Daily activities in people with schizophrenia: Relationships with cognition and community functioning

Ginette Aubin

School of Physical and Occupational Therapy

McGill University
Montreal, Quebec, Canada
April 30th, 2008

A thesis submitted to McGill University in partial fulfillment of the requirements of the degree of Doctor of Philosophy

Your file Votre référence
ISBN: 978-0-494-66598-5
Our file Notre référence
ISBN: 978-0-494-66598-5

DEDICATION

This thesis is dedicated to my late father, Conrad Aubin. Although he is no longer with me, my father always encouraged me to reach for the stars. I know he is with me in spirit during this milestone in my life. May his spirit rest in peace.

ACKNOWLEDGMENTS

The seven years of work leading up to this thesis were filled with endless support, unconditional encouragements and trust from my generous supervisor Isabelle Gélinas. I have learned a lot from her openness, from her ability to put facts into perspective, and benefited greatly from her extraordinary patience and dedication.

I am also grateful to Dr. Stip as my co-supervisor, for his openness to non-conventional approaches and for sharing his great research expertise with people with schizophrenia. The confidence he had in my ability to lead this project allowed me to go beyond my personal expectations

I would like to thank Constant Rainville as an advisor, for his rigorous scientific approach and for sharing his experience and knowledge.

It is with great fondness that I thank Christine Chapparo. This project originated in part from attending one of her conferences. Even on the other side of the world, in Australia, she has been extremely available and generous to answer my numerous questions. She has shared with me her enthusiasm for occupational therapy and has inspired me with her "thinking outside the box".

Ce travail n'aurait pas été possible sans l'aide de nombreuses personnes. Je tiens à remercier Chantal Cloutier qui a fait les évaluations à l'hôpital Louis-H. Lafontaine, Tania Pampoulova qui a été d'une disponibilité et d'une écoute rare et dont j'ai été honorée par sa participation aux évaluations cliniques et cognitives, Danick Jean-Vernet et Stéphane Rivard qui se sont généreusement prêtés à l'exercice de l'évaluation inter-juges, Jocelyne Thérien pour sa participation généreuse aux évaluations cliniques, Manon Cormier pour les nombreux échanges enrichissants, le personnel de l'hôpital St-Luc, Louise Godin pour son support au recrutement des participants, tous mes collègues de la clinique externe de psychiatrie de l'hôpital St-Luc pour leurs précieux encouragements, ceux du service d'ergothérapie de l'hôpital Louis-H. Lafontaine qui ont aussi participé au recrutement des particiants, Kathe Villeneuve pour son travail patient et précis, Gevorg Chillingaryan et Julie Lamoureux pour leurs précieux conseils dans le domaine des statistiques.

Je remercie toutes les personnes qui ont généreusement participé à cette étude et de qui j'ai énormément appris. Ces échanges ont toujours été extrêmenent gratifiants.

A toutes les personnes que j'ai croisées au Centre de recherche de l'hôpital Juif de Réadaptation, et qui m'ont accueillies comme l'une des leurs: Joyce Fung, Caroline Paquette, qui fut mon mentor, Vira Rose, Julianna Guy, Sophie DeSerres, Cynthia Thompson et tous les autres.

Je veux aussi témoigner de ma gratitude à Lise Labonté, Chef de Service en ergothérapie au CHUM pour sa confiance, à Sara Liebman pour l'enthousiaste révision de mes textes, ainsi qu'à Ovid Da Silva et à Hema Zbogar pour la révision des textes, et au personnel de la bibliothèque de l'hôpital Notre-Dame.

Merci à ma sœur Louise et son conjoint Pierre, de leur aide précieuse pour le travail minutieux de la revision des textes, et pour leur support.

Merci à Julien, mon fils et ma fierté, pour sa confiance en moi, pour sa patience, pour son énergie contagieuse, pour son inestimable coup de main. Merci à Louis, mon compagnon qui m'a patiemment et généreusement accompagné dans ce voyage plein de rebondissements, qui a été présent auprès de moi à toutes les étapes et qui a su d'adapter à cette folle vie de chercheur.

Ce projet a aussi été rendu possible grâce à une bourse de recherche du Fonds de Recherche en Santé du Québec (FRSQ).

TABLE OF CONTENT

DEDICATION ii
ACKNOWLEDGMENTS iii
TABLE OF CONTENT v
LIST OF TABLES x
LIST OF FIGURES xi
LIST OF ABBREVIATIONS xii
ABSTRACT xv
RÉSUMÉ xvii
PREFACE xix
Chapter 1 – Introduction 1
Chapter 2 – Review of the literature 5
2.1 General presentation of schizophrenia 5
2.1.1 Diagnosis 6
2.1.2 Subtypes 8
2.1.3 Etiology and risk factors for schizophrenia 10
2.1.4 Course and outcome of schizophrenia 12
2.1.5 Effective Treatment 13
2.2 Cognitive impairments as a core dimension of schizophrenia 15
2.2.1 The nature of cognitive impairment in schizophrenia 16
2.2.2 Perception and attention 18
2.2.3 Memory 19
2.2.4 Executive functions 21
2.2.5 Psychomotor slowing 23
2.2.6 Neurobiological and psychophysiological anomalies associated with cognition 23
2.2.7 Factors influencing cognition in schizophrenia 24
2.2.8 Treatment of cognitive impairments 26
2.2.9 Summary 28
2.3 Community functioning in persons with schizophrenia 28
2.3.1 Community functioning: origin, definitions and measurement 28
2.3.2 Influence of socio-demographic and clinical variables on community functioning 34
2.3.4 Empirical models of community functioning of people with schizophrenia and severe mental illness 38
2.4 Daily activities as priorities for treatment and intervention in people with schizophrenia 39
2.4.1 General characteristics of daily living activities 40

2.4.2 Daily activities and their cognitive component....43
2.4.3 Using a cognitive perspective in assessments of daily task performance....44
2.4.4 Daily activities of people with schizophrenia....49
2.5 Relationship between cognitive function and community functioning....54
2.5.1 Relationship of specific cognitive functions to community functioning....55
2.5.2 Impact of cognitive deficits on community functioning over time....64
2.6 Cognitive deficits and daily activities....65
2.6.1 Studies on cognitive deficits and daily activities using global performance-based assessments of daily activities performance....66

First Manuscript....68

2.6.2 Les activités quotidiennes et la cognition chez les personnes atteintes de schizophrénie....69
2.6.2.1 Résumé....70
2.6.2.2 Abstract....70
2.6.2.3 Introduction....71
2.6.2.4 L'impact des déficits cognitifs sur l'accomplissement des activités quotidiennes....71
2.6.2.5 Discussion....74
2.6.2.6 Conclusion....75
2.6.2.7 Références....76
2.6.3 Update of studies on daily activities and cognition....79
2.6.4 Daily activities and cognition over time....80
2.6.5 Summary....81

Second Manuscript....83

Chapter 3 Use of the Perceive, Recall, Plan and Perform System of Task Analysis with persons with schizophrenia: a preliminary study....84

3.1 Abstract....85
3.2 Introduction....86
3.3 Function and cognition in schizophrenia....86
3.4 A system of task analysis: the Perceive, Recall, Plan and Perform (PRPP) assessment....88
3.5 Methods....90
3.5.1 Part A....90
3.5.1.1 Participants....90
3.5.1.2 Instruments....91
3.5.1.3 Procedure....93
3.5.1.4 Data analysis....93
3.5.2 Part B....94
3.5.2.1 Participants....94
3.5.2.2 Instruments....95
3.5.3 Procedure....95
3.5.4 Data analysis....95
3.6 Results....95

3.6.1 Description of information processing difficulties during meal preparation tasks: Simple (Task One) versus complex (Task Two) 96
3.6.2 Relationship between community functioning and information processing capacity 97
3.6.3 Preliminary estimates of inter-rater reliability 97
3.7 Discussion 97
3.8 Limitations 100
3.9 Implication for practice 100
3.10 Conclusion 101
3.11 Acknowledgements 101
3.12 References 103

Third Manuscript 115

Chapter 4 Daily task performance from a cognitive perspective: Comparing people with schizophrenia and healthy controls 116
4.1 Abstract 117
4.2 Introduction 118
4.3 Methods 120
4.3.1 Participants 120
4.3.2 Measures 121
4.3.2.1 Cognitive assessment 121
4.3.2.2 Daily activity performance assessment 121
4.3.3 Procedure 122
4.3.4 Data analysis 123
4.4 Results 123
4.4.1 Participants 123
4.4.2 Groups differences in cognitive and functional variables 124
4.5 Discussion 125
4.6 Conclusion 127
4.7 References 129

Fourth Manuscript 138

Chapter 5 Daily functioning and information processing strategies in persons with schizophrenia 139
5.1 Abstract 140
5.2 Introduction 141
5.3 Methods 142
5.3.1 Participants 142
5.3.2 Measures 143
5.3.2.1 Clinical assessment 143
5.3.2.2 Cognitive functioning assessments 143
5.3.2.3 Community functioning assessments 143
5.3.2.4 Daily activities performance assessment 143
5.3.3 Procedure 144
5.3.4 Data analysis 145
5.4 Results 145
5.4.1 Participants 145

5.4.2 Functional limitations in the group of participants....146
5.4.3 Exploration of subgroups with similar profiles of functional limitations....146
5.5 Discussion....147
5.6 Conclusion....150
5.7 Acknowledgments....150
5.8 References....151

Fifth Manuscript....159

Chapter 6 Daily activities, cognition and community functioning in persons with schizophrenia....160
6.1 Abstract....161
6.2 Introduction....162
6.3 Methods....164
6.3.1 Participants....164
6.3.2 Assessments....164
6.3.2.1 Clinical assessments....164
6.3.2.2 Cognitive assessments....165
6.3.2.3 Community functioning assessments....165
6.3.2.4 Daily task performance assessment....165
6.3.3 Procedure....166
6.3.4 Data analysis....167
6.4 Results....167
6.4.1 Participants....167
6.4.2 Correlations between daily task performance, cognition, community functioning and symptoms....168
6.5 Discussion....168
6.6 Conclusion....171
6.7 References....173

Chapter 7 Use of multidimensional analysis for exploration of subgroups of participants and relationships between functional, cognitive and clinical variables....180
7.1 Methods....181
7.1.1 Participants....181
7.1.2 Measurement....181
7.1.3 Data analysis....182
7.2 Results....185
7.2.1 Exploratory factorial analysis with PRPP System descriptors....185
7.2.2 CATPCA with PRPP factors: Exploration of subgroups....188
7.2.3 CATPCA with functional, cognitive, clinical, and sociodemographic variables....190
7.3 Discussion....195
7.3.1 Exploration of subgroups of participants with similar functional profiles....195
7.3.2 Patterns of relationships between variables....195

Chapter 8 – Discussion and Conclusion....198

8.1 Functional limitations during daily task performance 200
8.2 Subgroups of participants with similar functional profiles 200
8.3 Daily task performance and cognition 201
8.4 Daily task performance and community functioning 202
8.5 Implications for occupational therapy practice 203
8.6 Limitations 205
8.7 Future directions 206
8.8 A model of relationships among information processing strategies 207

References 212

APPENDIX 1 Ethics committees approval 247

APPENDIX 2 Consent Forms 256

APPENDIX 3 Studies on cognition and community functioning 301

APPENDIX 4 Studies on cognition and daily activities 310

APPENDIX 5 Measurement tools 321

APPENDIX 6 Characteristics of Participants 333

APPENDIX 7 Comparison of the matched sub-group with the remaining group of participants 337

APPENDIX 8 PRPP System interpretation grid 343

LIST OF TABLES

Table 3.1 Socio-demographic data of participants in Part 1 and Part 2 of the study 109
Table 3. 2 PRPP quadrant and subquadrant mean and standard deviation scores: Task 1 and Task 2 110
Table 3.3 *ICC*s for PRPP quadrants scores and total score 111
Table 4.1 Perceive, Recall, Plan and Perform System of Task Analysis quadrants, subquadrants and descriptors in Stage 2 132
Table 4.2 Sociodemographic characteristics for the schizophrenia and control groups 133
Table 4.3 Cognitive characteristics of the paired groups 134
Table 4.4 Stage 1 of PRPP System type of errors during each dish preparation 135
Table 4.5 Schizophrenia and control group results on functional variables 136
Table 4.6 Descriptors with a significant difference in scores between schizophrenia and control groups 137
Table 5.1 PRPP items with mean item score lower than 2 (range 1- 3) 156
Table 5.2 Comparison of high efficiency vs low efficiency groups on functional, clinical, and cognitive variables 157
Table 6.1 Clinical characteristics for schizophrenia participants (n=82) 178
Table 6.2 Correlations between performance on PRPP System of Task Analysis and performance on cognitive tests (n=82) 179
Table 7.1 Five factor model of PRPP System descriptors 187

LIST OF FIGURES

Figure 3.1 The Perceive, Recall, Plan and Perform System of Task Analysis (Chapparo & Ranka, 2005) 112
Figure 3.2 Information Processing Model (adapted from Lerner, 1997) 113
Figure 3.3 Participants' PRPP total scores for Task 1 and Task 2 114
Figure 7.1 Categorical principal component analysis of PRPP System factors 189
Figure 7.2 Graphical representation of the relationships between cognitive, functional, and clinical variables using Categorical Principal Component Analysis (n = 81) 193
Figure 8.1 A model of interactions of processing strategies in task performance 209

LIST OF ABBREVIATIONS

ADL	Activities of daily living
AMPS	Assessment of motor and process skills
ANCOVA	Analysis of covariance
ANOVA	Analysis of variance (univariate)
AOTA	American Occupational Therapists Association
APA	American Psychiatric Association
CANTAB	Cambridge Neuropsychological Test Automated Battery
CAOT	Canadian Association of Occupational Therapists
CATIE	Clinical Antipsychotic Trials of Intervention Effectiveness
CATPCA	Categorical principal component analysis
CHUM	Centre Hospitalier de l'Université de Montréal
CPA	Canadian Psychiatric Association
CPT	Continuous Performance Test
CUtLASS 1	Cost Utility of the Latest Antipsychotic Drugs in Schizophrenia Study
DALY	Disability adjusted life year

DSM-IV-TR	Diagnostic and statistical manual of mental disorders 4^{th} edition text revised
ESRS	Extra-pyramidal symptoms rating scale
GAF	Global Assessment of Functioning Scale
IADL	Instrumental activities of daily living
ICD	International classification of diseases
ICF	International classification of impairment, disability and functioning
ILS	Independent Living Scales
ILS-PB	Independent Living Scales problem-solving factor
ILSS	Independent Living Skills Survey
IPT	Integrated Psychological Treatment
MATRICS	Measurement and Treatment Research to Improve Cognition in Schizophrenia initiative
MCAS	Multnomah Community Ability Scale
MOT	Motor Screening test
MSET	Modified Six Element Test
PAL	Paired Associates Learning visuospatial memory test
PANSS	Positive and Negative Syndrome Scale

ABSTRACT

While most people with schizophrenia face the functional consequences of a lifelong disorder, very few studies have investigated the specific domain of daily living activities performance. The purpose of this thesis was to examine the relationships between daily activity performance, cognitive deficits, and community functioning in people with schizophrenia. More specifically, the objectives were: 1) to describe functional limitations during daily task performance, 2) to explore the existence of subgroups of participants with similar functional limitations profiles, 3) to explore the relationships between daily task performance and cognitive functions as well as 4) with community functioning. This thesis tested the hypothesis that limitations in task performance negatively influence community functioning.

A sample of 82 individuals with schizophrenia and 28 healthy controls participated in this study and were assessed during a meal preparation task with the Perceive, Recall, Plan and Perform (PRPP) System of Task Analysis and on cognitive tests of visuospatial memory, spatial working memory, visuomotor coordination, planning and selective attention. Community functioning was assessed with the Independent Living Skills Survey and the Multnomah Community Ability Scale. Limitations in the Perceive, Recall and Plan quadrants of the PRPP System, were found in participants with schizophrenia when compared to a control group (n = 28), as well as in the complete sample (n = 82). Participants in the high-efficiency subgroup (n = 36) were more independent in daily living and performed better on the visuospatial associative learning task than the low-efficiency subgroup (n = 46). At the specific level of individual profiles, participants were distributed along a continuum of low- to high-functioning on the PRPP System factors and on functional, cognitive, and clinical characteristics.

The associative learning task was most associated with task performance, along with working memory and planning. Finally, less efficient planning skills were associated with a lower level of community functioning, confirming the hypothesis. These results emphasize the relationship of associative visual

memory to daily task performance, as well as that of efficiency in daily activities for residential status. Integrating these findings into the rehabilitation process will contribute to better meeting the needs of people with schizophrenia.

RÉSUMÉ

Peu d'études ont exploré le domaine des activités quotidiennes chez les personnes atteintes de schizophrénie. L'objectif principal de cette thèse était d'examiner les liens entre la performance des activités quotidiennes, les déficits cognitifs et le fonctionnement dans la communauté. Les objectifs spécifiques étaient : 1) décrire les limitations fonctionnelles pendant l'exécution d'une tâche quotidienne ; 2) explorer la présence de sous-groupes ayant des profils fonctionnels semblables; 3) explorer l'association entre l'exécution d'une tâche quotidienne et les fonctions cognitives; 4) ainsi qu'avec le fonctionnement dans la communauté.

Quatre-vingt-deux participants atteints de schizophrénie et vingt-huit autres sans diagnostic ont participé à cette étude et ont été évalués pendant la préparation d'un repas à l'aide du système d'analyse de tâche *Perceive, Recall, Plan and Perform (PRPP)*, ainsi qu'avec des tests visuospatiaux de mémoire et de mémoire de travail, et des tests de planification, de coordination visuo-motrice, et d'attention sélective. Le fonctionnement dans la communauté a été évalué à l'aide des questionnaires *Multnomah Community Ability Scale* et *Independent Living Skills Survey*.

Des limitations fonctionnelles ont été observées dans les quadrants Perceive, Recall et Plan de l'évaluation PRPP à la suite de la comparaison d'un sous-groupe avec le groupe contrôle et selon les scores les plus bas obtenus par le groupe complet. Parmi ces participants, ceux appartenant au groupe « le plus efficient » étaient plus indépendants et avait une meilleure mémoire visuelle associative que ceux du groupe « moins efficient ». Au niveau des profils individuels de réponse aux facteurs PRPP et à un ensemble de variables fonctionnelles, cognitives et cliniques, les participants étaient répartis selon un continuum de « fonctionnement » pauvre à élevé.

Le test de mémoire associative était le plus fortement associé à l'exécution de la tâche quotidienne, avec les tests de mémoire de travail visuo-spatiale et de planification. Plus les habiletés du quadrant Plan de l'évaluation PRPP étaient affectées, plus le fonctionnement dans la communauté était faible,

confirmant ainsi l'hypothèse. Ces résultats démontrent l'importance de l'association entre la mémoire visuelle associative pour l'exécution des activités quotidiennes, celle de la compétence dans les activités quotidiennes pour l'autonomie résidentielle et de l'intégration de ces nouvelles informations dans les interventions de réadaptation.

PREFACE

I Statement of originality

This thesis contains no materials written or published by another person, except where referenced. This thesis represents an original contribution to the advancement of the knowledge on schizophrenia and function.

This study is the first one to explore the functional limitations during a daily activity in a large sample of participants, and more specifically with a large number of people with schizophrenia, using a performance-based assessment and criterion-referenced task analysis based on an information processing model, namely the PRPP System of Task Analysis. This involved many preliminary steps, including the development of a task analysis grid and the assessment of interrater reliability when assessing the performance in a daily multi-task in persons with schizophrenia, which had never been done to our knowledge.

This study innovated by using a multidimensional and multivariate statistical analysis, the Categorical Principal Component Analysis (CATPCA), to graphically represent both the participants in this study and the patterns of relationships between variables pertaining to community functioning, cognitive functioning and performance in a daily activity. Another original aspect of this study is the exploration of subgroups of participants with similar functional profiles based on their performance on the daily activity using two different methods, namely a cut-off score on the PRPP System scores and a CATPCA. A factorial analysis was also conducted with the PRPP items as a preliminary step for the CATPCA, and this was also an original contribution.

This study is also the first to compare the performance of persons with schizophrenia in a daily multi-task to that of a control group using the PRPP System of Task Analysis. It is the first study, to our knowledge, to demonstrate the existing relationships of the performance in a daily activity with community functioning, taking into account three perspectives: the participants', the health professionals' and the objective level of residential independence. The results from this work provide fundamental knowledge on the problematic use of processing strategies in daily task performance by persons with schizophrenia.

II Contributions of Authors

Ginette Aubin was the primary investigator in charge of all the work and the research that is presented in this thesis including the literature review, the design of the studies, the recruitment of participants, the data collection, the analysis and interpretation of results. She was also in charge of presenting the research protocol to the ethics committee of the hospitals were the studies took place, of writing the grant proposals and the research papers. She also conducted the training of the raters who collaborated in this study and who used the Perceive, Recall, Plan and Perform System of Task Analysis.

All of this work was done under the guidance of Isabelle Gélinas, Ph.D., Emmanuel Stip, M.D., Constant Rainville, Ph.D. and Christine Chapparo, Ph.D. They offered practical suggestions and advice on the research methodology, design of the studies, data analysis, and interpretation. They are co-authors on all the papers and participated in editing and critically reviewing the manuscripts. Julie Lamoureux, D.M.D, M.Sc., also coauthored the manuscript in chapter 4 and contributed in determination of statistical tests used and revision of results. The data collection, computer material and a part of the data analysis was supported by a grant obtained by Dr. Emanuel Stip, Isabelle Gélinas and Ginette Aubin from the Fonds de la recherche en santé du Québec (FRSQ).The research was also supported by a research grant obtained by Ginette Aubin, Isabelle Gélinas, Dr. Émmanuel Stip and Christine Chapparo from the Canadian Occupational Therapy Foundation.

Five manuscripts are presented in this thesis. The first manuscript was published before the submission of this thesis, and is presented in its published version. The four other manuscripts are presented in their original version in this thesis. Three manuscripts have been accepted for publication or published after the submission of this thesis and one manuscript will be resubmitted. The following are the updated reference for the manuscripts:

1. Aubin, G., Gélinas, I., Stip, E., Chapparo, C., & Rainville, C. (2007). Les activités quotidiennes et la cognition chez les personnes atteintes de schizophrénie. *Santé mentale au Québec, 32*, 201-208.
2. Aubin, G., Chapparo, C., Gélinas, I., Stip, E., & Rainville, C. (2008). Use of the Perceive, Recall, Plan and Perform System of Task Analysis for persons with schizophrenia: A preliminary study. *Australian Occupational Therapy Journal, doi: 10.1111/j.1440-1630.2007.00725.*
3. Aubin, G., Gélinas, I., Stip, E., Rainville, C., Chapparo, C. & Lamoureux, J. (*2008*). Daily task performance and processing strategies: comparing persons with schizophrenia to controls. Manuscript submitted for publication to *American Journal of Occupational Therapy.*
4. Aubin, G., Gélinas, I., Stip, E., Chapparo, C., & Rainville, C. (2009). Daily functioning and information processing strategies in persons with schizophrenia. *Psychiatric Services, 60, XX-XX.*
5. Aubin G, Stip E, Gélinas I, Chapparo, C. & Rainville, C. (2009). Daily activities, cognition and community functioning in persons with schizophrenia. *Schizophrenia Research*, 107, 313-318.

Chapter 1 – Introduction

Schizophrenia is a severe mental illness that affects nearly 1% of the world population (American Psychiatric Association, [APA], 2000). Usually appearing in early adulthood, this mental disorder has an extremely complex and heterogeneous etiology (Lalonde, 1999; Roy, Mérette, & Maziade, 2001). The diagnostic criteria for schizophrenia as described in the *Diagnostic and Statistical Manual of Mental Disorders* ([DSM-IV-TR], APA) include positive and negative symptoms and poor social functioning. Cognitive impairments are also present in varying degrees (Heinrichs & Zakzanis, 1998) and are considered a central feature in schizophrenia; therefore, they are sometimes presented as a third category of symptoms (Mueser & McGurk, 2004).

1.1 Rationale

Most people with schizophrenia face the functional consequences of a lifelong disorder that affects multiple areas of life. Among these areas, activities of daily living are a key factor for community functioning (Alexandersson, 2000; Green, 1993). Numerous studies have identified cognitive deficits as affecting perception and attention, memory, and executive function in people with schizophrenia (Aleman, Hijman, de Haan, & Kahn, 1999; Braff, 1993; Hoff & Kremen, 2003; Velligan & Bow-Thomas, 1999). Considering the fact that many people with schizophrenia have difficulty performing various cognitive tasks, it is not surprising that their ability to perform daily tasks that involve staying focused, solving problems, modifying strategies, and remembering instructions is impaired (Tamminga, Buchanan, & Gold, 1998). Only a few studies have explored the performance of specific daily activities among people with schizophrenia. Unfortunately, in these studies, problematic behaviours and strategies observed during task performance that result from defective cognitive abilities have not been properly examined and described. These studies have not relied on the use of performance-based assessments that are skill-oriented, and which are recommended assessments to better evaluate the quality of the task performance in behavioural and measurable terms (MacDonald-Wilson, Nemec, Anthony, & Cohen, 2002). To this end, various authors have suggested that identifying functional limitations that have a significant effect on task performance and increasing knowledge of the variability of functional limitations would be helpful in better orienting goals and treatment interventions for people with schizophrenia (Girard, Fisher, Short, & Duran, 1999).

Although the relationship between cognition and community functioning among people with schizophrenia has been investigated (Green, 1996), little is known about the extent to which specific cognitive deficits affect daily activity performance and related functional skills. While one of the major rehabilitation interventions is to restore and develop functional skills necessary for daily living and to sustain valued roles (Anthony & Nemec, 1984), these interventions should be guided by the knowledge of underlying deficits (Bellack, Gold, & Buchanan, 1999). To this end, it is essential to better understand the interaction between impaired cognitive abilities and daily task performance.

The performance of activities such as instrumental activities of daily living is key to the residential independence and community functioning of people with schizophrenia. A small number of studies have examined the relationship between functional capacity, that is, the actual capacity to perform daily activities, and the broader domain of community functioning. Surprisingly, these studies have reported mixed results. Moreover, the extent to which discrete functional skills are related to the community functioning has not been well investigated.

1.2 Objectives

The purpose of this thesis is to examine the links between daily activity performance, cognitive deficits, and community functioning in people with schizophrenia. The *first objective* of this thesis is to describe functional limitations resulting from cognitive deficits during the performance of daily tasks among people with schizophrenia. The *second objective* of this thesis is to explore the presence of sub-groups of participants with similar profiles in terms of functional limitations observed during the performance of a daily activity.

The *third objective* of this thesis is to investigate the relationship between the performance of daily activities and specific cognitive functions, namely, attention, memory, and executive functions. The *fourth objective* of this thesis is to examine the relationship between functional limitations observed during the performance of a daily activity and community functioning among people with schizophrenia. This thesis tested the hypothesis that functional limitations observed during the performance of a daily activity will have a negative influence on community functioning among people with schizophrenia.

Community functioning is complex and multifactorial and limitations in the definition and assessment of community functioning have been identified in a number of studies (Dickerson, 1997; Green, 1996). Based on the literature review presented in this thesis, community functioning is determined by the mastery of tasks and behaviours that a person needs to perform in different life domains to sustain social roles in the environment where he/she lives.

This thesis investigated daily task performance in people with schizophrenia using the Perceive, Recall, Plan and Perform (PRPP) System of Task Analysis (Chapparo & Ranka, 1997b) to expand knowledge of the problematic behaviours and strategies affecting daily task performance and community functioning. The PRPP is a skill-oriented, criterion-referenced performance-based assessment with a cognitive perspective that uses both procedural and process task analysis. At the outset of preparing this thesis, no studies were known to extensively report on the use of the PRPP with people with schizophrenia. One preliminary study was conducted as part of this thesis. It explored the use of the PRPP system in assessing performance of different daily tasks among people with schizophrenia and provided preliminary estimates of interrater reliability.

Chapter 1 of this thesis reviews the literature on issues pertaining to the nature of schizophrenia, cognitive functioning, community functioning, and daily activities in people with schizophrenia. It also reviews studies of the relationship between cognitive deficits, community functioning, and daily activities. A review of studies of cognitive deficits and daily activities is presented as a first manuscript that was published in the journal *Santé mentale au Québec* (Aubin, Gélinas, Stip, Chapparo, & Rainville, 2007). The following chapters are four manuscripts that have been accepted or submitted for publication. Chapter 3 presents the results of the preliminary study mentioned earlier. The three other manuscripts present and discuss the results of the main study. Chapters 4 and 5 present the results of the main study, corresponding to the first and second objectives of this thesis. In Chapter 4, the daily task performance of a group of participants with schizophrenia is compared to that of a control group. Chapter 5 further explores the functional skills that are the most impaired in daily task performance and examines the characteristics of high- and low-efficiency subgroups. Chapter 6 presents the results corresponding to the third and fourth objectives and to the hypothesis concerning the relationships between daily activities performance, cognitive functions, and community functioning. Chapter 7 presents and discusses results from the multidimensional analyses that were conducted to further explore the presence of subgroups with similar functional profiles and the patterns of relationships between cognition, community functioning, and daily activity performance. Finally, Chapter 8 summarizes results from this study and discusses study limitations, implication for practice and future directions.

2.1.1 Diagnosis

The diagnosis of schizophrenia is made following behavioural observation and an interview with the person, along with information provided by family and friends. The diagnostic criteria of schizophrenia in the DSM IV-TR (APA, 2000) include symptoms such as hallucinations and delusions, disorganized speech and behaviour, and negative symptoms such as a blunted affect, alogia, and avolition. Poor social functioning in domains such as work, self-care, and interpersonal relationships is another criterion. At least two of the symptoms must be present for at least one month, and some signs of this disorder must be noticeable for at least six months. The diagnosis of schizophrenia is established when the abovementioned symptoms are present and other disorders have been ruled out. Because of the duration criteria, the diagnosis is usually based on information retrieved over a period of time. In the *International Classification of Diseases* ([ICD-10], WHO, 1992), diagnostic criteria are generally similar to those of the DSM-IV-TR, except for a shorter duration of illness and the fact that a decrease in social and occupational functioning is not required.

Schizophrenic symptoms are categorized into positive symptoms and negative symptoms (Strauss, Carpenter, & Bartko, 1974). Positive symptoms are psychotic symptoms and reflect an impaired capacity for reality testing, which interferes with the person's daily functioning (APA, 2000). These symptoms are called positive because they are an exaggeration or distortion of normal functions (Strauss et al.). Among the disturbances affecting sensory perception, auditory hallucinations are more frequent, characterized by the experience of "hearing voices" (APA). Other senses may be affected as well, resulting in visual, olfactory, tactile, and taste hallucinations. Delusions are described as erroneous beliefs centred on various themes, including persecution, religion, reference, and grandeur (APA; Aleman, et al., 1999). The content of these delusions becomes the main interest of the person and occupies all of his or her thinking, whether it is frightening or not (Knight, 2000). Speech and thoughts may be disorganized, resulting in poor attention, loose associations, tangential thoughts, neologisms, and incoherence (APA). Psychomotor disturbance may be present in the form of immobility, agitation, and bizarre movements (APA). It has been suggested that delusions and hallucinations are associated with a different neurological mechanism than are disorganized speech and thought (Liddle, 1987a). Obviously, these symptoms affect communication and interaction with others, making the person difficult to understand and relate to, with the person eventually becoming lost in his or her own world.

The second type of symptoms is called negative symptoms, which reflect a loss or restriction of function (Strauss et al., 1974). Negative symptoms include restrictions of affect, language, and motivation, also known as flattened affect, alogia, and avolition (Carpenter, Heinrichs, & Wagman, 1988). Poverty of thought, anhedonia, and apathy are also negative symptoms that indicate a decline in functioning. Negative symptoms tend to be more stable over time than positive symptoms (Carpenter et al.). Carpenter et al. have suggested that negative symptoms may be distinguished according to whether they are enduring primary symptoms of schizophrenia present during and between psychotic episodes, or whether they are secondary negative symptoms resulting from factors such as drug effects, dysphoric mood, or self-protection from psychotic decompensation. Lack of motivation and interest associated with negative symptoms may greatly interfere with daily living and role taking.

Cognitive impairments were recognized as being associated with schizophrenia more than a century ago by psychiatrist Emile Kraepelin (d'Amato, 2003). Although they are not explicitly included as such in the diagnosis criteria, cognitive deficits are a central feature in schizophrenia and are sometimes presented as a third category of symptoms (Mueser & McGurk, 2004). There is evidence that these deficits have an impact on community functioning and predict functional outcome in people with schizophrenia (Green, 1996; Green, Kern, Braff, & Mintz, 2000). These deficits translate into difficulties with such things as planning daily activities, learning in school, remembering, and ordering steps in a daily or work task. Although cognitive impairments characterize the people who are chronically and severely ill, evidence suggests that these impairments are present in most people with schizophrenia. Deficits are evidenced across a variety of neuropsychological measures, such as tests of attention, memory, and executive function. These deficits appear like a diffuse global impairment, possibly caused by specific anatomical abnormalities (Tamminga, Buchanan, & Gold, 1998). Deficits in cognition are present at the first episode and often at the prodromal phase of the disorder. Cognitive impairments are generally considered to be independent of symptoms, but negative symptoms seem to show a stronger relationship to cognition (Gold, 2004).

Schizophrenia is known to be quite heterogeneous across and within people (APA, 2004). In the DSM-IV-TR (APA, 2000), subtypes of schizophrenia are categorized relative to the predominance of symptoms, although these may change over time.

2.1.2 Subtypes

There are five subtypes of schizophrenia in the DSM-IV-TR (APA, 2000). The paranoid type is preoccupied with delusions and hallucinations. The disorganized type has disorganized behaviour and speech and an inappropriate affect. In the catatonic type, motor symptoms such as immobility, excessive activity, or strange movements or positions are present. The undifferentiated type is applied when no other subtype can be identified. The residual type is characterized by the presence of attenuated negative and positive symptoms. Limitations of this classification are that symptoms may vary with time and that they may be common to more than one subtype (APA). Alternative classifications have been developed based on the predominance of positive and negative symptoms, and on a three-dimensional grouping of symptoms.

Crow (1980) suggested that there were two observable syndromes in schizophrenia. Type I syndrome would be present when positive symptoms are predominant, and Type II syndrome, when negative symptoms are more common. Neither syndrome is “exclusive,” so that both may be present at some point in time. Crow also suggested that both syndromes may have distinct psychopathological processes: Type I syndrome would be associated with

Chapter 2 – Review of the literature

2.1 General presentation of schizophrenia

Schizophrenia is a severe and complex mental illness. It is a chronic condition in approximately two-thirds of people with the diagnosis (Harvey & Davidson, 2002). Schizophrenia is among the most disabling mental disorders, affecting multiple areas of life. It often affects the ability to work, study, perform tasks of daily living, and develop and maintain a social life.

It is generally agreed that schizophrenia affects around 1% of the world population (APA, 2000). Incidence seems to vary according to gender, with the disorder being more common among men than women (McGrath, 2005). In Canada, about 200,000 people were treated for schizophrenia in 2004 (Goeree et al., 2005).

Because of the costs associated with treatment, schizophrenia is considered to be the most expensive psychiatric illness (Sharma & Antonova, 2003). In Canada, 8% of hospital beds are occupied by people with schizophrenia. Costs associated with treatment, services, and lost productivity were estimated to be more than $6 billion in 2004. Loss of productivity accounts for most of this cost of schizophrenia (Goeree et al., 2005). The World Health Organization (WHO, 2001a) estimates that schizophrenia is the eighth leading cause of "disability adjusted life years (DALYs)" for people between age 15 and 44. DALYs are the sum of the years of life lost due to a death or disability. However, the "unmeasurable" costs – distress, poor quality of life, and family burden may be the heaviest of all (Knapp, Mangalore, & Simon, 2004).

In this section, the complex nature of schizophrenia is presented. First, the diagnostic criteria and subtypes will be described. To further elucidate the complexity of this illness and its impact on daily living, a summary of the abundant literature concerning etiology, course, outcome and effective treatment follows.

changes in dopaminergic transmission, and Type II syndrome would be associated with structural changes in the brain. Type II syndrome, in which negative symptoms predominate, has a poorer prognosis and has been associated with intellectual impairment. Crow argues that negative symptoms are less reversible than positive symptoms.

However, for many researchers and clinicians, this dichotomy is not sufficient to adequately describe the different symptom constellations. In order to explore this diversity and propose a new classification, Liddle (1987b) performed a factorial analysis based on the symptom assessment of 40 participants with persistent symptoms. Three dimensions were obtained, corresponding to the following syndromes: reality distortion, including symptoms of hallucinations and delusion; disorganization, including thought disorder and inappropriate affect; and psychomotor poverty, including mainly negative symptoms. The same syndromes were associated with particular cerebral functioning disturbances (Liddle, 1987a) and to decreased blood flow in regions of the brain specific to each syndrome (Liddle, 2000; Semkovska, Bédard, & Stip, 2001), thus demonstrating that they could be biologically supported. This dimensional classification has now been added in the description of schizophrenia's traditional subtypes in the DSM-IV-TR as an alternative classification (APA, 2000).

Another psychotic disorder, schizoaffective disorder, is generally included in studies of schizophrenia. Schizoaffective disorder is a distinct disorder according to the DSM-IV-TR (APA, 2000). However, it is known to include a combination of symptoms of both schizophrenia and affective disorder (Levinson, Umapathy, & Musthaq, 1999). The same criteria for acute symptoms of schizophrenia, including one-month duration, are applicable. A specific inclusion criterion for schizoaffective disorder is the presence of a co-occurring mood syndrome. Psychotic symptoms should also be present during the acute phase of the disorder for at least two weeks, without the presence of acute mood symptoms (APA). Although the prognosis is generally better than for schizophrenia, social and occupational functioning are often disturbed (Tsuang &

Coryell, 1993). However, when compared to people with major depression, the outcome for those with schizoaffective disorder is closer to that for people with schizophrenia (Tsuang & Coryell). Evans et al. (1999) found that, compared to people with a non-psychotic mood disorder, people with schizophrenia or schizoaffective disorder had been hospitalized more often and had more severely impaired neuropsychological performance. Stip et al. (2005) found that people with schizoaffective disorder performed better over time than people with schizophrenia on a visuo-spatial motor screening test and a visuo-spatial memory test, but were similar on reaction time and planning abilities. However, more studies with larger sample sizes are needed to clarify whether schizoaffective disorder is a variation of schizophrenia or a distinct disorder.

2.1.3 Etiology and risk factors for schizophrenia

As discussed earlier, the constellation of symptoms and outcomes in schizophrenia varies from person to person, as if there were many diseases in one (Roy, Mérette, & Maziade, 2001). Indeed, schizophrenia has an extremely complex and heterogeneous etiology (Lalonde, 1999; Roy et al.). Findings related to genetic, environmental, and neurobiological factors in the disorder lend substantial support to the hypothesis that schizophrenia involves abnormal neurodevelopment (Arnold & Rioux, 2001; Censits, Ragland, Gur, & Gur, 1997).

It is well recognized that the most important risk factor for schizophrenia is the familial/genetic factor (d'Amato, 2003; McDonald & Murray, 2000). Researchers have found that the risk for schizophrenia is up to 10 times higher among first-degree relatives of people with schizophrenia than among the general population (d'Amato & Saoud, 1996), making schizophrenia known as a familial condition with a genetic basis (Lichtermann, Karbe, & Maier, 2000). The development of schizophrenia depends on a large number of genes, with each gene varying in its degree of impact on the development of the disorder (d'Amato). It is when the gene effects are combined with a number of other risk factors that the disorder becomes clinically identifiable (d'Amato).

Interacting with genetic factors in schizophrenia are environmental risk factors that have been identified through numerous studies as playing a role in the development of schizophrenia (d'Amato & Saoud, 1996; McDonald & Murray, 2000). Reviews of studies on risk factors report that obstetric complications and perinatal events such as intrauterine growth retardation, prematurity and perinatal brain damage, as well as prenatal malnutrition and late winter births, have been found to increase the risk for schizophrenia (d'Amato & Saoud; McDonald & Murray). Although the underlying mechanisms are not clear, being born in a city increases the risk for a diagnosis of schizophrenia compared to being born in rural areas, and other risk factors include having an immigrant status, abusing cannabis, and experiencing adverse life events (McDonald & Murray).

Neurobiological abnormalities are generalized features in schizophrenia (Crow, 1980; Semkovska et al., 2001; Weinberger, Aloia, Goldberg, & Berman, 1994). These include enlargement of ventricules (Vita, Dieci, Silenzi, Tenconi, Giobbio & Invernizzi, 2000); reduced volume of the hippocampal region; abnormalities in blood flow in the frontal, thalamus, and cerebellum regions; abnormalities in neural activity in the frontal region; and diminished dopamine activity.

The diathesis-stress model of schizophrenia explains psychotic episodes and the evolution of the disorder through the interaction of biological, psychosocial, and environmental factors (Lalonde, 1999; Nuechterlein & Dawson, 1984; Zubin & Spring, 1977). This model postulates that when neurobiological vulnerability is established, the onset and course of the illness are influenced negatively by social and environmental stimuli, including life events and substance abuse (Lalonde). The model also includes protective factors, such as stable social support, coping skills training, antipsychotic medication (Lalonde; Leclerc, Lesage, & Ricard, 1997), and meaningful activities (Mueser & McGurk, 2004). These protective factors may help to reduce the impact of stress and may have a positive effect on the course of the disorder (Lalonde).

2.1.4 Course and outcome of schizophrenia

The onset of schizophrenia disorder is usually gradual and insidious. Subtle premorbid abnormalities in motor, cognitive, affective, and social areas, although they vary from one person to another, are often present before the first diagnosis of psychosis is established (Harvey & Davidson, 2002). These changes are exacerbated in the prodromal phase, which precedes the onset of psychosis. The illness has an earlier onset for men, typically occurring between the ages of 18 and 25, compared to ages 24 to 35 for women (Lalonde, 1999). This early onset leaves little time for the development of an adult's identity and may have important consequences on one's personal and occupational life. In fact, most of the social consequences appear at the prodromal phase of the illness, before the start of treatment (Häfner & An Der Heiden, 1999; Harvey & Davidson).

Symptoms appear in their acute phase during the first episode of the illness. After this episode, most people recover from the psychotic symptoms (Harvey & Davidson, 2002). However, in a study comparing symptomatic and functional outcome after the first hospitalization, recovery from a first episode in people with schizophrenia did not reach the same level as it did among people with affective disorders (Tohen et al., 2000). In the first two years after onset of the illness, functional and cognitive deficits are still present and relapse is frequent (APA, 2004; Harvey & Davidson).

In the long term, schizophrenia follows a heterogeneous course (Davidson & McGlashan, 1997; Sharma & Antonova, 2003). A few years after the first psychotic episode, psychotic symptoms generally stabilize, as do cognition and functional status (Häfner & An Der Heiden, 1999; Harvey & Davidson, 2002). A small number of people will never experience a psychotic episode again, but the majority will experience repeated episodes, where remission alternates with acute symptomatic phases. A small proportion will live with chronic and severe psychotic symptoms (APA, 2004).

In addition to these symptoms, people with schizophrenia have a mortality rate that is two to four times higher than among the general population. The suicide rate ranges between 4% and 10% and is higher in young men from industrialized countries (APA, 2004). People with schizophrenia are also at higher risk for substance abuse, infectious disease, and homelessness (APA; Mueser & McGurk, 2004).

Due to their various difficulties, people with schizophrenia rarely attain financial independence. Malla et al. (2006) found that of their 448 study participants from across Canada, 81% earned less than the low-income cut-off. Only 14% of participants had full-time work, 20% worked part-time, and 62% were unemployed. Over 70% were single, reflecting difficulty in establishing stable and intimate relationships. Among people with schizophrenia who are employed, many work in sheltered and non-competitive organizations; few attain residential independence (Harvey & Davidson, 2002).

2.1.5 Effective Treatment

A major development over the last few decades that has influenced the course of schizophrenia is changing health policy. Deinstitutionalization in the 1960s and shortened hospital stays have been accompanied by the establishment of community-based psychiatric services (Tessier & Clément, 1992).

A second key development is the evolution of pharmacological treatments, which has had a major impact on symptom reduction. Pharmacology remains the primary form of treatment for psychotic symptoms (APA, 2000). During the last two decades, the second-generation or atypical antipsychotic drugs seemed promising in their ability to reduce symptoms and side effects such as extra-pyramidal symptoms and movement disorders (Dossenbach et al., 2004). Atypical antipsychotics differ from first-generation or conventional antipsychotics in their lower affinity for specific dopamine receptors and in their greater affinity with other specific receptors for serotonin and norepinephrine (Lieberman et al., 2005). The Cost Utility of the Latest Antipsychotic Drugs in Schizophrenia Study (CUtLASS 1) explored whether quality of life in 227 randomized participants with schizophrenia would improve with second-generation antipsychotics over one year compared with first-generation antipsychotics (Jones et al., 2006). The study found that when medication was changed for medical reasons, there was no disadvantage in using first-generation antipsychotics compared to second-generation antipsychotics in terms of ratings of quality of life and symptoms, as well as associated costs (Jones et al.).

Another recent major study, the Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE), compared the efficacy of a first-generation antipsychotic to four newer second-generation antipsychotics in a "real world" study conducted in regular clinical settings with 1,493 individuals with schizophrenia (Lieberman et al., 2005). Results showed that the majority of participants in each group discontinued pharmacological treatment because of inefficacy or intolerable side effects (Lieberman et al.). Despite discontinuation of treatment, one of the newer medications, olanzapine, was found to be more effective, leading to a greater reduction in psychopathology and lower rates of discontinuation. However, olanzapine was also found to be associated with greater weight gain and increased metabolic effects such as diabetes, which may have serious medical implications. The difference in efficacy between olanzapine and the conventional drug was moderate, and there were no differences between the three other second-generation medications and the conventional antipsychotic. For a cohort of 455 participants, when all treatment groups were compared on psychosocial functioning, modest improvements were observed in all groups (Swartz et al., 2007). The authors concluded that other interventions, such as psychosocial rehabilitation, are needed as adjuncts to medication in order to produce more significant improvements in psychosocial functioning (Swartz et al.).

Indeed, evidence indicates that various psychosocial treatments have been found to improve the outcome of schizophrenia, making them a valuable adjunct to medical treatment (APA, 2004; Silverstein, 2000). Assertive community treatment, family psycho-education, supported employment, social skills training, and cognitive-behavioural therapy are among the interventions that have demonstrated effectiveness in improving different domains of community functioning (APA; Silverstein). Early detection and intervention have stimulated the hope that they may have a beneficial effect on long-term outcome (Penn, Waldheter, Perkins, Mueser, & Lieberman, 2005). Cognitive remediation therapy, when conducted alongside psychiatric rehabilitation approaches such as social skills training, has also been found to improve psychosocial functioning in people with schizophrenia (McGurk, Twamley, Sitzer, McHugo, & Mueser, 2007).

However, despite the development of pharmacological and psychosocial treatments, a significant proportion of people with schizophrenia continue to experience positive and negative symptoms, cognitive deficits, and chronic impairments leading to social and occupational difficulties (Green & Nuechterlein, 1999; Häfner & An Der Heiden, 1999; Rector & Beck, 2001; Tessier & Clément, 1992). Obviously, additional research is needed to better understand how the different facets of the disorder, including symptoms, cognition, and disability interact, in order to develop effective treatments and interventions that will reduce the limitations caused by schizophrenia.

The following section describes the nature of cognitive impairment in schizophrenia and presents a synthesis of major findings on the cognitive deficits involved in schizophrenia. The relationship of these cognitive deficits with neurobiological and psychophysiological anomalies, as well as factors that may influence cognition and current treatments for cognitive impairments in schizophrenia will be outlined.

2.2 Cognitive impairments as a core dimension of schizophrenia

Although cognitive impairments are not yet part of the diagnostic criteria for schizophrenia, it is now agreed that such impairments are a central dimension of the illness (Goldberg & Green, 2002; Sharma & Antonova, 2003). Furthermore, findings suggest that these impairments are not related to the presence of symptoms, as they may appear long after the former (Harvey, Green, Keefe, & Velligan, 2004). In fact, cognitive anomalies are often present in childhood, well before the emergence of psychotic symptoms (Tamminga et al., 1998). Studies have demonstrated that the cognitive deficits found in persons with schizophrenia are similar to those generally found in the brain-damaged population (Evans, Chua, McKenna, & Wilson, 1997; Goldberg & Green, 2002; Tamminga et al.). Evidence suggests that this illness is a “disease of cortex” (Goldberg & Green, p. 657).

2.2.1 The nature of cognitive impairment in schizophrenia

People with schizophrenia display cognitive deficits to varying degrees. Only about 30% of people with schizophrenia perform on the same level as healthy controls on neuropsychological tests (Palmer et al., 1997; Rund, 1998). In their review of studies on cognition in schizophrenia, Heinrichs and Zakzanis (1998) suggest that cognitive deficits are present in 61% to 78% of people with schizophrenia. According to these authors, in the studies they reviewed, all areas of cognition were impaired at some level in people with schizophrenia compared to controls. In fact, these deficits affect performance on neuropsychological tests, resulting in mean scores between one and two standard deviations below those of healthy controls (Gold, 2004; Sharma & Antonova, 2003). The greatest differences between participants with schizophrenia and controls were found on memory tests and motor-attention and language function tests (Heinrichs & Zakzanis).

Although there is heterogeneity in the severity of cognitive impairments in schizophrenia, studies have attempted to identify subtypes based on cognitive functioning. In one of these studies, five clusters were found based on performance on a battery of executive function tests that specifically assessed abstract reasoning and problem solving (Goldstein, 1994). These clusters corresponded to different impairment severity profiles, ranging from a relatively normal cluster to a mildly impaired cluster through to a severely globally impaired cluster and two moderately impaired clusters that differed from each other on scores of cognitive flexibility.

Cognitive deficits in schizophrenia have been found to be relatively stable in the long term (Gold, 2004; Hoff & Kremen, 2003; Rund, 1998). In the disease process, these cognitive deficits persist after the remission of a psychotic episode; to date, there is no evidence that cognitive functioning may return to normal levels in people experiencing a first psychotic episode with impaired cognitive performance (Harvey & Davidson, 2002). Nevertheless, in a longitudinal study of 43 people with schizophrenia with a mean age of 61 who were followed over 33 years, decline was found in abstract reasoning and visuo-spatial problem-solving abilities (Morrison, O'Carroll, & McCreadie, 2006). The authors conclude that these results probably reflect ongoing pathological changes in certain areas of the brain.

Impairments in attention, executive function, and memory have also been found in the relatives of people with schizophrenia (Hoff & Kremen, 2003). More specifically, discrete motor disturbances, vigilance deficits, diminished cognitive flexibility, slowed information processing, and reduced spatial working memory and verbal long-term recall have been found in healthy relatives of individuals with schizophrenia (Lichtermann et al., 2000). Moreover, encoding stage dysfunction relating to working memory and verbal learning may be at least modestly inheritable in families with schizophrenia (Tuulio-Henrikson, 2005). Such findings add evidence that some cognitive impairment in people with schizophrenia and their relatives are heritable (d'Amato, 2003). Researchers have hypothesized that along with schizophrenia, some cognitive deficits may be genetically determined (Gur et al., 2007; Tuulio-Henrikson).

Although there is debate around the issue of global versus specific deficits in schizophrenia, researchers suggest that some of these deficits are specific, whereas their expression is one of generalized cognitive impairment (Gold, 2004; Heinrichs & Zakzanis, 1998; Sharma & Antonova, 2003). A review of factor analytic studies has helped to delineate seven major cognitive dimensions that represent fundamental dimensions of cognitive deficits in schizophrenia (Nuechterlein, Barch, Gold, Goldberg, Green & Heaton, 2004). The different dimensions identified were attention/vigilance, verbal learning and memory, working memory, visual learning and memory, verbal comprehension, reasoning and problem solving, and speed of processing. An eighth dimension, social cognition, was added, following the inclusion of this domain in relatively recent studies.

The following section presents a synthesis of major findings on the most commonly studied cognitive deficits, namely perception and attention, memory, executive function, and psychomotor speed.

2.2.2 Perception and attention

Among the most commonly investigated cognitive deficits are those affecting the early stages of information processing, which disrupt perception and attention (Braff, 1993; Nuechterlein, Dawson, & Green, 1994). These deficits are considered to be central to schizophrenia (Braff).

Among the early perceptual anomalies, gating deficits, among others, are found, whereby irrelevant stimuli are not efficiently screened out. This anomaly reduces protection from an overload of information (Braff, 1993). Other evidence suggests that people with schizophrenia may over-inhibit stimuli, which leads to missing relevant cues (Brown, Cromwell, Filion, Dunn, & Tollefson, 2002). These early perceptual anomalies are emphasized in tasks requiring a fast and effective answer, particularly those with significant and complex cognitive demands, including multiple tasks, and tasks that are carried out in the presence of distractors or stressors (Braff). Measures assessing early stages information processing are skin conductance orienting response, reaction time tasks, visual backward masking, and smooth-pursuit eye movement (Braff; Nuechterlein et al., 1994). Deficits of habituation and non-responsiveness to stimuli, as well as slow processing, longer reaction times, and ocular motor abnormalities are among the impairments that have been identified with these testing techniques.

Attentional disturbances have also been found in people with schizophrenia, as well as their relatives (Cornblatt & Keilp, 1994; Dollfus et al., 2002). Furthermore, children at risk for schizophrenia present more attentional dysfunction compared to children in control groups (Cornblatt, Lenzenweger, Dworkin, & Erlenmeyer-Kimling, 1992; Tsuang & Faraone, 1999). Attentional impairment in schizophrenia is independent of the clinical state, whether it be acute or chronic (Cornblatt, Obuchowski, Schnur, & O'Brien, 1997), and is present in both medicated and non-medicated individuals (Lussier & Stip, 2001).

Two dimensions of attention, sustained and selective attention, have been studied extensively. Deficits in sustained attention have been measured with the Continuous Performance Test (CPT), which assesses the ability to maintain vigilance over time (Cornblatt & Keilp, 1994). This measure of attention in its more demanding versions includes a supplementary demand on working memory and might be considered as a "genetic vulnerability indicator" for schizophrenia (Chen & Faraone, 2000). Deficits in selective attention have been documented in people with schizophrenia and have been found to affect the ability to focus selectively on relevant stimuli (Henik & Salo, 2004; Velligan & Bow-Thomas, 1999). People with schizophrenia show increased sensitivity to interference when assessed with tests such as the Stroop colour-word test (Henik & Salo) and demonstrate impairment in their visual search strategies (Gold, Fuller, Robinson, Braun, & Luck, 2007; Lussier & Stip, 1999), which is consistent with the distractibility they display in everyday life. Difficulties in sustained and selective attention and the inefficiency of the habituation process are seen as the roots of perceptual and attentional deficits (Braff, 1993; Nuechterlein et al., 1994).

2.2.3 Memory

It is well known that memory in its various dimensions is particularly affected in people with schizophrenia. The existence of global memory impairments have been supported by the conclusions from a meta-analysis of results from 70 studies investigating cognitive impairments in schizophrenia (Aleman et al., 1999). This memory deficit is recognized as stable (Aleman et al.; Landro, 1994; Rund, 1998) and as not being secondary to attentional impairments (Landro; Rushe, Woodruff, Murray, & Morris, 1999).

Heinrichs and Zakzanis (1998) found larger differences in verbal memory measures between people with schizophrenia and healthy controls; however non-verbal modalities are also affected (Aleman et al., 1999; Heinrichs &

Zakzanis; Saykin et al., 1994). Deficits have been found in short-term or working memory, as well as in long-term memory.

Working memory is involved in maintaining and manipulating information for immediate use (Van der Linden et al., 2000b). This memory system is made of a number of distinct components and is involved in problem solving, language, and daily activities involving on-line information processing (Stip & Lussier, 1996b; Van der Linden, Meulemans, Belleville, & Collette, 2000a). In daily life, deficits in working memory may affect activities such as rehearsing a telephone number or following a conversation. Recent studies suggest that working memory deficits are also a core deficit in schizophrenia (Silver, Feldman, Bilker, & Gur, 2003). Working memory deficits in people with schizophrenia are not limited to the verbal dimension, as non-verbal and visuo-spatial working memory are affected as well (Gooding & Tallent, 2004).

Assessments of long-term memory in people with schizophrenia consistently find impairments in recall and learning (Aleman et al., 1999; Rushe et al., 1999). The tasks employed to test recall and learning usually require the retrieval of previously learned material, with or without cues (Stip & Lussier, 1996b; Van der Linden et al., 2000a). Recognition, which is assessed with tasks where learned material is presented with distractors, is generally impaired to a lesser degree (Stip & Lussier). These findings suggest that the memory deficits may be related more to encoding and retrieval difficulties than to the storage of information (Sharma & Antonova, 2003). Thus, it follows that the capacity to learn in both verbal and non-verbal modalities has been found to be affected as well (Saykin et al., 1994; Wood et al., 2002). It has been argued that impairments in learning capacity may interfere with rehabilitation outcome, including community tenure (Gold, 2004; Sharma & Antonova).

Two domains of memory are generally found to be less impaired among people with schizophrenia. Implicit memory (a memory based on previous experiences, without conscious awareness of these experiences) and related procedural learning memory (the long-term memory of skills and procedures) deficits are relatively mild compared to the other memory systems (Sharma & Antonova, 2003; Stip, 1996).

2.2.4 Executive functions

Executive functions refer to a group of cognitive functions that enable an individual to plan and carry out goal-directed behaviour (Velligan & Bow-Thomas, 1999). Executive functions are thought to be essential for goal-directed activities such as working and housekeeping, where planning and problem-solving skills are essential for independent living (Royall et al., 1993; Sharma & Antonova, 2003).

Executive processes include anticipation, initiation, goal selection, planning, sequencing, monitoring, inhibition of behaviour unsuited for the context or the goal, and use of feedback (Morice & Delahunty, 1996; Royall et al., 2002) These cognitive functions are associated with frontal lobe functioning (Royall et al.; Van der Linden et al., 2000b). The executive functions are also involved in the coordination of non-executive functions such as attention and memory that enable the performance of complex and often novel tasks (Morice & Delahunty; Royall et al.; Velligan & Bow-Thomas, 1999).

Two meta-analyses have confirmed that executive impairment is found across studies in schizophrenia (Heinrichs & Zakzanis, 1998; Johnson-Selfridge & Zalewski, 2001). People with schizophrenia are significantly more impaired than normal control groups and other psychiatric groups on tests of executive function (Johnson-Selfridge & Zalewski).

People with schizophrenia already experience executive impairments at the beginning of the illness, as demonstrated in studies of first psychotic episodes of schizophrenia (Hutton et al., 1998). One hypothesis posits that executive functions usually develop later in adolescence and young adulthood and that the establishment of complex and multiple neural circuits required by these functions is reduced following abnormal brain development and becomes even more limited by the diminished plasticity of the brain at that period (Pantelis, Yucel, Wood, McGorry, & Velakoulis, 2003). Therefore, according to these authors, these cognitive functions may be more impaired than other functions.

These deficits are expressed in people with schizophrenia in various ways, regardless of duration of the illness (Velligan & Bow-Thomas, 1999). Executive dysfunction in schizophrenia can result in difficulties related to problem solving and planning, concept formation, cognitive flexibility, self-monitoring, action initiation, inhibition of automatic responses, self-organization, and verbal fluency (Velligan & Bow-Thomas).

Various methods have been employed to study executive dysfunction in schizophrenia (Velligan & Bow-Thomas, 1999; Weinberger et al., 1994). According to the literature, tests such as the Wisconsin Card Sorting Test ([WCST], Grant & Berg, 1948, cited in Van der Linden et al., 2000b) and the Tower of London Test ([TOL], Shallice, 1982) are mostly used as assessments of executive function in schizophrenia (Johnson-Selfridge & Zalewski, 2001). In the WCST, a test that requires multiple cognitive skills such as concept formation and cognitive flexibility, individuals are asked to sort cards according to different stimuli (colour, shape, and number of objects) and to put them together with one of the four key stimuli-cards where they think the cards belong (Van der Linden et al.). The examiner confirms whether the individual's choice is correct, without giving any information of the "matching principle." After 10 correct placements, the examiner changes the matching principle without telling the individual, who has to discover the change out of the examiner's responses (Van der Linden et al., 2000b). Performance is measured by the number of correct categories, correct answers, and errors (Van der Linden et al., 2000b). The TOL specifically assesses planning abilities. This test involves two sets of three pegs of different length and three balls of different colours (Rainville et al., 2002). In order to solve the problem, the individual must rearrange the coloured balls on his or her set of pegs and balls in order to match the examiner's ball configuration. This task must be completed with as few moves as possible.

2.2.5 Psychomotor slowing

Psychomotor slowing has long been recognized in the clinical and research domains as a specific symptom of schizophrenia (Morrens, Hulstijn, & Sabbe, 2007). Decreased spontaneous movements and slowness are part of the psychomotor poverty syndrome, one of the three syndromes described by Liddle (1987a). Tasks used to assess psychomotor speed focus either on psychomotor speed or on processing speed (Morrens et al.), although tasks related to the latter are also classified as reflecting information processing and attentional deficits (Braff, 1993).

Psychomotor speed has been found to be impaired in fine motor tasks that address rapid fine movements such as finger tapping (Fuller & Jahanshahi, 1999), writing tasks that involve copying lines and drawings (Jogems-Kosterman, Zitman, Van Hoof & Hulstijn, 2001), and in gross motor tasks such as measures of gait velocity (Putzhammer et al., 2004). Psychomotor speed, assessed by tasks sensitive to processing speed such as reaction time tasks, has also been found to be affected in schizophrenia (Braff, 1993; Liberman et al., 2000). Psychomotor slowing is present over and above the influence of neuroleptics in drug naive, first-episode, and chronic patients (Morrens et al., 2007).

2.2.6 Neurobiological and psychophysiological anomalies associated with cognition

Studies have investigated neurobiological anomalies in people with schizophrenia, using the latest technologies such as brain imaging and psychophysiological techniques (Pantelis et al., 2003; Semkovska et al., 2001). Such studies have found relationships between brain abnormalities and cognitive functioning; for example, decreased blood flow in the frontal lobe has been linked to diminished performance on the WCST (Velligan & Bow-Thomas, 1999). Increased cerebral ventricular size and decrease of dopamine concentration have been found to negatively affect frontal lobe activation and functioning during the WCST (Weinberger et al., 1994).

Other studies have focused on autonomic nervous system activation, which is related to attentional resource allocation (Dawson, Schell, & Filion, 1990). Among others, the skin conductance orienting response (SCOR), reflecting both tonic and phasic activity of the sympathetic nervous system, appears to be a mediating vulnerability factor in schizophrenia (Dawson, Nuechterlein, Schell, Gitlin, & Ventura, 1994). When SCORs to mild innocuous stimuli are measured, high numbers of non-responders to stimuli have been reported. Between 40 and 50% of people with schizophrenia are non-responders, compared to 5% to 10% in the general population (Dawson & Nuechterlein, 1984). Non-responding has been associated with poorer outcome in social functioning (Öhman et al., 1989) and to more deviant performance on neuropsychological measures reflecting frontal lobe dysfunction in this population (Bartfai, Levander, Nybäck, & Schalling, 1987). Within the responders group, hyper-responders, or slow habituators, may be unable to selectively inhibit attention to irrelevant environmental stimuli (Dawson & Nuechterlein; Öhman et al.). These individuals present excessive behavioural responding to environmental cues, which results in impaired performance on the WCST (Schiffer, Sigal, & Mintz, 1996), as well as on other neuropsychological measures, such as verbal fluency and visuo-motor processing (Brekke, Raine, Ansel, Lencz, & Bird, 1997). Certain authors have thus concluded that cognitive dysfunction in schizophrenia can be understood as a direct "behavioural consequence of compromised cerebral functioning" (Tamminga et al., 1998, p.S22).

2.2.7 Factors influencing cognition in schizophrenia

Research has yielded various findings regarding the influence of specific factors on the severity of cognitive deficits in schizophrenia. Controversial results have been obtained for gender effects on cognition. Goldstein et al. (1998) found that males had poorer scores than females on measures of attention, language, verbal memory, and executive functions. Hoff et al. (1998) found no differences in cognitive function between males and females after controlling for symptom severity. Similarly, Moriarty et al. (2001) found no significant differences on cognitive test results between poor outcome males and females with schizophrenia. In a review of studies dealing with sex differences in schizophrenia, Leung and Chue (2000) conclude that there is little evidence to suggest that cognitive impairment is greater in males than in females, especially in verbal processing. They argue that sex differences in cognitive function in people with schizophrenia are not robust enough results. In that sense, contrasting results from Goldstein's study could be explained by the small sample size (male = 17, female = 14) and lack of statistical corrections for multiple comparisons.

Age in particular influences cognition in people with low levels of functioning (Friedman, Harvey, Kemether, Byne, & Davis, 1999; Moriarty et al., 2001). However, neuropsychological performance is similarly impaired in young adults living a first-episode and in middle aged chronically ill people with schizophrenia (Censits et al., 1997). In general cognitive decline begins around age 65 (Friedman et al.).

Education was found to be associated with some aspects of cognition such as memory, motor dyscoordination, and saccadic tasks, which provide an index of cognitive function (Broerse, Crawford, & den Boer, 2002; Heinrichs & Zakzanis, 1998; Poole, Ober, Shenaut, & Vinogradov, 1999). Level of education is generally considered as a potential confounding variable for cognitive tests in people with schizophrenia.

Cognition is considered to be relatively independent of symptoms (Tamminga et al., 1998). Positive symptoms that respond best to pharmacological treatment generally show little or no relationship to cognition, whereas a small association between cognition and negative symptoms tends to be consistently but modestly present (Gold, 2004). Nevertheless, people in the acute phase of schizophrenia tend to have more impaired cognitive functioning than people in remission (Goldstein et al., 1998). Inpatients have been known to have lower cognitive scores than outpatients on some cognitive tests, such as those assessing attention, executive motor function, and memory (Perlick, Mattis, Statsny, & Teresi, 1992).

Medication, in addition to its effects on symptoms, has some influence on cognition. The sedative effects of antipsychotic medication may sometimes exacerbate psychomotor slowing; the type of medication, whether it be conventional or a new atypical antipsychotic, may influence the procedural learning rate (Bédard et al., 2000). Moreover, Minzenberg, Poole, Benton, and Vinagradov (2004) suggest that the anticholinergic load of medication may be responsible for some of the memory deficits in people with schizophrenia. These authors found that the anticholinergic load accounted for approximately 10% of the variance in measures of memory function and divided attention. Nevertheless, while conventional antipsychotics affect memory negatively, the newer generation of antipsychotics is expected to have a positive effect on reducing these impairments (Keefe, Silva, Perkins, & Lieberman, 1999; Purdon et al., 2000; Stip & Lussier, 1996a).

2.2.8 Treatment of cognitive impairments

Since cognitive impairments are recognized as playing a key role in the functioning of people with schizophrenia, major efforts have been made to develop medication and rehabilitation treatments that target cognitive impairment (Gold, 2004). Meta-analyses and reviews of studies on the effect of atypical antipsychotics on cognitive impairments in people with schizophrenia have yielded interesting results (Keefe et al., 1999). Clozapine, olanzapine, risperidone, and quetiapine are the most commonly used atypical antipsychotics in clinical practice. The superiority of atypical antipsychotics over conventional medication on the improvement of cognitive functioning has been confirmed. Positive changes have been demonstrated after brief periods of treatment (Harvey & Keefe, 2001). More specifically, improvement in specific cognitive functions such as verbal fluency, vigilance, fine motor functions, executive functions, and long-term memory has been found. However, the mechanisms leading to cognitive improvement are not yet well understood. In recent years, the National Institute of Mental Health in the United States has launched the Measurement and Treatment Research to Improve Cognition in Schizophrenia initiative (MATRICS) in order to better understand these mechanisms (Marder & Fenton, 2004). One key goal of this major research project is to provide a consensus method, including adequate methodologies, by which cognitive enhancement drugs may be evaluated before approval and marketing.

Reflecting this interest in cognitive improvement, cognitive rehabilitation approaches for people with schizophrenia have been developed over the last few decades. In a meta-analyses of psychological treatments, five cognitive remediation studies have met the rigorous criteria of Pilling et al. (2002). These studies explored the effect of cognitive remediation on attention, visual memory, and verbal memory. When interventions were based on training specific cognitive functions, little or no effect on cognition was observed. These results fail to support the use of specific cognitive remediation techniques with people with schizophrenia in everyday clinical practice (Bellack et al., 1999; Pilling et al.).

Prouteau et al. (2004) studied the efficacy of a comprehensive rehabilitation program, Integrated Psychological Treatment (IPT), which involves remediation of basic cognitive abilities and skills training (Brenner et al., 1994). The study involved 90 individuals, including those experiencing a first episode of psychosis and those with chronic schizophrenia. This rehabilitation program showed interesting results in terms of improvement of visual memory and some aspects of community functioning (Prouteau et al., 2005). However, it has been argued that cognitive impairments may also interfere with learning capacity and consequently with rehabilitation outcome, including community tenure (Gold, 2004; Sharma & Antonova, 2003). Currently, it is not yet clear how much cognitive improvement is needed in order to translate into better daily functioning (Harvey & Keefe, 2001).

2.2.9 Summary

This literature review suggests that cognitive deficits in people with schizophrenia are stable and enduring. Almost all areas of cognition are impaired at some level. Major cognitive dimensions are affected in both verbal and non-verbal modalities, including attention and perception, memory, executive function, and psychomotor speed. Currently, little is known about the most efficient treatments and interventions for these cognitive deficits.

Impaired daily functioning is another challenge for people with schizophrenia, so much so that it is included as a major criterion for diagnosis. Numerous studies have examined issues in community functioning and the factors that affect integration of people with schizophrenia into the community. The following section discusses community functioning issues, as well as sociodemographic and clinical characteristics that influence the community functioning of people with schizophrenia.

2.3 Community functioning in persons with schizophrenia

Deinstitutionalization in the 1960s was accompanied by the establishment of community-based psychiatric services for people with chronic and severe mental illness, such as schizophrenia and affective disorders (Liberman, 1988; Tessier & Clément, 1992). Although advancements in pharmacological treatment significantly reduced schizophrenia symptoms, the impact of these advancements in terms of improving community living was limited (Liberman & Nuechterlein, 1999). Many people with schizophrenia continued to experience severe disability in daily functioning (Tessier & Clément).

2.3.1 Community functioning: origin, definitions and measurement

Harsh living conditions of people with severe mental disorders in the community have drawn attention to inefficient psychiatric practices after the deinstitutionalization movement. This led to the development of psychiatric rehabilitation approaches, inspired by the goals and interventions of physical rehabilitation that aimed to integrate people with physical disabilities into the community and to maintain their community functioning with minimal dependence on the health care system (Anthony & Nemec, 1984). The practice of psychiatric rehabilitation is oriented toward the consequences of the illness on daily living activities and social roles (Anthony, 1993). Community-based programs and rehabilitation interventions aim at facilitating the integration of people with severe mental illness into meaningful roles in the community and especially in the environment of their choice (Anthony, Cohen, Farkas & Gagné, 2004; Anthony & Nemec; Liberman, 1988; Tessier & Clément, 1992).

Individuals have described their personal recovery from mental illness as a journey towards finding new meanings and purposes in one's life, changing roles, values, goals, skills and attitudes leading to a satisfying life, and including recovery from mental illness itself (Anthony, 1993; Farkas, 2007). The psychiatric rehabilitation approach has been recognized as helpful and effective for individuals to gain or regain their valued roles and is considered as supporting the recovery process (Anthony; Farkas).

In the psychiatric rehabilitation practice, the major interventions focus on the development of skills and of environmental supports (Anthony, et al., 2004; Anthony & Liberman, 1986; Farkas, 2006). Specifically, skills training interventions are oriented toward the development or restoration of physical, emotional, and cognitive skills required for people to live, learn, and work in the environments they had chosen (Anthony, 1993; Anthony, et al.; Anthony & Nemec, 1984).

Involvement in valued roles in the community is one major psychiatric rehabilitation outcome (Farkas, 2007). In studies on the outcomes of psychiatric rehabilitation interventions and social integration of people with severe mental illness, terms such as community functioning, participation, function, functional outcome, everyday functioning, functional status, and social adaptation, among others, have been used interchangeably.

Many definitions exist and vary according to the profession or the viewpoint from which they originate, raising confusion as to which term best describes how a person with a mental health disorder functions in the environment (Fossey & Harvey, 2001; Knight, 2000). To describe human functioning, the World Health Organization's International Classification of Functioning, Disability and Health ([ICF], WHO, 2001b) has suggested the dimensions of:

> "*impairment* of bodily structures or functions; *activity* and *activity limitations*, defined as the nature and extent of activities that a person actually performs; and *participation* and *participation restrictions*, defined as the nature and extent of a person's involvement in life situations" (Fossey & Harvey, 2001, p.92).

Although the concept of participation is particularly relevant for people with mental health problems including schizophrenia, it is better integrated in physical rehabilitation than in psychiatric rehabilitation (Larivière, 2008) and consequently has been little explored in people with mental health problems (Desrosiers, 2005; Larivière). A major limitation to its use in this thesis involves the lack of clear definitions of operational criteria in WHO's ICF model of functioning for the dimensions of activity and participation (Fossey & Harvey, 2001). Moreover, within this model, relevant assessment tools have not yet been thoroughly tested and validated with people with mental disorders (Larivière).

In occupational therapy litterature, function has been defined as "the ability to perform the daily life tasks related to activities of daily living (ADLs) and instrumental activities of daily living (IADLs), work and leisure ... primarily the ability of the individual to perform the daily life tasks that he or she wants and needs to perform" (Fisher, 1992, p. 184,). Green (1996), in a review of studies on cognition and community functioning in people with schizophrenia, defines functional outcome as the product of the competence of a person in the numerous tasks that constitute his or her social and instrumental roles, and suggests that "these skills can be summarized in terms of relatively global indices of community (mainly social and occupational) functioning" (p. 323). Other authors describe everyday functioning in people with severely mentally ill adults as related to those skills and tasks considered essential for a person to live independently in the community (Patterson, Goldman, McKibbin, Hughs, & Jeste, 2001). Functional status has been defined as "the ability to fulfill effectively social and role related functions" in a variety of life settings, in a conceptual framework for outcome measurement of people with severe mental disorders (Rosenblatt & Atkisson, 1993, p. 352).

From these definitions of community functioning, two major common elements stand out: social and instrumental role performance and competence in the accomplishment of daily life tasks and skills. However, it is not clear how roles, tasks, and skills are defined and how they are related. Role functioning was defined by Wallace, Liberman, Tauber, and Wallace (2000) as "the product of an individual's skills and motivation, and of the environment's rewards, opportunities and demands" (p. 631). Kielhofner's (2002) Model of Human Occupation defines roles as an internalized socially defined status with related actions and attitudes, such as home maintainer, parent, friend, worker, and member of an organization. Roles comprise a broad range of domains, including occupational, interpersonal, and instrumental domains (Lecomte, 2000) and are the base for social interactions. Roles are related to different life domains that include family life, activities of daily living, school, work, and leisure (Schindler, 2004a).

From a social adaptation perspective, participation in roles is based on the performance of independent living skills (Lecomte, 2000). Similarly, Schindler (2004b) suggests that in order to enact a role effectively, "individuals need a repertoire of task and interpersonal skills, and these skills are the foundation of roles" (p. 20). In this view, independent living skills include daily activities such as meal preparation, money and medication management, and transportation (Lecomte). Arns and Linney (1995) studied the relationship of functional skills of severely mentally ill people to subjective and societal benefits as a result of an intervention. They defined functional skills as a group of discrete, observable behaviours and activities essential for adaptation to one's environment. These skills include activities such as those related to social interaction, personal care, cooking, or transportation. In the psychiatric rehabilitation approach, functional skills are divided into physical skills, which include activities such as cleaning and dressing; emotional skills, which involve activities such as communicating and relating to friends; and intellectual skills, which include abilities such as making decisions and setting goals (Cohen & Anthony, 1984). As described by Fisher (1992), Green (1996), and Patterson et al. (2001), independent living skills correspond to daily living tasks in different daily life domains.

The development of community-based programs and psychiatric rehabilitation interventions aiming for the improvement of community functioning was accompanied by a shift in how the success of interventions for managing the needs of people with severe mental illness was evaluated. The focus shifted from "social adjustment" to the ability to function in the community (Knight, 2000). In response to the development of community-based treatments and interventions, health services administrators became preoccupied with costs and treatment efficacy; clients worried about gaining more autonomy in their daily life (Dickerson, 1997) as well as satisfaction and meaning (Anthony, 1993); and professionals needed more information in order to develop interventions and establish treatment goals (Wallace, Lecomte, Wilde, & Liberman, 2001). Measurement of community functioning as an outcome of treatment took on more importance (Bellack et al., 2007; Dickerson), emphasizing the ability to accomplish daily tasks, rather than focusing on hospitalization and social behaviours and interactions (Knight; Lecomte, 2000).

Clearly, there is little consensus about the domains to be included in the measure of community functioning. Notwithstanding, authors report multiple life domains that can be affected by severe mental illness, such as daily activities, social skills, money management, social networks, family relations, use of leisure time, physical health, and personal security (Dickerson, 1997), as well as general organization, communication skills, use of transportation, and medication management (Patterson et al., 2001), and maintaining a schedule (Arns & Linney, 1995). Over time, a number of assessment tools were developed to measure community functioning. In a review of community functioning measurement tools, Dickerson identified six major dimensions: daily living activities, psychiatric symptoms, social interactions and withdrawal, work and vocational activities, well-being, and physical health.

Identification of these various domains supports the notion that community functioning is multidimensional. However, mental health professionals gave more importance to specific domains when they determined the functional status of their clients with severe mental illness. Green (1993) reported the results of three studies of the domains chosen by mental health professionals to assess the functioning of people with severe mental illness. In these studies, mental health professionals identified three major domains, independent of one another, that affected functional level, namely: competence in daily task performance, aggressive behaviours, and motivation or readiness to engage in treatment. In another study, behavioural problems, treatment adherence, and independence in activities of daily living were also chosen by mental health professionals during the development of a community functioning assessment tool as priorities among various indicators of disability caused by severe mental health disorders (Barker, Barron, McFarland, & Bigelow, 1994).

Among the factors that challenge the assessment of community functioning in people with severe mental illness, including schizophrenia, are the changes in the course of the illness where acute symptoms lead to symptom remission (Dickerson, 1997). Other difficulties arise from the source of information, whether it be self-report or based on the perception of family and professionals (Dickerson; Evans et al., 1997). Although it is essential to consider the person's perspective of his or her own functioning, it is acknowledged that self-report questionnaires can be biased by personal values, emotional status, cognitive functioning, and lack of insight in people with schizophrenia (Edwards, 1990; Harvey, Velligan, & Bellack, 2007; McKibbin, Brekke, Sires, Jeste, & Patterson, 2004). Information provided by other informants can be limited by a lack of knowledge of the person's daily life habits. Overall, using multiple sources of information, that include the person, the person's family and social networks, and mental health professionals, brings together different perspectives relevant to community functioning assessment (McKibbin et al.; Rosenblatt & Atkisson, 1993).

2.3.2 Influence of socio-demographic and clinical variables on community functioning

As mentioned earlier, poor social functioning is part of the diagnostic criteria for schizophrenia, and people with the disorder generally have poorer community functioning than people with other psychiatric diagnoses (Girard, Fisher, Short, & Duran, 1999; Walkup & Gallagher, 1999). Moreover, it is acknowledged that although positive symptoms of schizophrenia may be reduced with the use of antipsychotic medication, functional impairments remain relatively unchanged (Bowie, Reichenberg, Patterson, Heaton, & Harvey, 2006). People with schizophrenia have more functional limitations than those with major affective disorders, regardless of age (Bartels, Mueser, & Miles, 1997; Martinez-Aran et al., 2002; Schretlen et al., 2000; Walkup & Gallagher). Among individuals experiencing a first psychotic episode, functional recovery takes longer and is less pronounced in young people with schizophrenia than in young people with major affective disorders (Tohen et al., 2000).

Socio-demographic, clinical, and cognitive factors have been examined relative to community functioning among people with schizophrenia. In this section, the socio-demographic and clinical variables are reviewed; cognitive variables in community functioning will be described in a later section.

Various studies have reported a relationship between socio-demographic and clinical variables and community functioning among people with schizophrenia. In a study of prognostic variables for levels of functioning, women who had been treated were able to perform more work than women experiencing a first episode and more than men who either had been treated or were experiencing a first-episode, regardless of their initial levels of functioning (Siegel et al., 2006). This study also found that men were less likely than women to have meaningful social relationships after a mean of three years of follow-up. Studies assessing subgroups of low-functioning people in different activity domains have reported that men often have more functional limitations than women (Cohen& Talavera, 2000; Hintikka, Saarinen, Tanskanen, Koivumaa-Honkanen, & Viiinamäki, 1998; Walkup & Gallagher, 1999).

The age difference between men and women at first episode has a direct influence on the course of the illness (Häfner & An Der Heiden, 1999; Mueser & McGurk, 2004). Because schizophrenia appears earlier in men, the social situation of men is generally less well-established than that of women. However, due to decreases in estrogen levels in women over time, the social evolution of both men and women tends to be similar (Häfner & An Der Heiden). Leung and Chue (2000), in their review of sex differences in schizophrenia, found that women generally have a more favourable outcome in the first years of the illness, although this difference disappears in the long term. In other studies comparing functional outcome in men and women with schizophrenia using a global community functioning assessment, no differences were found with gender (Addington & Addington, 2000; Brekke, Kohrt, & Green, 2001; Hintikka et al., 1998; Klapow, Evans, Patterson, Heaton, Koch & Jeste, 1997; Moriarty et al., 2001; Palmer et al., 2002; Schretlen et al., 2000).

Studies have found that people experiencing a first episode of psychosis have similar levels of social functioning compared to people with multiple episodes of schizophrenia (Grant, Addington, Addington, & Konnert, 2001). For these people, the duration of untreated psychosis was often associated with an insidious onset of the illness, as well as with negative symptoms and functional and social incapacity (Davidson & McGlashan, 1997). From these studies, the authors conclude that decline in functioning has already taken place when people experience a first psychotic episode.

Generally, people with schizophrenia who are 60 years of age and older are less functional than younger people with the same diagnosis (Walkup & Gallagher, 1999). Some authors state that functional decline appears around age 65 (Friedman et al., 2001). Education, as well as age, to a lesser degree, were found to predict the level of community functioning in a study of an adaptation model of community living for people with schizophrenia (Lecomte, 2000).

Education level was associated with some aspects of functioning, such as amount of work at follow-up among first-episode participants, but not among participants being treated for a longer period (Siegel et al., 2006). Other studies have failed to find a relationship between education and functioning (Clark & O'Carroll, 1998; Cohen& Talavera, 2000; Dickerson, Ringel, & Parente, 1999; Klapow et al., 1997; Schretlen et al., 2000). These conflicting results may be explained by the fact that some of the latter studies, which failed to find a relationship, included mostly inpatients (Clark & O'Carroll, 1998; Schretlen et al.) whose general functioning differs from that of stable community-living outpatients (Bellack et al., 2007) or older adults, who are experiencing a decline in functioning and cognition (Cohen& Talavera; Klapow et al.)

In their review of outcomes in schizophrenia, Davidson and McGlashan (1997) found that rehabilitation efforts generally contribute to a better long-term outcome. They also suggest that responsiveness to pharmacological treatments started early in the course of illness may be a strong predictor of long-term outcome.

In regard to residential independence, studies have found that the more independent people with schizophrenia are in their housing, the better their functional level (Arns & Linney, 1995; Dickerson, Ringel et al., 1999; Palmer et al., 2002). According to the longitudinal study results of Siegel et al. (2006), level of functioning at the beginning of the study was one of the most important variables in predicting functional outcome, regardless of where the person was in the course of the illness.

Negative symptoms have been found to be associated with lower functional levels in numerous studies (Addington & Addington, 2000; Greenwood, Landau, & Wikes, 2005; Milev, Ho, Arndt, & Andreasen, 2005; Moriarty et al., 2001; Palmer et al., 2002). It is generally agreed that negative symptoms are linked to poor long-term functional outcome among people with schizophrenia, although the mechanism underlying this link to community functioning is not yet clear (Buchanan, 2007; Davidson & McGlashan, 1997; Häfner & An Der Heiden, 1999).

Mixed results have been obtained regarding the association of positive symptoms to community functioning. A number of studies found no association between positive symptoms and functioning (Moriarty et al., 2001; Velligan, Bow-Thomas, Mahurin, Miller, & Halgunseth, 2000). In a longitudinal study of predictors of community functioning in people with schizophrenia, a group of positive symptoms predicted community functioning (Norman et al., 1999). In fact, Norman et al. found stronger associations with community functioning and the disorganization symptoms when positive symptoms of disorganized speech, thought disorder, and inappropriate affect were grouped according to the symptom categories or syndromes described by Liddle and Morris (1991). Another longitudinal study using similar categories found that at one- and four-year follow-up, two symptom categories, namely, a disorganization factor, which included measures of thought disorder and inappropriate speech, and a psychomotor poverty factor, which included measures of negative symptoms such as poverty of speech and movement and blunted affect, were significantly associated with psychosocial status (Kurtz, Moberg, Ragland, Gur, & Gur, 2005). Differences in findings of an association of positive symptoms with community functioning may be explained by the categorization of positive symptoms into the disorganization syndrome

Siegel et al.'s (2006) study on prognostic variables on long-term level of function concluded that the type of symptoms – positive, negative, or depressive – was not as important as the intensity of these symptoms in predicting long-term level of functioning.

Bellack, Gold, and Buchanan (1999) suggested a method for comparing daily activity performance and clinical and cognitive characteristics between high-functioning individuals and people with lower levels of functioning. Individuals with schizophrenia who had different levels of residential independence were compared on these characteristics (Arns & Linney, 1995; Bartels et al., 1997; Dickerson, Ringel et al., 1999; Palmer et al., 2002; Perlick, Statsny, Mattis & Teresi, 1992; Sood, Baker, & Bledin, 1996) Those who were more independent were found to be more competent in daily living activities

(Bartels et al.; Dickerson, Ringel et al.; Sood et al.), especially in self-care activities and instrumental activities of daily living (Sood et al.). They also performed activities of daily living more frequently (Dickerson, Ringel et al.). Less functional people had more symptoms and cognitive deficits (Bartels et al.; Palmer et al.; Perlick, Statsny, Mattis & Teresi). Variables more frequently reported that better explained residential independence were competence in daily activities (Arns & Linney; Bartels et al.; Dickerson, Ringel et al.; Palmer et al.) and the relative absence of negative symptoms (Dickerson, Ringel et al.; Palmer et al.).

2.3.4 Empirical models of community functioning of people with schizophrenia and severe mental illness

A study of a psychosocial model of adaptation of persons with schizophrenia assessed 101 people with schizophrenia on a number of socio-demographic, clinical, psychological, and social adaptation variables, as well as methods of coping and daily life stressors (Lecomte, 2000). Five individual variables were found to have a significant direct effect on adaptation. "Adaptation" was defined by the performance of independent living skills and social roles, similar to definitions of community functioning. The study found that frequency of life events; severity of negative symptoms; age; education; and two coping strategies, self-control and adjustment, had a direct effect on adaptation.

Alexandersson (2000) presented a model to explain differences in the level of community functioning of people with severe mental disorders. Clinical, socio-demographic, and functional data from more than 1,600 people were analyzed during an assessment of the consequences of closing a public hospital in the state of Pennsylvania. Thirteen variables explaining 49% of variance in community functioning were included in the final model. These variables were basic self-care skills, interpersonal relations, daily activities functioning, work skills, receiving inpatient services, taking medication as often as possible, taking an active role in the treatment plan, having recently received a consultation in a community mental health centre, belonging to a specific area in Pennsylvania, and living in an apartment, boarding house, structured residence, or community residential rehabilitation organization. The variables that most explained the functional level in this model were daily activities functioning and work skills.

The literature on community functioning highlights the fact that community functioning in people with schizophrenia is complex and multifactorial. This has led to multiple definitions. For the needs of this thesis, based on the literature review, community functioning is determined by the mastery of tasks and behaviours that a person needs to perform in different life domains to sustain social roles in the environment. Assessing community functioning is a challenging task because it involves numerous sources of information and should take into account different points of view (Rosenblatt & Atkisson, 1993). In this thesis, assessment of community functioning is based on two perspectives: that of the participant and that of the mental health professional. In accordance with the definition of community functioning, the dimensions assessed included the performance of role-related tasks in different life domains as reported by participants and mental health professionals and behaviours that affect role functioning as assessed by mental health professionals.

One of the most frequently identified variable that affects community functioning is the performance of daily activities. A synthesis of the literature on daily activities in schizophrenia is presented in the next section.

2.4 Daily activities as priorities for treatment and intervention in people with schizophrenia

People with schizophrenia living in the community are expected to perform various activities in order to take care of themselves and their living environment. The performance of daily activities has been recognized as a major dimension of community functioning in these people (Dickerson, 1997; Green, 1993). The ability to perform these activities and solve related problems is a key determinant in maintaining residential and financial independence.

In a study on treatment outcome priorities, housing independence was rated by people with schizophrenia as the second most important outcome of treatment, after the reduction of positive symptoms (Fischer, Shumway, & Owen, 2002). A panel of experts on assessing the effectiveness of treatments also identified independent living as an important issue for health and well-being (Nasrallah, Targum, Tandon, McCombs, & Ross, 2005). The ability to live on one's own, without supervision of daily activities such as shopping, money management, food preparation, laundry, personal hygiene, and recreational and vocational activities is part of the definition of independent living, determined as a major criterion for recovery from schizophrenia (Liberman, Kopelowitz, Ventura, & Gutkin, 2002).

Canadian guidelines for the treatment of schizophrenia (Canadian Psychiatric Association, [CPA], 1998) recommend that "the first task of any rehabilitation effort is to improve the patient's ability to perform basic activities of daily living (ADL): personal hygiene, grooming, dressing, and self-care ..." (p. 35S). While accomplishing these activities is a prerequisite for better social inclusion, rehabilitation should also include IADLs, which involve activities such as meal planning, shopping, and food preparation (CPA). Interventions helping individuals to regain a sense of control over their life, as well as valued roles in the domains of residence, community, work and education are likely to support the recovery process in these persons (Farkas, 2007).

Given Canadian treatment guidelines and the identification of independent living as an important outcome for treatment and rehabilitation of schizophrenia, studies of the performance of daily living activities are clearly justified.

This section describes the general characteristics and cognitive aspects of daily activities, as well as the characteristics of assessments that measure the performance of daily activities that involve a cognitive component. A summarized review of studies about the performance of daily activities by people with schizophrenia is then presented.

2.4.1 General characteristics of daily living activities

Activities of daily living have been defined by Ottenbacher and Christiansen (1997) as "those skills that enable the person to interact independently with the physical and social environment" (p. 109). Fisher (1995) has defined occupation as the activities of daily living, the actions consisting in taking possession or occupying the space and time in our daily life.

In the late 1960s, Lawton and Brody (1969) suggested that to better assess the functioning of older adults in the community, the IADL needed to be included, rather than only the basic "physical self-maintenance activities" (p. 179) such as toileting, feeding, and dressing. Lawton and Brody created a list of those tasks considered to be essential, which included using the telephone, shopping, food preparation, housekeeping, laundry, transportation, medication management, and financial management. Most of these tasks are still included in the definition of IADL for different populations at risk for disability, such as people with severe mental illnesses, particularly those with schizophrenia.

Conceptual models in occupational therapy categorize instrumental activities of daily living into different domains, with some variations in their category attribution. The Canadian model of occupational performance contains three performance areas: self-care, productivity, and leisure (Canadian Association of Occupational Therapists, [CAOT], 2002). The activities listed by Lawton and Brody (1969) in the IADL are included in the self-care and productivity areas of this model. According to the American Occupational Therapists Association (AOTA) domains of practice (Youngstrom, 2002), activities are classified differently and include activities of daily living (ADL), instrumental activities of daily living (IADL), education, work, play, leisure, and social participation. ADL are described as basic or personal activities of daily living and IADL are defined as "multistep activities to care for self and others, such as household management, financial management, and childcare" (AOTA, 2004, p. 2). This classification of activities as ADL and IADL is the most commonly used.

It is intuitively known that daily activities have different levels of difficulty (Fisher, 1995). Indeed, ADL are generally expected to be less difficult to perform than IADL. A hierarchy of performance of daily activities was developed for the assessment of functioning among older adults (Lawton & Brody, 1969).

According to this hierarchy, IADL are lost before ADL in older adults and in people with Alzheimer's disease, suggesting that their performance is more difficult to maintain over time within this degenerative process (Barberger-Gateau, Fabrigoule, Amieva, Helmer, & Dartigues, 2002; Lawton & Brody, 1969; Nygard, 1998). Another set of hierarchical scales of daily tasks were obtained using a latent trait analysis of a daily activities performance evaluation, the Assessment of Motor and Process Skills (AMPS), which has been used with people with different illnesses and disorders, including schizophrenia (Fisher, 1995). Tasks were distributed on the motor and process skills scales according to the degree of challenge or difficulty. In this hierarchical distribution of tasks, ADL were classified more frequently at the easier level than IADL, and IADL were classified more frequently at the mean and more difficult level on both motor and process skills scales (Fisher).

In the AOTA's definition of IADL, activities are qualified as "multistep"; therefore, special attention is given to the structure and sequence of the activity. Chapparo and Ranka (1997a) posit that there are three levels of structure in human occupations. The first level involves sub-tasks, which are the observable steps of a task. At the second level are the tasks that include a sequence of a definite number of sub-tasks, which are ordered in a sequence to reach a specific goal. The third level involves routines, which are groups of several tasks that perform together in a given function. Taking into account this description, the structure of IADL is generally at the second, or task, level.

Whatever the activity's structure level, multiple abilities or skills are required to perform ADL and IADL. Cognitive, motor, and affective or interpersonal skills are the major performance skills common to occupational therapy models of practice (AOTA, 2004; CAOT, 2002; Chapparo & Ranka, 1997a). As mentioned earlier, in psychiatric rehabilitation approaches, interventions take into account the need for physical, emotional, and intellectual skills and environmental support required for living in one's chosen environment (Anthony & Nemec, 1984). Clearly, the important role of cognitive skills involved in daily activities is acknowledged in the occupational therapy and psychiatric rehabilitation literature.

2.4.2 Daily activities and their cognitive component

The accomplishment of daily activities requires the use and interaction of different cognitive functions (Humphreys, Forde, & Riddoch, 2001; Lezak, LeGall, & Aubin, 1994; Toglia, 1998). Toglia's dynamic interactional model of cognition described several characteristics of a task that influence the use of cognitive operations and strategies: number of items necessary to the task and placement of these items, task complexity, familiarity with the performance of the task, and motor pattern involvement. Lawton and Brody (1969) stated that if activities could be classified into different levels of a hierarchy according to complexity, then each level would be associated with a greater cognitive demand than the preceding level. The complexity of a task increases when the execution of a number of sub-tasks is necessary to complete the task (Rainville & Passini, 2005). The task can be seen as a goal to reach and the sub-tasks as sub-goals, each level implying a series of decisions sometimes taken as part of an asynchronous sequence, meaning that they are started or completed at different times (Rainville & Passini).

At the higher level of complexity, "multitasks" gather together several different tasks with different levels of importance, difficulty, and duration (Burgess, 2000). These tasks must be carried out only one at a time, but must also overlap, in order to maintain an acceptable performance time. Complex multitasks may sometimes be sequenced in different ways by different people or on different occasions (Forde & Humphreys, 2002). In this type of task, the person determines the objective of the tasks and sets personal goals relative to the quality of performance (Burgess).There may be a delay before judging the success or failure of these objectives in the absence of immediate feedback, as in baking a cake. In daily life, interruptions and unpredicted results may happen, like the telephone ringing during the preparation of the meal. In such a case, there may be a need to later recall certain steps and to change the focus of attention at the right moment. In this type of task, loss of attention may lead to modifying the task, forgetting the goal of the task, slowing down the execution of the task or acting in a disorganized manner. Constraints may be present during the task, such as time limits or required specific procedures. Problem solving is necessary when these constraints must be included in the planning of the task, as are anticipating potential obstacles and the consequences of the choices made on the final outcome.

Schwartz et al. (1995) describes "routine" activities as learned and practiced activities, with short-term procedures involving operations on concrete rather than abstract objects. Routine activities are generally described similarly in a script by people from the general population. Action components and their sequence in the activity are described with a similar level of specificity (Humphreys & Forde, 1998). Routine activities such as brushing teeth or combing hair require little or no planning and attentional resources and are almost always executed in the same manner, almost automatically (Schwartz et al., 1998). However, context and the specifics of how these activities are performed can vary, which then necessitates some involvement of executive functions (Schwartz et al., 1998).

Novel activities, for example, ones where learning or exploring new methods is involved, require modifying or inhibiting automatic routines, as well as working memory and problem solving processes (Humphreys et al., 2001).

2.4.3 Using a cognitive perspective in assessments of daily task performance

Assessments of cognitive functioning (memory, attention, executive function) include a variety of methods that can be classified into two general approaches: bottom-up or top-down (Duchek & Abreu, 1997). In the bottom-up approach, cognition is reduced to its sub-components, and the assessment is at the level of impairment (Duchek & Abreu). Specific cognitive components such as attention or working memory are assessed when a bottom-up approach is used. This approach generally reflects the design of most neuropsychological assessments.

The top-down approach to assessment of cognitive functioning focuses on the functional level of analysis (Duchek & Abreu, 1997). Cognitive functioning is therefore inferred from everyday activities through observation and identification of strengths and limitations in daily activity performance (Duchek & Abreu; Gitlin, 2001). This is evidenced in performance-based assessments using direct observation of ADL or IADL task performance (Gitlin). It has been argued that assessment at the functional level will more readily guide occupational therapy intervention than assessment at the impairment level (Duchek & Abreu; Fisher, 1998) and that it is especially useful with people who have psychiatric or cognitive impairments (Gitlin).

Instrumental activities of daily living such as grocery shopping and meal preparation are among the most complex daily tasks, requiring the use of numerous cognitive skills (Burgess, 2000). Thus, assessing performance of such tasks is particularly relevant for identifying the impact of cognitive deficits on daily functioning in people with schizophrenia. Assessments carried out during the performance of such daily living tasks have the advantage of reflecting real skills rather than providing global ratings of functioning (Gitlin, 2001; Josman & Birnboim, 2001). This type of assessment, also called performance-based assessment, has existed for a long time in occupational therapy practice (Law, 1992). Interest in this type of assessment for people with schizophrenia has recently grown with the assumption of a greater "face validity" of performance-based assessments of everyday functioning compared to neurocognitive measures (Bellack et al., 2007) and the fact that they may better reflect actual functioning and limitations (Harvey et al., 2007). Moreover, performance-based assessment are expected to be particularly useful for evaluating the effectiveness of treatments and interventions on daily functioning of people with schizophrenia (McKibbin et al., 2004). Psychiatric rehabilitation experts have called for an assessment format that evaluates the client's skills in the context "in which the client chooses to live, learn, socialise and work" (MacDonald-Wilson et al., 2002, p. 425). Furthermore, these authors assert that functional assessment must be skills oriented; must contain items that are behavioural, observable, and measurable; and must have the capacity to assess both skill strengths and deficits.

Performance-based assessments focus on the accomplishment of tasks in either the person's environment or in a standard environment, such as an outpatient clinic (Bellack et al., 2007; Gitlin, 2001). Observation in the natural setting has the advantage of representing the real life situation and is preferred by occupational therapists (Gitlin). When this type of assessment is difficult to apply due to cost and time constraints, performance observation can take place in a simulated environment (Bowie et al., 2006). Following the observation of a person's task performance, a task analysis is useful in detecting underlying cognitive problems by investigating the interactions among the cognitive abilities of the person, the task, and the environment (Duchek & Abreu, 1997; Toglia, 1998). Two types of analysis may be accomplished: task or procedural task analysis and performance or process task analysis (Chapparo & Ranka, 1997b; Fisher, 2003; Hagedorn, 2000).

Procedural task analysis focuses on the effectiveness of sequential task performance (Yuen & D'Amico, 1998). It first identifies the major steps of the task (Yuen & D'Amico). Then, during observation of task performance, difficulties and different types of errors may be identified at each step, resulting in a measure of skill or mastery (Chapparo & Ranka, 2005). Examples of assessments that use this type of analysis are the Test of Grocery Shopping Skills (TOGSS)(Hamera & Brown, 2000), which was developed for use with people with severe mental illnesses, and the Perceive, Recall, Plan and Perform (PRPP) System of Task Analysis, which was developed for use with people with acquired brain injuries and has been used with other populations that have cognitive deficits. One type of procedural task analysis, sequential analysis, has been used in neuropsychological approaches to quantify and measure executive dysfunctions in schizophrenia. One example is the Kitchen Behavioural Scoring Scale (Fortin, Godbout, Doucet, & Braun, 2002; Semkovska, Stip, Godbout, Paquet, & Bédard, 2002). These assessments do not take into account the other domains of cognition when quantifying and qualifying the different error types observed during task performance. Because of their specific goals and outcomes, the usefulness of these assessments to determine the mastery and competence in a daily task, as well as to orient rehabilitation interventions in people with schizophrenia is not manifest.

Process task analysis usually occurs after a sequence (or procedural task) analysis has been completed following the observation of the client's performance (Hagedorn, 2000). This type of performance analysis refers to the "observational evaluation of the quality of a person's task performance" (Fisher, 1998, p. 517) and is useful to determine whether a person's skills are adjusted to the demands of a task (Chapparo & Ranka, 1997b; Fisher, 1998). Process task analysis involves examining errors observed during task performance in order to determine the difficulties in the cognitive processes that underlie these errors (Chapparo & Ranka, 2003). Indeed, the way the person approaches and accomplishes the task is sometimes more informative than the end product of the task (Toglia, 1998). The outcome of the process task analysis is a qualitative or quantitative measure of the mastery of skills (Chapparo & Ranka, 2005) and may indicate the level of difficulty or dependency in performing each activity (Gitlin, 2001), as well as the person's efficiency and competence in performing a task (Fisher, 1995). The Assessment of Motor and Process Skills (AMPS), which has been used with various populations and the PRPP System use process task analysis.

Different taxonomies have been developed to further describe the strengths and difficulties observed during task performance (Hagedorn, 2000). The intellectual skills described by Cohen and Anthony (1984), such as making decisions and setting goals, are examples of cognitive operations necessary for daily task performance. Fisher (1995) has defined process skills as component actions of task performance that are observable during the accomplishment of everyday tasks. These process skills are used to "organize and adapt actions of task performance as it unfolds over time" (p. 15). Toglia (1998) described processing strategies and behaviours as "organized approaches, routines, or tactics that operate to select and guide the processing of information" (p. 8) and that can be observed during task performance. These small units of behaviours cut across the traditional cognitive function domains such as memory, attention, and executive function (Toglia) and are presented in the PRPP System model as information processing strategies during task performance (Chapparo & Ranka, 2005). A potentially great number of these behaviours can be applied to task performance (Chapparo & Ranka). Process skills and processing strategies may therefore be defined as the discrete behaviours and actions necessary for the accomplishment of daily tasks.

Performance-based assessments are also categorized according to whether they are norm-referenced or criterion-referenced. Norm-referenced tests involve comparing the performance of a person on a task for which norms have been delineated from a general or specific population (Ottenbacher & Christiansen, 1997). Normative data are usually presented in tables. Such data are based on the idea that there is a "normal" way to perform a task. This can become an issue with people with schizophrenia, especially in the context of measuring change in functioning. A normative standard would be difficult to define in regards to daily functioning (Bellack et al., 2007).

Criterion-referenced tests compare a person's performance on a task to an expected performance standard or to that person's own performance, rather than to the performance of others (Chapparo & Ranka, 2005; Ottenbacher & Christiansen, 1997). Criterion-referenced tests are used to evaluate a person's competence or mastery, and can be used to guide the progression of treatment (Fisher, 1992; Ottenbacher & Christiansen). The score on this type of test represents the person's actual ability to perform in a specific task or setting rather than how that person compares to others.

A distinction has been suggested in terms of outcomes in the International Classification of Functioning, Disability and Health (ICF) model of functioning (WHO, 2001b) that has been retained by other authors. Functional capacity corresponds to the actual ability of a person to execute a task in a standardized environment where conditions are controlled (Bowie et al., 2006; Harvey et al., 2007; WHO). Functional performance, also labelled "real-world performance," describes what the person really does in his or her personal environment (Harvey et al., 2007; WHO), as other factors may intervene such as confidence, motivation, and other environmental factors (Harvey et al., 2007). Functional limitations refer to "a limitation or a restriction in the ability to perform an action or an activity in the manner or range considered normal that results from impairment" (Reed & Sanderson, 1999, p. 187). Functional limitations can be used to further describe the difficulties experienced by people with schizophrenia during the performance of daily tasks.

2.4.4 Daily activities of people with schizophrenia

Studies have demonstrated that the more people with schizophrenia were independent in maintaining their community living, the more competent they were in their daily activities (Bartels et al., 1997; Dickerson, Ringel et al., 1999; Sood et al., 1996). Aubin, Hachey, and Mercier's (2002) study of the meaning of daily activities and quality of life in people with schizophrenia found that being involved in daily activities supported a sense of competence and pleasure. Aubin, Hachey, and Mercier (1999) also found that perceived competency and pleasure from daily activities influenced quality of life. In a qualitative study of the daily occupations of people with schizophrenia, household chores, work-related activities, and daily household maintenance were perceived as opportunities to contribute to the community environment (Haertl & Minato, 2006). Study participants perceived these activities as contributing to their quality of life and to a healthy lifestyle. Furthermore, these activities were often viewed as having a "normalizing" effect and as contributing to a sense of productivity.

However, studies consistently demonstrate that many people with schizophrenia show some impairment in their performance of daily activities. Generally, these people are less often involved in daily activities and have more deficits affecting autonomy compared to people without a psychiatric diagnosis

(Brown, 1998; Girard et al., 1999) and to people with other psychiatric diagnosis such as depression (Girard et al.).

Walkup and Gallagher (1999) found that men reported more limitations in their daily activities than women. In a study of long-term homemaking functioning, men, compared to women, more often had hygiene problems and difficulties with household and money management (Hintikka et al., 1998).

Studies have investigated the performance of people with schizophrenia on specific daily activities; other studies have compared performance of people with schizophrenia to control groups; two other studies compared the performance of subgroups of people with schizophrenia with different functional levels. These studies are reviewed further in section 2.6 on daily activities and cognition and in the paper published in the journal *Santé mentale au Québec* (Aubin, Gélinas, Stip, Chapparo, & Rainville, 2007) in section 2.6.2. However, the results pertaining specifically to the description of the performance of daily activities and functional limitations are presented here. Additional studies are also reported.

Two studies explored the performance of people with schizophrenia in a shopping task. One study used the Test of Grocery Shopping Skills (TOGSS) (Hamera & Brown, 2000) with 73 participants (Rempfer, 1999). This assessment produces three global scores: accuracy (choosing the right item at the right price and format), redundancy (number of rows or sections in the store visited), and efficiency (total task duration). Participants in the study were found to have difficulties with all three indices.

A study of individuals experiencing a first episode (n = 23) also used a shopping task. Performance was assessed with the Perceive, Recall, Plan and Perform (PRPP) System of Task Analysis (Still, 2006). The PRPP System is a two-stage, criterion-referenced assessment based on an information-processing model, and assesses the efficiency of the information processing strategies underlying the performance of a daily task. In the study, errors in performance were first identified. Then, a total of 34 observable behavioural descriptors (e.g., modulates, recalls steps, identifies obstacles, calibrates, persists, times) were assessed during the shopping task. These descriptors are spread into four quadrants: Perceive (perception/attention), Recall (memory), Plan (planning, programming and evaluating), and Perform (enactment of the plan). Participants committed more errors of accuracy than errors of omission, repetition, and timing during the shopping task (Still). Moreover, descriptors in the Plan quadrant were most affected, followed by the Perceive, Recall, and Perform quadrant descriptors. The results obtained in this study could lead to more precise identification of functional limitations than the TOGSS, as the PRPP System assessment was based on the observation of a number of individually described and rated behaviours instead of three global indices based on success or failure in accomplishing of the task steps.

Studies have compared the performance of people with schizophrenia during shopping and meal preparation tasks to that of control groups. When compared to a control group (*n* = 22) using the TOGSS, participants (*n* = 53) had more difficulties than controls on all of the above-mentioned measures, namely, accuracy, redundancy, and efficiency (Greenwood et al., 2005).Moreover, in the same study, participants with a higher severity of negative symptoms (*n* = 28) had lower scores on all measures of task performance than those without negative symptoms (*n* = 25).

A neuropsychological approach to errors associated with impaired executive function was used to analyze task performance of a group of 27 individuals with schizophrenia (17 outpatients and 10 inpatients) and 27 controls. The task included choosing a menu, shopping for ingredients, and preparing a meal for two (Fortin et al., 2002; Semkovska, Bédard, Godbout, Limoge, & Stip, 2004). In this approach, the assessment was based on the most efficient sequence of actions that would produce the most efficient and cost-effective approach to the ADL. Scores were based on number of sequencing errors, omissions and repetitions, as well as on amount of time to complete the mail and the length of delay between completing the first and second dishes. Compared to controls, participants with schizophrenia made more omission errors in the menu task; more sequencing and repetition errors in the shopping task; and more sequencing, repetition, omission, and macro-step planning errors in meal tasks. They also had a longer delay between the first and last dishes. Similar results were obtained in another study using the same IADL task (Godbout, Limoges, Allard, Braun, & Stip, 2007). Participants with schizophrenia (n = 33) were compared to controls (n = 16). The schizophrenia group took longer for the grocery shopping and meal serving tasks and was less able to stay within budget, resulting in more failure to meet goals on the grocery and meal tasks. The schizophrenia group also committed more omission and perseveration errors. Unfortunately, identification of the different types of errors did not lead to better understanding of functional limitations or of impaired observable skills and behaviours.

Two studies explored differences in functioning of subgroups, based on their success in the execution of daily tasks. During three simple meal preparation tasks, 10 participants with schizophrenia were evaluated in terms of their degree of independence in carrying out each step of the recipes (Knight, 2000). Assessment of the individual's ability to prepare recipes centred on the level of assistance the individual needed to complete the steps. Unfortunately, the intervention protocol of the examiner left little opportunity to observe problem-solving mechanisms when difficulties arose. The author completed her assessment by describing observed problematic behaviours. The group that succeeded best executed the tasks autonomously, showed better organizational skills and judgement, could anticipate future steps and their sequence, and was able to solve problems. The intermediate group had more difficulty maintaining and working out a plan, maintaining attention to the task, and solving problems, and also had safety issues. Those with the lower level of performance needed much assistance to finish the tasks, as compared with the other group. These study participants had difficulty identifying and solving problems and using feedback. They also had difficulty determining the length of each step, waiting for steps to be completed, following instructions, and maintaining attention and motivation.

In another study, two groups of participants with schizophrenia with different levels of functioning were compared on their performance on the same IADL task (Stip et al., 2007). Groups were formed based on performance on another assessment of daily tasks, the Assessment of Motor and Process Skills (AMPS) (Fisher, 1995) and on level of residential autonomy. This resulted in one group of 12 participants with a high level of task performance and autonomy and a group of 11 participants with a low level of task performance and autonomy. The IADL task on which participants were compared has been described previously and involved choosing a menu, shopping for ingredients, and preparing a meal for two. Groups differed on the length of delay between the first and second dishes: The lower functioning group took longer and tended to make more omission errors. Both studies revealed interesting trends for further exploration of different levels of ability in task performance; however, these studies involved major limitations, given their small sample sizes and the absence of a theoretical model supporting the observation and the systematic description of problematic behaviours in the first study.

Performance of activities such as IADLs is key to the residential independence and community tenure of people with schizophrenia. These activities are complex and require the use of numerous cognitive abilities. Many problems have been reported in studies on the performance of daily activities in people with schizophrenia. However, these problems have not been well described in terms of functional skills due to limitations inherent to the performance-based assessments used in these studies.

Several characteristics relevant to the assessment of these daily activities among people with schizophrenia have been highlighted. They include taking a cognitive perspective on task performance, following a performance-based and criterion-referenced approach, and using process task analysis to better describe functional skills and limitations in people with schizophrenia. Moreover, this assessment should be based on a theoretical model that focuses on the interaction of cognition and task performance. The PRPP system seems to be one such assessment.

Another aspect of daily activity performance that has not been well examined is the existence of subgroups of people with similar functional profiles. Little is known about different subgroups of people with schizophrenia based on varying ability levels in performing daily activities, as studies have experienced various limitations, especially concerning sample size. A better understanding of the variability of functional limitations within a group of people with similar psychiatric diagnoses would be helpful to better identify needs in terms of goals and treatment interventions (Girard et al., 1999).

Considering the fact that many people with schizophrenia have difficulty performing various cognitive tasks, it is not surprising that their ability to perform daily tasks that involve staying focused, solving problems, modifying strategies, and remembering instructions is impaired (Tamminga et al., 1998). The following sections examine the influence of cognition on functioning. First, at a more global level, the association between cognition and community functioning will be described. Then, at the more immediate skill level, the relationship between cognition and daily task performance will be examined in more detail.

2.5 Relationship between cognitive function and community functioning

Neurobiological vulnerability, as described in the vulnerability-stress model (Lalonde, 1999; Nuechterlein & Dawson, 1984), and its resulting cognitive impairments have been recognized as one of the predominant factors that influences the functional outcome of people with schizophrenia (Liberman, 1996). Indeed, interest in the consequences of cognitive impairments on community functioning and daily activities has grown over the past few decades. Research findings have led many authors to conclude that cognitive deficits, more than symptoms, predict community functioning (Green et al., 2000; Hoff & Kremen, 2003; Liddle, 2000).

This section presents results from cross-sectional studies that have explored the links between cognition and community functioning. Results are discussed from longitudinal studies that examined cognitive variables that best predict community functioning and the relationship of cognitive and functional changes over time.

2.5.1 Relationship of specific cognitive functions to community functioning

Green's (1996) review of 17 studies on the functional consequences of cognitive deficits in people with schizophrenia drew attention to the consequences of cognitive deficits for different life domains through a synthesis of the most relevant studies available at that time. Outcome variables were categorized into three domains: community outcome, social problem solving, and social skills acquisition. As explained earlier, community outcome for outpatients with schizophrenia was defined in Green's review as the "results of competence in a large number of constituent social and instrumental role tasks" (p. 323) and was characterized by global indices of community functioning, mainly in the social and occupational domains. The two other domains, social problem solving and social skills acquisition, were outcomes used mostly for hospitalized individuals.

Results from Green's (1996) review supported the existence of an association of certain variables with community outcome in people with schizophrenia. Long-term verbal memory was associated with all three domains of functioning and was also a predictor of community outcome. Executive functions, measured with card sorting tests to gauge cognitive flexibility, were also related to community outcome. Sustained attention was associated with social problem solving and social skills acquisition. Short-term verbal memory was associated with social skills acquisition.

A second review (Green, Kern, Braff & Mintz, 2000) expanded Green's (1996) review to include 37 studies. In this second review, the outcome domains were labelled differently, with "daily activities" being added to "community outcome." The changes in labelling of the community outcome domain reflect the researchers' greater interest in daily activities as an important aspect of community functioning.

Meta-analyses confirmed the conclusions from Green's (1996) review, with verbal fluency also found to be associated with community outcome. In studies using a global cognitive score, cognitive deficits were found to explain between 20% and 60% of the variance of the outcome measures. The coefficients of association between the neurocognitive tests and the outcome measures in these studies ranged between 0.20 and 0.40. Green et al. (2000) noted that mixed results were obtained with the card sorting test and sustained attention measures, indicating that more studies were needed to clarify the relationship of these variables and the different domains of functioning.

Green et al. (2000) conducted another series of meta-analyses with studies that used long-term memory tests, such as list learning tests and tests of passages and prose. The results demonstrated that the estimated associations for list learning with functional outcomes from the three categories (community outcome, problem solving skills, and skills acquisition) were almost twice the size of the other memory tests. The estimated *r* for list learning was 0.42, while for the tests of memory for passages and prose, *r* was estimated at 0.24. Green et al. hypothesized that the learning potential may be particularly relevant for community outcome.

To build on Green et al.'s (2000) literature review, 12 recent cross-sectional studies on the relationships of cognition and community functioning were reviewed, as it was likely that the association of new cognitive variables and community functioning may have been further explored, yielding new information on the relationships of cognition and community functioning. Community functioning measures in most of these studies included a section on the performance of IADLs and on behaviours that were thought to have an impact on community functioning. Detailed results from these studies are presented in Appendix 3, as well as the description of the study's sample, outcome measures, and cognitive assessments. Studies were grouped according to the cognitive measures used, whether they were global or specific. Although not exhaustive, an analysis of the strengths and limitations was done, especially relative to the cognitive and community functioning measures used.

In addition to the reviews by Green (1996) and Green et al. (2000), three other studies have found that global cognitive scores were positively associated with the community functioning measure and were predictors of this outcome (Bowie et al., 2006; Keefe, Poe, Walker, Kang, & Harvey, 2006; Moriarty et al., 2001). However, another study obtained different results, with no association being found between the composite score of cognitive functioning and community functioning (Cohen& Talavera, 2000). In this latter study, negative symptoms and medication intake predicted the level of functioning. However, the authors used a dichotomized cognitive score, determined by a cut-off score of a global cognitive measure, and a dichotomized functional score, using a cut-off randomly based on the ability to perform two or more daily tasks. This resulted in a loss of information on both cognitive and functional domains, which may explain the difference in results. Still, results from the these studies support the fact that global measures of cognition generally present stronger associations with community functioning than do measures of specific cognitive functions (Green et al.), however, global measures provide limited information on which cognitive function is most closely associated with functioning.

The assessments of specific cognitive function provide more precise information about the links of cognition with community functioning (Green, 1996). As previously observed by Green, these specific cognitive functions were measured with a variety of tools, and different cognitive functions were assessed in each study (see Appendix 3).

Long-term verbal memory was associated with community functioning in two studies (Lehoux et al., 2003; Martinez-Aran et al., 2002), but a third study failed to find an association (Clark & O'Carroll, 1998). This difference may be explained by the functional assessment and by the sample used in Clark and O'Carroll's study. The REHAB total score in that study was not associated with long term memory or other measures of cognition. The REHAB scale (Baker & Hall, 1988) includes deviant behaviour (disruptive or embarrassing behaviours such as violence, self-harm, incontinence, and shouting) and general behaviour subscales (social activity, speech disturbance, and speech skills, as well as self-care activities and community skills). The REHAB scale was designed for people living in institutions, hospitals, or other residential settings, with a high level of disability (Phelan, Wykes, & Goldman, 1994), and among whom the deviant behaviours described in this scale were exhibited more frequently compared to people living in the community. Since Clark and O'Carroll's study used a sample composed of inpatients, the use of the REHAB scale was justified. Participants in Clark and O'Carroll's study may have still been in a sub-acute phase, a situation in which it is possible that symptoms more than cognition may have affected the daily life of participants. Therefore, it is not surprising that the REHAB total score was found to be associated with disorganization symptoms that affected speech and psychomotor poverty symptoms.

As in Green (1996) and Green et al. (2000), short-term verbal memory was not associated with community functioning in the two studies that included the assessment o this cognitive function (Lehoux et al., 2003; Martinez-Aran et al., 2002).

The association of community functioning measures and executive functions using the WCST or a version of that test was found in three studies (Lehoux et al., 2003; Martinez-Aran et al., 2002; Poole et al., 1999). One study found that functioning was associated with planning, as measured by the Tower of London test (Lehoux et al.).

However, other studies have found no association between executive function and community functioning. Contrary to Green et al.'s (2000) findings, verbal fluency was not associated with functioning in Martinez-Aran et al.'s study (2002) and Revheim et al's study (2006). When examining the results of the studies reviewed by Green (1996) and Green et al., it seems plausible that verbal fluency may have been associated more with specific aspects of community functioning such as work and quality of life.

Clark and O'Carroll (1998), using a measure of planning and organizational abilities over time, namely the Modified Six Element Test (MSET) (Evans et al., 1997), also failed to find an association between executive functions and community functioning. The MSET differs from other neuropsychological tests because it was built to be ecologically valid in order to predict everyday problems related to dysexecutive syndrome (Wilson, Evans, Emslie, Alderman, & Burgess, 1998). The absence of a relationship between executive function, measured with the MSET, and functioning is surprising, as the MSET has been found to detect planning and problem solving deficits in people with schizophrenia (Evans et al.; Wilson et al.). The results obtained by Clark and O'Carroll may be explained by the choice of the REHAB scale, as well as by the sample of inpatients, as explained earlier.

As in Green et al.'s (2000) review, results for sustained attention were mixed. Revheim et al. (2006) found an association between sustained attention and functioning, but Lehoux et al. (2003) did not. In Revheim et al.'s study, community functioning was measured using the Independent Living Scales, with the Problem-Solving factor subscale ([ILS-PB], Revheim & Medalia, 2004), a 33-item questionnaire based on problem solving in daily activities. Sustained attention was found to be better correlated with social problem solving in the studies by Green (1996) and Green et al., and this could explain the results in Revheim et al.'s study.

The association between community functioning and three cognitive functions that were not well represented in the reviews by Green (1996) and Green et al. (2000), namely, working memory, processing speed, and fine motor dexterity, have been explored. A relationship between working memory and community functioning was found in three studies. Verbal working memory (Dickinson & Coursey, 2002; Revheim et al., 2006) and visuo-spatial working memory (Takahashi et al., 2005) were found to be associated with community functioning. Processing speed was associated with functioning in two studies (Dickinson & Coursey; Revheim et al.).

The relationship between psychomotor tasks and community outcome has not been well understood. Two studies including psychomotor tasks revealed significant associations between fine motor dexterity (Lehoux et al., 2003), sequenced drawing, as part of the executive dysfunction factor (Poole et al., 1999), and community function. In a third study, the association of fine motor dexterity with community functioning was present, but disappeared after correcting for multiple comparisons (Revheim et al., 2006). It is not clear why these studies had different results, but the fact that only a small number of participants (n = 11) performed the fine motor dexterity test in Revheim et al.'s study may have affected the strength of the results.

In one study on neurocognitive correlates of recovery from schizophrenia, no functional measures were used (Kopelowicz, Liberman, Ventura, Zarate, & Montz, 2005). Instead, the group of 56 participants with schizophrenia were divided into two subgroups, according to whether they were "recovered" or "non-recovered." The performance of both groups on cognitive tests was compared to that of a control group. Participants in the recovered subgroup had to meet the following criteria in a stable way for at least two years: experience little or no positive or negative symptoms, work or study on at least a part-time basis, have a good social network, and live alone without supervision. Participants in the non-recovered subgroup were matched on age, gender, ethnicity, and parental educational level to participants in the recovery subgroup. Participants were included in the non-recovered subgroup if they did not meet the criteria for recovery but were clinically stable for at least one year. Participants in the recovered group performed better than participants in the non-recovered group on tests of executive functions, verbal working memory, verbal fluency, and verbal learning, suggesting that these cognitive functions may make the difference between high and moderate/low level of functioning. Participants in the recovered group had lower performance scores on verbal learning tests and tests of span of apprehension compared to controls, supporting the fact that these cognitive functions may be affected even when people with schizophrenia demonstrate a high level of functioning. Both subgroups and the control group had similar scores on the visuo-perceptual skills test. The information obtained from this study is useful for increasing understanding of which cognitive functions are determining criteria for better community functioning. However, the strict criteria used to differentiate between the recovered and non-recovered groups limit generalizability to people with other levels of functioning, as the abovementioned criteria do not reflect the continuum of functional status observed in the clinical realm, including the capacity to work, severity of symptoms, need for supervision, and quality of social networks.

Green (1996) identified limitations in the studies on the relationship between cognition and functional outcomes, such as a great variety of cognitive and community functioning measures affecting the power of the studies and the possible generalization of their results. These limitations were also found in the additional 12 studies reviewed earlier.

In terms of cognitive measures, Velligan et al. (2000) and Dickinson and Coursey (2002) have suggested that many different cognitive measures may be highly intercorrelated, which may indicate that the cognitive constructs, too, are interrelated. For example, in two studies, all subscales of Weschler Adult Intelligence Scale ([WAIS-III], Weschler, 1997), namely verbal comprehension, perceptual organization, working memory, and processing speed, as well as the full-scale IQ, were strongly associated with the composite functional score (Dickinson & Coursey; Revheim et al., 2006). The subscales were also strongly correlated with one another and with the WAIS-III full-scale IQ, and, according to the authors, this was part of the explanation for the association of all the cognitive subscales with the functional scores.

Tests used as specific measures of cognitive function are used as an indicator for the construct (e.g., WCST) and as the construct itself (cognitive flexibility) (Green & Nuechterlein, 1999). Many tests can measure the same construct, and a single test may measure a number of constructs or abilities (Velligan et al., 2000). Other researchers who have assessed one specific function, such as spatial working memory, used a test and a score computation unique to this study (Takahashi et al., 2005), thus limiting future comparisons. Although the results from these studies add to the body of knowledge on cognition and function in schizophrenia, the methodological decisions make it difficult to draw definite conclusions from these studies about which cognitive functions were associated with community functioning.

Studies using specific cognitive function tests have also used various outcome measures. In such studies, community functioning measures have been presented with various constructs, components, and assessment methods. In fact, not many studies defined community functioning as a theoretically based construct; rather, they described it according to the measurement tools or methods used. Limitations were observed in the specificity of domains assessed relative to community functioning.

Functional level has sometimes been determined by the capacity to accomplish a certain number of daily tasks (Cohen& Talavera, 2000) or by global functioning scales. Using a cut-off randomly based on the ability to perform two or more daily tasks resulted in a loss of information on functional domains in Cohen and Talavera's study.

Global functioning scales have frequently been used to measure treatment outcome. In three studies, functioning was measured with the Global Assessment of Functioning Scale ([GAF], APA, 1987) or the Social and Occupational Functioning Assessment Scale ([SOFAS], APA, 2000). The GAF is based on specific ratings on one single axis, taking into account the level of psychological, social, and occupational functioning on a continuum of mental health–illness. The SOFAS is similar to the GAF in that both are numerical scales that provide a global rate, but the SOFAS is not confounded by symptom severity. However, the use of a single-axis scale including psychological, social, and occupational aspects of functioning offers little precision as to the actual source of dysfunction (Phelan et al., 1994; Rosen, Hadzi-Pavlovic, & Parker, 1989) and is less useful in identifying functional difficulties (Fossey & Harvey, 2001). These scales may not give an adequate portrait of a person's strengths and weaknesses in terms of functioning (Silverstein, 2000), as these different domains may not vary together (Dickerson, 1997; Fossey & Harvey). The level of functioning in daily activities is inferred from these scales, which are generally oriented more toward assessing work and school performance.

Another study focused on problem solving in daily activities as a functional outcome indicator, using the Independent Living Scales ([ILS], Revheim &

Medalia, 2004), which is a 33-item questionnaire based on problem solving in daily activities (Revheim et al., 2006). The Problem Solving section (ILS-PB) is limited to the evaluation of abstract reasoning and judgment required for daily living, which is one of the categories of skills necessary for independent living. However, it provides no information on the actual performance of daily activities or other aspects of community functioning.

In the studies reviewed, information about community functioning was obtained through reports and observations of daily functioning made by caretakers of people with schizophrenia. This carried the risk of bias, as these caretakers may not have been aware of all the activities performed by those in their care (Bellack et al., 2007; Dickerson, 1997; Norman et al., 1999; Velligan et al., 2000). No information was collected through self-reports from the actual study participants. However, obtaining information from the participant, as well as from clinicians and significant others in the person's life has been recommended to reflect multiple perspectives and increase the credibility of the results (Ciarlo, Brown, Edwards, Kiresuk, & Newman, 1986).

Other limitations pertain to the treatment status and age of participants. Five studies were conducted with samples of inpatients, and the others used stable outpatients. Symptoms in the acute or sub-acute phase may introduce more noise in the variance of functional measures (Dickinson & Coursey, 2002). As mentioned in the previous section on cognition, cognitive deficits may be exaggerated in the acute phase of schizophrenia. It is expected that the clinical and residual symptomatic state of stable outpatients is part of their "daily life" situation, and that situation is more likely to have an enduring implication on functional status (Dickinson & Coursey).

A number of studies were conducted with older adults, who are at a stage of cognitive decline and for whom community functioning is expected to differ from that of younger people. Three studies included people with a mean age between 58 and 75, which is within the range of expected cognitive and functional decline for people with schizophrenia, which is determined to be above age 65. It could therefore be argued that results from these studies of older adults do not accurately reflect the level of cognitive and community functioning among younger adults.

2.5.2 Impact of cognitive deficits on community functioning over time

Longitudinal studies have an important predictive power for both cognitive and functioning variables, as they consider their evolution or change over time. Two reviews have focused specifically on longitudinal studies of cognition and functional outcome. In Green, Kern, and Heaton's (2004) review of 18 studies, 14 of these studies supported a positive relationship between baseline cognition and community functioning when the two variables were measured with a minimum six-month follow-up period. However, based on this review, none of the specific cognitive constructs (e.g. attention, memory , etc.) previously found to be associated with community functioning was identified as being more important than others in terms of their relationship with community functioning.

The second review examined nine studies exploring the links between changes in cognitive function and changes in functional status (Matza et al., 2006). The synthesis of results generally supported the fact that cognitive changes are associated with changes in community functioning. Results consistently demonstrated that a decline in global measures of cognition was associated with a decline in functional status. Changes in memory, processing speed, and executive function were associated with changes in functional status, although these results were less consistent. The authors concluded that more research is necessary to determine how cognitive variables are associated with specific functional domains over time, including daily activities, and whether these changes are noticeable at the same rate.

A recent study of 55 participants involved in a rehabilitation program found that better community functioning, especially more autonomy in activities of daily living, and less interference of physical and psychiatric symptoms on rehabilitation, were predicted by better baseline visual memory (Prouteau et al., 2005). Community functioning was measured with the Multnomah Community Ability Scale (MCAS), which was developed for people with severe mental disorders living in the community. The scale examines social competence, behavioural problems, interference with functioning, and adjustment to living skills (Barker, Barron, McFarland, & Bigelow, 1994).

In summary, despite the differences and limitations of various cognitive and community functioning assessment tools, results from recent cross-sectional and longitudinal studies are generally consistent with Green's conclusions (1996) that indicate an association between long-term verbal memory and executive function and community functioning. Working memory, processing speed, and negative symptoms were also found to be associated with community functioning, while less consistent associations were found with fine motor dexterity, attention, and positive symptoms. Among these tests, those assessing learning potential, such as memory tests of list learning, have been hypothesized as being relevant for community functioning.

Limitations around the choice of cognitive and community functioning assessments and the characteristics of study participants have been discussed. The next step involves exploring the relationship between cognition and daily activity performance in order to develop a deeper understanding of the impact of cognitive deficits on functioning in daily life. A review of studies that exclusively used performance-based assessments of daily activities as a measure of functioning will be presented in the next section.

2.6 Cognitive deficits and daily activities

A review was conducted of 12 recent cross-sectional studies that focused on the association between cognition and daily activity performance among people with schizophrenia. This review is presented in three parts. The first part concerns studies on daily activities and cognition that used performance-based assessment of daily tasks focusing on the overall ability to complete several daily tasks. The second part is a manuscript that was published in the journal *Santé mentale au Québec* in 2007. This manuscript is a review of studies on daily activities and cognition that used specific performance-based assessments using task analysis that focused on the quality of the performance in a limited number of daily tasks. The third part is a summary of relevant studies that have been published since the 2007 publication, as well as results of five longitudinal studies that included daily activities as an outcome. The results of these studies are presented in detail in Appendix 4.

2.6.1 Studies on cognitive deficits and daily activities using global performance-based assessments of daily activities performance

Three studies used a global cognitive measure and a performance-based assessment of a number of ADL and IADL tasks (Bowie et al., 2006; Keefe et al., 2006; Klapow et al., 1997). Each study reported a positive association between the global cognitive score and the performance-based assessment. In one of these studies, global cognition measured with a cognitive screening tool was the only predictor of the performance-based assessment of daily activities over sociodemographic data and clinical assessments (Klapow et al.). In the two other studies, a positive association was found between functional capacity measured with the performance-based assessment and community functioning. Functional capacity predicted community functioning and mediated the effect of cognition on community functioning in one of these studies (Bowie et al.). In the other study, functional capacity did not explain community functioning variance over a global cognitive rating (Keefe et al.). Differences in the prediction of community functioning by functional capacity in these two studies may be explained by the different types of statistical analysis used, that is, stepwise regression analysis, which assesses the linear relationship between one dependent variable and a number of independent variables, in Keefe's study, and confirmatory path analysis, which tests models taking into account complex relationships, such as direct and indirect effects of independent variables on dependent variables (Tabachnik & Fidell, 2001), in Bowie's study. The cognitive rating scale used in Keefe et al.'s study also tapped into the same life domains and skills as the community functioning assessment.

Two studies used tests for specific cognitive functions as well as a performance-based assessment of success in various daily tasks. In Schretlen et al.'s (2000) study, the performance-based assessment included observations on an inpatient ward and ADL and IADLs of 105 individuals with severe mental illness, including 35 with schizophrenia. Auditory divided attention, long-term memory, and a diagnosis of schizophrenia were the only variables predicting scores on the performance-based assessment. In Twamley et al.'s (2002) study, 111 individuals with schizophrenia were assessed through cognitive tests, with a performance-based assessment of daily activities and a measure of residential independence. Results of the cognitive tests (global dementia rating scale, verbal abilities, verbal memory, attention/working memory, motor and psychomotor abilities, cognitive flexibility, and learning), as well as negative symptoms, were associated with the performance-based assessment of daily activities. The degree of residential independence was associated with daily activity performance. Only the memory subscale of the dementia rating scale and negative symptoms predicted the assessment of daily activities.

In the previous five studies, performance-based assessments of daily activities included ADLs, IADLs, and observations on an inpatient ward. Many activities were included in the performance-based measures and performance analysis was based on the success or failure in performing these tasks. Consequently, little information was provided about the process of executing these tasks or about specific areas of strength and weakness (Rempfer, Hamera, Brown, & Cromwell, 2003) during the performance of daily tasks among people living in the community. The performance-based assessments used in the above studies did not yield specific information about which daily tasks were problematic and how any such difficulties were associated with various aspects of cognition. Following is a manuscript on a review of studies on cognitive deficits and daily activities using specific assessments of daily activity performance.

First Manuscript

A limited number of studies explored the links between cognition and daily activities on the "task performance" level, taking into account behaviours and actions observed during the performance of daily activities. Five studies were found in a literature review that investigated the relationship between cognition and the performance of specific daily activities using a task analysis among people with schizophrenia. The following manuscript, published in French in *Revue Santé Mental au Québec* presents a brief review of these studies. The details and results of these studies are presented in Appendix 4.

2.6.2 Les activités quotidiennes et la cognition chez les personnes atteintes de schizophrénie

Ginette Aubin[1], Isabelle Gélinas[2], Emmanuel Stip[3], Christine Chapparo[4], Constant Rainville[5]

[1]Ergothérapeute, Ph.D. candidate, Centre Hospitalier de l'Université de Montréal ; [2]Ph.D., École de Physiothérapie et d'Ergothérapie de l'Université McGill, Centre de Recherche Interdisciplinaire en Réadaptation ; [3]MD, Hôpital Louis-H. Lafontaine, Centre de Recherche Fernand-Séguin ; [4]Ph.D., School of Occupation and Leisure Sciences, University of Sydney, Australia; [5]Ph.D, Centre de Recherche de l'Institut Universitaire de Gériatrie de Montréal.

Reprinted with permission from Aubin, G., Gélinas, I., Stip, E., Chapparo, C., & Rainville, C. (2007). Les activités quotidiennes et la cognition chez les personnes atteintes de schizophrénie. *Santé mentale au Québec, 32*, 201-208.

2.6.2.1 Résumé

Cet article présente une recension des écrits sur l'impact des déficits cognitifs sur les activités quotidiennes des personnes atteintes de schizophrénie, domaine encore peu exploré. Les études recensées ont démontré des associations entre les déficits de l'attention soutenue, de la mémoire de travail, de l'organisation, de l'utilisation de la stratégie spatiale et certaines difficultés observées pendant l'exécution d'une tâche quotidienne. Par ailleurs, l'article questionne le type d'analyse de tâche utilisé dans ces études pour décrire les problèmes observés. Des suggestions sont faites par rapport au type d'analyse à prioriser afin d'obtenir des informations plus complètes sur les processus cognitifs, et les comportements observés au cours de l'accomplissement des tâches quotidiennes par ces personnes.

2.6.2.2 Abstract

This paper presents a literature review on the impact of cognitive deficits on daily activities in persons affected by schizophrenia, a domain little explored. Associations were found in studies between cognitive functions such as sustained attention, working memory, organisation and use of spatial strategy deficits and specific difficulties observed during the task performance. Besides, the type of task analysis used in these studies in order to describe the problems observed needs more investigation. Suggestions are made relative to the type of task analysis that should be given priority in order to obtain better information on cognitive processes and behaviours observed during daily task performance by persons affected by schizophrenia.

2.6.2.3 Introduction

La détérioration du fonctionnement social et occupationnel fait partie des critères associés à la schizophrénie (American Psychiatric Association, [APA], 2000). Plus que les symptômes, les déficits cognitifs présents chez les personnes atteintes de schizophrénie prédisent leur fonctionnement dans la communauté (Green, Kern, Braff, & Mintz, 2000; Hoff & Kremen, 2003; Liddle, 2000). Il est reconnu que la capacité à accomplir les activités de la vie quotidienne est une dimension majeure de la mesure du fonctionnement dans la communauté (Alexandersson, 2000; Dickerson, 1997; Green, 1993; Knight, 2000). Par ailleurs, l'impact des déficits cognitifs sur l'accomplissement des activités quotidiennes « in vivo » chez les personnes atteintes de schizophrénie a été peu exploré. Cet article présente une recension des écrits qui décrivent les liens entre l'exécution des activités quotidiennes et la cognition chez les personnes atteintes de schizophrénie. Plus spécifiquement, cette recension porte sur des études qui utilisent l'analyse de l'exécution des tâches quotidiennes et décrivent comment les déficits cognitifs affectent l'exécution de ces tâches. Une discussion mettra en perspective les résultats obtenus et proposera des pistes d'exploration.

2.6.2.4 L'impact des déficits cognitifs sur l'accomplissement des activités quotidiennes

La recension des écrits a été effectuée dans les bases de données Medline, Premedline, Healthstar, PsychInfo et Cinahl. Les études incluses devaient avoir été publiées entre 1986 et 2006, et publiées en anglais ou en français. Les termes utilisés sont schizophrénie, habiletés de vie dans la communauté, fonctionnement dans la communauté, indépendance fonctionnelle, niveau fonctionnel, habiletés fonctionnelles, habiletés de vie, habiletés de vie dans la communauté, incapacité fonctionnelle, activités quotidiennes, soins personnels et évaluation fonctionnelle. Cinq études portant spécifiquement sur l'analyse de l'exécution de tâches quotidiennes par des personnes atteintes de schizophrénie en lien avec des mesures cognitives ont été répertoriées.

Deux études (Greenwood, Landau, & Wikes, 2005; Rempfer, Hamera, Brown, & Cromwell, 2003) ont exploré les liens entre la capacité à faire des emplettes dans un contexte naturel et l'attention soutenue, la mémoire verbale, la mémoire de travail et des mesures des fonctions exécutives, telles que la flexibilité cognitive et les habiletés de planification, d'organisation et de stratégie à l'aide du «Test of Grocery Shopping Skills» (Hamera & Brown, 2000). La première étude portait sur 73 personnes ayant un diagnostic de schizophrénie, alors que la deuxième incluait trois groupes : l'un avec des personnes atteintes de schizophrénie ayant des symptômes négatifs, un deuxième groupe sans ces symptômes et un troisième groupe de participants témoins. Un score de «précision» était déterminé selon l'habileté à sélectionner les bons items dans le bon format et au meilleur prix. Un score de « redondance » était calculé selon le nombre d'allées du magasin empruntées par la personne, et ce score augmentait lorsque la personne sillonnait des allées en surplus. L'«efficience» était calculée d'après la durée de la tâche. Dans la première étude, des liens ont été obtenus entre le score de précision et les tests reflétant la vitesse de traitement de l'information et l'attention soutenue. Les scores de redondance étaient inversement associés aux résultats des mesures des habiletés de planification et d'organisation. Dans la deuxième étude, les scores de redondance, de précision, de stratégie utilisée pour faire les achats et d'efficience étaient tous associés de façon significative aux tests de stratégie spatiale, de fluence et d'inhibition verbale et de la mémoire de travail. Le groupe ayant des symptômes négatifs était plus déficitaire, tant au plan cognitif que fonctionnel, que le groupe sans symptômes négatifs, ce dernier étant à son tour plus déficitaire que le groupe témoin.

Deux autres études ont mesuré la désorganisation comportementale pendant une activité quotidienne. Lors de la préparation d'un repas par 17 personnes atteintes de schizophrénie (Semkovska, Stip, Godbout, Paquet, & Bédard, 2002) et lors du choix du menu, des emplettes et de la préparation du repas par 28 personnes schizophrènes (Semkovska, Bédard, Godbout, Limoge, & Stip, 2004), les capacités d'organisation et de mise en séquences des étapes ont été comparées à celles d'un groupe de personnes sans diagnostic à l'aide du « Kitchen Behavioral Scoring Scale » (Fortin, Godbout, Doucet, & Braun, 2002). Dans les deux études, un grand nombre d'erreurs de « macro-séquences » (i.e. de la séquence des plats), d'omission et de répétition d'étapes ont été commises par les personnes atteintes de schizophrénie. Des associations ont été démontrées particulièrement entre les erreurs observées et les résultats aux tests évaluant la capacité à résister aux stimuli et aux interférences, et à générer des stratégies et des séquences efficaces. Les erreurs étaient alors expliquées par une difficulté à planifier lorsque l'attention doit être maintenue sur plusieurs tâches simultanément, à maintenir une intention ou un plan d'action, à résister aux stimuli de l'environnement non essentiels à la tâche.

Une dernière étude a examiné les liens entre la mémoire, l'attention soutenue et des fonctions exécutives et la capacité à préparer des recettes simples chez 10 personnes atteintes de schizophrénie (Knight, 2000). L'auteur a complété son évaluation par la description des comportements problématiques. Le groupe le plus fonctionnel a démontré un meilleur jugement et une meilleure capacité à s'organiser et à résoudre les problèmes, et a obtenu les meilleurs scores aux tests des fonctions exécutives. Le groupe intermédiaire a mieux réussi aux tests de mémoire et d'attention soutenue. Par ailleurs, il a eu plus de difficulté à maintenir et à élaborer un plan, à maintenir son attention sur la tâche, à résoudre des problèmes et a parfois utilisé des méthodes non sécuritaires. Les membres du groupe ayant le plus bas niveau de fonctionnement ont eu de moins bons scores aux tests neuropsychologiques en général, et ont dû recevoir beaucoup d'aide au cours de la tâche. Ces personnes ont eu des problèmes, au niveau de l'aspect sécuritaire, de l'identification et de la résolution des problèmes et de l'utilisation du feedback, à se représenter le processus de préparation des recettes, à attendre et à reconnaître la durée des étapes, à suivre les instructions et à maintenir leur attention et leur motivation. Étant donné la petite taille de l'échantillon, les résultats sont difficilement généralisables et doivent être interprétés avec précaution.

2.6.2.5 Discussion

Les études mentionnées précédemment ont clairement établi des liens entre certaines des difficultés observées pendant l'exécution d'une tâche quotidienne par des personnes atteintes de schizophrénie et la mesure de fonctions cognitives telles que l'attention soutenue, la vitesse de traitement de l'information, la capacité à résister aux stimuli et aux interférences et des fonctions exécutives incluant la stratégie, la mémoire de travail, les habiletés de planification et d'organisation. Dans une étude, l'impact des symptômes négatifs sur la performance a aussi été démontré. Quatre des études recensées ont identifié des problèmes lors de l'exécution dans les tâches quotidiennes à l'aide d'une analyse procédurale de la tâche (Greenwood et al., 2005; Rempfer et al., 2003; Semkovska et al., 2004; Semkovska et al., 2002). Ce type d'analyse réfère à l'efficacité de la mise en séquence des étapes d'une tâche et à la réussite de chacune de ces étapes (Chapparo & Ranka, 2003). Elle ne décrit pas les comportements problématiques observés mais seulement leur impact sur la séquence et l'efficacité de la tâche.

À l'instar des études précédentes, Knight (2000) a proposé une description qualitative très intéressante des comportements problématiques observés lors de la préparation de repas, tels que des difficultés à maintenir et à élaborer un plan, et à fournir des efforts pour maintenir son attention sur la tâche. Ce type d'analyse de performance fait partie des méthodes d'analyse cognitive de tâche, et réfère à l'évaluation par observation de la qualité du processus de la tâche (Fisher, 1998). Il vise à mettre en évidence les différences entre les exigences de la tâche et les habiletés de la personne (Fisher, 1998). Toutefois, dans cette étude, les observations n'étaient pas systématisées à partir d'un modèle théorique de cognition ou de traitement de l'information. Une analyse de tâche développée à partir d'un modèle théorique sera plus à même d'inclure toutes les composantes essentielles en accord avec ce modèle, et de faciliter l'interprétation des données recueillies (Josman & Birnboim, 2001).

Les méthodes d'analyse cognitive de tâche, connues en ergonomie, en psychologie et en ergothérapie, sont particulièrement intéressantes car elles visent à identifier et à décrire les processus cognitifs nécessaires à la performance de tâches ainsi que les stratégies cognitives utilisées pour adapter les réponses à des situations complexes (Militello & Hutton, 1998). Toutefois, peu d'outils utilisant ce type de méthode ont été développées dans la perspective d'évaluer la dimension cognitive chez les personnes atteintes de schizophrénie. Une grille d'analyse de tâche récemment connue au Québec, l'évaluation «Perceive, Recall, Plan and Perform» (PRPP) (Chapparo & Ranka, 1997b) développée pour les personnes ayant un traumatisme crânien semble pertinente. Elle a déjà été utilisée auprès de jeunes vivant un premier épisode de psychose (Still, Beltran, Catts, Chapparo, & Langdon, 2002). Cette grille s'appuie sur un modèle de traitement de l'information décrivant les habiletés cognitives requises pour la performance de tâches quotidiennes. Dans un premier temps, une analyse procédurale est effectuée, puis, dans un deuxième temps, l'analyse de la performance est complétée à l'aide d'items comportementaux observables et mesurables. Les comportements problématiques peuvent alors être identifiés et leur développement ou leur restauration intégrée dans la planification d'interventions spécifiques.

2.6.2.6 Conclusion

Les interventions de réadaptation se développent de plus en plus en vue de remédier aux déficits cognitifs, et d'améliorer le fonctionnement dans la communauté et dans les activités de la vie quotidienne des personnes atteintes de schizophrénie (Velligan, Kern, & Gold, 2006). Une façon d'optimiser les interventions de réadaptation auprès des personnes atteintes de schizophrénie ayant des déficits cognitifs, serait de mieux décrire les processus observés lors de l'exécution des activités quotidiennes en ciblant des comportements observables et mesurables qui permettent de mettre en valeur leurs forces et leurs déficits (MacDonald-Wilson, Nemec, Anthony, & Cohen, 2002). Dans ce sens, l'utilisation des grilles d'analyse telles que l'évaluation PRPP devrait davantage être explorée auprès de cette clientèle.

2.6.2.7 Références

Alexandersson, A. (2000). Using panel data to model community functioning of severely mentally ill persons. *Administration and Policy in Mental Health, 27*, 147-152.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders: DSM-IV-TR* (4th text. rev. ed.). Washington, DC: American Psychiatric Association.

Chapparo, C., & Ranka, J. (1997b). The Perceive, Recall, Plan, Perform (PRPP) System of Task Analysis In C. Chapparo & J. Ranka (Eds.), *Occupational performance model (Australia)* (Vol. 1, pp. 189-198). Lidcombe, NSW, Australia: University of Sydney, Australia.

Chapparo, C., & Ranka, J. (2003). *The PRPP System of Task Analysis: User's Training Manual.* Lidcombe, NSW, Australia: Discipline of Occupational Therapy, Faculty of Health Sciences, University of Sydney, Australia.

Dickerson, F. (1997). Assessing clinical outcomes: The community functioning of persons with serious mental illness. *Psychiatric Services, 48*, 897-902.

Fisher, A. (1998). Uniting practice theory in an occupational framework. *American Journal of Occupational Therapy,* 52, 509-521.

Fortin, S., Godbout, L., Doucet, C., & Braun, C. (2002). Strategic sequence planning and prospective memory in frontally lesioned head trauma patients performing activities of daily living. *Brain and Cognition, 48*, 361-365.

Green, M., Kern, R., Braff, D., & Mintz, J. (2000). Neurocognitive deficits and functional outcome in schizophrenia: Are we measuring the "right stuff"? *Schizophrenia Bulletin, 26*, 119-136.

Green, R. (1993). Three dimensions mental health professionals emphasize when judging levels of functioning of the severely mentally disabled in the community. *Evaluation and Program Planning, 16*, 365-376.

Greenwood, K. E., Landau, S., & Wikes, T. (2005). Negative symptoms and specific cognitive impairments as combined targets for improved functional outcome within cognitive remediation therapy. *Schizophrenia Bulletin, 31*, 910-921.

Hamera, E., & Brown, C. (2000). Developing a context-based performance measure for persons with schizophrenia: the Test of Grocery Shopping Skills. *American Journal of Occupational Therapy, 54*, 20-25.

Hoff, A. L., & Kremen, W. S. (2003). Neuropsychology in schizophrenia: An update. *Current Opinion in Psychiatry, 16*, 149-155.

Josman, N., & Birnboim, S. (2001). Measuring kitchen performance: What assessment should we choose? *Scandinavian Journal of Occupational Therapy, 8*, 193-202.

Knight, M. (2000). *Cognitive function and food preparation ability in schizophrenia.* Unpublished doctoral dissertation, University of Rhode Island, Rhode Island.

Liddle, P. (2000). Cognitive impairment in schizophrenia: Its impact on social functioning. *Acta Psychiatrica Scandinavica, 101*, 11-16.

MacDonald-Wilson, K., Nemec, P., Anthony, W., & Cohen, M. (2002). Assessment in psychiatric rehabilitation. In B. Boulton (Ed.), *Handbook of Measurement and Evaluation in Rehabilitation* (3rd ed., pp. 423-448). Baltimore: Paul Brookes.

Militello, L. G., & Hutton, R. J. (1998). Applied cognitive task analysis (ACTA): A practitioner's toolkit for understanding cognitive task demands. *Ergonomics, 41*, 1618-1641.

Rempfer, M., Hamera, E., Brown, C., & Cromwell, R. (2003). The relations between cognition and the independent living skill of shopping in people with schizophrenia. *Psychiatry Research, 117*, 103-112.

Semkovska, M., Bédard, M., Godbout, L., Limoge, F., & Stip, E. (2004). Assessment of executive dysfunction during activities of daily living in schizophrenia. *Schizophrenia Research, 69*, 289-300.

Semkovska, M., Stip, E., Godbout, L., Paquet, F., & Bédard, M. A. (2002). Behavioral dizorganisation in schizophrenia during a daily activity: The Kitchen Behavioral Scoring Scale. *Brain and Cognition, 48*, 546-553.

Still, M., Beltran, R., Catts, S., Chapparo, C., & Langdon, R. (2002). *Cognitive and functional assessment of patients with early psychosis.* Paper presented at the 3rd International Conference on Early Psychosis, Copenhagen, Denmark.

Velligan, D., Kern, R., & Gold, J. (2006). Cognitive rehabilitation for schizophrenia and the putative role of motivation and expectancies. *Schizophrenia Bulletin, 32*, 474-485.

2.6.3 Update of studies on daily activities and cognition

Since the submission and publication of this manuscript, three other studies have been published that investigate the relationship between cognition and the performance of specific daily activities among people with schizophrenia, using a task analysis. Detailed results of these studies are presented in Appendix 4.

Two of these studies examined performance using a daily living task similar to that used in Semkovska et al.'s (2004) study, which was described in the previous section. In one study, failure to reach goals in the IADL task was associated with cognitive composite scores for executive function, visual scanning, and memory in 33 individuals with schizophrenia (Godbout et al., 2007).

In the second study, two groups of participants with schizophrenia with different levels of functioning (Group 1 = high task performance, high autonomy, *n* = 12; Group 2 = low task performance, low autonomy, *n* = 11) were compared on performance of the same IADL task as used in the first study with cognitive measures (Stip et al., 2007). Of the cognitive tests, only the long-term verbal memory test differentiated the groups.

A third study explored the relationships between cognition and function in a group of 23 first episode participants (Still, 2006). Function was assessed with three instruments. A global functioning scale (SOFAS) and a quality of life scale (QLS) gave a profile of global functioning. The third instrument, the Perceive, Recall, Plan and Perform (PRPP) System of Task Analysis (Chapparo & Ranka, 1997b), was used to assess performance of a shopping task. Significant associations were found between PRPP System Perceive, Recall, and Plan quadrants and visual memory, as well as with planning measured with the TOL. Negative symptoms were also associated with performance of the shopping task. In contrast to the findings of other studies mentioned in section 2.6.1 (Bowie et al., 2006), no associations were found in that study between the performance-based assessment of a shopping task and the measures of functioning, that is, the global functioning scale and the quality of life scale; only negative symptoms predicted the SOFAS and QLS scores. The choice of a global rating scale to assess functioning may be part of the explanation for the lack of association between the shopping task and the global functioning scales. Although a strength of this study was the use of a skill-oriented assessment of the performance of a daily task, major limitations were identified that included the small sample size, the absence of a control group, the choice of global scales to assess the level of functioning, and the selection of first episode participants, which limits generalizability to people with a longer duration of illness.

2.6.4 Daily activities and cognition over time

Five longitudinal studies were found that included a section on daily activities in their outcome variables. Although they did not use performance-based assessments, they were included in this review because they could yield interesting insights into the relationship between daily activity performance and cognition over time. In one of these studies, cognitive function did not predict the frequency of daily task performance over a mean 15-year follow-up period (Fujii, Wylie, & Nathan, 2004). In this study, the cognitive functions that were assessed included short-term memory, working memory, executive function, and psychomotor speed. Cognitive function, namely long-term memory and planning, which are frequently reported to be associated with community functioning and daily activities, were not assessed. It is also possible that the frequency of the performance of daily activities alone may not be predicted by cognitive functioning over such a period of time. No relationship was found between cognition and competence and independence in daily activities in first-episode participants at one-year follow-up (Malla, Norman, Manchanda, & Townsend, 2002). Independence and competence in daily activities were better predicted in first-episode participants by their premorbid level of functioning, symptoms, and adherence to treatment. In this clientele, the impact of disorganizing symptoms on daily functioning may represent a greater problem, as treatment adherence is also an issue.

However, improved competence in daily activities was associated with better performance in terms of executive functions and visual memory in a study with stable outpatients with schizophrenia at a mean follow-up period of two years (Dickerson, Boronow, Ringel, & Parente, 1999). In Velligan et al.'s (2000) study, visual memory and executive functions predicted independence in daily activities in another group of stable outpatients at a mean follow-up period of 18 months. A fifth longitudinal study that used individuals in a rehabilitation program reported that in the long term, better adjustment to living skills was predicted by a better baseline visual memory (Prouteau et al., 2005). The study found that improvements in independence in daily living over the 15-to-16–month follow-up period was more likely to increase with higher planning abilities and lower visual memory baseline performance. It is interesting to note that the last two studies (Prouteau et al.; Velligan et al.) used the MCAS subscale of adjustment to living skills (Barker, Barron, McFarland, & Bigelow, 1994), which included ability to manage money, independence in daily living, and acceptance of illness.

2.6.5 Summary

Cross-sectional and longitudinal studies on daily activities performance and cognition, whether they used a global performance-based assessment that focused on the overall ability to complete daily tasks or a specific performance-based assessment using task analysis, have reported a relationship between cognition and daily activity performance, especially in terms of memory and executive function. However, the literature review on daily activity performance has revealed insufficient knowledge about functional limitations in schizophrenia due to drawbacks in performance-based assessments. Studies on the relationship between the performance of daily activities, cognitive deficits, and community functioning of people with schizophrenia using similar approaches present important weaknesses. Consequently, little is known about the relationships between the cognitive deficits and the functional limitations in task performance.

As this thesis analyzed the relationships between daily activities performance, cognition and community functioning, an appropriate task performance assessment was needed. Following the literature review, important characteristics were identified as critical for the assessment of daily activity performance in people with schizophrenia. The PRPP System of task analysis holds these characteristics and consequently corresponds to the requirements of this study for a performance-based assessment with a cognitive perspective to identify functional strengths and limitations during daily task performance in persons with schizophrenia. However, as only one other study reported on the use of this tool with people with schizophrenia, the first step was to further explore and describe the use of this tool with this clientele.

Second Manuscript

Following the literature review, the PRPP System of Task Analysis was found to correspond to the needs of this thesis for an assessment that is skill-oriented, performance-based and criterion-referenced. Moreover, this assessment is based on a model of information processing. This preliminary study was conducted to explore the use of the PRPP System with people with schizophrenia in two tasks with different complexity levels and to obtain preliminary estimates of interrater reliability and of construct validity. The participants were recruited in two outpatient psychiatric clinics in Montreal, Canada, and were only involved in this preliminary study. This study was an important step in preparation for the major study of this thesis.

Chapter 3

Use of the Perceive, Recall, Plan and Perform System of Task Analysis with persons with schizophrenia: a preliminary study

Use of PRPP task analysis with schizophrenia

Ginette Aubin[1], O.T., Ph.D. cand., Christine Chapparo[2], MA, Ph.D, DipOT (NSW), Isabelle Gélinas[3], O.T., Ph.D., Emmanuel Stip[1], M.D., Constant Rainville[3] Ph.D.

Corresponding author: Ginette Aubin, Centre de recherche Fernand-Seguin, 7331, rue Hochelaga, Montreal, QC Canada, H1N 3V2

ginette.aubin@mail.mcgill.ca

phone 514-251-4015, fax 514-251- 2617

Accepted for publication by the *Australian Journal of Occupational Therapy*

[1] Centre de recherche Fernand-Seguin, 7331, rue Hochelaga, Montreal, QC Canada, H1N 3V2

[2] Discipline of Occupational Therapy, Faculty of Health Sciences, The University of Sydney, PO Box 170, Lidcombe NSW, 1825 Australia

[3] Research Center, Jewish Rehabilitation Hospital, 3205 Place Alton-Goldbloom, Chomedey, Laval, QC Canada, H7V 1R2

3.1 Abstract

Background/Aim: Task analysis that targets information processing skills is an essential tool to understanding difficulties encountered by people with schizophrenia in their daily activities. The purpose of this preliminary study was to explore the use of the Perceive, Recall, Plan and Perform System of Task Analysis (PRPP) with this clientele. The specific objectives were to describe information processing difficulties as measured by the PRPP and to examine preliminary evidence of construct validity and inter-rater reliability. Methods: In the first part of this study, ten participants with schizophrenia living in the community were assessed with the PRPP during both a simple and a complex meal preparation task. Community functioning was measured with the Independent Living Skills Survey (ILSS). In the second part of this study, inter-rater reliability was appraised using three trained raters who scored 15 participants preparing the complex meal preparation task. Results: Analysis of performance demonstrates that people with schizophrenia have difficulties especially in the Perceive and Plan quadrants of the PRPP and are more challenged in the complex task. The PRPP total score for the complex task is strongly related to the community functioning score. Results indicate good inter-rater reliability for the PRPP total score and moderate inter-rater reliability for the quadrant scores. Conclusion: In spite of a small sample size, results from this preliminary study support the use of the PRPP System of Task Analysis to further explore the impact cognitive deficits have on daily task performance and thus on community functioning in people with schizophrenia.

Key words

Cognition, occupational therapy, reliability and validity, schizophrenia, task performance and analysis

3.2 Introduction

People diagnosed with schizophrenia experience a wide range of cognitive deficits that affect their performance of daily living tasks and, in turn, their community functioning (Green, 1996). Occupational therapists require occupation-focused assessments to identify and explain more precisely how cognitive deficits interfere with daily task accomplishment in these persons. Researchers have called for an assessment format that evaluates the client's skills in the context 'in which the client chooses to live, learn, socialise and work' (MacDonald-Wilson, Nemec, Anthony, & Cohen, 2002, p.425). Furthermore, these researchers assert that functional assessment in psychiatry needs: (1) to be skills oriented; (2) to contain items that are behavioural, observable and measurable; and (3) to have the capacity to assess both skill strengths and skill deficits. Hence, it is imperative that occupational therapists acquire an assessment instrument that is able to identify the level of skills demanded in relevant daily life tasks as they are performed in context. This instrument should also identify strengths and weaknesses in the cognitive processing strategies which are required to execute these critical activities. It has been suggested that measuring cognitive disorder as it occurs in the natural setting could lead to greater individualization of treatment plans and therefore to more efficient therapy outcome (Semkovska, Bédard, & Stip, 2001).

One such ecological assessment is the PRPP System of Task Analysis (Chapparo & Ranka, 1997b) which measures both task performance skills and cognitive information processing capacity over time and in context. The first objective of this paper is to describe the use of the Perceive, Recall, Plan and Perform System of Task Analysis with people diagnosed with schizophrenia. The second objective is to examine preliminary evidence for the PRPP system's construct validity and inter-rater reliability.

3.3 Function and cognition in schizophrenia

A diminished level of functioning is one of the DSM-IV-TR (American Psychiatric Association, [APA], 2000) criteria for the diagnosis of schizophrenia along with positive and negative symptoms. Many life domains are usually impaired in these persons, such as daily activities (for example, personal hygiene and nutrition), social skills, use of leisure time and financial management (Dickerson, 1997). Only about 40% of these persons are employed, mostly in sheltered organisations or workshops (Harvey & Davidson, 2002).

It is generally agreed that cognitive impairments are a central dimension of this disorder (Goldberg & Green, 2002; Sharma & Antonova, 2003) and are present to varying degrees. Cognitive disorders in people diagnosed with schizophrenia have been extensively described using information processing models. Current observations indicate that dysfunction of neuronal circuitry dynamics contributes to the brain's abnormal information processing in schizophrenia (Hajos, 2006). Deficits in attention (Braff, 1993; Light & Braff, 2005), memory (Aleman, Hijman, de Haan, & Kahn, 1999) and executive function (Velligan & Bow-Thomas, 1999), all of which have been found to affect community functioning in these people (Green, Kern, Braff, & Mintz, 2000).

The ability to successfully perform and complete daily life tasks is also a significant factor that predicts community functioning in people with schizophrenia (Alexandersson, 2000; Arns & Linney, 1995; Bartels, Mueser, & Miles, 1997; Dickerson, Ringel, & Parente, 1999; Palmer et al., 2002). Several studies have demonstrated that the capacity to perform activities of everyday life is affected by cognitive deficits (Brekke, Raine, Ansel, Lencz, & Bird, 1997; Evans, Chua, McKenna, & Wilson, 1997).

These observations have stimulated the development of ecological assessments, that take into account the personal context and daily life constraints of persons being assessed (Hamera & Brown, 2000; Patterson, Goldman, McKibbin, Hughs, & Jeste, 2001). Although this has resulted in a more precise measure of their functional abilities, only a small number of studies manage to use assessment tools addressing the impact of cognitive deficits on the specific functional skills needed for the accomplishment of daily life tasks (Aubin, Gélinas, Stip, Chapparo, & Rainville, 2007). Except for a handful of studies that describe the particular information processing deficits that may inhibit the occupational performance of people with schizophrenia in their functional context (Light & Braff, 2005), the research on this topic remains rather limited. Knowledge about the 'observable' effects of these deficits during real life performance of daily activities in these persons is therefore restricted (Bowie, Reichenberg, Patterson, Heaton, & Harvey, 2006).

Four studies identified problems related to cognitive disturbances during task execution in people with schizophrenia using a procedural task analysis (Greenwood, Landau, & Wikes, 2005; Rempfer, Hamera, Brown, & Cromwell, 2003; Semkovska, Bédard, Godbout, Limoge, & Stip, 2004; Semkovska, Stip, Godbout, Paquet, & Bédard, 2002). This type of task analysis focuses on the sequence and the mastery of the task steps (Chapparo & Ranka, 2005). It does not however, describe the problematic cognitive behaviours observed, but rather demonstrates their impact on the effectiveness of task performance. In contrast, the PRPP System of Task Analysis specifically focuses on both the operations required to process cognitive information and on the behaviours to be used during the performance of a given activity.

3.4 A system of task analysis: the Perceive, Recall, Plan and Perform (PRPP) assessment

The Perceive, Recall, Plan and Perform (PRPP) System of Task Analysis was initially created to meet the needs of occupational therapists working with clients who had sustained a brain injury (Chapparo & Ranka, 1997b). These persons have cognitive deficits that are often similar to those observed in people with schizophrenia (Evans et al., 1997; Fujii, Wylie, & Nathan, 2004). The conceptual model underlying the PRPP system was at first adapted from an information processing model in the field of instructional design which was developed to explain the process of learning tasks in the work place (Romiszowski, 1984). This assessment is one of the measures associated with the Occupational Performance Model (Australia), which defines occupational performance as a product of the interaction between humans and their environment (Chapparo & Ranka, 1997a).

The PRPP system is a standardized, two stage, criterion referenced assessment. It uses task analysis methods to examine the effectiveness of information processing, and results in the measurement of occupational mastery, information processing capacity, and contextual influences (Chapparo & Ranka, 1997b). The depth of processing that occurs depends on the nature and complexity of the task being performed.

Stage 1 of the PRPP system employs a standard behavioural task analysis whereby everyday activity performance is broken down into steps, and errors in execution are identified (Kirwan & Ainsworth, 1992). An overall measure of mastery for specific and relevant occupations is generated. Stage 2 of the PRPP system uses a cognitive task analysis. Cognitive task analysis is a family of assessment methods which describe the cognitive processes underlying the performance of specific activities and the cognitive strategies used to respond efficiently to complex situations (Militello & Hutton, 1998; Schraagen, Chipman, & Shalin, 2000). The information processing strategies measured in the PRPP assessment represent four processing dimensions: (1) attention and sensory perception (Perceive); (2) memory (Recall); (3) response planning and evaluation (Plan); and (4) performance monitoring (Perform). These are illustrated in the central quadrants of the PRPP assessment's conceptual model (Chapparo & Ranka, 2005, see Figure 1). A total of 34 behavioural 'descriptors' are used individually or cumulatively to identify processing strengths and deficits within each of the four quadrants. They are featured on the outer ring of the PRPP conceptual model. These descriptors are observable behaviours, such as "maintains" and "monitors" in the Perceive quadrant, "contextualises to duration" and "recalls steps" in the Recall quadrant. They may be targeted as rehabilitation goals (Fry & O'Brien, 2002), and may also contribute to focusing interventions and to refining the quality of the decision-making process at the clinical level.

This evaluation is distinct from other functional assessments using task observation (for example (for example, Arnadottir, 1990; Baum & Edwards, 1993; Fisher, 1995) in its synthesis of information processing theory and occupational performance. The PRPP conceptual model roughly mirrors the staged processing flow of information that is found in most theoretical models of information processing (see Figure 2).

The aim of this preliminary study was to begin to describe in behavioural terms, the impact of information processing difficulties on everyday task performance in this sample of people with schizophrenia using the PRPP System of Task Analysis. Another aim was to determine whether these descriptions could be documented in a reliable manner. Specifically, this study was guided by the following research questions. First, what information processing difficulties are encountered by this sample of people with schizophrenia during meal preparation as measured by the PRPP system? Second, are there differences in information processing capacity during performance of tasks of different complexity in this sample? Third, what is the relationship between community functioning as measured by the French version of the Independent Living Skills Survey ([ILSS], Cyr, Toupin, Lesage, & Valiquette, 1994) and the PRPP in this sample of people with schizophrenia? Fourth, what is the inter-rater reliability of the PRPP assessment? This preliminary study was part of a larger study aimed at describing the impact of cognitive deficits on daily activities in people with schizophrenia.

3.5 Methods

In order to answer the above questions, the study was conducted in two parts. Both parts of the study had a descriptive correlational design. The first part of the study (Part A) focused on the exploration of information processing difficulties as well as aspects of construct validity, while the second part of the study (Part B) focused on the inter-rater reliability of the PRPP System of Task Analysis. Both parts of the study were approved by the ethics committees of the hospitals where they took place.

3.5.1 Part A

3.5.1.1 Participants

Ten participants with a DSM-IV-TR diagnosis of schizophrenia or schizo-affective disorder (APA, 2000) as established by their treating psychiatrist, were recruited according to the following criteria: between 18 and 55 years of age, living in the community in a stable state, familiar with meal preparation, and lacking any physical disabilities, mental retardation or cognitive impairments caused by another diagnosis (such as dementia). The participants were recruited in an outpatient psychiatric clinic in Montreal, Canada. All agreed to sign an informed consent form to participate in the study and to be filmed while doing two daily living activities.

3.5.1.2 Instruments

Two instruments were used with the sample (N = 10) in Part A.

The Perceive, Recall, Plan and Perform (PRPP) System of Task Analysis (Chapparo & Ranka, 1997b, 2005): Although originally developed in the 1980's, the PRPP assessment in its current form is a relatively new assessment. Since a number of studies referred to below have already been conducted across various client groups with this instrument, its usefulness is apparent. As described previously, the PRPP system includes two stages: Stage One, where errors in steps are identified and Stage Two, where the errors are associated to different descriptors. Information processing scores are obtained after completing the latter stage. These scores are derived from 34 observable behaviours (descriptors) that are scored on a three-point rating scale, where a score of **1** indicates that the descriptor behaviour impacts negatively on task performance to the extent that the task is either incomplete or performance requires significant prompting; a score of **2** indicates some qualitative difficulties with the behaviour; and **3** indicates that the performance showed no deficit in a particular behaviour. From summed descriptor scores a global PRPP system processing score can be calculated, as can specific PRPP quadrant or subquadrant scores that quantitatively describe processing capacity in attention, perception, memory, planning and performance monitoring. High agreement among six testers was achieved in identifying the break down of steps in Stage One for dressing, hygiene, and meal preparation tasks in normal adults (Chapparo & Ranka, 1997b). Acceptable to high inter-rater and intra-rater agreement was obtained in identification of Stage One errors in a sample of clients with acquired brain injury, along with high evidence of face and content validity using a panel of experts (Chapparo & Ranka, 1992). Internal consistency of items in each quadrant has been reported as high (Fordham, 2001), and inter-rater and test-retest reliability across a number of studies ranges from 0.64 to 0.99 (Lohri, 2005; Munkhetvit, 2005; Pulis, 2002). Studies using the PRPP System of Task Analysis have demonstrated agreement between PRPP quadrant and subquadrant scores and neuropsychological measures of cognition in adolescents with early psychosis (Still, Beltran, Catts, Chapparo, & Langdon, 2002) and between PRPP quadrant and subquadrant scores and measures of cognitive play in normal and learning disabled children when raters were blind to the purpose of the study (Boland, 2004). The PRPP system has been used in Australia, Sweden, Switzerland, Thailand, Norway, and French Canada, with reports of cultural validity and utility (Munkhetvit, 2005).

All participants executed two meal preparation tasks and their performance was rated using the PRPP System of Task Analysis by a professionally trained occupational therapist experienced with this clientele. In Task One, the simple task, participants were asked to make breakfast for one person that included instant coffee, toast and fried eggs and serving them altogether, in a cup and on a plate, respectively. Task Two was the more complex task, where participants were asked to make a one-person dinner comprised of boiled potatoes, hamburger steak and a baked pre-mixed cake. All parts of this meal were to be ready at the same time. The potatoes and meat had to be served on a plate and the kitchen was to be left clean and tidy. These two meal preparation tasks were pre-tested with five normal persons. The type and level of meal difficulty were chosen in order to evoke the greatest possible number of information processing operations. As well, the importance of maintaining cultural relevance for the sample was considered imperative in the choice of meals. The two tasks had different levels of complexity regarding the total duration of the meal preparation, the need to execute delayed intentions, the sequencing of the individual dishes and the capacity to follow written directions and to monitor the progression (process) of the task.

The Independent Living Skills Survey ([ILSS], Wallace, Liberman, Tauber, & Wallace, 2000) is a questionnaire that measures community functioning in people with severe mental illness. The validated French version (Cyr, Toupin, Lesage & Valiquette, 1994) includes 9 sections (56 items in total) covering the performance of the following daily activities: self-care, grooming, household chores, eating habits and meal preparation, health management, financial management, leisure, transportation and work. Items are assessed for the last month and are scored. The higher the score on the ILSS, the more independent the person is in daily living activities. The results of Cyr and colleagues' (1994) study also demonstrated that this tool has a good test-retest reliability (correlations varying between .62 and .85) and discriminates subjects according to their diagnosis, gender and type of housing. A factorial analysis highlighted two factors: basic activities and more complex activities.

3.5.1.3 Procedure

Data were collected from each participant over a two-hour session. All participants completed the ILSS questionnaire and were observed while performing the two meal preparation tasks in the occupational therapy department kitchen. The performance of the participants was videotaped during both preparations. Socio-demographic and clinical data were collected from initial individual interviews with the clients as well as from client records.

3.5.1.4 Data analysis

In order to identify information processing difficulties experienced during meal preparation, descriptive statistics were calculated with the PRPP system's global quadrant and subquadrant scores for Task One and Task Two. To compare the performance according to the complexity of the task, t-tests were used to test the difference between mean PRPP system global scores of Task

One and Task Two. Because of the non-normal distribution of the quadrant and subquadrant scores, nonparametric Wilcoxon signed rank tests for paired samples were calculated to test differences between quadrant scores (Perceive, Recall, Plan and Perform quadrants, as shown in Figure 3.1), between subquadrant scores, and individual descriptors of Task One and Task Two.

To investigate the construct validity of the PRPP assessment, its relationship to community functioning using the ILSS was analyzed. Pearson correlations were calculated between the ILSS scores and the Task One global score and between the ILSS and the Task Two global score. All analyses yielding a *p* value of .05 or less were considered significant.

3.5.2 Part B

3.5.2.1 Participants

Fifteen participants were involved in this Part B of the study, with the same diagnosis and inclusion and exclusion criteria as those in Part A. Data from eight participants in Part A of the study was used, and a group of seven participants were recruited in another outpatient psychiatric clinic in Montreal, Canada. All signed an informed consent form to participate and to be filmed while executing a cooking task in the occupational therapy department kitchen.

Three raters, one male and two females, were selected according to the following criteria: living in the Montreal (Canada) area; having received formal training in the PRPP System of Task Analysis by the assessment developers; working as occupational therapists with a clientele diagnosed with cognitive deficits; and having three or more years of clinical experience as an occupational therapist. The three selected raters had between 8 and 16 years of clinical experience. All had been recently trained in the use of the PRPP System of Task Analysis by the assessment developers. Two had experience in the mental health field, particularly with people diagnosed with schizophrenia and one had experience in community services with the elderly.

3.5.2.2 Instruments

The Perceive, Recall, Plan and Perform (PRPP) System of Task Analysis (Chapparo & Ranka, 1997b, 2005) was the only instrument used in Part B of the present study.

3.5.3 Procedure

Socio-demographic and clinical data were collected from an initial interview with the participants and from client records. The fifteen participants were videotaped while performing the complex meal preparation task, as described in the *Procedure* section of Part A. In order to explore the inter-rater reliability of the PRPP System of Task Analysis, the three raters independently observed and scored the videos. Three scoring records were generated from the observations: Stage One (errors in steps), an interpretation grid and the scoring sheet of Stage Two.

3.5.4 Data analysis

To investigate the inter-rater reliability, intra-class correlations using a two-way mixed effects model for absolute agreement were calculated for the total score (PRPP Total) and for each quadrant score , using SPSS for Windows (Statistical Package for Social Sciences, Version 10, 2000). All analyses yielding a p value of .05 or less were considered significant. *ICC* values of .70 and higher were considered to be acceptable for this study. These values are considered sufficient for research purposes for group-level comparisons and for newly developed instruments (Nunnally, 1978; Polit & Beck, 2004; Slagle, Weinger, Dinh, Brumer, & Williams, 2002).

3.6 Results

Participants in Part A and Part B of the study had a similar mean education level, distribution of gender, diagnosis, mean duration of psychiatric follow-up and level of autonomy in community living arrangements (Table 3.1). The mean age was slightly different for participants in Part B of this study, who were found to be slightly older than participants in Part One of the study, but this had no impact on the analysis of data.

3.6.1 Description of information processing difficulties during meal preparation tasks: Simple (Task One) versus complex (Task Two)

In both meal preparation activities, problems with task-related behaviours were detected. Total PRPP scores showed variations that indicated difficulties had been observed in the performance of most participants (Figure 3.3). More specifically, problems were demonstrated in all four quadrants, especially in the Perceive and Plan quadrants, where scores appeared to be lower than in the other two quadrants on both tasks (Table 3.2). Descriptors such as "searches, locates, monitors, contextualises to place and to duration, recalls steps, chooses, sequences, questions, analyses and judges" were affected in both the simple as well as in the complex meal preparation activities.

A significant difference was found between the mean PRPP total score on the simple task (M = 98.4, SD =2.6) and that of the complex task (M = 89.5, SD = 7.3; $t\,(9)$= 4.835, $p \leq .001$). According to the Wilcoxon signed rank test, significant differences were also found between the simple and the complex task mean quadrant scores in three quadrants: the Perceive, Recall and Plan quadrant mean scores were higher on the simple task than on the complex one, as shown in Table 3.2. Differences were particularly found on the mean scores of the following subquadrants: Attending, Sensing, Recalling Schemes, Mapping, Evaluating and Continuing, as also shown in Table 3.2. Finally, significant differences were found between descriptors "maintains, monitors, contextualizes to place, analyzes and judges" ($p \leq .05$) on both tasks. Because these descriptors were ranked significantly lower on the complex task, performance was thought to be more impaired in this activity in comparison to the simple task.

3.6.2 Relationship between community functioning and information processing capacity

A significant association was found between the PRPP System of Task Analysis' total scores on the complex activity (Task Two) and results on the ILSS measuring community functioning ($r = .67$, $p = .032$). No significant association was found between the simple task (Task One) and the ILSS total score.

3.6.3 Preliminary estimates of inter-rater reliability

Table 3.3 shows results for the inter-rater reliability of the PRPP system's total and quadrant scores. *ICC* values for the PRPP total score reaches .77 ($p = .001$), which is well over the minimum acceptable score of .70. The quadrants' reliability coefficient varies from .63 to .69 ($p = .001$), a modest level that almost reaches the minimum expected level of .70.

3.7 Discussion

This study is among the first to explore the use of the Perceive, Recall, Plan and Perform System of Task Analysis with people diagnosed with schizophrenia and is part of a larger study aimed at investigating the impacts of cognitive deficits on their daily living activities. This preliminary study was conducted in two parts.

In Part A of this study, the objective was to describe the impact of information processing difficulties on the performance of daily living tasks in people with schizophrenia using the PRPP System of Task Analysis and to explore the relationship between information processing difficulties and community functioning.

Problems with task-related information processing behaviours appeared in all four quadrants of the PRPP assessment, in both simple and complex tasks, although no standard neuropsychological testing was used to quantify these deficits. This finding is similar to recent studies suggesting that the general effect of schizophrenia on cognitive performance in people with this disorder occurs at a very general level, or through some fundamental process that underlies multiple complex cognitive functions (Dickinson, Iannone, Wilk, & Gold, 2004). Disturbances in the Perceive and Plan quadrants were particularly evident, but specific behaviours measured in the Recall quadrant, such as "contextualising to place and to duration" and "recalling steps" were affected as well.

Similar results were obtained in Knight's (2000) study examining the relationship between cognition and the ability to prepare simple recipes in 10 persons with schizophrenia. In her study, the intermediate level group had difficulties in maintaining and working out a plan, maintaining attention on the task and in solving problems. In another study exploring behavioural disorganization during a daily life task in individuals with schizophrenia, associations were found between errors observed during a meal preparation, the ability to resist outside stimuli and interference, and generating efficient strategies and sequences, as measured by specific neuropsychological tests (Semkovska et al., 2002). In the present study, not only were perception and attention (Perceive quadrant) and response planning and evaluation (Plan quadrant) difficulties identified, but "Recall" or memory difficulties were also observed during the performance of the two kitchen tasks. As memory is also very often affected in persons with schizophrenia (Aleman et al., 1999), the results of the present study suggest that the PRPP System of Task Analysis model might facilitate identification of a more complete continuum of behaviours relative to information processing, including those related to memory.

As expected, the more complex task (Task Two, cooking a dinner) generated significantly lower scores than the simple task (Task One, making breakfast) on most quadrants of the PRPP assessment, suggesting that this System of Task Analysis is sensitive to differences in cognitive demands. Moreover, as also expected, the Independent Living Skills Survey global score was correlated with the PRPP system's total score for the more challenging task (Task Two) but not for the less difficult task (Task One). From these results, it could be hypothesized that community functioning is associated more strongly to performance of complex daily living tasks than to the execution of simpler tasks in this population. The more complex task had a longer duration, involved more delayed intentions and sequence planning, had written directions to be followed and constraints that necessitated continuous monitoring of the task's progression. Tasks such as complex meal preparation involve multitasking and are among the more complex daily tasks as they necessitate use of multiple cognitive abilities (Burgess, 2000), which in turn are probably essential on a regular, repetitive and daily basis for maintaining community functioning.

The objective of Part B of the study was to determine whether this assessment tool could be used in a reliable manner with this clientele. *ICC* value for the total score was good according to the study's specified criteria (.70), while *ICC* values for the quadrants (Perceive, Recall, Plan and Perform) were moderate, almost reaching this level. Studies investigating cognitive and perception skills are few and far between in the reported literature, and those which have indeed looked at these two factors have reported fair to moderate inter-rater reliability results. In a study on the inter-rater reliability of another observational tool, the "MAECES", an ergonomic assessment method comparing workers' abilities relative to the job demands (Lavoie, 1999), results were similar or lower than those obtained in the present study. The author suggested that more precise definitions and more comprehensive training for therapists who wish to use such tools are needed. In the present study, the three raters had an acceptable level of agreement for the PRPP total score. Nevertheless, they had greater differences in their ratings across quadrants and *ICC*s were lower than those reported in earlier studies.

Differences in ratings in observational assessments are generally explained by the need for (1) more extensive training of the raters; (2) a precise clarification of definitions; and (3) scales that are more refined (Lavoie, 1999; Slagle et al., 2002). Discrepancies in the inter-rater agreements of the present study may also be explained by the little variation in PRPP scores of participants. *ICC* values are influenced by the between-subject variance, and small *ICC* values may be obtained in a homogeneous population (Shrout, 1998). Therefore it is possible that in the present study, participants did not differ sufficiently in their skill abilities as observed during task performance.

Another aspect which may explain raters' agreement discrepancies is the severity of the raters' judgments and by their possibly confounding experience with other performance assessments such as the Assessment of Motor and Process Skills (Fisher, 1995). In fact, two raters had also been previously extensively trained in this latter assessment's scoring procedure. Additionally, the differences among the raters' experiences with both the PRPP assessment and with the type of participant might also have contributed to a lower inter-rater reliability: one of the three raters had little or no experience with a mental health clientele. Even though all the raters had completed the PRPP system scoring procedures training, this was done in English, their second language, possibly affecting their more thorough understanding of the English descriptor definitions. Finally, the participants were observed and rated via video performance, perhaps camouflaging nuances of behavioural responses that might have been more obvious "in vivo".

3.8 Limitations

The results from this preliminary study were obtained with small samples (n = 10 and n = 15), therefore, they can only be interpreted as exploratory. Also, a limited number of trained raters responding to the inclusion criteria were available for this study at the time it was conducted. Other studies investigating inter-rater reliability during task observation suggest that *ICC* values of .80 and more should be obtained for high-stakes situations (Slagle et al., 2002) and for specific intervention (Donohue, 2006). These limitations should be taken into account for future studies on the inter-rater reliability of the PRPP System of Task Analysis in clinical settings.

3.9 Implication for practice

Results from this study support the relevance of using the PRPP System of Task Analysis with people diagnosed with schizophrenia. The PRPP system's descriptors are task-related behaviours which are observable and measurable as they occur in clinical and natural settings. Targeting problematic descriptors in the establishment of treatment goals might well contribute to realistic, individualised and generalisable interventions in order to maximize this population's community functioning.

3.10 Conclusion

This study is an important step toward substantiating critical psychometric properties of the PRPP System of Task Analysis. The acceptable inter-rater reliability resulting from the present study is promising and points to the potential for establishing other psychometric facets of this model. Based on an occupation-focused information processing model, observation of task-related behaviours during the performance of daily life tasks by this sample of people with schizophrenia provides "functional" information on the impact of cognitive impairments on these tasks. Although they are preliminary, the results of this study are consistent with the literature. Nevertheless, this study also highlights the numerous challenges that arise when measuring inter-rater reliability through observational assessments based on specific cognitive and perceptual behaviours, especially in a clinical context. Future investigations should consider replication of the results of the present study. Hopefully, larger studies including more participants and raters should be conducted to validate the results obtained in the present study. This preliminary study warrants further studies to explore the consequences of cognitive deficits on daily life tasks in people with schizophrenia, and particularly to understand more fully the relationship of these deficits to community functioning in these people.

3.11 Acknowledgements

This study was made possible thanks to the contribution of Dr. E. Stip's research funds and with the collaboration of L. H. Lafontaine hospital's occupational therapists, and Danick Jean-Vernet, Stéphane Rivard and Chantal Cloutier (raters). Thanks to all participants, to Louise Godin, to the therapists and staff of

the psychiatric outpatient clinic at the Centre hospitalier de l'Université de Montréal (CHUM), to Sara Liebman, OT, Ph.D., for her revision and to Gevorg Chillingaryan, statistician.

3.12 References

Aleman, A., Hijman, R., de Haan, E., & Kahn, R. (1999). Memory impairment in schizophrenia: A meta-analysis. *American Journal of Psychiatry, 156*, 1358-1366.

Alexandersson, A. (2000). Using panel data to model community functioning of severely mentally ill persons. *Administration and Policy in Mental Health, 27*, 147-152.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders: DSM-IV-TR* (4th ed.). Washington, DC: American Psychiatric Association.

Arnadottir, G. (1990). *The Brain and Behavior: Assessing cortical dysfunction through activities of daily living (ADL)*. St-Louis, MO: Mosby.

Arns, P., & Linney, J. (1995). Relating functional skills of severely mentally ill clients to subjective and societal benefits. *Psychiatric Services, 46*, 260-265.

Aubin, G., Gélinas, I., Stip, E., Chapparo, C., & Rainville, C. (2007). Les activités quotidiennes et la cognition chez les personnes atteintes de schizophrénie. *Santé mentale au Québec, 32*, 201-208.

Bartels, S., Mueser, K., & Miles, K. (1997). A comparative study of elderly patients with schizophrenia and bipolar disorder in nursing homes and the community. *Schizophrenia Research, 27*, 181-190.

Baum, C., & Edwards, D. (1993). Cognitive performance in senile dementia of the Alzheimer's type: The Kitchen task assessment. *American Journal of Occupational Therapy, 47*(5), 431-436.

Boland, K. (2004). *Assessing information processing in the context of pretend play.* Unpublished master's thesis, University of Sydney, Lidcombe, NSW, Australia.

Bowie, C. R., Reichenberg, A., Patterson, T. L., Heaton, R. K., & Harvey, P. D. (2006). Determinants of real-world functional performance in schizophrenia subjects: Correlations with cognition, functional capacity, and symptoms. *American Journal of Psychiatry, 163*, 418-425.

Braff, D. (1993). Information processing and attention dysfunctions in schizophrenia. *Schizophrenia Bulletin, 19*, 233-259.

Brekke, J., Raine, A., Ansel, M., Lencz, T., & Bird, L. (1997). Neuropsychological and psychophysiological correlates of psychosocial functioning in schizophrenia. *Schizophrenia Bulletin, 23*, 19-28.

Burgess, P. (2000). Strategy application disorder: The role of the frontal lobes in human multitasking. *Psychological Research, 63*, 279-288.

Chapparo, C., & Ranka, J. (1992). *Development of an information processing task analysis to identify errors in self-maintenance performance of brain injured clients: Final category B Grants Research Report*. Lidcombe, NSW, Australia: University of Sydney, Faculty of Health Sciences.

Chapparo, C., & Ranka, J. (1997a). The occupational performance model (Australia): A description of constructs and structure. In C. Chapparo & J. Ranka (Eds.), *Occupational performance model (Australia)* (Vol. 1, pp. 1-23). Lidcombe, NSW, Australia: University of Sydney, Australia.

Chapparo, C., & Ranka, J. (1997b). The Perceive, Recall, Plan, Perform (PRPP) system of task analysis In C. Chapparo & J. Ranka (Eds.), *Occupational Performance Model (Australia)* (Vol. 1, pp. 189-198). Lidcombe, NSW, Australia: University of Sydney, Australia.

Chapparo, C., & Ranka, J. (2005). *The PRPP System of Task Analysis: User's training manual*. Lidcombe, NSW, Australia: Discipline of Occupational Therapy, Faculty of Health Sciences, University of Sydney, Australia.

Cyr, M., Toupin, J., Lesage, A., & Valiquette, C. (1994). Assessment of independent living skills for psychotic patients, further validity and reliability. *Journal of Nervous and Mental Disease, 182*, 91-97.

Dickerson, F. (1997). Assessing clinical outcomes: The community functioning of persons with serious mental illness. *Psychiatric Services, 48*, 897-902.

Dickerson, F., Ringel, N., & Parente, F. (1999). Predictors of residential independence among outpatients with schizophrenia. *Psychiatric Services, 50*, 515-519.

Dickinson, D., Iannone, V., Wilk, C., & Gold, J. (2004). General and specific cognitive deficits in schizophrenia. *Biological Psychiatry, 55*, 826–833.

Donohue, M. V. (2006). Interrater reliability of the Social Profile: assessment of community and psychiatric group participation. *Australian Occupational Therapy Journal, 53*, 1-10.

Evans, J., Chua, S., McKenna, P., & Wilson, B. (1997). Assessment of dysexecutive syndrome in schizophrenia. *Psychological Medicine, 27*, 635-646.

Fisher, A. (1995). *AMPS: Assessment of motor and process skills.* Fort Collins, COL: Three Star Press.

Fordham, M. (2001). *Perceive, Recall, Plan, Perform (PRPP) Rating Scales (Parent and Teacher) : Reliability and Validity.* Unpublished master's thesis, University of Sydney, Lidcombe, NSW, Australia.

Fry, K., & O'Brien, L. (2002). Using the Perceive, Recall, Plan and Perform System to assess cognitive deficits in adults with traumatic brain injury: A case study. *Australian Occupational Therapy Journal, 49*, 182-187.

Fujii, D., Wylie, M., & Nathan, J. (2004). Neurocognition and long-term prediction of quality of life in outpatients with severe and persistent mental illness. *Schizophrenia Research, 69*, 67-73.

Goldberg, T. E., & Green, M. F. (2002). Neurocognitive functioning in patients with schizophrenia: An overview. In K. L. Davis, D. Charney, J. T. Coyle & C. Nemeroff (Eds.), *Neuropsychopharmacology: The fifth generation of progress* (pp. 657-669). Philadelphia: Lippincott Williams & Wilkins.

Green, M. (1996). What are the functional consequences of neurocognitive deficits in schizophrenia? *American Journal of Psychiatry, 153*, 321-330.

Green, M., Kern, R., Braff, D., & Mintz, J. (2000). Neurocognitive deficits and functional outcome in schizophrenia: Are we measuring the "right stuff"? *Schizophrenia Bulletin, 26*, 119-136.

Greenwood, K. E., Landau, S., & Wikes, T. (2005). Negative symptoms and specific cognitive impairments as combined targets for improved functional outcome within cognitive remediation therapy. *Schizophrenia Bulletin, 31*, 910-921.

Hajos, M. (2006). Targeting information-processing deficit in schizophrenia: A novel approach to psychotherapeutic drug discovery. *Trends in Pharmacological Science, 27*, 391-398.

Hamera, E., & Brown, C. (2000). Developing a context-based performance measure for persons with schizophrenia: the Test of Grocery Shopping Skills. *American Journal of Occupational Therapy, 54*, 20-25.

Harvey, P. D., & Davidson, M. (2002). Schizophrenia: Course over the Lifetime. In K. L. Davis, D. Charney, J. T. Coyle & C. Nemeroff (Eds.), *Neuropsychopharmacology: The fifth generation of progress* (pp. 641-655). Philadelphia: Lippincott Williams & Wilkins.

Kirwan, B., & Ainsworth, L. K. (1992). *A Guide to Task Analysis*. London: Taylor and Francis.

Knight, M. (2000). *Cognitive function and food preparation ability in schizophrenia*. Unpublished doctoral dissertation, University of Rhode Island, Rhode Island.

Lavoie, M. (1999). *Étude de fidélité inter-examinateurs de la Grille de comparaison des capacités du travailleur en relation avec les exigences du poste de travail*. Unpublished master's thesis, Université de Montréal, Montreal, Canada.

Lerner, J. (1997). *Learning disabilities: Theories, diagnosis and teaching strategies* (7th ed.). Boston: Houghton Mifflin Company.

Light, G. A., & Braff, D. L. (2005). Mismatch negativity deficits are associated with poor functioning in schizophrenia patients [Electronic Version]. *Archives of General Psychiatry*, *62*, 127-136. Retrieved February 26th 2007.

Lohri, J. (2005). *Information and sensory processing abilities of young children with autism spectrum disorder*. Unpublished master's thesis, Discipline of Occupational Therapy, Faculty of Health Sciences, University of Sydney, Lidcombe, NSW, Australia.

MacDonald-Wilson, K., Nemec, P., Anthony, W., & Cohen, M. (2002). Assessment in psychiatric rehabilitation. In B. Boulton (Ed.), *Handbook of Measurement and Evaluation in Rehabilitation* (3rd ed., pp. 423-448). Baltimore: Paul Brookes.

Militello, L. G., & Hutton, R. J. (1998). Applied cognitive task analysis (ACTA): A practitioner's toolkit for understanding cognitive task demands. *Ergonomics, 41*, 1618-1641.

Munkhetvit, P. (2005). *Cognitive assessment in patients with acquired brain injury in Thailand.* Unpublished doctoral dissertation, University of Sydney, Lidcombe, NSW, Australia.

Nunnally, J. C. (1978). *Psychometric Theory* (2nd ed.). New York: McGraw-Hill.

Palmer, B., Heaton, R., Gladsjo, J., Evans, J., Patterson, T., Golshan, S., et al. (2002). Heterogeneity in functional status among older outpatients with schizophrenia: Employment history, living situation and driving. *Schizophrenia Research, 55*, 205-215.

Patterson, T., Goldman, S., McKibbin, C., Hughs, T., & Jeste, D. (2001). USCD performance-based skills assessment: Development of a new measure of everyday functioning for severely mentally ill adults. *Schizophrenia Bulletin, 27*, 235-245.

Polit, D., & Beck, C. T. (2004). Assessing data quality. In *Nursing Research: principles and methods* (7th ed., pp. 413-447). Philadelphia: Lippincott, Williams & Wilkins.

Pulis, J. (2002). *Assessing information processing deficits in children: The PRPP System of Task Analysis.* Unpublished doctoral dissertation, Discipline of Occupational Therapy, Faculty of Health Sciences, University of Sydney, Lidcombe, NSW, Australia.

Rempfer, M., Hamera, E., Brown, C., & Cromwell, R. (2003). The relations between cognition and the independent living skill of shopping in people with schizophrenia. *Psychiatry Research, 117*, 103-112.

Romiszowski, A. (1984). *Designing Instructional Systems: Decision making in course planning and curriculum design*. New York, NY: Nichols Publishing.

Schraagen, J. M., Chipman, S. F., & Shalin, V. L. (2000). *Cognitive task analysis*. Mahwah, NJ: Lawrence Erlbaum Associates.

Semkovska, M., Bédard, M., Godbout, L., Limoge, F., & Stip, E. (2004). Assessment of executive dysfunction during activities of daily living in schizophrenia. *Schizophrenia Research, 69*, 289-300.

Semkovska, M., Bédard, M., & Stip, E. (2001). Hypofrontalité et symptômes négatifs dans la schizophrénie: synthèse des acquis anatomiques et neuropsychologiques et perspecives écologiques. *L'Encéphale, 27*, 405-415.

Semkovska, M., Stip, E., Godbout, L., Paquet, F., & Bédard, M. A. (2002). Behavioral dizorganisation in schizophrenia during a daily activity: The Kitchen Behavioral Scoring Scale. *Brain and Cognition, 48*, 546-553.

Sharma, T., & Antonova, L. (2003). Cognitive function in schizophrenia: Deficits, functional consequences, and future treatment. *Psychiatric Clinics of North America, 26*, 25-40.

Slagle, J., Weinger, M., Dinh, M.-T., Brumer, V., & Williams, K. (2002). Assessment of the intrarater and interrater reliability of an established clinical task analysis methodology. *Anesthesiology, 96*, 1129-1139.

Still, M., Beltran, R., Catts, S., Chapparo, C., & Langdon, R. (2002). *Cognitive and functional assessment of patients with early psychosis.* Paper presented at the 3rd International Conference on Early Psychosis. 25-28 September 2002, Copenhagen, Denmark.

Velligan, D., & Bow-Thomas, C. (1999). Executive function in schizophrenia. *Seminars in Clinical Neuropsychiatry, 4*, 24-33.

Wallace, C., Liberman, R., Tauber, R., & Wallace, J. (2000). The independent living skills survey: A comprehensive measure of the community functioning of severely and persistently mentally ill persons. *Schizophrenia Bulletin, 26*, 631-658.

Table 3.1 Socio-demographic data of participants in Part 1 and Part 2 of the study

	Part 1 *N* =10 *Value, Mean (SD)*	Part 2 *N* =15 *Value, Mean (SD)*
Age (years):	35.6 (8.6)	38 (9.5)
Male /Female	4/6	7/8
Schizophrenia type:		
Paranoid	7	11
Undifferentiated, disorganized or Schizoaffective	3	4
Education		
Primary & high school	4	5
College or University	6	10
Duration of psychiatric follow-up (years)	5,9 (4)	5,2 (4)
Living conditions		
Autonomous/supervised appartment	4	7
With family/group home	6	8

Table 3.2 Part A: PRPP quadrant and subquadrant mean and standard deviation scores: Task 1 and Task 2 ($N = 10$)

PRPP QUADRANTS	Task 1 *M (SD)*	Task 2 *M (SD)*	*p*
Perceive	22.8(0.9)	20.7(2.3)	.011*
Recall	26.6(0.6)	25.0(1.4)	.010*
Plan	25.6(1.2)	21.5(3.1)	.005*
Perform	23.4(0.9)	22.3(1.7)	.105
PRPP SUBQUADRANTS	Task 1	Task 2	p value
Attending	8.5(0.5)	7.2(1.4)	.026*
Sensing	8.3(0.67)	7.5(1.2)	.039*
Discriminating	6 (0)	6 (0)	-
Recalling facts	9 (0)	9 (0)	-
Recalling Schemes	8.8(0.63)	7.9(0.87)	.024*
Recalling Procedures	8.8(0.4)	8.1(0.9)	.059
Mapping	9.0 (0)	8.4(0.69)	.034*
Programming	8.5(0.8)	7.7(1.0)	.074
Evaluating	8.1(0.63)	5.4(2.36)	.007*
Initiating	6 (0)	5.9(0.3)	.317
Continuing	8.8(0.63)	7.6(1.34)	.041*
Controlling	8.6(0.5)	8.8(0.4)	.157

* Significant differences between Task 1 and Task 2 means according to Wilcoxon signed rank test, $p \leq .05$

Table 3.3 Part B: *ICC*s for PRPP quadrants scores and total score of Task 2, for N = 3 raters*

Items	*ICC* $p \leq .001$
Perceive	.65
Recall	.65
Plan	.69
Perform	.63
PRPP total	.77

* Each rater assessed the 15 participants of this part of the study

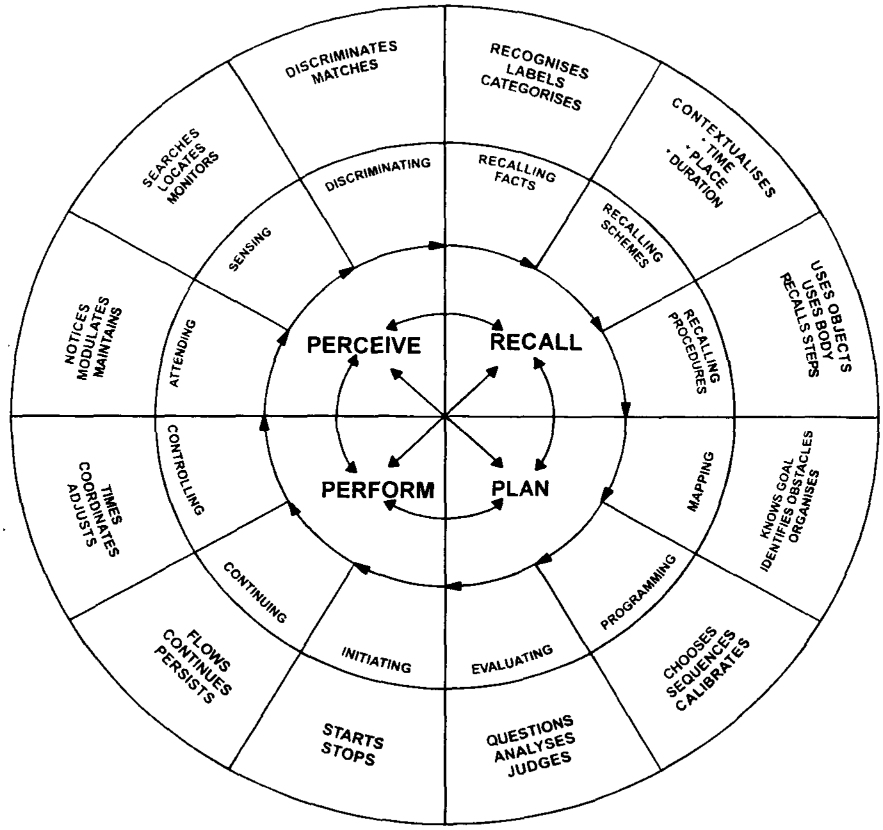


Figure 3.1 The Perceive, Recall, Plan and Perform System of Task Analysis (Chapparo & Ranka, 2005)

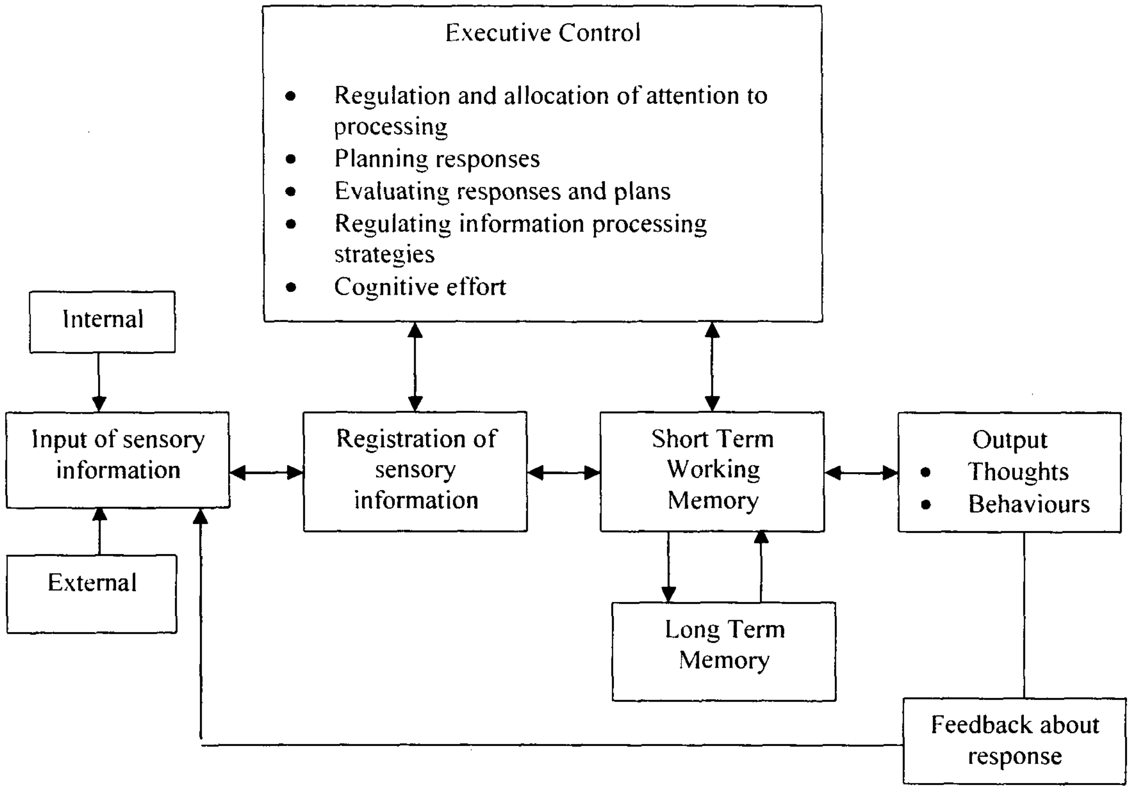


Figure 3.2 Information Processing Model (adapted from Lerner, 1997)

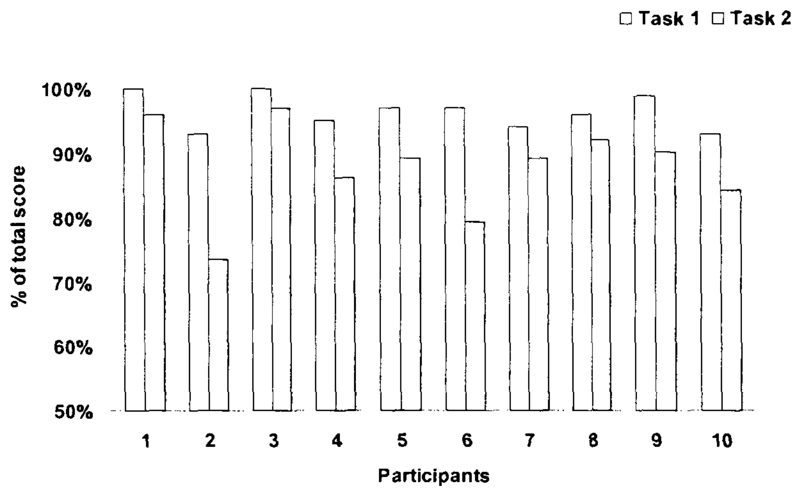


Figure 3.3 Part A: Participants' PRPP total scores for Task 1 and Task 2 (*N* =10)

Third Manuscript

The results from the preliminary study in the previous chapter support the relevance of using the Perceive, Recall, Plan and Perform System of Task Analysis with people with schizophrenia in a reliable manner. Functional limitations were found in all four quadrants of the PRPP System, but the Perceive and Plan quadrants were more affected. The assessment of performance in a complex task, namely a meal preparation task, was more useful to identify functional limitations than the simpler task in this group of participants. This warranted the use of this specific task in the main study of this thesis. In order to answer to the first objective of this study, which is to describe the functional limitations during a daily activity in persons with schizophrenia, the performance on the meal preparation task of a group of participants with schizophrenia (*n* =28) was compared to that of a matched healthy control group (*n* =28). The participants with schizophrenia in the present study (*n* = 28) were part of the main sample recruited for this thesis (*n* =82) and did not include the participants from the preliminary study.

Chapter 4

Daily task performance from a cognitive perspective: Comparing people with schizophrenia and healthy controls

Submitted to the American Journal of Occupational Therapy

Key Words: Performance-based assessment, Serious mental disorders, Independent living skills

Ginette Aubin, Ph.D Candidate, McGIll University, O.T (C), Centre hospitalier de l'Université de Montréal (CHUM), Hôpital Notre-Dame, Occupational Therapy Service, Montreal, Quebec, Canada

Isabelle Gélinas, Ph.D., Associate Professor, School of Physical & Occupational Therapy,

McGill University, Montreal, Quebec, Canada

Emmanuel Stip, M.D., Centre de Recherche Fernand-Seguin, Montreal, Quebec, Canada

Christine Chapparo, Ph.D., Discipline of Occupational Therapy, Faculty of Health Sciences, University of Sydney, Lidcombe, NSW, Australia

Constant Rainville, Ph.D., Centre de Recherche de l'Institut Universitaire de Gériatrie de Montréal, Montreal, Quebec, Canada

Julie Lamoureux, D.M.D, M.Sc., Université de Montréal, Département de Médecine Sociale et Préventive, Montreal, Quebec, Canada

Corresponding Author: Ginette Aubin, CHUM- Hôpital Notre-Dame, 1560 rue Sherbrooke est, 6^{e} Pavillon L.C. Simard, Montreal, QC, Canada, H2L 4M1.

Phone: 514-890-8242, Fax : 514-412-7236, email: aubigi@videotron.ca

4.1 Abstract

Objectives: This study tested the hypothesis according to which daily task performance in a group of 28 participants with schizophrenia will be more impaired than that of a matched control group of 28 participants without a psychiatric diagnosis.

Methods: Participants in both groups were assessed on neuropsychological tests, and their performance in a meal preparation task was rated according to the Perceive, Recall, Plan and Perform System of Task Analysis.

Results: Individuals with schizophrenia were more cognitively impaired than those in the control group. They also made more errors of accuracy in task performance, and had lower scores in the Perceive, Recall, Plan and Perform quadrants descriptors of the PRPP System.

Conclusion: The hypothesis was confirmed as differences in daily task performance, were found, with the schizophrenia group being more impaired than the control group on a number of information processing skills, which could become targets for rehabilitation interventions.

4.2 Introduction

The accomplishment of daily activities requires the use and interaction of different cognitive functions (Toglia, 1998). As cognitive impairments are predominant factors that influence the community functioning of people with schizophrenia, it is not surprising that their daily functioning is affected as well (Goldberg & Green, 2002). The efficient performance of these activities is a determinant of independent living, which is a major criterion for recovery in schizophrenia (Liberman, Kopelowitz, Ventura, & Gutkin, 2002). Instrumental activities of daily living, such as grocery shopping and preparing meals, are complex daily tasks requiring numerous skills in the cognitive dimension (Burgess, 2000). Consequently, these tasks are particularly relevant to identify the impact of cognitive deficits upon daily functioning in persons with schizophrenia (Josman & Birnboim, 2001; Rempfer, Hamera, Brown, & Cromwell, 2003). Moreover, the assessment of daily activities performance with a cognitive perspective should be directed at finding of the strengths and weaknesses in both task performance skills and cognitive information processing strategies required to execute these critical activities.

Comparing task performance of a group of people with schizophrenia to that of healthy individuals is a useful method to identify problematic behaviours that most impact performance. However, a limited number of studies have compared daily task performance in people with schizophrenia and healthy controls (Godbout, Limoges, Allard, Braun, & Stip, 2007; Greenwood, Landau, & Wikes, 2005; Semkovska, Bédard, Godbout, Limoge, & Stip, 2004). Unfortunately, results from these studies involved global indices based on the success or failure of steps in the task, and different types of errors. These results did not systematically indicate which impaired skills and behaviours most affected task performance.

To better describe the impact of information processing difficulties on everyday task performance, the Perceive, Recall, Plan and Perform (PRPP) System of Task Analysis (Chapparo & Ranka, 1997b) has been adopted for persons with schizophrenia (Aubin, Chapparo, Gélinas, Stip, & Rainville, 2008;

Still, 2006). This standardized, criterion-referenced assessment has 2 stages of analysis. In Stage 1 of the PRPP System procedural task analysis is performed where performance is broken down into steps, and errors during performance are identified. In Stage 2, cognitive task analysis serves to assess the efficiency of information processing strategies underlying task performance (Chapparo & Ranka, 2005). Toglia (1998) described processing strategies and behaviours as “organized approaches, routines, or tactics that operate to select and guide the processing of information” (p. 8) that can be observed during task performance. These small units of behaviours “cut across” traditional cognitive function domains such as memory, attention and executive function (Chapparo & Ranka, 2005; Toglia, 1998).

Information processing strategies in the PRPP System are categorized in 4 processing quadrants: attention and sensory perception (Perceive), memory (Recall), response planning and evaluation (Plan), and performance monitoring (Perform). The focus of the Perceive quadrant is in attending and gathering information required for task performance, and in determining what is central or not for the task. The Recall quadrant is concerned with the recognition, retrieval and storage of information. The information recognized is compared with retrieved knowledge, and manipulated for needs of the task. The Plan quadrant involves mapping, programming and evaluating responses in novel and/or complex tasks. These behaviours are similar to the executive skills of ideating, decision-making, anticipating, reasoning and evaluating the chosen strategies. The function of the processing strategies in the Perform quadrant is to initiate and prompt continuation and persistence in the task, and to monitor responses to fit the plan in the chosen environment in time and space (Chapparo & Ranka, 2005).

The present study was undertaken to contribute to the body of literature on daily activities and schizophrenia. It was intended to further explore whether daily task performance as measured with the PRPP System is affected in a group of persons with schizophrenia living in the community when compared to a control group. It was hypothesized that people with schizophrenia have significantly more limitations in information processing skills, as assessed with the PRPP System, than individuals without a psychiatric disorder during daily task performance. To our knowledge, this is the first published study that used the PRPP System of Task Analysis with people with schizophrenia.

4.3 Methods

4.3.1 Participants

This study had a comparative descriptive design (Burns & Grove, 1993) involving a convenience sample of participants with schizophrenia and a control group without a psychiatric diagnostic from the general population. The control group was used to help distinguish the impact of cognitive deficits on daily task performance in persons with schizophrenia.

A group of 28 participants with schizophrenia was recruited at the outpatient psychiatric clinic of the Centre Hospitalier de l'Université de Montréal (CHUM), in the Montreal area. The inclusion criteria were: a DSM-IV-TR (American Psychiatric Association, 2000) diagnosis of schizophrenia or schizo-affective disorder confirmed by a treating psychiatrist, being between 18 and 60 years of age, living in the community, familiar with meal preparation, able to speak French, displaying a stable state without any major medication change for at least 2 months prior to the study. The exclusion criteria were: a major physical handicap, a current substance abuse problem, cognitive deficits of organic origin (such as dementia) or mental retardation (see Appendix 7).

The control group, composed of 28 persons without a psychiatric diagnosis, was matched for age and sex. It was recruited through advertisements placed in the same hospital. The inclusion criteria were: no known psychiatric disorder, being between 18 and 60 years of age, familiar with meal preparation and able to speak French. The exclusion criteria were the same as those for the schizophrenia group.

This study was approved by the Ethics Committee of the CHUM. All study participants signed an informed consent form and received $30 (CAN) for their expenses related to the study (see Appendix 2).

4.3.2 Measures

4.3.2.1 Cognitive assessment

For cognitive functioning assessment, participants were individually administered 4 subtests from the Cambridge Neuropsychological Test Automated Battery (CANTAB) (Levaux et al., 2007), with CANTAB eclipse version 2.0. The 4 subtests and measures retained for this study were: 1) *Motor Screening (MOT):* visuo-motor coordination, speed of response, i.e. mean latency time, 2) *Paired associate learning task (PAL):* recall measured with the first trial memory score, i.e. the total number of patterns correctly located, on the first trial, summed across 8 stages (range: 0 – 26), and learning measured by total error adjusted score, i.e. the total number of incorrect placements, 3) *Stockings of Cambridge (SOC):* planning measured with the number of problems solved in minimum moves, 4) *Spatial working memory (SWM):* visuo-spatial working memory measured by number of errors made between searches as well as a strategy score indicating the use of a more systematic strategy. As a fifth test, the *Stroop Color-Word test (Golden version)* was employed to assess selective attention and cognitive flexibility with the interference score (Golden, 1978).

4.3.2.2 Daily activity performance assessment

The PRPP System of Task Analysis: Both Stages 1 and 2 of the PRPP System of Task Analysis were tested in this study. In Stage 1, errors of accuracy (an attempt was made to perform a step, but was incorrect or inaccurate), omission (no attempt was made to perform the step), repetition (the person did not stop to perform the step), and timing (steps were performed too quickly or too slowly) were identified. In Stage 2, a total of 34 observable behavioural descriptors were categorized into 4 quadrants: Perceive, Recall, Plan, and Perform (Table 4.1). Each quadrant was divided into 3 subquadrants, containing either 2 or 3 “descriptors” that individually or cumulatively identified processing strengths and deficits in information processing strategies. These descriptors were scored on a 3-point rating scale, with (1) indicating that the descriptor behaviour impacted negatively on task performance to the extent that the task was not completed to the expected level or performance required significant prompting; (2) indicating some qualitative difficulties with behaviour; and (3) indicating that the performance showed no deficit in this behaviour. A global PRPP System total score and specific PRPP System quadrant scores were calculated. A more complete description of its psychometric properties with psychiatric clients can be found in another study (Aubin et al., in press).

Familiarity with meal preparation task questionnaire: This questionnaire created for the study, was inspired from Dickerson and Fisher (1997). As our study involved a meal preparation task, each participant answered a brief questionnaire on his/her evaluation of his/her level of familiarity with the kitchen and with the preparation of each dish. A scale from 0 (never used the kitchen or cooked this dish), to 3 (cooks this dish regularly every month or more often) was implemented.

4.3.3 Procedure

Study participants with schizophrenia meeting the inclusion criteria were seen twice within a 14-day period. On the first meeting, the afore-mentioned cognitive assessments were administered by trained evaluators of these tests. At the second meeting, daily task performance assessment was completed by an occupational therapist with experience in psychiatry, and trained in use of the PRPP System. The meal preparation task was established during a preliminary study, and included the preparation of meat, potatoes and a cake, with instructions that all dishes should be ready at the same time (Aubin et al., 2008). Participants were instructed to try and solve problems that might arise without asking as much as possible the evaluator to help. The evaluator interfered only in case where security of the person was threatened, or in case of extreme anxiety. A maximum delay of 10 minutes between completion of the first and the last dish was considered acceptable, but participants were not aware of this performance criterion. Participants from the control group were seen individually once or twice, depending on their availability for the neuropsychological tests and the meal preparation task. All participants were seen in the Occupational Therapy service kitchen in the hospital. Socio-demographic data on participants with schizophrenia were collected through questionnaires and by consulting the medical files. For the control group, a questionnaire served to collect general sociodemographic data.

4.3.4 Data analysis

Descriptive data was presented for both the schizophrenia and control groups on sociodemographic, cognitive and functional variables. Simple t-tests and chi-square tests were done to compare groups in their sociodemographic variables. Where theoretical interaction was a concern, we used factorial design ANOVAs to test their significance. It was determined that the mean level of education was significantly different between the compared groups, this variable was therefore included in the analyses as a covariable as it was thought to be a potential confounding variable. To verify the hypothesis of functional limitations of the schizophrenia population, a series of mixed models with one between-subject factor (groups), one within-subject factor (pairs of subjects) and one covariable (education difference for each pair of subjects) tested differences between the 2 groups on cognitive and functional variables. Differences in PRPP descriptor scores between both groups were investigated with similar models. Since these analyses were still at the exploratory level, we did not control for multiplicity of tests and statistical significance was set at $p \leq .05$ for all analyses.

4.4 Results

4.4.1 Participants

Sociodemographic data on the paired subgroup of participants with schizophrenia (n = 28) and the control group (n = 28) are presented in Table 4.2. The mean age for both groups was a little over 43 years and 64% (n = 18) of the subjects were males in both groups. Education was about 3 years less for the participants with schizophrenia ($t\,(54) = -3.80$, $p < .001$).

4.4.2 Groups differences in cognitive and functional variables

Significant differences were observed in the cognitive tests performance between the schizophrenia subgroup and the control group, with the schizophrenia subgroup scoring significantly lower than the control group on all tests, except for the Stroop interference score, as can be seen in Table 4.3.

A number of functional limitations were observed on Stages 1 and 2 of the PRPP System within both groups. Differences were found between both groups in the number of accuracy errors in Stage 1 of the PRPP System (Table 4.4). The number of errors committed by both groups in the other error types was considered to be non-significant, and no other comparison analyses were conducted on these errors.

In Stage 2 of the PRPP System of Task Analysis, significant differences were found between the groups for total score and scores of the PRPP quadrants (Table 4.5). Men and women were compared (within each group), with no differences on their PRPP total scores (schizophrenia group: $t(26) = -.166$, $p = .870$; control group, $t(26) = .867$, $p = .394$) and no gender by group interaction was found ($F(1,26) = .136$, $p = .715$). There were no differences in the proportion of participants in each group who did not respected the time criteria for delay between the first and the last dish as well as in those who did not started with the dish that took longer to prepare (Table 4.5). There was no difference in familiarity with meal preparation (Table 4.5). No significant interaction of group with familiarity was observed for the PRPP System total score ($F(1,48.98) = .355$, $p = .554$), and for the Perceive ($F(1,51.79) = .347$, $p = .559$), Recall ($F(1,50.99) = .030$, $p = 863$), Plan ($F(1,47.94) = .376$, $p =.542$) and Perform ($F(1, 51.70) =.159$, $p = .692$) quadrant scores. The effect of familiarity on task performance, and, consequently on the PRPP System scores was therefore considered to be similar for both groups and not controlled for.

At the level of PRPP System descriptors, the presence of group by education interaction was seen only with the "monitors" item. ANCOVAs were done and the difference in the descriptor "monitors" was observed only in the "13 years or less of education" subgroup ($F(1,5.18) =140.91$, $p = .000$), with participants from the control group having a higher mean. Significant differences between the 2 groups were evident in all the other descriptors, the control group having higher scores (Table 4.6).

4.5 Discussion

This study tested the hypothesis that people with schizophrenia have significantly more functional limitations than individuals without a psychiatric disorder during daily task performance. The PRPP System of Task Analysis, based on a model of information processing, was adopted to describe the functional limitations observed during the task performance. The results demonstrated that more difficulties in information processing strategies were observed in persons with schizophrenia during the accomplishment of a daily task when compared to a matched control group without a psychiatric diagnosis, confirming the hypothesis. Moreover, the results on a number of neuropsychological tests also indicated that the schizophrenia group was more impaired than the control group in most of the tests. Knowing that multiple domains of cognitive functioning are necessary for daily functioning, it is not unexpected that these deficits interfered with the performance of a daily living task.

A difference in the quality of task execution was noted in the schizophrenia group compared to the controls. This difference was reflected in a greater number of accuracy errors. Both groups had similar non-clinically significant rates for most other types of errors, namely, omission, repetition and timing errors. This was not surprising as the study participants had to be familiar with meal preparation.

The errors observed were further explained by problems in processing strategies measured in Stage 2 of the PRPP System. Lower PRPP System total scores and quadrant scores were obtained by the schizophrenia group compared to the control group. Differences in scores in a number of descriptors belonging to the Perceive, Recall and Plan quadrant, suggest that persons with schizophrenia are more vulnerable in these processing strategies during a daily multi-task than a matched control group.

In studies focussing on neuropsychological performance, people with schizophrenia demonstrated significantly more impaired visual search performance than controls when required to use top-down goals to limit their search to relevant items (Gold, Fuller, Robinson, Braun, & Luck, 2007). They also showed more impulsive behaviours than controls when faced with choices in specific tasks, making suboptimal choices compared to the controls (Hutton et al., 2002). It has also been demonstrated that memory (Aleman, Hijman, de Haan, & Kahn, 1999), capacity to monitor errors during task performance (Silver & Goodman, 2007) as well as duration judgement (Elvevag et al., 2003) and planning (Wilson, Evans, Emslie, Alderman, & Burgess, 1998) are impaired in people with schizophrenia compared to control groups. At a functional "everyday" level, the difficulties outlined above may have been reflected within this group of individuals with schizophrenia in problems affecting behaviours, such as "searches and locates", "chooses", "recalls steps", "identifies obstacles, sequences, questions, analyses and judges" and "contextualise to duration".

However, some aspects of the meal preparation task were similar for both groups. Indeed, the overall planning abilities of this meal preparation task did not differ greatly between both groups. No participants from either the schizophrenia subgroup or the control group failed to complete the task to the end. Participants from both groups managed to complete meal preparation within a similar time frame, and the delay between completion of the first and the last dish was not statistically different in both groups. These results are different from those of other studies where controls performed better in the optimal sequencing of dishes, and participants with schizophrenia had longer first/last dish delays (Semkovska et al., 2004). Similarly, planning a grocery shopping task was more problematic than task execution for participants with schizophrenia compared to the controls (Hamera, Brown, Rempfer, & Davis, 2002). The differences in results may be explained by differences in the complexity of the tasks in these studies, or by distractions affecting attention and possibly planning abilities.

Participants in the present investigation were living in the community, and were familiar with meal preparation as these were inclusion criteria. Accordingly, planning skills, such as those requested in the meal preparation task, were present to a certain level in these participants.

The current study had some limitations pertaining to the fact that the occupational therapist did the cognitive and functional assessment for some participants with schizophrenia and for all participants from the control group. The therapist was aware of the potential risk for bias. The results of cognitive assessment were calculated by computer program and were not known until the end of data collection. A PRPP System Task Analysis grid was developed for this study to diminish risks of bias. The elevated number of tests also represents a risk for Type II errors.

A methodological strength of the present study was the use of a control group matched for age and gender, and the control for education differences between matched pairs of participants.

4.6 Conclusion

This study makes a unique contribution to the body of knowledge on function and schizophrenia in the identification of problematic behaviours leading to the inefficiency of task performance, which could become targets for rehabilitation interventions in people with schizophrenia. The PRPP System of Task Analysis has shown to be sensitive to differences in the efficiency of processing strategies during daily multi-task performance. More studies are needed to explore how these problematic behaviours during task performance are associated with community functioning as well as their relationship with specific cognitive functions.

Acknowledgments: This study was supported by a grant from the Canadian Occupational Therapy Foundation (COTF) and Fonds de la recherche en santé du Québec (FRSQ). We thank Tania Pampoulova, Jocelyne Thérien and Kathe

Villeneuve for their help in the organization of data collection, as well as Ovid Da Silva for editing this paper.

4.7 References

Aleman, A., Hijman, R., de Haan, E., & Kahn, R. (1999). Memory impairment in schizophrenia: A meta-analysis. *American Journal of Psychiatry, 156*, 1358-1366.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders: DSM-IV-TR* (4th text. rev. ed.). Washington, DC: American Psychiatric Association.

Aubin, G., Chapparo, C., Gélinas, I., Stip, E., & Rainville, C. (2008). Use of the Perceive, Recall, Plan and Perform System of Task Analysis for persons with schizophrenia: A preliminary study. *Australian Occupational Therapy Journal*, *doi: 10.1111/j.1440-1630.2007.00725.*

Burgess, P. (2000). Strategy application disorder: The role of the frontal lobes in human multitasking. *Psychological Research, 63*, 279-288.

Burns, N. & Grove, S. (1993). The practice of nursing research: conduct, critique and utilization. Philadelphia, PA: Saunders Company.

Chapparo, C., & Ranka, J. (1997b). The Perceive, Recall, Plan, Perform (PRPP) System of Task Analysis In C. Chapparo & J. Ranka (Eds.), *Occupational performance model (Australia)* (Vol. 1, pp. 189-198). Lidcombe, NSW, Australia: University of Sydney, Australia.

Chapparo, C., & Ranka, J. (2005). *The PRPP System of Task Analysis: User's training manual.* Lidcombe, NSW, Australia: University of Sydney, Australia.

Dickerson, A., & Fisher, A. (1997). Effects of familiarity of task and choice on the functional performance of younger and older adults. *Psychology and Aging, 12*, 247-254.

Elvevag, B., McCormack, T., Gilbert, A., Brown, G., Weinberger, D., & Goldberg, T. E. (2003). Duration judgement in patients with schizophrenia. *Psychological Medicine, 33*, 1249-1261.

Godbout, L., Limoges, F., Allard, I., Braun, C., & Stip, E. (2007). Neuropsychological and activity of daily living script performance in patients with positive or negative schizophrenia. *Comprehensive Psychiatry, 48*, 293-302.

Gold, J., Fuller, R., Robinson, B., Braun, E., & Luck, S. (2007). Impaired top-down control of visual search in schizophrenia. *Schizophrenia Research, 94*, 148-155.

Goldberg, T. E., & Green, M. F. (2002). Neurocognitive functioning in patients with schizophrenia: An overview. In K. L. Davis, D. Charney, J. T. Coyle & C. Nemeroff (Eds.), *Neuropsychopharmacology: The Fifth Generation of Progress* (pp. 657-669). Philadelphia: Lippincott Williams & Wilkins.

Golden, C. J. (1978). *Stroop color and word test: A manual for clinical and experimental uses.* Wood Dale, IL: Stoelting.

Greenwood, K. E., Landau, S., & Wikes, T. (2005). Negative symptoms and specific cognitive impairments as combined targets for improved functional outcome within cognitive remediation therapy. *Schizophrenia Bulletin, 31*, 910-921.

Hamera, E., Brown, C., Rempfer, M., & Davis, N. (2002). Test of grocery shopping skills: Discrimination of people with and without mental illness. *American Journal of Psychiatric Rehabilitation, 6*, 296-311.

Hutton, S. B., Murphy, F. C., Joyce, E. M., Rogers, R. D., Cuthbert, I., Barnes, T. R., et al. (2002). Decision making deficits in patients with first-episode and chronic schizophrenia. *Schizophrenia Research, 55*, 249-257.

Josman, N., & Birnboim, S. (2001). Measuring kitchen performance: What assessment should we choose? *Scandinavian Journal of Occupational Therapy, 8*, 193-202.

Levaux, M.-N., Potvin, S., Sepehry, A., Sablier, J., Mendrek, A., & Stip, E. (2007). Computerized assessment of cognition in schizophrenia: Promises and pitfalls of CANTAB. *European Psychiatry, 22*, 104-115.

Liberman, R. P., Kopelowitz, A., Ventura, J., & Gutkin, D. (2002). Operational criteria and factors associated to recovery from schizophrenia. *International Review of Psychiatry, 14*, 256-272.

Rempfer, M., Hamera, E., Brown, C., & Cromwell, R. (2003). The relations between cognition and the independent living skill of shopping in people with schizophrenia. *Psychiatry Research, 117*, 103-112.

Semkovska, M., Bédard, M., Godbout, L., Limoge, F., & Stip, E. (2004). Assessment of executive dysfunction during activities of daily living in schizophrenia. *Schizophrenia Research, 69*, 289-300.

Silver, H., & Goodman, C. (2007). Impairment in error monitoring predicts poor executive function in schizophrenia patients *Schizophrenia Research, 94*, 156-163.

Still, M. (2006). *The relationship between cognition and function in young people with schizophrenia.* Unpublished master's thesis, The University of Sydney, Sydney, Australia.

Toglia, J. (1998). A dynamic interactional model to cognitive rehabilitation. In N. Katz (Ed.), *Cognitive rehabilitation models for intervention in occupational therapy* (pp. 104-143). Boston: Andover.

Wilson, B., Evans, J., Emslie, H., Alderman, N., & Burgess, P. (1998). The development of an ecologically valid test for assessing patients with a dysexecutive syndrome. *Neuropsychological Rehabilitation, 8*, 213-228.

Table 4.1 Perceive, Recall, Plan and Perform System of Task Analysis quadrants, subquadrants and descriptors in Stage 2

Quadrants	PERCEIVE	RECALL	PLAN	PERFORM
Subquadrants	**Attending**	**Recalling Facts**	**Mapping**	**Initiating**
Descriptors	Notices	Recognizes	Knows goal	Starts
	Modulates	Labels	Identifies obstacles	Stops
	Maintains	Categorizes	Organizes	
Subquadrants	**Sensing**	**Recalling Schemes**	**Programming**	**Continuing**
Descriptors	Searches	Contextualises to time	Chooses	Flows
	Locates	Contextualises to place	Sequences	Continues
	Monitors	Contextualises to duration	Calibrates	Persists
Subquadrants	**Discriminating**	**Recalling Procedures**	**Evaluating**	**Controlling**
Descriptors	Discriminates	Uses objects	Questions	Times
	Matches	Uses body	Analyzes	Coordinates
		Recalls steps	Judges	Adjusts

Table 4.2 Sociodemographic characteristics of the group of persons with schizohrenia and the control group

	Schizophrenia *n*=28 *M (SD)*	Controls *n*=28 *M (SD)*
Age (years)	43.4 (9.96)	43.64 (9.88)
Education (years)*	12.18 (2.72)	15.11 (3.08)
Illness duration (years)	15.57 (10.09)	-
Total no. of hospital stays	5.41 (6.22)	-
	n (%)	*n (%)*
Sex (m/f)	18 (64.3%)/ 10 (35.7%)	18 (64.3%)/ 10 (35.7%)
Occupation		
No paid work	19 (67.9%)	2 (7.1%)
Competitive work (part time)	2 (7.1%)	4 (14.3%)
Competitive work (full time)	1 (3.6%)	21 (75%)
Social integration program	4 (14.3%)	0 (0%)
Student	0 (0%)	1 (3.6%)
Volunteer	2 (7.1%)	0 (0%)
Housing		
Family	2 (7.1%)	13 (46.4%)
Appartment/Room	15 (53.6%)	11 (39.3%)
Sharing appartment	0 (0%)	4 (14.3%)
Foster/Group homes	6 (21.4%)	0 (0%)
Supervised apartments	5 (17.9%)	0 (0%)

*A significant difference in education between participants with schizophrenia and the control group was found: t (54) = -3.80, p < .001. No significant difference was found on age between participants with schizophrenia and the control group: t(54) = 0.087, p = .931.

Table 4.3 Cognitive characteristics and comparison of the group of persons with schizophrenia and the control group

Neuropsychological tests	Schizophrenia $n = 28$ *Mean (SD)*	Controls $n = 28$ *Mean (SD)*	*F*	*df*	*p*
Visuo-motor coordination					
MOT mean latency (millisec)	1,288.84 (240.32)	1,020.54 (240.32)	17.39	27	.000*
Visuo-spatial memory					
PAL first trial memory	15.46 (3.38)	20.0 (3.38)	32.20	27	.000*
PAL total errors adjusted	37.32 (24.86)	12.46 (24.86)	21.44	27	.000*
Spatial working memory					
SWM between search	42.10 (19.15)	23.46 (19.15)	18.08	27	.000*
SWM strategy	37.64 (6.03)	31.21 (6.03)	16.81	27	.000*
Planning					
SOC problem solved in minimum moves	7.28 (2.01)	8.5 (2.01)	5.24	27	.030*
Selective attention					
Stroop interference	-1.03 (9.54)	4.32 (9.54)	4.18	27	.051

* Significant difference at $p \leq .05$

Table 4.4 Stage 1 of PRPP System type of errors during the meal preparation task

	Schizophrenia *n*=28 *M (SD)*	Controls *n*=28 *M (SD)*	*F*	*df*	*p*
Accuracy errors	13.96 (6.24)	6.75 (2.96)	42.73	27	.000*
Repetition errors[1]	0.36 (0.62)	0.07 (0.26)	-		-
Omission errors[1]	1.35 (1.03)	0.78 (0.87)	-		-
Timing errors[1]	0.39 (1.03)	0.18 (0.94)	-		-

* Significant difference at p ≤ .05

[1] The number of errors committed by both groups in this type was considered to be insignificant. No other analyses were conducted.

Table 4.5 Schizophrenia and control group results on functional variables

	Schizophrenia n =28 M (SD)	Controls n =28 M (SD)	F	df	p
PRPP total score /max. 102	85.40 (4.18)	92.26 (4.18)	44.34	27	.000*
Perceive score / max. 24	20.80 (1.11)	22.55 (1.11)	38.91	27	.000*
Recall score / max.27	23.51 (1.11)	24.81 (1.11)	22.22	27	.000*
Plan score / max. 27	17.95 (2.17)	21.16 (2.17)	36.46	27	.000*
Perform score / max. 24	23.14 (0.58)	23.73 (0.58)	11.59	27	.002*
			t	df	p
Familiarity with meal preparation / max. 9	5.54 (2.32)	6.0 (1.51)	-0.887	54	.379
Total duration of meal preparation (minutes)	43.71 (11.53)	40.0 (11.53)	1.19	54	.238
Delay between end of first and end of last dish (minutes)	10.04 (8.42)	6.96 (5.16)	1.65	54	.105
	n (%)	n (%)			p
Criteria for dishes ready at the same time not respected	11 (39.3 %)	8 (28.6 %)	-	-	.180 [a]
					1.00[b]
Did not start with the longest dish preparation	13 (46.4%)	9 (32.1%)	-	-	1.00[a]
			-	-	.375[b]

* Significant difference at $p \leq .05$

[a] McNemar test, in pairs where difference in education is more than 3 years difference in favour of controls

[b]McNemar test, in pairs where difference in education is less than 3 year difference.

Table 4.6 PRPP System descriptors with a significant difference in scores between persons with schizophrenia and control groups*

Items	Schizophrenia n =28 *Mean* (*SD*)	Controls n =28 *Mean* (*SD*)	*F*	*df*	*p*
Searches	2.33 (0.32)	2.67 (0.32)	12.42	32.79	.001
Locates	2.34 (0.32)	2.66 (0.32)	10.73	32.69	.003
Contextualizes to duration	2.32 (0.37)	2.65 (0.37)	8.93	32.65	.005
Uses objects	2.92 (0.11)	3 (0.11)	4.54	31.39	.041
Recalls steps	1.77 (0.42)	2.10 (0.42)	8.87	32.55	.005
Knows goal	2.67 (0.32)	2.88 (0.32)	7.44	30.65	.010
Identifies obstacles	1.80 (0.48)	2.24 (0.48)	14.02	30.67	.001
Organizes	2.63 (0.26)	2.79 (0.26)	5.39	31.61	.027
Chooses	2.02 (0.48)	2.34 (0.48)	8.68	30.26	.006
Sequences	2.10 (0.48)	2.40 (0.48)	5.07	32.42	.031
Questions	1.44 (0.42)	1.82 (0.42)	17.17	31.50	.000
Analyzes	1.44 (0.42)	1.82 (0.42)	17.17	31.50	.000
Judges	1.44 (0.42)	1.82 (0.42)	17.17	31.50	.000

* Significant difference at $p \leq .05$, after controlling for education

Fourth Manuscript

In Chapter 4, more difficulties in information processing strategies were observed in persons with schizophrenia during the accomplishment of a daily task when compared to a matched control group without a psychiatric diagnosis. Limitations were found in the ability to take in, to store, to retrieve and to organize new information during task performance as the Perceive, Recall, Plan and Perform quadrants of the PRPP System were most affected. The following chapter further explored the functional limitations in persons with schizophrenia, based on their specific difficulties in information processing strategies. It also aimed at answering the second objective of finding out about the presence of subgroups of participants with similar functional profiles and the specific characteristics that differentiate them. A larger sample of participants with schizophrenia was recruited for this main part of the thesis (N = 82), which included the participants from the previous study (n = 28) in Chapter 3 and excluded the control group.

Chapter 5

Daily functioning and information processing strategies in persons with schizophrenia

Ginette Aubin, Ph.D. candidate, Isabelle Gélinas, Ph.D., Emmanuel Stip, M.D.,

Constant Rainville, Ph.D, Christine Chapparo, PhD.

Submitted to Psychiatric Services

5.1 Abstract

Objective: This descriptive study aimed at examining the functional limitations displayed by people with schizophrenia when observed during a daily task performance, and to explore the presence of subgroups of participants with similar profiles in terms of their functional limitations. Methods: Eighty-two participants with schizophrenia living in the community were assessed during their performance in a daily activity using a functional assessment with a cognitive perspective, the Perceive, Recall, Plan and Perform System of Task Analysis. Other assessments included neuropsychological tests from the CANTAB battery, community functioning and symptoms. Research participants were classified as highly efficient or low efficient according to their score on the daily activity performance and were compared on the functional, cognitive and symptoms variables. Results: Participants committed a number of errors leading to functional limitations in the daily task performance. More participants from the high efficiency group attained residential independence and were independent in their living skills than participants from the low efficiency group. The only cognitive test that differentiated both groups was the visual memory test. No differences were found in the level of symptoms. Conclusions: Findings suggest that performance in a daily task and visual memory are key information for the level of residential independence. Therefore the teaching and training of these functional skills in persons with schizophrenia should take into account learning capacity.

5.2 Introduction

Persons with schizophrenia consistently report some impairment in their performance of daily activities (Ivarsson, Carlsson, & Sidenvall, 2004; Walkup & Gallagher, 1999). Compared to persons without a psychiatric diagnosis, persons with schizophrenia are less often involved in daily activities and have more deficits affecting their autonomy (Brown, 1998; Girard, Fisher, Short, & Duran, 1999). Indeed, people with schizophrenia often complain about cognitive difficulties, such as attention and memory problems, affecting their daily life (Prouteau et al., 2004).

Studies have reported that the more a person with schizophrenia is independent in maintaining community living, the more competent they are in their daily activities (Bartels, Mueser, & Miles, 1997; Dickerson, Ringel, & Parente, 1999; Sood, Baker, & Bledin, 1996). In these persons' perceptions, being involved in daily activities supports a sense of competence and pleasure (Aubin, Hachey, & Mercier, 2002) and this influences their quality of life (Aubin, Hachey, & Mercier, 1999; Haertl & Minato, 2006). Consequently, independent living and daily activity performance are identified as treatment outcome priorities by persons with schizophrenia and are major criteria for recovery from this disorder (Fischer, Shumway, & Owen, 2002; Liberman, Kopelowitz, Ventura, & Gutkin, 2002).

If daily activities are important for residential independence and the quality of life of persons with schizophrenia, then more specific information on the limitations that impede their performance is needed. Unfortunately, studies up to now have provided only general information on the observable behaviours affecting the mastery and competence of daily activities and therefore were limited in their usefulness to guide rehabilitation interventions in persons with schizophrenia. This has been partly due to the assessments of the daily activities used which have produced global indices of performance (Godbout, Limoges, Allard, Braun, & Stip, 2007; Hamera & Brown, 2000; Rempfer, 1999; Semkovska, Bédard, Godbout, Limoge, & Stip, 2004; Semkovska, Stip, Godbout, Paquet, & Bédard, 2002). When the information was more specific, methodological limitations restricted the possibility of generalization of results (Knight, 2000).

The identification of functional limitations having the most impact on the performance of daily tasks as well as gaining better knowledge of the variability of functional limitations within a group of persons with similar psychiatric diagnoses are mandatory for the establishment of appropriate treatment goals and interventions for these clientele (Girard et al., 1999). Taking these considerations and the limitations of previous studies into account, we were guided by the following questions: 1) in daily task performance, which functional limitations are displayed by people with schizophrenia? 2) are there subgroups of participants with similar profiles in terms of their functional limitations which are revealed during the performance of a daily task?

5.3 Methods

5.3.1 Participants

For this descriptive study, two psychiatric outpatient clinics were designated as recruitment centers in the Montreal, Quebec area. A convenience sample of a total of 82 persons with schizophrenia, referred by their mental health teams accepted to participate between January 2006 and February 2007. Inclusion criteria included: a DSM-IV diagnosis of schizophrenia or schizo-affective disorder confirmed by a treating psychiatrist, between 18 and 60 years of age, living in the community, familiar with meal preparation, able to speak French, displaying a stable state without any major medication change for at least 2 months prior to the study. Those presenting with a major physical handicap, a current substance abuse problem, and cognitive deficits of organic origin (such as dementia) or mental retardation were excluded. This study was approved by the ethics committees of the hospitals where it took place. After complete description of this study to the participants, written informed consent was obtained (see Appendix 2). Participants were remunerated $30 for their expenses.

5.3.2 Measures

5.3.2.1 Clinical assessment

The Positive and Negative Syndrome Scale (PANSS) (Kay, Fiszbein, & Opler, 1987) was used to assess the severity of symptoms.

5.3.2.2 Cognitive functioning assessments

Four subtests from the Cambridge Neuropsychological Test Automated Battery (CANTAB) (Levaux et al., 2007), with CANTAB eclipse version 2.0, were administered and specific indices were used : 1) Motor Screening (MOT): visuo-motor coordination measured by mean latency time, 2) Paired associate learning task (PAL): recall measured with the first trial memory score, and learning measured by the total errors adjusted score, 3) Stockings of Cambridge (SOC): planning measured with the number of problems solved in minimum moves, 4) Spatial working memory (SWM): visuo-spatial working memory measured with the number of errors made between searches as well as a strategy score, indicating the use of a more systematic strategy. The Stroop color-word test (Golden version) was employed to assess selective attention by the interference score (Golden, 1978).

5.3.2.3 Community functioning assessments

The Independent Living Skills Survey (ILSS) (Wallace, 1986; Wallace, Liberman, Tauber & Wallace, 2000) interview format of the French self-report version of the questionnaire was used (Cyr, Toupin, Lesage, & Valiquette, 1994). The Multnomah Community Ability Scale (MCAS) was completed by the clinician (Barker, Barron, McFarland, & Bigelow, 1994). The French version of this tool was adopted (Corbière et al., 2002).

5.3.2.4 Daily activities performance assessment

The Perceive, Recall, Plan and Perform (PRPP) System of Task Analysis is a standardized, criterion-referenced assessment (Chapparo & Ranka, 1997b) and was administered for the assessment of daily activity performance. In Stage

1 of the PRPP System, errors of accuracy, omission, repetition and timing during performance are identified. In Stage 2 of the PRPP System, cognitive task analysis is undertaken to describe the efficiency of information processing strategies underlying the performance of tasks. These information processing strategies are categorized in 4 quadrants: Perceive, Recall, Plan, and Perform. Each quadrant is divided into 3 subquadrants, containing either two or three "descriptors". A total of 34 observable behavioral descriptors are considered individually or cumulatively to identify processing strengths and deficits and are scored on a 3-point rating scale. A global PRPP System processing score and specific PRPP System quadrant are calculated. They have demonstrated their utility in the assessment of persons with schizophrenia and a more complete description of the tool and its psychometric properties appear in two recent studies (Aubin, Chapparo, Gélinas, Stip, & Rainville, 2008; Aubin, Gélinas, Stip, Rainville, Chapparo & Lamoureux, 2008; Still, 2006).

5.3.3 Procedure

All cognitive assessments were administered by trained evaluators (a medical doctor and an occupational therapist). The daily task performance assessment was completed by either 1 of 2 occupational therapists with experience in psychiatry, located in 2 outpatient clinics and trained in the use of the PRPP System. Both observed and rated participants during the meal preparation task which included the preparation of meat, potatoes and a cake, with instructions that all dishes be ready at the same time (Aubin, Chapparo, Gélinas, Stip, & Rainville, 2008; Aubin, Gélinas, Stip, Rainville, Chapparo & Lamoureux, 2008). A maximum delay of 10 min between completion of the first and last dish was considered acceptable, but participants were not aware of this criterion. All participants were met in the occupational therapy department kitchen in the hospital where they were recruited. As this study involved a meal preparation task, each participant answered a brief questionnaire created for this study, the "*Familiarity with Meal Preparation Task Questionnaire*" evaluating his or her level of familiarity with each dish. A scale from 0 (never used the kitchen or cooked this dish), to 3 (cooks this dish regularly every month or more often) was deployed.

5.3.4 Data analysis

To answer the first research question, descriptive statistics, including means, frequencies and standard deviations, were calculated for all socio-demographic, clinical, cognitive, and functional variables. PRPP System descriptors with mean scores below 2, a score indicating that the descriptor behaviour impacts negatively on task performance, were defined as problematic PRPP System descriptors. To answer the second research question, the group was divided according to the score obtained on the PRPP System. Participants with a score higher than 85% of the PRPP System maximum total score ($\geq$ 86.7/102) were considered highly efficient, and those with a score lower than 85% of the PRPP system maximum total score (<86.7/102) were considered "low" efficient. The cut-off was thought to represent a mastered performance, taking into account that mastery does not exclude the presence of minor performance errors. A cut-off score for mastery level at 85% has been generally accepted in the criterion-referenced assessment literature (Millman, 1973; Watkins & Kush, 1988). Both groups were compared on functional, cognitive, clinical and sociodemographic variables with *t* tests and Pearson's chi-square. Since these analyses were still at the exploratory level, statistical significance was set at $p \leq .05$.

5.4 Results

5.4.1 Participants

Two-thirds (63%) were men, with a mean age of 41.7 (SD = 9.89) years. More than two-thirds (69%) were unemployed, and almost one-half (49%) were living independently, alone in an apartment or a room. Mean number of years of education was 11.71 (SD = 2.90) years. Ninety-one percent (n = 75) were Caucasian, 1(1.2%) was Asian, 2 (2.4%) were Haitian, 4 (4.8%) were African.

5.4.2 Functional limitations in the group of participants

The PRPP System revealed certain functional limitations in participants on Stage One of this assessment. The most common errors were accuracy errors (M = 13.71, SD = 5.82). These errors were noted when an attempt to do a step in the meal preparation became problematic or when the quality of the outcome was questionable. Other types of errors were less frequent (repetition errors, [M = 0.52, SD = 0.87], omission errors, [M = 1.68, SD = 1.59], and timing errors, M = 0.73, SD = 1.27). Having the dishes ready at the same time was problematic for 32 (39.1 %) participants who took longer than the acceptable delay and 37 (45%) participants did not choose to start the task with the dish that took the longest to prepare (the cake).

When these errors were analyzed in the Stage 2 of the PRPP System, difficulties in Plan and Perceive quadrant descriptors, as well as in a number of Recall quadrant descriptors were most significant (**Table 1).** Descriptors such as “modulates”, “searches”, and “recalls steps” to name a few obtained mean scores below 2 out of a maximum score of 3.

5.4.3 Exploration of subgroups with similar profiles of functional limitations

The “high-efficiency” group included 36 participants while the “low-efficiency” group numbered 46 participants. Results from the comparison of these 2 groups on main variables are presented in Table 2. The high-efficiency group differed significantly from the low-efficiency group on all functional variables. Both groups also differed on the proportion of independently-living persons: significantly more persons were independent in their housing in the high-efficiency group (25 independent vs 11 dependent; 69% of group independent) than in the low-efficiency group (15 independent vs 31 dependent; 33% of group independent), χ^2 (1, N = 82) = 10.97, p = .001.

The high- and low-efficiency groups differed significantly on the PAL visual memory test, specifically on learning (total errors) measure. There were no significant differences between these 2 groups on the severity of symptoms, on gender proportions (χ^2[1, N = 82] = .147, p = .702), on age (t[79.99] = -.974, p = .33), years of education (t[80] = 1.51, p = .135) and psychiatric follow-up duration, t(79) = .123, p = .903.

Since familiarity with meal preparation was significantly different for both groups, which was thought to possibly affect the results of their performance on this daily task, a generalized linear model was used to control for the effect of familiarity on PRPP System scores. High-efficiency group scores were still significantly different from low-efficiency group scores on PRPP System total scores (χ^2[1, N = 82] = 114.05, p = .000), and Perceive (χ^2[1, N = 82] = 23.93, p = .000), Recall (χ^2[1, N = 82] = 86.77, p = .000), Plan (χ^2[1, N = 82] = 89.24, p = .000) and Perform quadrants (χ^2[1, N = 82] = 45.68, p = .000).

5.5 Discussion

The results from this study suggest that the information obtained from the observation of performance in a daily task closely reflected "real world" functioning. In effect, participants who belonged to the high-efficiency group retained residential independence for the most part and had more autonomous community tenure than participants who belonged to the low-efficiency group. Not unexpectedly, the degree of familiarity with the task was more intense in the high-efficiency group than in the low-efficiency group. Nonetheless, familiarity with the task did not solely explain functional differences between the 2 groups, as PRPP System scores were still different after controlling for familiarity. Hence, this functional assessment captured the "here and now" level of performance over and above any practice or experience with this meal preparation task.

Symptoms, either positive or negative, or general psychopathology, did not differentiate high-efficiency from low-efficiency groups. Only one neuropsychological test, the learning measure (total errors) in the PAL visuo-spatial memory test, differentiated the high-efficiency group from the low-efficiency group, with the high efficiency group having better scores on this test. The difference between the groups is particularly interesting and suggests that learning capacity for a majority of these persons is one of the key characteristics for residential independence and that a greater capacity to retain information may increase the chances for better community tenure.

Similar results were obtained in another study. Stip and collaborators (2007) compared on neuropsychological tests of attention, memory and executive function tests persons with schizophrenia, grouped on the basis of their performance on daily tasks and on their level of residential autonomy. They found as in the present study that only the long term memory test differentiated the groups and that no significant differences were apparent between the groups on the executive function tests. The authors suggested that the most autonomous persons may have developed specific mnemonics and strategies to help them negotiate with day-to-day problems as could be the case in the present investigation. Results from the present study are in accordance with the literature on the relationship of long term memory with the level of community functioning (Green, Kern, Braff, & Mintz, 2000; Kopelowicz, Liberman, Ventura, Zarate, & Montz, 2005).

Nonetheless, the study participants presented a number of functional limitations. Difficulties appeared to affect the planning and the quality of the execution of steps. The higher frequency of accuracy errors suggests that participants in this study consistently attempted to execute the task steps but that processing and the use of information and knowledge often lacked quality, precision and consistency. Similar results were obtained by Still (2006), with the PRPP System of Task Analysis, in a group of 23 first episode participants performing a shopping task. If accuracy type of errors characterizes this group of persons, then intervention with these persons should probably be more oriented toward the retrieval and use of knowledge and information, and problem-solving along with learning more effective procedures.

In fact, information processing strategies in the Perceive quadrant, namely “modulates, searches, locates, and monitors” were problematic. As some studies have found, selective attention and visual search deficits have been consistently reported in persons with schizophrenia undergoing neuropsychological testing (Gold, Fuller, Robinson, Braun, & Luck, 2007; Lussier & Stip, 1999; Velligan &

Bow-Thomas, 1999). In the Recall quadrant, significant problems were apparent in "recalls steps and contextualizes to time", reflecting the difficulty in retrieving and using necessary knowledge relative to steps and timing of steps during task performance. Processing strategies in the Plan quadrant of the PRPP system were affected as well. Behaviors related to decision-making, problem-solving, and error-monitoring abilities have been reported to be deficient in persons with schizophrenia (Carter, MacDonald, Ross, & Stenger, 2001; Evans, Chua, McKenna, & Wilson, 1997; Hutton et al., 2002). Problems in the Perform quadrant were less frequent and less severe than in the other quadrants for this sample. The group had less difficulty to start (initiates), continue, and persist in the task, and almost no perseverative behaviors (problems with "stops") were observed. It is possible that this type of structured task, with specific instructions and with a given level of complexity, did not elicit problems related to initiation, effort, motivation, and persistence which are known to be problematic in some people with schizophrenia (Buchanan, 2007; Carpenter, Heinrichs, & Wagman, 1988).

One limitation of this study is the relatively high number of comparisons and tests, leading to an elevated risk of type I error. Our study was considered to be at the exploratory level; therefore, the analyses, where the significance level was relatively low, may be best viewed as needing further exploration and research. In one of the sites, the occupational therapist did the cognitive and functional assessments in some participants, due to non-availability of the other evaluators, room scheduling or participants' availability. However, the occupational therapist was aware of the potential risk for bias and the computerized cognitive assessment was thought to diminish the risks of bias as results were calculated by the computer program and were not known before the end of data collection. As for functional assessment, the PRPP System task analysis grid developed for this study was, therefore, especially useful to avoid bias.

Not surprisingly, the classification into high- and low-efficiency according to the PRPP System scores did not perfectly discriminate between dependent and independent-living persons. Although performance efficiency in meal preparation was helpful to differentiate the level of housing independence in the participants, obviously, more daily tasks should be assessed before determining the need for supervision and the level of community functioning in persons with schizophrenia. Also, different types of supervision are offered by health services organisations therefore enabling more "dependent" persons to live on their own. Other problems such as substance abuse, non-adherence to treatment and absence of family members or social network may be reasons for a more structured environment.

5.6 Conclusion

The functional assessment in this study better described the problematic processing strategies affecting the performance of a daily task in person with schizophrenia. The results in this study suggest that persons with schizophrenia experience limitations in a number of behaviours during a daily task performance. Bellack, Gold and Buchanan (1999) have suggested that rehabilitation should focus on improving functional skills rather than cognitive capacities. In the perspective of the development of rehabilitation interventions, if learning capacity is a determinant of independent functioning, then different strategies should be developed for the teaching and training of these functional skills in persons with schizophrenia.

5.7 Acknowledgments

This study was supported by a grant from the Fonds de la Recherche en Santé du Québec (FRSQ). We thank Tania Pampoulova, Jocelyne Thérien, Chantal Cloutier and Kathe Villeneuve for their help in the data collection as well as Sara Liebman and Ovid Dasilva for editing this paper.

Disclosure: None for any author.

5.8 References

Aubin, G., Chapparo, C., Gélinas, I., Stip, E., & Rainville, C. (2008). Use of the Perceive, Recall, Plan and Perform System of Task Analysis for persons with schizophrenia: A preliminary study. *Australian Occupational Therapy Journal, doi: 10.1111/j.1440-1630.2007.00725.*

Aubin, G., Gélinas, I., Stip, E., Rainville, C., Chapparo, C. & Lamoureux, J. (2008). *Daily task performance and processing strategies: comparing persons with schizophrenia to controls.* Manuscript submitted for publication.

Aubin, G., Hachey, R., & Mercier, C. (1999). Meaning of daily activities and subjective quality of life in people with severe mental illness. *Scandinavian Journal of Occupational Therapy, 6*, 53-62.

Aubin, G., Hachey, R., & Mercier, C. (2002). La signification des activités quotidiennes chez les personnes souffrant de troubles mentaux graves. *Canadian Journal of Occupational Therapy, 69*, 218-228.

Barker, S., Barron, N., McFarland, B., & Bigelow, D. (1994). A community ability scale for chronically mentally ill consumers: Part I. Reliability and validity. *Community Mental Health Journal, 30*, 363-379.

Bartels, S., Mueser, K., & Miles, K. (1997). A comparative study of elderly patients with schizophrenia and bipolar disorder in nursing homes and the community. *Schizophrenia Research, 27*, 181-190.

Bellack, A., Gold, J., & Buchanan, R. (1999). Cognitive rehabilitation for schizophrenia: Problems, prospects, and strategies. *Schizophrenia Bulletin, 25*, 257-274.

Brown, C. (1998). Comparing individuals with and without mental illness using the Daily Activities Checklist. *Occupational Therapy Journal of Research, 18*, 85-98.

Buchanan, R. (2007). Persistent negative symptoms in schizophrenia: An overview. *Schizophrenia Bulletin, 33*, 1013-1022.

Carpenter, W., Heinrichs, D., & Wagman, A. (1988). Deficit and non-deficit forms of schizophrenia: The concept. *American Journal of Psychiatry, 145*, 578-583.

Carter, C., MacDonald, A. W., Ross, L. L., & Stenger, V. A. (2001). Anterior Cingulate Cortex Activity and Impaired Self-Monitoring of Performance in Patients With Schizophrenia: An Event-Related fMRI Study. *American Journal of Psychiatry, 158*, 1423-1428.

Chapparo, C., & Ranka, J. (1997b). The Perceive, Recall, Plan, Perform (PRPP) System of Task Analysis In C. Chapparo & J. Ranka (Eds.), *Occupational performance model (Australia)* (Vol. 1, pp. 189-198). Lidcombe, NSW, Australia: University of Sydney, Australia.

Corbière, M., Crocker, A., Lesage, A., Latimer, E., Ricard, N., & Mercier, C. (2002). Factor structure of the Multnomah Community Ability Scale. *Journal of Nervous and Mental Disease, 190*, 399-406.

Cyr, M., Toupin, J., Lesage, A., & Valiquette, C. (1994). Assessment of independent living skills for psychotic patients: Further validity and reliability. *Journal of Nervous and Mental Disease, 182*, 91-97.

Dickerson, F., Ringel, N., & Parente, F. (1999). Predictors of residential independence among outpatients with schizophrenia. *Psychiatric Services, 50*, 515-519.

Evans, J., Chua, S., McKenna, P., & Wilson, B. (1997). Assessment of dysexecutive syndrome in schizophrenia. *Psychological Medicine, 27*, 635-646.

Fischer, E., Shumway, M., & Owen, R. (2002). Priorities of consumers, providers, and family members in the treatment of schizophrenia. *Psychiatric Services, 53*, 724-729.

Girard, C., Fisher, A., Short, M., & Duran, L. (1999). Occupational performance differences between psychiatric groups. *Scandinavian Journal of Occupational Therapy, 6*, 119-126.

Godbout, L., Limoges, F., Allard, I., Braun, C., & Stip, E. (2007). Neuropsychological and activity of daily living script performance in patients with positive or negative schizophrenia. *Comprehensive Psychiatry, 48*, 293-302.

Gold, J., Fuller, R., Robinson, B., Braun, E., & Luck, S. (2007). Impaired top-down control of visual search in schizophrenia. *Schizophrenia Research, 94*, 148-155.

Golden, C. J. (1978). *Stroop color and word test: A manual for clinical and experimental uses.* Wood Dale, IL: Stoelting.

Green, M., Kern, R., Braff, D., & Mintz, J. (2000). Neurocognitive deficits and functional outcome in schizophrenia: Are we measuring the "right stuff"? *Schizophrenia Bulletin, 26*, 119-136.

Haertl, K., & Minato, M. (2006). Daily occupations of persons with mental illness: Themes from Japan and America. *Occupational Therapy in Mental Health, 22*, 19-32.

Hamera, E., & Brown, C. (2000). Developing a context-based performance measure for persons with schizophrenia: the Test of Grocery Shopping Skills. *American Journal of Occupational Therapy, 54*, 20-25.

Hutton, S. B., Murphy, F. C., Joyce, E. M., Rogers, R. D., Cuthbert, I., Barnes, T. R., et al. (2002). Decision making deficits in patients with first-episode and chronic schizophrenia. *Schizophrenia Research, 55*, 249-257.

Ivarsson, A.-B., Carlsson, M., & Sidenvall, B. (2004). Performance of occupations in daily life among individuals with severe mental disorders. *Occupational Therapy in Mental Health, 20*, 33-50.

Kay, S., Fiszbein, A., & Opler, L. (1987). The positive and negative syndrome scale (PANSS) for schizophrenia. *Schizophrenia Bulletin, 13*, 261-276.

Knight, M. (2000). *Cognitive function and food preparation ability in schizophrenia.* Unpublished doctoral dissertation, University of Rhode Island, Rhode Island.

Kopelowicz, A., Liberman, R. P., Ventura, J., Zarate, R., & Montz, J. (2005). Neurocognitive correlates of recovery from schizophrenia. *Psychological Medicine, 35*, 1165-1173.

Levaux, M.-N., Potvin, S., Sepehry, A., Sablier, J., Mendrek, A., & Stip, E. (2007). Computerized assessment of cognition in schizophrenia: Promises and pitfalls of CANTAB. *European Psychiatry, 22*, 104-115.

Liberman, R. P., Kopelowitz, A., Ventura, J., & Gutkin, D. (2002). Operational criteria and factors associated to recovery from schizophrenia. *International Review of Psychiatry, 14*, 256-272.

Lussier, I., & Stip, E. (1999). Attention sélective et schizophrénie avant l'administration de neuroleptiques. *L'Encéphale, 25*, 576-583.

Millman, J. (1973). Passing scores and test lengths for domain-references measures. *Review of Educational Research, 43*(2), 205-216.

Prouteau, A., Verdoux, H., Briand, C., Lesage, A., Lalonde, P., Nicole, L., et al. (2004). Self-assessed cognitive dysfunction and objective performance in outpatients with schizophrenia participating in a rehabilitation program. *Schizophrenia Research, 69*, 85-91.

Rempfer, M. (1999). *Independent living skills in people with schizophrenia: Influence of clinical symptoms and cognitive functioning.* Unpublished doctoral dissertation, University of Kansas.

Semkovska, M., Bédard, M., Godbout, L., Limoge, F., & Stip, E. (2004). Assessment of executive dysfunction during activities of daily living in schizophrenia. *Schizophrenia Research, 69*, 289-300.

Semkovska, M., Stip, E., Godbout, L., Paquet, F., & Bédard, M. A. (2002). Behavioral dizorganisation in schizophrenia during a daily activity: The Kitchen Behavioral Scoring Scale. *Brain and Cognition, 48*, 546-553.

Sood, S., Baker, M., & Bledin, K. (1996). Social and living skills of new long-stay hospital patients and new long-term community patients. *Psychiatric Services, 47*, 619-622.

Still, M. (2006). *The relationship between cognition and function in young people with schizophrenia.* Unpublished master's thesis, The University of Sydney, Sydney, Australia.

Stip, E., Sablier, J., Sepehry, A., Rivard, S., Cloutier, C., Aubin, G., et al. (2007). Cuisine et schizophrénie: activité carrefour d'une évaluation écologique, ergothérapique et neuropsychologique. *Santé Mentale au Québec, 32*(1), 159-179.

Velligan, D., & Bow-Thomas, C. (1999). Executive function in schizophrenia. *Seminars in Clinical Neuropsychiatry, 4*, 24-33.

Walkup, J., & Gallagher, S. (1999). Schizophrenia and the life course: National findings on gender differences in disability and service use. *International Journal of Aging and Human Development, 49*, 79-105.

Wallace, C. (1986). Functional assessment in rehabilitation. *Schizophrenia Bulletin, 12*, 604-624.

Wallace, C., Liberman, R., Tauber, R., & Wallace, J. (2000). The independent living skills survey: A comprehensive measure of the community functioning of severely and persistently mentally ill persons. *Schizophrenia Bulletin, 26*, 631-658.

Watkins, M., & Kush, J. (1988). Assessment of academic skills of learning disabled students with classroom microcomputer. *School Psychology Review, 17*(1), 81-88.

Table 5.1 PRPP items with mean item score lower than 2 (range 1- 3)

PRPP items and definitions	N = 82 M (SD)
PERCEIVE	
Modulates: Spontaneous narrowing and broadening of focus	1.98 (0.49)
Searches: Active and systematic seeking of sensory information	1.98 (0.49)
Locates : Finds body parts, objects and parts of the environment	1.98 (0.49)
Monitors: When required, responds by action to sensory changes	1.88 (0.56)
RECALL	
Contextualize to time: Knows when a task occurs	1.89 (0.49)
Recall steps: Performs the general and specific procedures and steps	1.73 (0.37)
PLAN	
Identifies obstacles : Explores & identifies potential constraints	1.71 (0.48)
Questions: Hesitates, looks or examines aspects of the task	1.38 (0.35)
Analyses : Stops to evaluate a specific constraint	1.38 (0.35)
Judges: Makes safe and informed decisions	1.38 (0.35)

Table 5.2 Comparison of high efficiency vs low efficiency groups on functional, clinical, and cognitive variables

Variables	High efficiency (*n* = 36) *M (SD)*	Low efficiency (*n* = 46) *M (SD)*	*t*	*df*	*p*
ILSS[a]	70.64 (4.80)	73.13 (5.60)	-2.12	80	.037*
MCAS[b]	70.50 (8.27)	67.39 (6.33)	1.92	80	.057
PRPP[c]	90.04 (2.76)	81.31 (3.18)	13.04	80	.000*
Familiarity [d]	6.13 (2.01)	4.86 (2.14)	2.72	80	.008*
PANSS Negative symptoms[e]	19.27 (7.72)	20.97 (7.18)	-1.03	80	.306
PANSS Positive symptoms[e]	18.77 (5.68)	19.08 (5.19)	-0.25	80	.798
PANSS General psychopat.[f]	38.13 (9.06)	38.78 (8.25)	-0.34	80	.738
PANSS total score[g]	74.47 (19.27)	77.23 (17.30)	-0.68	80	.496
Stroop interference[h,i]	-1.10 (8.92)	-2.26 (8.44)	0.59	79	.552
MOT (millisec.)[j]	1176.21 (267.61)	1234.89 (272.40)	0.98	80	.331
PAL first trial memory[k]	16.47 (3.75)	15.10 (4.92)	-1.37	80	.172
PAL total errors[l]	25.91 (22.85)	43.69 (44.98)	-2.32	80	.023*
SWM between errors[h, l]	37.02 (19.33)	37.91 (21.14)	-0.19	79	.847
SWM strategy[h, m]	35.52 (5.24)	35.22 (6.42)	0.23	79	.818
SOC problems solved in minimum moves[h, n]	8.02 (1.96)	7.24 (2.14)	1.69	79	.094
	% (*n*)	% (*n*)	χ^2		*p*
Dish ready at same time	86.1% (31)	41.3% (19)	17.04	1	.000*
Start with longest dish preparation	86.1% (31)	34.8% (16)	21.75	1	.000*

* Significant difference at p value ≤ 0.05

[a] Possible scores range from 0 to 112, with higher scores indicating higher functioning.
[b] Possible scores range from 5 to 85, with higher scores indicating higher functioning.
[c] PRPP, perceive, recall, plan and perform. Possible scores range from 3 to 102, with higher scores indicating higher functioning.
[d] Possible scores range from 0 to 9, with higher scores indicating more familiarity.
[e] Possible scores range from 7 to 49, with higher scores indicating more psychopathology.
[f] Possible scores range from 16 to 112, with higher scores indicating more psychopathology.
[g] Possible scores range from 30 to 210, with higher scores indicating more psychopathology.
[h] N=81 , Stroop: 1 missing in high efficiency gr.; SWM and SOC: 1 missing in low efficiency gr.
[i] Possible scores range from –30 to 30, with higher scores indicating better ability.
[j] Longer latency time indicates slower processing.
[k] Possible scores range from 0 to 26, with higher scores indicating better recall.
[l] More errors indicate lower ability.
[m] Possible scores range from 8 to 56, with lower scores indicating use of a more systematic strategy.
[n] Possible scores range from 0 to 12, with higher scores indicating better ability to problem solve.

Fifth Manuscript

The previous chapter supports the results found in chapter 4 concerning the functional limitations in the Perceive, Recall, Plan and Perform quadrants of the PRPP System of Task Analysis. More participants in the high-efficiency group were independent and had more autonomous community tenure than participants who belonged to the low-efficiency group. Moreover, the participants in the high-efficiency group also had better abilities in visual associative memory. This cognitive function seems to have a particular relationship with daily task performance. The following chapter corresponds to the third and fourth objectives of this thesis. It aimed at further investigating the relationships between daily task performance in persons with schizophrenia and cognitive functions of visuospatial memory, spatial working memory, visuomotor coordination, planning and selective attention in answer to the third objective of this thesis. Moreover, the relationships between task performance and community functioning were also examined and the hypothesis of this thesis, of functional limitations in daily task performance having a negative influence on community functioning was tested. Similar to the previous manuscript in Chapter 5, data from the large sample of 82 participants was used in this part of the thesis.

Chapter 6
Daily activities, cognition and community functioning in persons with schizophrenia

Ginette Aubin, Ph.D. candidate, Isabelle Gélinas, Ph.D., Emmanuel Stip, M.D., Constant Rainville, Ph.D., Christine Chapparo, Ph.D.

Submitted to Schizophrenia Research

6.1 Abstract

Objective: This descriptive correlational study explores the relationships between daily activity performance, attention, memory, executive functions and community functioning in people with schizophrenia. More specifically, this study attempted to verify the hypothesis that functional limitations in the performance of daily activities negatively affect the community functioning of people with schizophrenia. Methods: Eighty-two individuals with schizophrenia living in the community were recruited for the study. The Perceive, Recall, Plan and Perform (PRPP) System of Task Analysis was used to assess participants' performance during a meal preparation task. The study used cognitive tests assessing visuo-spatial associative memory, spatial working memory, planning and visuo-motor coordination, selective attention, as well as a subjective assessment of cognition (SSTICS). Community functioning was assessed with the Independent Living Skills Survey (ILSS) and the Multnomah Community Ability Scale (MCAS). Results: Significant associations were found between task performance and visuo-spatial associative learning, spatial working memory, and planning. Mapping, programming, and evaluating skills in task performance were found to be associated with the MCAS. Negative symptoms were also significantly associated with task performance. Conclusions: The findings of the current study suggest that visuo-spatial associative learning, compared to other cognitive functions, may more strongly affect daily task performance. Planning skills necessary for efficient task performance were also found to be those most determinant for community functioning. Rehabilitation interventions should consider these underlying deficits when developing strategies to help people with schizophrenia build functional skills essential for community living.

6.2 Introduction

Independent living and related daily activities performance have been identified as treatment outcome priorities by persons with schizophrenia (Fischer, Shumway, & Owen, 2002) and represent major criteria for recovery (Liberman, Kopelowitz, Ventura, & Gutkin, 2002). As well, independent living skills development and restoration are major targets for rehabilitation interventions (APA, 2004; Silverstein, 2000). Nevertheless, a great proportion of persons with schizophrenia still have chronic impairments leading to social and occupational difficulties as well as residential and financial dependence (Green & Nuechterlein, 1999; Häfner & An Der Heiden, 1999; Rector & Beck, 2001; Tessier & Clément, 1992) in spite of these current rehabilitation objectives.

Studies examining the relationship between functional capacity, ie. the actual capacity to perform daily activities, and the broader domain of community functioning have reported mixed results. While a direct relationship between a person's functional capacity and community living has been found in studies using performance-based assessments of daily living activities (Bowie, Reichenberg, Patterson, Heaton, & Harvey, 2006; Keefe, Poe, Walker, Kang, & Harvey, 2006), other studies have reported no significant associations between the performance of specific daily tasks, and global scales of community functioning (Still, 2006).

More consistent findings have been found concerning the presence of cognitive impairments and their relationship to community living in people with schizophrenia. Over the last decade, research findings have led many authors to conclude that cognitive deficits in these persons predict the level of community functioning (Green, Kern, Braff, & Mintz, 2000; Hoff & Kremen, 2003; Liddle, 2000). Therefore, if persons with schizophrenia have difficulties performing various cognitive operations, then it is not surprising that their performance in daily tasks involving the need to stay focused, to solve problems, to modify strategies and to remember instructions, all of which are basic community living skills, is impaired as well (Tamminga, Buchanan, & Gold, 1998).

Only a few studies have reported on the relationship between specific daily living activity performance and cognition in people with schizophrenia. The results of these studies acknowledge the relationship between memory, attention, executive functions and global aspects of daily task performance. Some critical aspects of the latter include: accuracy, sequencing and repetition of steps and degree of success in reaching the goal (Godbout, Limoges, Allard, Braun, & Stip, 2007; Greenwood, Landau, & Wikes, 2005; Rempfer, Hamera, Brown, & Cromwell, 2003; Semkovska, Bédard, Godbout, Limoge, & Stip, 2004; Semkovska, Stip, Godbout, Paquet, & Bédard, 2002). But it is notable that none of these studies identify the specific problems that are involved in the interaction between impaired cognitive abilities and "real-world functioning", resulting in the dysfunctional performance of these daily tasks. Specifically, the observable task performance limitations overlying cognitive deficits which are most affected in persons with schizophrenia, such as perception and attention, memory, planning and enactment of the activity have not been adequately investigated in relation to community functioning.

Girard, Fisher, Short and Duran (1999) pointed out that the identification of functional limitations having the most impact on the performance of tasks would help orient the goals and treatment interventions for this clientele. Experts concerned with the development of effective interventions have called for studies exploring the relationship between daily functional capacity and community functioning (Bellack et al., 2007). They have also underlined the necessity to investigate the relationships between specific cognitive processes and specific functional tasks (McKibbin, Brekke, Sires, Jeste, & Patterson, 2004). Studies previously mentioned on the relationship between daily activities, community functioning and cognitive deficits in persons with schizophrenia present inconsistent findings and limited investigation of skill limitations. The present study aimed at filling in some of these gaps. First, this study aimed at exploring the relationship between daily activity performance, and specific cognitive functions, namely, attention, memory, and executive functions in persons with schizophrenia. Second, it aimed at examining the relationship between the performance of a daily activity and the community functioning of persons with a diagnostic of schizophrenia. More specifically, this study attempted to verify the following hypothesis: functional limitations observed during the performance of daily activities have a negative influence on the community functioning of persons with schizophrenia. The relationship of symptoms with daily task performance was also explored, as these have also been found to be related to daily task performance (Godbout et al., 2007; Greenwood et al., 2005; Semkovska et al., 2004).

6.3 Methods

6.3.1 Participants

Two psychiatric outpatient clinics were used as recruitment centers in the Montreal, Quebec area and 82 persons with schizophrenia agreed to participate (see Appendix 6). Inclusion criteria included: a DSM-IV-TR (American Psychiatric Association, 2000) diagnosis of schizophrenia or schizo-affective disorder confirmed by a treating psychiatrist, between 18 and 60 years of age, living in the community, familiar with meal preparation, able to speak French, and displaying a stable state without any major medication change for at least two months prior to the study. All participants were referred by mental health teams. Exclusion criteria included: a major physical handicap, a current substance abuse problem, cognitive deficits due to an organic origin (such as dementia) or mental retardation. This study was approved by the ethics committees of the hospitals where it took place. After a thorough description of this study to the participants, written informed consent was obtained (see Appendix 2). Participants received $30. for their expenses related to the participation in this study.

6.3.2 Assessments

6.3.2.1 Clinical assessments

The clinical state was assessed with the Positive and Negative Symptom Scale (PANSS) (Kay, Fiszbein, & Opler, 1987; Lançon et al., 1997), the Calgary

Depression Scale (CDS) (Addington, Addington, & Maticka-Tyndale, 1994), and the Extrapyramidal Symptoms Rating Scale (ESRS) (Chouinard & Margolese, 2005). ESRS provides three indices: Clinical Global Impression (CGI) of severity of dyskinesia, parkinsoninsm and dystonia, with ratings ranging from 0 = absent to 3 = mild.

6.3.2.2 Cognitive assessments

The cognitive functioning was assessed with four subtests from the Cambridge Neuropsychological Test Automated Battery (CANTAB) (Levaux et al., 2007), with the CANTAB eclipse version 2.0; one classical test, the Stroop Color-Word Test, Golden version (Golden, 1978) and a subjective assessment, the Subjective Scale to Investigate Cognition in Schizophrenia (SSTICS) (Stip, Caron, Renaud, Pampoulova, & Lecomte, 2003) was also applied. The four CANTAB subtests retained for this study have been described in another study (Aubin, Gélinas, Stip, Chapparo, & Rainville, 2008).

6.3.2.3 Community functioning assessments

Community functioning was assessed with the Independent Living Skills Survey ([ILSS], Cyr, Toupin, Lesage, & Valiquette, 1994; Wallace, 1986) and with the Multnomah Community Ability Scale ([MCAS], Barker, Barron, McFarland, & Bigelow, 1994).

6.3.2.4 Daily task performance assessment

The performance in a daily task was assessed with the Perceive, Recall, Plan and Perform (PRPP) System of Task Analysis. The PRPP System of task analysis is a standardised, criterion referenced assessment which has two stages of analysis (Chapparo & Ranka, 2005). The PRPP System uses a cognitive task analysis to describe the efficiency of the information processing strategies underlying the performance of daily tasks. These information processing strategies are categorized into four quadrants: Perceive, Recall, Plan, and Perform. A total of 34 observable behavioural descriptors are used individually or cumulatively to identify processing strengths and deficits and are scored on a three point rating scale. A more complete description of the tool and its psychometric properties can be found in another study (Aubin, Chapparo, Gélinas, Stip, & Rainville, 2008). Interrater reliability with the two raters resulted in Intraclass correlations (*ICC*) values ranging between ,79 and ,95 for three quadrants (Recall, Plan and Perform) and for the total score. The mean percentage of agreement between the two raters for individual items was 77.56%. Results for the Perceive quadrant were lower (*ICC* = .26), therefore definitions and rating criteria were reviewed, and a rating grid developed to obtain a high agreement between both raters.

Since a meal preparation task was used to evaluate the participants, each one answered a brief questionnaire created for this study, the "Familiarity with Meal Preparation Task Questionnaire", evaluating his or her level of familiarity with each dish. A scale from 0 (never used the kitchen or cooked this dish), to 3 (cooks this dish regularly every month or more often) was employed.

6.3.3 Procedure

The participants meeting the inclusion criteria were seen twice within a 14 day interval. On the first meeting, the clinical tests and cognitive assessments outlined previously were administered by trained evaluators (a medical doctor and an occupational therapist).

At the second meeting, the daily task performance assessment was completed by either one of two occupational therapists with experience in psychiatry, located in two outpatient clinics and trained in the use of the PRPP System. Both observed and rated the participants during the meal preparation task which was established during a preliminary study. This task was pretested and included the preparation of meat and potatoes and of a cake, with instructions that all dishes be ready at the same time (Aubin, Gélinas, Stip, Rainville, & Chapparo, 2008; Aubin, Gélinas, Stip, Rainville, Chapparo & Lamoureux, 2008). All participants were seen in the occupational therapy department kitchen in the hospital were they were recruited.

6.3.4 Data analysis

Descriptive statistics including means, frequencies and standard deviations were calculated for all socio-demographic, clinical, cognitive and functional variables. To answer the research objectives and hypothesis, partial correlations were calculated, controlling for a priori defined potential confounders (age, gender and education), in order to examine the relationship between the scores on the daily task performance, and scores on the neuropsychological tests and community functioning measures. Simple Pearson correlations were calculated with daily task performance and PANSS scales. Since these analyses were still at the exploratory level, statistical significance was set for all analyses at a p value $\leq .05$.

6.4 Results

6.4.1 Participants

One person could not complete the Stroop test because of a color recognition problem, one did not complete the ESRS test and another one could not complete the working memory and planning tests. Since they had completed all the other tests, these persons were included in the study.

Two thirds of the participants in this group were men (n = 52), with a mean of 41.70 (SD = 9.89) years of age. More than two thirds (n = 57) were unemployed and almost half (n = 40) were living independently, alone in an apartment or a room. The clinical characteristics of the participants (n = 82), are presented in Table 6.1. According to the CDS cut-offs (Muller, Muller, & Fellgiebell, 2006) this group was below the cut-off for mild depression and was not considered as a depressed group. This group was also considered as having borderline to very mild severity of dyskinesia, parkinsoninsm and dystonia according to their ratings on the three ESRS global indices.

6.4.2 Correlations between daily task performance, cognition, community functioning and symptoms

As presented in Table 6.2, after adjustment for gender, age and education, significant associations were found between the PRPP System total score, those of the Perceive, Recall and Plan quadrant scores and the following: PAL first trial memory and total errors scores, SWM between search errors and strategy score, as well as the SOC problems solved in minimum moves score. Correlations with SWM and PAL total errors scores are negative because higher scores represent more errors and a less efficient strategy. No associations were found with MOT visuomotor coordination, nor with Stroop or SSTICS.

As regards community functioning, only one significant association was found between PRPP System Plan quadrant scores and MCAS (pr = .267, p = .017). This suggests that more efficient planning abilities in task performance are associated with a higher level of community functioning. No significant associations were found between PRPP System scores and the ILSS.

Significant associations were found between the Negative symptoms scale of the PANSS and the PRPP System total score and the Recall and Plan quadrants scores. This suggests that a better performance on the meal preparation task is associated with lesser degree of negative symptoms. As shown by correlations coefficients, the associations were moderate, ranging from - .230 to .384.

6.5 Discussion

This study focused on the relationships between the actual performance of a daily task, cognitive deficits and community living ability in a group of people with schizophrenia. Significant associations were found between the daily task performance and the visual memory test, the spatial working memory test and the planning test. People who better succeeded in the associative memory task also had better abilities in searching and locating material, in recalling the task procedures and in mapping, programming and evaluating their actions during the meal preparation task. Results from the present study support the evidence that memory in and of itself needs to be considered as much as executive functions in the explanation of activities of daily living performance in persons with schizophrenia, in accordance with Godbout and colleagues' (2007) conclusions.

In a study where both verbal and visual memory were evaluated, only the visual memory test was associated to the performance of a shopping task (Still, 2006). Two longitudinal studies on the relationship between cognition and community functioning reported that visual memory and executive functions predicted independence and competence in daily activities (Dickerson, Boronow, Ringel, & Parente, 1999; Velligan, Bow-Thomas, Mahurin, Miller, & Halgunseth, 2000). In a third longitudinal study, better adjustment to living skills were predicted by a stronger baseline visual memory, and improvement in daily living skills over the 15-16 month follow up period was more likely to increase with higher baseline performance in planning abilities and poorer associative learning visual memory baseline performance in participants involved in a rehabilitation program (Prouteau et al., 2005). Hence, results from the present study and from the abovementioned studies are congruent in associating daily task performance and visual memory. More specifically, the learning measure in the visual memory test seems to have an important role in the competence and improvement in daily living task performance. Consequently, enhancing associative visual memory during a rehabilitation program may have a positive effect on the improvement in this community functioning domain as was suggested by Prouteau and colleagues (2005).

Another interesting result is the association of both spatial working memory measures with the meal preparation task performance. Similar associations were found between spatial strategy use and working memory and grocery shopping task performance in people with schizophrenia (Greenwood et al., 2005). In the current study, people who had difficulty planning and using a strategy during the spatial working memory test also had more difficulties in behaviours related to the planning of the meal. Moreover, people who committed more search errors because of difficulties in holding and manipulating information during the spatial working memory test also had more difficulties in modulating attention, in searching and locating material for the meal preparation. These results are in accordance with literature stating that working memory and planning, similar to strategy use, are essential for the accomplishment of complex daily living tasks (Burgess, 2000; Humphreys, Forde, & Riddoch, 2001). These cognitive functions have also been integrated as important targets for cognitive rehabilitation interventions for this clientele (Wykes, 2000).

Another sphere investigated in this study was the relationship between the performance of a meal preparation task and community functioning. This study's hypothesis that functional limitations have a negative influence on community functioning was supported, although only the Plan quadrant descriptors were found to be associated with community functioning assessed by mental health professionals. By the same token, a previous study found that more descriptors in the Plan quadrant than in other PRPP System quadrants were impaired in participants with schizophrenia compared to a control group during the performance of a similar task (Aubin, Gélinas, Stip, Rainville, Chapparo, & Lamoureux, 2008). Thus, results in the present study suggest that the most determinant processing strategies for community functioning were related to the ability to "map", "program" and "evaluate" actions and behaviours during task performance (e.g. identifies obstacles, organises, chooses). This type of skills is somewhat similar to the components of executive functions, which are known to play a role in efficient performance of everyday activities and in independent living (Burgess, 2000; Lezak, Howieson, & Loring, 2004; Lezak, LeGall, & Aubin, 1994).

The absence of other significant associations between other aspects of task performance and community functioning could be explained in different ways. Most importantly, performance in one daily task was assessed, while a number of tasks with different types of cognitive demands may be quite determinant for community living, such as money and medication management to name a few (Godin, 1985). Other explanations pertain to other factors which may affect the level of community functioning notwithstanding functional capacity, such as lack of motivation and an environment with little opportunities for autonomy (Bellack et al., 2007; Velligan, Kern, & Gold, 2006) and presence or absence of environmental support (Anthony, Cohen, Farkas & Gagné, 2004) and those factors were not assessed.

The association of negative symptoms with the Recall and Plan quadrants of the performance-based assessment is not surprising. In other studies, negative symptoms in people with schizophrenia have been found to be associated with omission errors in a menu task, longer delay for completion of the task, errors in planning and repetition errors in a meal task (Semkovska et al., 2004), less accuracy and efficiency, and more redundancy in a grocery shopping task (Greenwood et al., 2005). Symptoms such as decreased motivation and defects in attention control may have affected processing strategies involving recalling procedures and steps as well as choosing, sequencing and monitoring the task.

The results in the present study indicate a number of significant associations between daily activity performance, cognition and community functioning. However, the correlations are small to moderate in magnitude. Explanations such as the fact that PRPP System descriptors "cut across" traditional cognitive abilities, and that both the ILSS and the MCAS evaluations cover a wide range of domains and activities must be considered. Other daily living tasks and social behaviours may also have an influence on community functioning. Moreover, the relatively high number of tests leads to an elevated risk of Type I error. This study was considered to be of an exploratory nature, and results need further exploration and research. Replication of these analyses with other samples of participants should further validate these results.

6.6 Conclusion

The present findings extend the previous ones concerning the relationship of functional capacity and cognitive tests as well as the association of functional capacity and community functioning in persons with schizophrenia. This study presents a unique perspective on the specific processing skills and strategies reflective of the underlying cognitive functions and relevant for efficient task performance and in turn for successful community living.

As one of the focuses of psychiatric rehabilitation interventions is the improvement of functional skills (Farkas, 2006), therefore enhancing the efficient use and transfer of these processing behaviours in different daily tasks and situations becomes a relevant target. Interventions should take into account the underlying deficits and should focus on the processing of information as well as on the task execution itself (Bellack, Gold, & Buchanan, 1999; Chapparo & Ranka, 2005). Authors have suggested that strategies addressing cognition as a highly intertwined set of capacities (Dickinson, Iannone, Wilk, & Gold, 2004), as well as motivation to develop competencies (Velligan et al., 2006) may be more closely linked to meaningful improvements in everyday functioning.

Acknowledgments: This study was supported by a grant from the Canadian Occupational Therapy Foundation (COTF) and from the Fonds de la Recherche en Santé du Québec (FRSQ). We thank Tania Pampoulova, Jocelyne Thérien and Kathe Villeneuve for their help in the organization of the data collection, as well as Sara Liebman for editing this paper.

6.7 References

Addington, D., Addington, J., & Maticka-Tyndale, E. (1994). Specificity of the Calgary Depression Scale for schizophrenics. *Schizophrenia Research, 11*, 239-244.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders: DSM-IV-TR* (4th text. rev. ed.). Washington, DC: American Psychiatric Association.

American Psychiatric Association. (2004). *Practice guidelines for the treatment of patients with schizophrenia*. Retrieved November 5th 2005, from www.psych.org/cme.

Anthony, W., Cohen, M., Farkas, M., & Gagné, C. (2004). *La réhabilitation psychiatrique*. Charleroi, Belgium: Socrate-Réhabilitation.

Aubin, G., Chapparo, C., Gélinas, I., Stip, E., & Rainville, C. (2008). Use of the Perceive, Recall, Plan and Perform System of Task Analysis for persons with schizophrenia: A preliminary study. *Australian Occupational Therapy Journal, doi: 10.1111/j.1440-1630.2007.00725.*

Aubin, G., Gélinas, I., Stip, E., Rainville, C., Chapparo, C. & Lamoureux, J. (2008). *Daily task performance and processing strategies: comparing persons with schizophrenia to controls.* Manuscript submitted for publication.

Barker, S., Barron, N., McFarland, B., & Bigelow, D. (1994). A community ability scale for chronically mentally ill consumers: Part I. Reliability and validity. *Community Mental Health Journal, 30*, 363-379.

Bellack, A., Gold, J., & Buchanan, R. (1999). Cognitive rehabilitation for schizophrenia: Problems, prospects, and strategies. *Schizophrenia Bulletin, 25*, 257-274.

Bellack, A., Green, M., Cook, J., Fenton, W., Harvey, P., Heaton, R., et al. (2007). Assessment of community functioning in people with schizophrenia and other severe mental illnesses: A white paper based on an NIMH-sponsored workshop. *Schizophrenia Bulletin, 33*, 805-822.

Bowie, C. R., Reichenberg, A., Patterson, T. L., Heaton, R. K., & Harvey, P. D. (2006). Determinants of real-world functional performance in schizophrenia subjects: Correlations with cognition, functional capacity, and symptoms. *American Journal of Psychiatry, 163*, 418-425.

Burgess, P. (2000). Strategy application disorder: The role of the frontal lobes in human multitasking. *Psychological Research, 63*, 279-288.

Chapparo, C., & Ranka, J. (2005). *The PRPP System of Task Analysis: User's training manual*. Lidcombe, NSW, Australia: University of Sydney, Australia.

Chouinard, G., & Margolese, H. (2005). Manual for the Extrapyramidal Symptom Rating Scale (ESRS). *Schizophrenia Research, 76*, 247-265.

Cyr, M., Toupin, J., Lesage, A., & Valiquette, C. (1994). Assessment of independent living skills for psychotic patients: Further validity and reliability. *Journal of Nervous and Mental Disease, 182*, 91-97.

Dickerson, F., Boronow, J., Ringel, N., & Parente, F. (1999). Social functioning and neurocognitive deficits in outpatients with schizophrenia: A 2-year follow-up. *Schizophrenia Research, 37*, 13-20.

Dickinson, D., Iannone, V., Wilk, C., & Gold, J. (2004). General and specific cognitive deficits in schizophrenia. *Biological Psychiatry, 55*, 826–833.

Farkas, M. (2006). Réadaptation psychiatrique: une approche et un processus. *Santé mentale, 106*, 51-58.

Fischer, E., Shumway, M., & Owen, R. (2002). Priorities of consumers, providers, and family members in the treatment of schizophrenia. *Psychiatric Services, 53*, 724-729.

Girard, C., Fisher, A., Short, M., & Duran, L. (1999). Occupational performance differences between psychiatric groups. *Scandinavian Journal of Occupational Therapy, 6*, 119-126.

Godbout, L., Limoges, F., Allard, I., Braun, C., & Stip, E. (2007). Neuropsychological and activity of daily living script performance in patients with positive or negative schizophrenia. *Comprehensive Psychiatry, 48*, 293-302.

Godin, L. (1985). Mon expérience comme fiduciaire de patients psychiatriques. *Santé mentale au Québec, 10*, 93-98.

Golden, C. J. (1978). *Stroop color and word test: A manual for clinical and experimental uses*. Wood Dale, IL: Stoelting.

Green, M., Kern, R., Braff, D., & Mintz, J. (2000). Neurocognitive deficits and functional outcome in schizophrenia: Are we measuring the "right stuff"? *Schizophrenia Bulletin, 26*, 119-136.

Green, M., & Nuechterlein, K. (1999). Should schizophrenia be treated as a neurocognitive disorder? *Schizophrenia Bulletin, 25*, 309-318.

Greenwood, K. E., Landau, S., & Wikes, T. (2005). Negative symptoms and specific cognitive impairments as combined targets for improved functional outcome within cognitive remediation therapy. *Schizophrenia Bulletin, 31*, 910-921.

Häfner, H., & An Der Heiden, W. (1999). The course of schizophrenia in the light of modern follow-up studies: The ABC and WHO studies. *European Archives of Psychiatry and Clinical Neuroscience, 249*(Suppl. 4), 14-26.

Hoff, A. L., & Kremen, W. S. (2003). Neuropsychology in schizophrenia: An update. *Current Opinion in Psychiatry, 16*, 149-155.

Humphreys, G., Forde, E., & Riddoch, M. (2001). The planning and execution of everyday actions. In B. Rapp (Ed.), *Handbook of Cognitive Neuropsychology* (pp. 565-589). Philadelphia: Psychology Press.

Kay, S., Fiszbein, A., & Opler, L. (1987). The positive and negative syndrome scale (PANSS) for schizophrenia. *Schizophrenia Bulletin, 13*, 261-276.

Keefe, R., Poe, S.E., M., Walker, T. M., Kang, J. W., & Harvey, P. D. (2006). The Schizophrenia Cognition Rating Scale: An interview-based assessment and its relationship to cognition, real-world functioning, and functional capacity. *American Journal of Psychiatry, 163*, 426-432.

Lançon, C., Auquier, P., LLorca, P. M., Martinez, J. L., Bougerol, T., & Scotto, J. C. (1997). Étude des propriétés psychométriques de la PANSS dans sa version française dans une population de patients schizophrènes. *L'Encéphale, 23*, 1-9.

Levaux, M.-N., Potvin, S., Sepehry, A., Sablier, J., Mendrek, A., & Stip, E. (2007). Computerized assessment of cognition in schizophrenia: Promises and pitfalls of CANTAB. *European Psychiatry, 22*, 104-115.

Lezak, M., Howieson, D., & Loring, D. (2004). *Neuropsychological assessment* (4th ed.). New York: Oxford University Press.

Lezak, M., LeGall, D., & Aubin, G. (1994). Évaluation des fonctions exécutives lors des atteintes des lobes frontaux. *Revue de neuropsychologie, 4*, 327-343.

Liberman, R. P., Kopelowitz, A., Ventura, J., & Gutkin, D. (2002). Operational criteria and factors associated to recovery from schizophrenia. *International Review of Psychiatry, 14*, 256-272.

Liddle, P. (2000). Cognitive impairment in schizophrenia: Its impact on social functioning. *Acta Psychiatrica Scandinavica, 101*, 11-16.

McKibbin, C. L., Brekke, J. S., Sires, D., Jeste, D. V., & Patterson, T. L. (2004). Direct assessment of functional abilities: Relevance to persons with schizophrenia *Schizophrenia Research, 72*, 53-67.

Muller, M., Muller, K., & Fellgiebell, A. (2006). Detection of depression in acute schizophrenia: Sensitivity and specificity of two standard observer rating scales. *Canadian Journal of Psychiatry, 51*, 387-392.

Prouteau, A., Verdoux, H., Briand, C., Lesage, A., Lalonde, P., Nicole, L., et al. (2005). Cognitive predictors of psychosocial functioning outcome in schizophrenia: A follow-up study of subjects participating in a rehabilitation program. *Schizophrenia Research, 77*, 343-353.

Rector, N., & Beck, A. (2001). Cognitive behavioral therapy for schizophrenia: an empirical review. *The Journal of Nervous and Mental Disease, 189*(5), 278-287.

Rempfer, M., Hamera, E., Brown, C., & Cromwell, R. (2003). The relations between cognition and the independent living skill of shopping in people with schizophrenia. *Psychiatry Research, 117*, 103-112.

Semkovska, M., Bédard, M., Godbout, L., Limoge, F., & Stip, E. (2004). Assessment of executive dysfunction during activities of daily living in schizophrenia. *Schizophrenia Research, 69*, 289-300.

Semkovska, M., Stip, E., Godbout, L., Paquet, F., & Bédard, M. A. (2002). Behavioral dizorganisation in schizophrenia during a daily activity: The Kitchen Behavioral Scoring Scale. *Brain and Cognition, 48*, 546-553.

Silverstein, S. (2000). Psychiatric rehabilitation of schizophrenia: Unresolved issues, current trends, and future directions. *Applied and Preventive Psychology, 9*, 227-248.

Still, M. (2006). *The relationship between cognition and function in young people with schizophrenia.* Unpublished master's thesis, The University of Sydney, Sydney, Australia.

Stip, E., Caron, J., Renaud, S., Pampoulova, T., & Lecomte, Y. (2003). Exploring cognitive complaints in schizophrenia: SSTICS-subjective scale to investigate cognition in schizophrenia. *Comprehensive Psychiatry, 44*, 331-340.

Tessier, L., & Clément, M. (1992). De la réadaptation psychosociale au développement communautaire. In *La réadaptation psychosociale en psychiatrie, défi des années 90.* Boucherville: Gaëtan Morin.

Velligan, D., Bow-Thomas, C., Mahurin, R., Miller, A., & Halgunseth, L. (2000). Do specific neurocognitive deficits predict specific domains of community function in schizophrenia? *Journal of Nervous and Mental Disease, 188*, 518-524.

Velligan, D., Kern, R., & Gold, J. (2006). Cognitive rehabilitation for schizophrenia and the putative role of motivation and expectancies. *Schizophrenia Bulletin, 32*, 474-485.

Wallace, C. (1986). Functional assessment in rehabilitation. *Schizophrenia Bulletin, 12*, 604-624.

Wykes, T. (2000). The Rehabilitation of Cognitive Deficits. *American Journal of Psychiatric Rehabilitation, 4*(2), 234-248.

Table 6.1 Clinical characteristics for schizophrenia participants (N=82)

	n	%
Diagnosis		
Paranoid schizophrenia	53	64.6%
Schizo-affective type	20	24.4%
Undifferentiated type	4	4.9%
Residual type	3	3.7%
Disorganised type	2	2.4%
	M	*SD*
Illness duration (years)	15.69	9.18
Total no. of hospital stays (mean no.)	5.52	5.66
PANSS		
PANSS total score	76.02	18.13
PANSS positive	18.95	5.38
PANSS negative	20.23	7.42
PANSS general psychopathology	38.50	8.57
Calgary Depression scale		
Total score	2.20	1.78
Extra-pyramidal Symptom Rating Scale		
C.G.I. of severity of Dyskinesia	0.91	1.21
C.G.I. of severity of Parkinsoninsm	1.26	1.22
C.G.I. of severity of Dystonia[1]	0.33	0.76

[1] n=81

Table 6.2 Correlations between performance on PRPP System of Task Analysis and performance on cognitive tests (n=82)

PRPP System scores	PRPP Total	Perceive	Recall	Plan	Perform
Cognition					
	pr [a]	*pr*	*pr*	*pr*	*pr*
MOT	-.182	-.139	-.166	-.183	-.100
PAL First trial memory	.228*	.176	.295**	.170	.155
PAL Total errors	-.317***	-.237*	-.384***	-.257*	-.204
SWM between search errors[1]	-.187	-.232*	-.150	-.171	-.037
SWM strategy[1]	-.224*	-.211	-.210	-.230*	-.023
SOC	.217	.133	.258*	.208	.095
Stroop[1]	.059	.088	.134	.002	-.020
SSTICS[2]	-.090	-.041	-.108	-.085	-.065
Community functioning					
	pr	*pr*	*pr*	*pr*	*pr*
ILSS	-.192	-.084	-.195	-.209	-.125
MCAS	.196	.107	.098	.267*	.102
Symptoms					
	r [b]	*r*	*r*	*r*	*r*
PANSS total	-.174	-.060	-.214	-.201	-.051
PANSS positive	-.013	.095	-.018	-.072	.011
PANSS negative	-.270 *	-.197	-.291**	-.278*	-.078
PANSS gen. psychopathology	-.118	-.001	-.180	-.133	-.043

[a] Partial correlations, controlling for age, gender and education
[b] Simple Pearson correlations
* p < .05, ** p < .01, *** p < .005
[1] N= 81 [2] N=79
MOT: Motor screening, mean latency time
PAL: Paired associate learning task, recall measured with the first trial memory score, learning measured by total error adjusted score
SWM: Spatial working memory, number of errors between searches and strategy score indicating the use of a more systematic strategy
SOC: Stockings of Cambridge: planning, problems solved in minimum moves
Stroop: selective attention, interference score
SSTICS: Subjective Scale to Investigate Cognition in Schizophrenia.

Chapter 7

Use of multidimensional analysis for exploration of subgroups of participants and relationships between functional, cognitive and clinical variables

In the previous chapters, functional limitations during a meal preparation task in people with schizophrenia have been described. Subgroups defined based on the global efficiency of their performance were compared. High and low functioning subgroups were different in the residential status and on their performance in a visuospatial associative memory test. This cognitive function was also found to be most strongly associated with task performance, while broader community functioning was specifically associated with the planning skills of the Plan quadrant of the PRPP System during the meal preparation task. The presence of subgroups based on the individual functional profiles of participants had not yet been sufficiently investigated in this thesis, nor were the patterns of relationships between daily task performance and the set of cognitive, functional and clinical characteristics in these individuals.

In this chapter, in order to further explore the presence of subgroups of participants with similar functional profiles according to their individual responses on specific sets of variables and examine patterns of relationships between cognition, community functioning, and daily activity performance, multidimensional analyses, namely categorical principal component analyses (CATPCA), were conducted in this study.

CATPCA was chosen for answering both of these objectives, since one major advantage of this analysis is that it allows examination of relationship patterns between several variables and a sample of individuals through graphic representations (Lebart, Piron, & Morineau, 2006). The information presented in these graphics is helpful in identifying particular groups that stand out on specific variables (Meulman & Heiser, 2004). This method reduces numerous variables into a smaller number of underlying orthogonal dimensions or components, similar to what occurs in principal components analysis (Linting, Meulman, Groenen, & van der Kooij, 2007). CATPCA is suitable for mixed levels of measurement as in nominal, ordinal, and numerical variables (Linting et al., 2007).

The methods used for this part of the study and the results of the CATPCA, which complete the presentation of the main study of this thesis, are presented, along with a discussion of the findings.

7.1 Methods

7.1.1 Participants

This part of the study also had a descriptive correlational design. As sample size is important in factorial analysis (Tabachnik & Fidell, 2001), PRPP System data from study participants with schizophrenia (N = 82) and from participants in a control group (n = 28) (see Chapter 4) were used in the analyses. Both groups were collapsed after it was verified that their correlation matrix on the set of PRPP System descriptors was similar. Additional data from two participants who fulfilled the criteria for the control group as described in Chapter 4 and who completed all of the assessments, but who were not included in previous analyses because they could not be matched for age to a participant in the schizophrenia group, were added in these analyses. Therefore, data from 112 participants were included in the factorial analyses, a number considered acceptable for this analysis (Gefen, Straub, & Boudreau, 2000; MacCullum, Widaman, Zhang, & Hong, 1999). CATPCA were performed only with data from the participants with schizophrenia (N = 82), as they were the major interest in this thesis.

7.1.2 Measurement

The assessments and tests included in the analysis have been described in Chapter 5 and in Appendix 5, which describes measurement tools. The following cognitive functioning tests were included in the analysis: the MOT visuo-motor coordination test, which measures mean latency of response (MOT); the PAL visual memory test with first trial memory (PALtrial) and total errors (PALerrors) measures; the SWM visuo-spatial working memory test with between search errors measures (SWMerrors) and strategy score (SWMstrat); the SOC planning test with problems solved in minimum moves measure (SOC); and the Stroop interference score. Both community functioning tests were included, namely the participant-rated ILSS and the clinician-rated MCAS. A "negative symptoms" score was calculated using the PANSS items from the negative factor obtained by Lançon et al. (1997). This PANSS negative factor was thought to better represent the singularity of these symptoms and was used in the analysis and labelled NegativeSx. Participants were divided into two subgroups, based on their residential status – the "dependent" subgroup (*n* = 41) and the "independent" subgroup (*n* = 40). The data from one participant from the dependent group was considered as outlying and was not entered in the analysis. PRPP factors obtained through the factorial analysis were to be added to these variables.

7.1.3 Data analysis

Analyses were performed in three steps. In the first step, exploratory factorial analysis of PRPP System descriptors was performed. This step was necessary in order to simplify and reduce the information contained in the set of PRPP System variables while identifying the underlying or latent dimensions that best represent the explained variance in this set of variables (Tabachnik & Fidell, 2001). PRPP System factor scores would then be used in the subsequent analyses.

Factorial analysis included two stages. First, principal axis factoring with orthogonal (varimax) rotation was performed with SPSS v.15. This stage was useful in identifying meaningful factors. Kaiser's criteria of a minimum eigenvalue of 1 and the Cattell's scree test were used as criterion for factors extraction (Baillargeon, 2003). Variables with minimum loading of .30 on a factor were retained to better explore the general pattern of the solution (Costello & Osborne, 2005; Fabrigar, Wegener, MacCullum, & Strahan, 1999). Bartlett's test of sphericity, the Kaiser-Meyer-Olkin measure of sampling adequacy, factors pattern, as well as variables communalities were considered for the quality of the factor model (Baillargeon). As the dimensions obtained were theoretically expected to be correlated, a maximum likelihood analysis with oblique rotation was undertaken using LISREL v.8.72. This type of analysis was used to confirm the factor structure obtained in the exploratory factorial analysis (Gefen et al., 2000). Goodness of fit statistics were calculated to determine the adequacy of the model, and factor scores were constructed with the same statistical package.

In the second step of the analysis, a categorical principal component analysis (CATPCA) was conducted with the PRPP System factors in order to further explore whether subgroups of participants with schizophrenia with similar functional profiles exist, based on their patterns of scores on the PRPP factors. The third step involved exploring patterns of relationships between cognitive, community functioning, and daily activity performance variables in people with schizophrenia, using the CATPCA method.

For the second and third steps of the analyses, preliminary CATPCA were conducted to determine how many components could be extracted in order to explain the maximum of variance and to be theoretically sound and interpretable. Kaiser's criterion of a minimum eigenvalue of 1 was used for component extraction. Variables were assigned an equal weight and were recoded into seven numerical categories. The symmetrical method was chosen for normalization, as interest in this analysis was directed toward relations between objects (persons) and variables in both analyses. The global fit of the CATPCA solutions was indicated by the amount of variance explained and Cronbach's alpha of the model (Meulman, Van der Kooij, & Heiser, 2004).

The outcome of the CATPCA is a figure displaying the joint representation of variables and participants in a principal axis orientation (Zeijl, Dubois-Reymond, & Te Poel, 2001). Variables are represented as vectors. The position of the variable's endpoint is determined by the component loadings of the variable on each component. These component loadings are equivalent to the association of the variable with each principal component (Linting et al., 2007). The length of the vector from the origin (0,0), representing the quantified mean for each variable, to the endpoint represents the total variance explained by this variable in the model (de Ridder, Theunissen, & van Dulmen, 2007; Linting et al.). Variables with longer vectors explain more variance and have a better fit in the model than variables with shorter vectors. The distance between the variables approximately represents their degree of association with one another (Linting et al.; Meulman et al., 2004). Variables close to one another are positively and moderately to highly associated. An angle of 90° formed by the variables' vectors indicates a poor or absent association, while 180° angles indicate a strong negative relationship (Lebart et al., 2006; Linting et al.).

The variable's endpoint represents the category of participants with the highest scores in that variable, often corresponding to the highest level of functioning in that particular variable. Although not represented graphically, the categories with the lowest scores rest in the opposite direction of the endpoint of the vectors.

Individuals are represented as points on the graphic. Each individual obtains a component score, which is a standard score on each principal component (Linting et al., 2007). The position of a point is determined by its component scores, and each point is located close to the categories of variables in which they scored (Linting et al.). The origin (0,0) represents the mean component score for the sample. The points are positioned according to their relationship with the variables (Zeijl et al., 2001). The perpendicular projection of a point on a vector indicates the individual's score on that particular variable (Linting et al.). Proximity between individuals is interpreted as a similarity in their profile of responses on the variables (Lebart et al., 2006; Zeijl et al.). Subgroups of participants with similar profiles can be identified when points closely grouped in bundles or clusters are observed on the graphic.

7.2 Results

7.2.1 Exploratory factorial analysis with PRPP System descriptors

The factorial analysis was conducted with the PRPP System descriptors. From the 34 initial variables, 24 were kept for analysis. After preliminary analyses, 10 items were eliminated for the following reasons: (1) four items had little variation from the maximum score (orients, matches, recognizes, and starts); (2) five items were collapsed to form two variables because they had been scored identically (searches/locates become searches, questions/analyses/judges become judges); (3) two variables were forming a factor by themselves (discriminates and continues) and had a low item-total correlation and low communality; and (4) one descriptor obtained no factor loading (uses objects). Factor analyses of the PRPP System ratings disclosed, as a best result, principal axis factoring extraction of five correlated factors explaining 50.19% of the variance (Table 7.1).

The quality of the solution was evaluated with two different indices. The Bartlett's test of sphericity was used to test whether the correlation matrix was different from an identity matrix, where the variables are non-collinear and would lead to each variable becoming a factor (Friel, 2004). A significant *p* value equivalent to .000, inferior to .05 was obtained in this test, which confirmed that the correlation matrix was different from an identity matrix. The Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) is a measure of the factorability of the correlation matrix and is an indicator of the degree of common variance shared by the variables (Baillargeon, 2003; Friel). This measure varies between 0 and 1, with values closer to 1 being better. The value obtained was equivalent to 0.850, which was considered very good and indicated that the correlation matrix was factorable (Friel).

Maximum likelihood analysis was performed to test the adequacy of the factor structure. There are no strict rules about which goodness of fit statistics should be reported; however, some indices have been recommended for reporting model adjustment (Raykov, Tomer, & Nesselroade, 1991). As suggested by Schermelleh-Engel et al. (2003) and Raykov et al. (1991), one descriptive measure of the overall fit of the model is the Root Mean Square Error of Approximation (RMSEA), which indicates whether the model fits in the population (Schermelleh-Engel et al.). Values between 0.05 and 0.08 indicate an adequate fit: This index was equivalent to 0.0770 in the current analysis, suggesting that the model had an adequate fit to the data. Non-normed Fit Index (NNFI) is a descriptive measure based on model comparison; a cut-off of .95 indicates a good fit relative to the independence model (Schermelleh-Engel et al.). The NNFI was equal to .941, close to the cut-off. Goodness of fit statistics confirmed that the model had an acceptable fit to the data.

Because the five factors obtained did not replicate the quadrants of the original model, they were named after what theoretically seemed best to represent their common characteristics. Factor interpretation was conducted, taking into account the variables with the highest loadings on the factor (Friel, 2004), the initial PRPP System model, information processing theory, and executive function definition and concepts (Chapparo & Ranka, 2005; Dutil, Bottari, Vanier, & Gaudreault, 2003; Katz, Tadmor, Felzen, & Hartman-Maeir, 2007; Lezak, Howieson, & Loring, 2004; Rainville & Passini, 2005; Toglia, 1998; van der Gaag, 1992).

Most of the items forming Factor 1 concerned the "Planning" process of task performance – "sequences," "maintains," "modulates," "times," "flows," "organizes," and "chooses." These variables are related to the organization of steps and material (Dutil et al., 2003; Lezak et al., 2004) and to maintaining attention to the task.

Factor 2 was thought to represent the "Execution-Correction" process of task performance; it included "contextualizes to time," "contextualizes to duration," "judges," "identifies obstacles," "searches," and "persists." These variables relate to problem solving and correcting errors (Katz et al., 2007; Lezak et al., 2004; Rainville & Passini, 2005), as well as knowing when to start a step and for how long it should be performed.

Table 7.1 Five factor model of PRPP System descriptors

	Cronbach's Alpha	F1	F2	F3	F4	F5	Commu-nalities
F1 Planning (7 items)							
sequences		.801					.693
maintains		.588					.519
modulates		.766					.673
times	.818	.641					.431
flows		.491					.444
organizes		.555					.333
chooses		.643					.489
F2 Execution/ Correction (6 items)							
contex. to time			.838				.831
contex. to duration			.705				.592
judges/analyzes/ questions	.865		.881				.761
id. obstacles			.933				.837
searches/locates			.606				.498
persists			.198				.071
F3 Motor Regulation (6 items)							
adjusts				.896			.835
uses body				.732			.553
calibrates	.748			.536			.305
coordinates				.522			.379
monitors				.573			.413
contex. to place				.496			.313
F4 Task Goal (2 items)							
knows goal	.677				.537		.619
recalls steps					.958		.638
F5 Basic Knowledge (3 items)							
categorizes						.548	.637
stops	.573					.586	.310
labels						.566	.315
Total scale	.912		Mean communality				.509

Total explained variance 50.188%

Factor 3, the "Motor Regulation" factor, was mainly associated with physical and motor regulation of task performance (Chapparo & Ranka, 2005; van der Gaag, 1992). It included "adjusts," "uses body," "calibrates," "coordinates," "monitors," and "contextualizes to place."

Factor 4, the "Task Goal" factor, included two variables – "knows goal" and "recalls steps," which were thought to reflect the maintenance of this major aspect of task performance (Chapparo & Ranka, 2005; Lezak et al., 2004; Rainville & Passini, 2005).

Factor 5, labelled "Basic Knowledge," included "labels," "categorizes," and "stops." These descriptors seemed to involve basic knowledge of facts about the task (Chapparo & Ranka, 2005; van der Gaag, 1992), such as when to stop and how to name and classify utensils. Factor scores to be used in the subsequent analyses were calculated with Lisrel, using the item scores, loadings, and correlations between factors.

7.2.2 CATPCA with PRPP factors: Exploration of subgroups

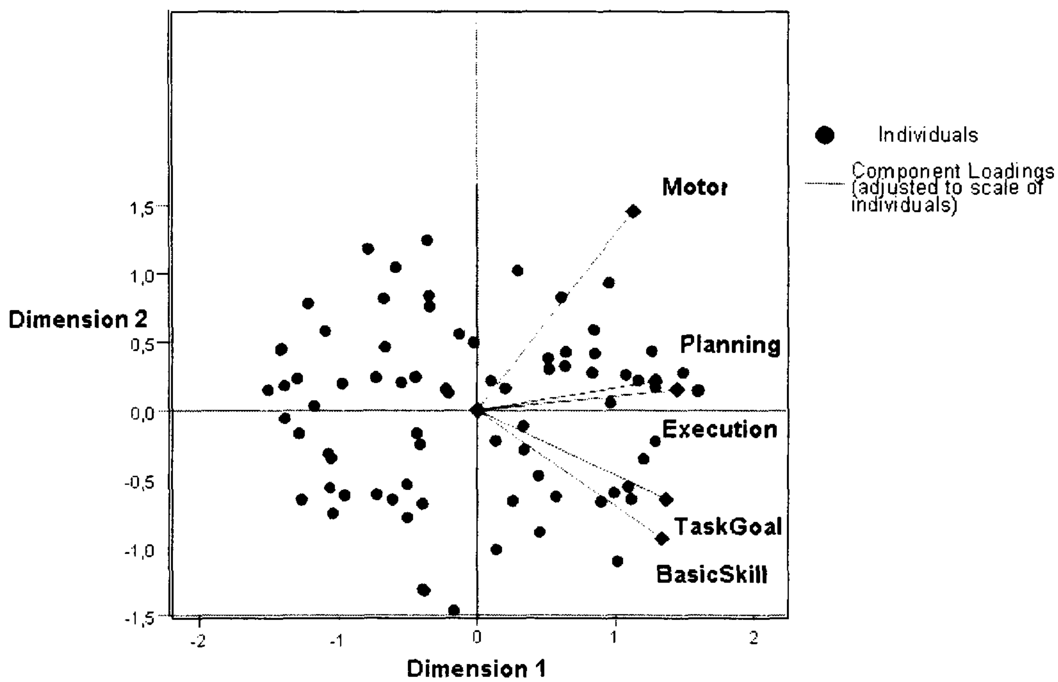
CATPCA was conducted with the PRPP System factors to explore subgroups of participants with schizophrenia with similar functional profiles (n = 82). The control group was not included in these analyses.

The two-dimensional model explained 88.96% of the total variance, with the first component (Dimension 1 on the x-axis) explaining 76.56% (eigenvalue 3.82) and the second (Dimension 2 on the y-axis) explaining 12.40% (eigenvalue 0.62). The large amount of variance explained by the first component in the model suggests that this component is the major dimension in this model. The second component's eigenvalue was below Kaiser's criterion of a minimum eigenvalue of 1; however, it was retained in the analysis for graphic representation. Cronbach's alpha for the two-component model was equal to .969, which was considered satisfactory (Bland & Altman, 1997).

The results of the analysis are presented graphically in Figure 7.1. Joint representation of PRPP System factors and participants in the current study are shown. It can be observed that the component scores of the individuals (points) are scattered over both dimensions. No clusters of individuals are discriminated following visual analysis, implying that there are no apparent subgroups based on a similar profile of response on scores on the PRPP System factors. Rather, individuals (points) are spread along the two axes. This indicates that study participants are distributed along a continuum of scores on both dimensions. To understand the meaning of this continuum of scores, the content of the dimension can be interpreted according to the position of the variables relative to this dimension (de Ridder et al., 2007).

The endpoints of the PRPP System factors on Dimension 1 are located on the positive (right) side of the graphic relative to the origin, 0. The position of the variables on Dimension 1 implies that they are all positively associated with the first component (Lebart et al., 2006). Individuals with positive scores on that dimension obtained high scores on these variables and individuals with negative scores obtained low scores on the PRPP factors.

Figure 7.1 Categorical principal component analysis of PRPP System factors



Analysis of Dimension 2 must be done with caution, as this dimension explains only 12% of total variance. On Dimension 2, a positive score indicates higher scores on the Motor Regulation factor, and a negative score indicates a better performance on Task Goal and Basic Knowledge factors.

The length of the PRPP System vectors indicates that each of these variables explains a similar amount of variance in the model. The analysis of the position of the variables reveals that the Planning and Execution-Correction factors are highly associated because of their proximity. Task Goal and Basic Knowledge factors are also highly associated. The angle formed by the vectors of the Motor Regulation factor and the Task Goal and Basic Knowledge factors is close to 90° and indicates a small degree of association. Both Planning factors and Execution-Correction factors are moderately associated with the Motor Regulation, Task Goal, and Basic Knowledge factors.

7.2.3 CATPCA with functional, cognitive, clinical, and sociodemographic variables

In this analysis, the relationship between functional, cognitive, clinical, and socio-demographic variables was examined. Sixteen variables, namely the five PRPP System factors, as well as MOT, PALerrors, PALtrials, SMW errors, SWMstrat, SOC, Stroop, NegativeSx, ILSS, MCAS, and residential status were included in the analysis. All variables were recoded into seven numerical categories, while the only dichotomous variable (residential status) was entered at the nominal level. Data from one participant was not included in the analysis because of missing and outlying scores on some of the cognitive tests.

The analysis resulted in a two-component model, explaining 45.88% of the total variance, which is acceptable in this type of analysis (Pett, Lackey, & Sullivan, 2003). The first component (Dimension 1 on the *x*-axis) accounted for 30.98% (eigenvalue = 4.95) and the second component (Dimension 2 on the *y*-axis) accounted for 12.40% (eigenvalue = 2.38). Cronbach's alpha for the model was equivalent to .921.

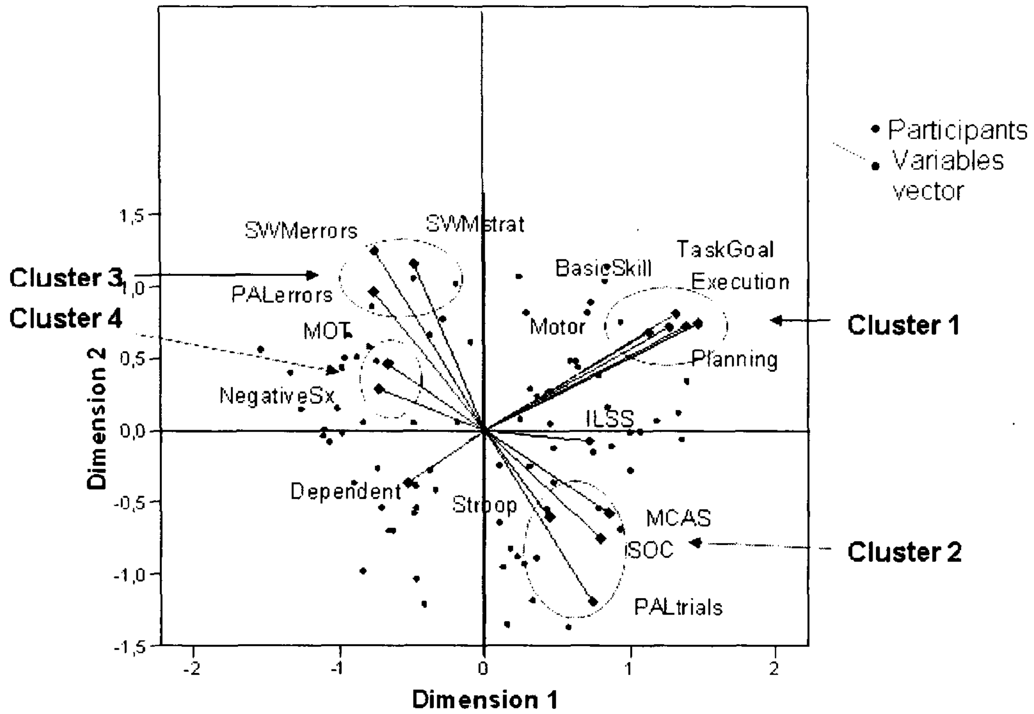
The outcome of the analysis is presented in Figure 7.2. This figure presents the joint representation of the functional, cognitive, and clinical variables and the components scores of participants. The variables' endpoint represents the category of participants with the highest scores in that variable, usually corresponding to the highest level of functioning on that particular variable. For some of the variables, however, a higher score represents a lower level of functioning. This is the case for the negative symptoms (Negative Sx), MOT mean latency (MOT), PAL visual memory learning (PALerrors), SWM between search errors (SWMerrors), and strategy (SWMstrat) (i.e., a higher severity of symptoms, a slower speed of response, more errors in the learning measure of visual memory and in the spatial working memory task and a worst strategy score). The endpoint of the residential status variable represents the category with the larger number of participants, in this case the "Dependent" subgroup (n = 41).

The relationship between variables can be interpreted through the position of bundles or clusters of variables. These clusters reflect a high degree of association between the variables. Such clusters of variables are visible on the graph (Figure 7.2): Cluster 1 is formed by the five PRPP System factors; Cluster 2 is formed by MCAS, SOC, PALtrials, and Stroop; Cluster 3 is formed by SWMerrors and SWMstrat, as well as by PALerrors; and Cluster 4 is formed by MOT and Negative Sx. ILSS does not belong to a cluster.

By their proximity and position relative to one another, it is apparent that Cluster 1, representing performance-based assessment, is poorly associated with Clusters 2, 3, and 4, representing the cognitive tests, clinician-rated community functioning, and negative symptoms. Cluster 1 is most distant to the Dependent subgroup, which suggests a negative and strong association between these variables. This results in a low score on the PRPP factors being associated with the Dependence subgroup and, consequently, a high score on the PRPP factors being associated with being "independent." The "participant-rated" community functioning variable, the ILSS, is moderately and positively associated with Cluster 1 and Cluster 2 and moderately and negatively associated with Clusters 3 and 4.

The position of Cluster 2 relative to Clusters 3 and 4 suggests a strong, negative relationship. Clusters 2 and 3 are poorly associated with the Dependent subgroup. Finally, Cluster 4 is moderately associated with the Dependent subgroup.

Figure 7.2 Graphical representation of the relationships between cognitive, functional, and clinical variables using Categorical Principal Component Analysis (n = 81)



Cluster 1: PRPP System factors – Planning, Execution, Task Goal, Basic Skills, and Motor Regulation
Cluster 2: MCAS, SOC, PAL First trial, Stroop
Cluster 3: SWM Strategy, SWM Between search errors, PAL Total errors
Cluster 4: Negative symptoms, MOT

PRPP System: Perceive, recall, Plan and Perform System of task analysis: Planning, Execution (Execution-Correction), Task Goal, Basic Skills, Motor (Motor regulation) Factors; ILSS: Independent Living Skills Survey; MCAS: Multnomah Community Ability Scale
SOC: Stockings of Cambridge planning test, number of problems performed in minimum moves; PAL: Paired Associates Learning visuospatial test, PALtrials : first trial to memory score, PAL errors: total number of errors; Stroop: interference score; SWM: Spatial Working Memory test, SWMerrors: between search total errors, SWMstrat: strategy score; MOT: Motor Screening test, mean latency time
NegativeSX: Negative symptoms; Dependent: Dependent subgroup

In summary, the cross-shaped pattern of vectors in the graphic reveals strong associations between 1) performance based-assessment and residential status and, 2) among the cognitive tests and MCAS, the clinician-rated assessment of community functioning. This pattern also implies a small degree of association between the performance-based assessment, cognitive tests, and negative symptoms, and a poor relationship between cognitive tests and residential status. The ILSS, the participant-rated community functioning assessment, is moderately associated with most variables in the model. Negative symptoms are highly associated with both community functioning measures and cognition.

The presence of subgroups can also be explored in this analysis. It is notable that participants' component scores are dispersed over both Dimensions 1 and 2. No clusters of points representing subgroups of individuals with similar profiles can be detected. Relative to their projection on both dimensions, participants are distributed along a continuum of component scores. Again, the position of the variables can be helpful in interpreting the content of the dimension.

On the left side of Dimension 1 (*x*-axis), categories with higher scores on SWMerrors, SWMstrat, PALerrors, MOT, and Negative Sx, and belonging to the Dependent subgroup are displayed. On the right side are displayed the endpoints representing the highest scores on the PRPP System factors, the two community functioning scores (ILSS and MCAS), the SOC planning test, the Stroop test, and the PAL trials (recall) test. Dimension 1 seems to represents a continuum of functioning, from "low functioning" on the left, to "high functioning" on the right.

The second component (Dimension 2 on the *y*-axis) accounts for less variance and is more difficult to explain. The graphical display suggests that having a positive score on Dimension 2 is associated with high scores on PRPP System factors and SWM errors, SWM Strat, PAL errors, MOT, and Negative Sx. Having a negative score on Dimension 2 indicates high scores on the PALtrials, SOC, Stroop, and MCAS, and also indicates belonging to the Dependent subgroup. A tentative explanation for this dimension could be that a dissociation in the level of functioning in cognitive and functional domains is present to a small degree (relative to the proportion of variance explained by this component) in this sample.

7.3 Discussion

7.3.1 Exploration of subgroups of participants with similar functional profiles

The CATPCA with PRPP System factors was used to further explore the presence of subgroups with similar functional profiles in this sample of people with schizophrenia. The analysis revealed that study participants were quite heterogeneous in terms of their scores on the PRPP System factors and no subgroups based on a common and specific functional profile were detected. Rather, individuals were distributed along a continuum of scores from poor to high performance on all five PRPP factors based on performance on a meal preparation task. A participant with a low score on one PRPP factor is likely to obtain a low score on the other factors. Similarly, a high score on one PRPP factor is likely to be accompanied by a high score on the other factors.

The sample size for the factor analysis was within the limits of acceptability. Future studies should perform confirmatory analyses to validate these results with larger samples. However, this analysis added information regarding the nature of the different factors. The PRPP factors together defined one major dimension in this analysis. This view is consistent with information processing and executive function models, where different intertwined cognitive components are necessary during task performance (Chapparo & Ranka, 1997b; Rainville & Passini, 2005).

7.3.2 Patterns of relationships between variables

An overall picture of the patterns of relationships between daily activity performance, cognitive deficits, community functioning, and symptoms, was obtained following multidimensional analysis. As a major outcome of this analysis, performance-based assessment of the daily living task was found to reflect the level of residential independence. This suggests that functional capacity assessed during performance of a daily multi-task better determined the degree of autonomy in community tenure among participants than did cognitive functioning and severity of negative symptoms. The results obtained with this ecological assessment support the fact that competence in daily activities is a key factor for residential independence, as indicated in studies that relied on reports of daily activities (Arns & Linney, 1995; Dickerson, Ringel, & Parente, 1999; Palmer et al., 2002).

Only one other variable showed a moderate degree of association with residential independence – the ILSS, participant-rated community functioning. The clinician-rated community functioning, MCAS, showed the strongest associations with the tests of cognitive functions. These differences in associations are not surprising as both assessments did not involve the same aspects of functioning. The participants' assessment of their living skills was quite representative of their level of residential independence, while the assessment of their ability to function in the community from a more comprehensive point of view by their clinician was better associated with the cognitive functioning of participants. These results support the suggestions of authors who recommend collecting information from different sources in order to tap into different aspects of daily life relevant for community functioning assessment (Bellack et al., 2007; Ciarlo et al., 1986; McKibbin et al., 2004; Rosenblatt & Atkisson, 1993). These results are also in agreement with the conclusions of a number of studies on the positive association of cognition and community functioning (Green, 1996; Green et al., 2000).

Because this type of analysis is exploratory, the interpretations are applicable only to this specific population, on this specific task, and cannot be extended to a more general population (Lebart et al., 2006). Nonetheless, the graphical display demonstrated that the individuals in this study sample did not belong to subgroups, based on their scores in the cognitive, functional, and clinical domains. In other words, there were no apparent subgroups of participants sharing a particular profile relative to their performance on this set of variables. Participants were distributed along a continuum of functioning in the cognitive, functional, and clinical domains. To the extent of our knowledge, linking parcels of information on daily activity performance, community functioning, cognitive functioning, and symptoms among people with schizophrenia into a coherent picture has never been presented in such a manner.

Chapter 8 – Discussion and Conclusion

People with schizophrenia often experience a wide range of cognitive deficits that affect their daily functioning in terms of their ability to learn and to live independently. Understanding these difficulties is essential in order for clinicians to plan effective rehabilitation strategies. To better adapt interventions to the specific needs of people with schizophrenia, clinicians need to know the extent to which specific cognitive functions are related to daily living skills. Moreover, if the ultimate goal of rehabilitation is to restore, develop, and maintain an optimal level of community living in people with schizophrenia in accordance with their valued roles, then it is justified that assessment targets the specific functional skills required to attain this objective (Anthony, Cohen, Farkas & Gagné, 2004). Findings in this thesis provide clinicians with original insights that may be valuable in planning strategies and interventions for people with schizophrenia.

The purpose of this thesis was to examine the links between daily activities performance, cognitive deficits, and community functioning in people with schizophrenia. The thesis set four objectives: First, the research aimed at describing functional limitations during daily task performance among people with schizophrenia. Second, it explored the presence of subgroups of participants with similar profiles in terms of functional limitations observed during daily activity performance. Third, the research investigated the relationship between daily activity performance and specific cognitive functions, namely attention, memory, and executive functions. The fourth objective was to examine the relationship between functional limitations observed during daily activity performance and community functioning among people with schizophrenia. This thesis tested the hypothesis that functional limitations observed during the performance of a daily activity will have a negative influence on community functioning among people with schizophrenia.

In Chapter 3, a preliminary study examined the use of the Perceive, Recall, Plan and Perform System of Task Analysis in tasks with different levels of complexity with people with schizophrenia and provided estimates of interrater reliability. Results from this preliminary study strongly supported the use of the PRPP System for assessing performance in a complex task, namely a meal preparation task, in order to answer the objectives and to verify the hypothesis of the main research project. Chapter 4 examined functional limitations observed during the performance of a daily task by comparing the performance of individuals with schizophrenia with that of matched controls during the meal preparation task and by determining which skills were more impaired in participants with schizophrenia. One strength of this study was that it took into account the degree of familiarity with meal preparation when comparing groups. This aspect is often neglected in studies of daily activity performance despite the risk that results may be confounded by lack of experience.

As outlined in Chapter 5, further description of functional limitations was achieved by determining which information processing strategies were more affected in a large group of participants with schizophrenia. To our knowledge, this is the first research using this performance-based assessment with a task analysis in such a large group of participants with schizophrenia. As desribed in Chapter 5, global level of efficiency in task performance was used as a criterion to form subgroups of participants with schizophrenia, and these subgroups were compared on cognitive, functional, and clinical characteristics.

As discussed in Chapter 6, this study expands the existing body of knowledge on daily activities and cognition. It has done so by investigating the relationships between daily activity performance, related functional skills, and specific cognitive functions, namely attention, memory, and executive functions. Chapter 6 also discussed the relationship between functional limitations observed during daily activity performance at the skill level and community functioning in people with schizophrenia. Chapter 7 further extended the previous investigations on subgroups with the use of multidimensional analyses, namely categorical principal component analysis (CATPCA). This method concentrated the analysis on the specific individual response profiles of participants on two different sets of variables: the first set corresponded to the

PRPP System factors, and the second set included functional, cognitive, and clinical variables. The categorical principal component analysis as a method for exploring subgroups is one of the original methodological elements in this thesis.

A summary of major findings and original insights to be drawn from this thesis research are presented, as well as limitations, implication for practice, and suggestions for future directions.

8.1 Functional limitations during daily task performance

The first objective of this thesis was to describe functional limitations observed during the performance of a daily task in people with schizophrenia. Participants were found to have limitations related to three PRPP System quadrants. During the meal preparation task, in the Perceive quadrant, participants were most affected in their ability to "search and locate." In the Recall quadrant, they were most limited in the ability to "contextualize to duration," "use objects," and "recall steps." In the Plan quadrant, they were most limited in the ability to "know the goal," "identify obstacles," "organize," "choose," "sequence," and "question, analyze and judge." Although more impairment occurred in the Plan quadrant than in the other quadrants, all stages of information processing – the ability to take in, store, retrieve, manipulate, and integrate new information into previous experiences (Chapparo & Ranka, 2005) – were affected. These results are in accordance with neuropsychological findings (Silver & Goodman, 2007; Elvevag et al., 2003; Wilson et al., 1998). However, to our knowledge, no other studies have described discrete skills limitations in task performance with such an ecological point of view.

8.2 Subgroups of participants with similar functional profiles

The second objective of this thesis was to explore the presence of subgroups of participants with similar profiles of functional limitations during the performance of a daily activity. At the global level of task performance efficiency, the information gained from the analysis of the meal preparation task performance allowed participants to be categorized into high- and low-efficiency subgroups and provided insights into participants' levels of independence and learning ability. Those in the high-efficiency subgroup were more independent in their community tenure and performed better on the visuo-spatial associative learning test. These results emphasize the relationship between efficient daily living skills and independent living, as well as between these skills and visual memory, as found in other studies (Dickerson, Ringel et al., 1999; Still, 2006; Velligan et al., 2000), and more specifically, with associative learning (Prouteau et al., 2005). The present study's specific contribution is in adding ecological validity to the results from previous studies that used mainly questionnaires and reports on daily activities as opposed to "real life" task performance analysis.

When an in-depth analysis was made at a more specific level, based on the individual response profile on the five PRPP System factors, participants were distributed along a continuum from low to high scores on all five PRPP System factors. As the analysis integrated functional, cognitive, and clinical characteristics to daily task performance, participants' distribution was also heterogeneously spread along a continuum of scores from low to high functioning on this set of characteristics. This thesis adds to previous findings of heterogeneity in cognitive impairment, symptoms, and level of functioning in people with schizophrenia (Davidson & McGlashan, 1997; Heinrichs & Zakzanis, 1998; Palmer et al., 2002; Palmer et al., 1997; Rund, 1998). Moreover, this research yields insights into heterogeneity in functional capacity and into the relationships between the cognitive, functional, and clinical domains, where impairment in one domain is likely to be associated with impairment in other domains. Although such findings seem obvious, to our knowledge, they have not been empirically represented in such a striking way.

8.3 Daily task performance and cognition

The third objective of this thesis was to investigate the relationships between daily activity performance and specific cognitive functions, namely, attention, memory, and executive functions. This study expands knowledge on daily activities and cognition by demonstrating associations between processing strategies in daily task performance and visuo-spatial memory, planning, and spatial working memory. The most numerous and strongest associations were found with the visuo-spatial associative learning task. These results not only confirm the involvement of memory and executive functions in task performance as found in previous studies (Godbout et al., 2007; Still, 2006); they also emphasize the role of learning in task performance as assessed with the visuo-spatial memory test, which found differences between low- and high-efficiency subgroups.

8.4 Daily task performance and community functioning

The fourth objective of this thesis was to examine the relationship between functional limitations observed during daily activity performance and community functioning in people with schizophrenia. Such a relationship may seem obvious; however, it has rarely been explored using task analysis approaches. Two important findings resulted from these analyses. First, at the skill level, it was found that more difficulties in the ability to map, programme, and evaluate actions and task performance during the meal preparation task were associated with lower levels of community functioning. This finding confirmed the hypothesis that functional limitations observed during daily activity performance will negatively affect community functioning in people with schizophrenia.

The second major finding concerns a more global level encompassing functional, cognitive, and clinical characteristics, where a strong association between independent living and task performance was found following the CATPCA. A person's ability to live independently in the community is one of the most objective aspects of community functioning and is also one of the most valued goals of treatment identified by people with schizophrenia (Fischer, Shumway &Owen, 2002), particularly as it relates to health and well-being (Nasrallah et al., 2005). Independent living is a major criterion for recovery among people with schizophrenia (Liberman et al., 2002). This analysis also showed that although cognitive tests were strongly associated with the clinician-rated assessment of community functioning, they were poorly associated with residential status. The results of this analysis, consistent with results previously presented, emphasize that competence in activities of daily living better inform on residential status and independent living ability than performance in standardized tests of cognitive functions.

8.5 Implications for occupational therapy practice

Recovery from mental illness involves a process where an individual is "taking back control of is life", and finds new meanings in life through the involvement in valued roles and activities (Farkas, 2007, p.69). Occupational therapists support this process in assessing "the personal, environmental and occupational factors that underlie the client's occupational issues" (Townsend & Polatajko, 2007, p.256) in clients facing occupational challenges. More specifically, they are interested in assessing whether the person demonstrates the essential skills for sustaining valued roles and meaningful daily life activities performance. The present study's contribution to a recovery-oriented body of knowledge is therefore in refining the "understanding of the complexities of occupation and community participation" (Krupa & Clark, 2004, p.70) with the potential of leading to the development of specific "supportive practices and interventions" (Krupa & Clark, 2004, p.70) based on the results of this study.

This study focussed on the assessment of daily task performance in relationship with community functioning. In clinical practice, one purpose of functional assessments is to determine whether a person can effectively and safely perform the tasks essential for independent living. Results from this study reinforce the importance of this type of occupation for independent living and community functioning in people with schizophrenia. In the current study, the assessment of information processing strategies using the PRPP System during a meal preparation task did differentiate between individuals who were independent from those who were dependent in their residential status for a significant proportion of participants. Results suggest that the degree of complexity of the meal preparation task was sufficient to reach this goal; however, the PRPP System is flexible enough to be used for the assessment of numerous other tasks. These qualities definitely demonstrate the usefulness of this tool to assess daily living skills in people with schizophrenia.

The PRPP System identified weaknesses and strengths in processing strategies and should thus be considered when planning rehabilitation interventions aiming at developing and restoring function in daily life tasks. As mentioned in Chapters 5 and 6, when rehabilitation interventions focus on improving functional skills, the enhancement, efficient use and transfer of the information processing skills in different daily tasks and situations may become a relevant target. These processing skills are measurable and labelled as everyday words that could be used in different contexts during rehabilitation.

The underlying cognitive deficits should also be taken into account In the planning of rehabilitation interventions. Results from this study emphasize the important role of visual associative memory in daily task performance. The associative learning capacity of individuals needs to be considered in the assessment as well as in the skills training. Authors have suggested that "influencing real-world community function in schizophrenia may require a more complex approach than simple remediation of cognition in general across all people" (Greenwood et al., 2005, p. 919) and that "strategies that address cognition comprehensively, as a highly intertwined set of capacities, offer the best chance of meaningful improvements in everyday functioning" (Dickinson et al., 2004, p. 832). Therefore, interventions should focus on processing information, as well as on task execution itself (Bellack, Gold, & Buchanan, 1999; Chapparo & Ranka, 2005). Using the PRPP System information processing strategies as a basis for activity analysis may be helpful in developing such approaches.

Results from this study suggest that other factors intervene relative to community functioning regardless of the level of functional and cognitive capacity. Implications for occupational therapy can be drawn from these observations. The assessment of performance in other daily tasks may be relevant to rule out difficulties in other specific domains of daily living that may interfere in the ability to live independently. Factors such as motivation, social networks, and most importantly, availability of a supportive environment are factors that influence daily functioning (Bellack et al., 2007). The Canadian Model of Occupational Performance and Engagement (Townsend & Polatajko, 2007) recognizes the importance of the environment for occupational participation and its role in constraining or promoting recovery (Krupa & Clark, 2004).

Interventions in psychiatric rehabilitation also include those directed towards the modification of the environment to adapt it to the needs of the person and the development of environmental resources in order to support the person in her roles, in her chosen environment (Anthony et al., 2004). Most persons undergoing psychiatric rehabilitation need a combination of both approaches (Rössler, 2006). For example, a person with schizophrenia experiencing difficulties in the performance of daily tasks may choose to live independently with the help of supported housing programs or assertive community treatment and in the proximity of prepared food services. In such a situation, skills development or training may be suggested but not necessary or required for independent living.

8.6 Limitations

The questionnaire on familiarity with meal preparation is an original aspect of the methods used in this thesis. However, it is a subjective assessment based on memory of events, with the potential risk for inaccurate information.

A number of limitations were described in Chapters 3 to 7, including the large number of tests that may potentially lead to Type I errors and the need to replicate the factor analysis with larger samples and to use confirmatory analyses. It is important to remember that results from multidimensional analysis apply specifically to the specific sample in question. In order to validate the significant results obtained in this study, the study should be replicated with different samples.

Other limitations relate to data collection. Due to limited availability of raters, one occupational therapist did both the cognitive and performance-based assessments for some participants. However, as the tests were computerized, the occupational therapist was not aware of the final results before completing the performance-based assessment. Moreover, due to recruitment difficulty, some participants who had previously been treated by the occupational therapists were included in the study; therefore, occupational therapists were not blind to their residential status. Interrater reliability was tested twice during this thesis. From the first test, unclear descriptor definitions and rating criteria were identified and corrected, and difficulties caused by interference from previous experience with other task analysis in certain raters were addressed. Reliability considerably increased in the second test, except on one PRPP System quadrant. This was also explained by interference from previous experience with another task analysis and the need for further clarification. An interpretation grid for errors was conjointly built by the two raters in order to gain as much agreement as possible, particularly in the Perceive quadrant. In addition, raters discussed any rating problems as they arose. Nonetheless, it is possible that the results would have increased in significance given higher interrater agreement.

8.7 Future directions

Results from this study support findings from existing research on the role of memory, especially the role of learning in daily functioning (Green et al., 2000; Prouteau et al., 2005). Learning potential has been identified as an important target for assessment and rehabilitation intervention by Green et al. (2000), Spaulding et al. (1999), and Silverstein (2000). Moreover, a major current in cognitive rehabilitation with people with schizophrenia actually focuses on assessing learning potential and categorizing individuals according to their "learner status" in order to better adapt interventions to individual need (Watzke, Brieger, Kuss, Schoettke & Wiedl, 2008; Wiedl, 1999; Woonings, Appelo, Kluiter, Slooff & van der Bosch, 2002). An interesting avenue to pursue would be to determine whether this performance-based assessment could be used as a more "face-valid" form of dynamic assessment of learning potential, where the ability to improve performance with instructions and practice is assessed

(Silverstein, 2000). Such a dynamic assessment could be helpful in identifying individuals based on their learning potential in order to better meet specific rehabilitation needs (Green et al., 2000; Toglia, 1998).

The present study explored task performance in a standardized environment, therefore addressing functional capacity rather than functional performance as defined by WHO's (2001) ICF model. Studies are needed that explore functional performance, e.g. the performance of tasks in the real personal environment of participants, informing on the influence of environmental context on functional capacity. Different environments provide different types of support and constraints. The current study should be replicated in a natural environment with familiar and socially expected tasks, as well as with novel tasks with unexpected elements that would better represent the unpredictability of real life. One facet of task performance that is crucial to explore in people with schizophrenia is the ability to identify goals and initiate tasks through a less structured approach.

Another element that could be further explored is the model developed during this thesis for describing and understanding the interactions of the different processing strategies during task performance. This model, as an attempt to represent and synthesize how these behaviors are involved during task performance, is presented in the following section.

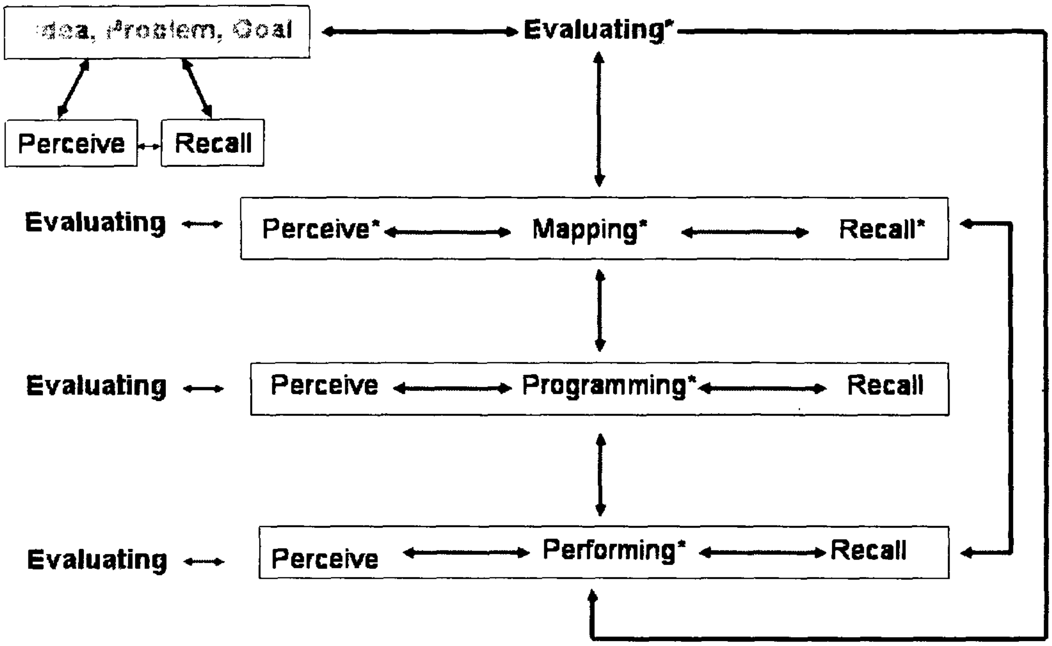
8.8 A model of relationships among information processing strategies

The relationships among information processing strategies and the directions of these relationships have been theoretically represented in the original PRPP System of Task Analysis model. Following the observation of different types of errors in task performance in study participants, a new theoretical model was elaborated. This new model aimed at understanding the relationships among information processing strategies during the process of goal-directed task performance in an attempt to better explain difficulties in task performance in people with schizophrenia. It was based on the integration of information processing theory, problem solving, and executive function models

(Brenner et al., 1994; Chapparo & Ranka, 1997b; Morin, Briand & Lalonde, 1999; van der Gaag, 1992). This model is presented in Figure 1.

As can be seen in Figure 1, either a problem, an idea, or a specific goal (e.g., preparing a meal) is at the start of the task performance. The idea/problem/goal can be triggered by something that is perceived (e.g., hunger sensation) or recalled (e.g., time to eat!). Then is it evaluated (the "Evaluating" box following the idea/problem/goal) for the need to use a plan and to further orient to the problem. When a plan is considered, skills from the Mapping sub-quadrant intervene (knows goal, identifies obstacles, organizes), taking into account previous experiences, "perceptual" information obtained on the task, and the context of performance. The plan leads to programme actions and behaviours to reach the goal, with the skills in the Programming sub-quadrant (chooses, sequences, and calibrates), after which action takes place in the Perform quadrant (starts, flows continues, times, coordinates, etc.) at the centre of this model as a "core structure" of task performance. This structure is connected to inputs from the Perceive and Recall quadrants, which help keep updated information about the process of the task. The Evaluation sub-quadrant (questions, analyzes, and judges) monitors for errors and problems in the application of the plan and is involved in decision-making. These skills from the Evaluation sub-quadrant also "overarch" the set of components in this model in the verification of goal attainment. At each moment of the process, these perceiving, recalling, planning, and performing skills interact, as new information is obtained, stored, retrieved, and integrated while the action unfolds.

Figure 8.1 A model of interactions of processing strategies in task performance



*According to the PRPP model descriptors

This model, which is still in development, was useful during this study to visualize how these skills interact during task performance and how problems at one point of the process and in one type of skill may affect the performance of other steps and skills. Some of the results from this study, such as those from the factor analysis seemed to support to a certain extent the proposed interactions between the information processing strategies in this model.

The factor analysis that was conducted with the PRPP System descriptors during this study explored the relationships between processing strategies and revealed five latent dimensions, presented in Chapter 7. These dimensions did not exactly correspond to either the hypothesized model or the original PRPP System model, and not all processing strategies from the original PRPP System model were included in factors. It is possible that the PRPP System processing strategies either were not problematic in the present study group or were difficult to assess in that particular task. However, each factor includes a number of processing strategies from different PRPP System quadrants, similar to the different "boxes" in the structure of the hypothesized model of interactions described above. The results from the factor analysis support the assumption of an interrelation between processing strategies from different PRPP System quadrants, as in the hypothesized model and the original PRPP System model.

Interpretation of the PRPP factors was facilitated by integrating previously mentioned information processing, problem solving, and executive function models with additional models (Chapparo & Ranka, 2005; Dutil, Bottari, Vanier, & Gaudreault, 2003; Katz, Tadmor, Felzen & Hartman-Maeir, 2007; Lezak, Howieson & Loring, 2004; Rainville & Passini, 2005; Toglia, 1998; van der Gaag, 1992). Dutil et al.'s (2003) approach to task performance assessment, based on executive function models and theories, was particularly useful in interpreting the PRPP System factors. These authors developed an assessment of activities of daily living that considered executive function deficits in people with brain injuries (Dutil, Forget, Vanier & Gaudreault, 1990; Dutil et al., 2003). This assessment is based on four components or operations thought to be essential for task performance, namely formulating a goal, planning, carrying out the task, and verifying goal attainment. Although the PRPP System factors did not exactly correspond to these operations, some similarities were observed. Three PRPP System factor names were inspired by Dutil et al.'s (2003) task operations, namely, the "Planning," "Execution-Correction," and "Task Goal" factors. The other factors, "Motor Regulation" and "Basic Knowledge," were named based on information processing models and motor performance approaches (Chapparo & Ranka, 2005; Lezak et al., 2004; van der Gaag, 1992).

These PRPP System factors were found to be intertwined and to form a unidimensional, integrated system. One part of the system affects other parts of the system, illustrating the importance of considering each component of the system as an essential part of task performance assessment. This proposed model of the interactions of the processing strategies during task performance is still in development and could be further explored and tested.

As a conclusion, during the preparation of this thesis, more than 200 occupational therapists in Quebec were introduced and trained in the use of the PRPP System. The descriptors were translated into French and discussion groups were held in Montreal and Quebec City. The hypothesized model of interactions between processing strategies elaborated during this thesis could be further developed as an additional tool for training occupational therapists in the use of the PRPP System of Task Analysis with people with schizophrenia and eventually, for other client populations.

References

Addington, D., Addington, J., & Maticka-Tyndale, E. (1994). Specificity of the Calgary Depression Scale for schizophrenics. *Schizophrenia Research, 11*, 239-244.

Addington, D., Addington, J., Maticka-Tyndale, E., & Joyce, J. (1992). Reliability and validity of a depression rating scale for schizophrenics. *Schizophrenia Research, 6*, 201-208.

Addington, D., Addington, J., & Schissel, B. (1990). A depression rating scale for schizophrenics. *Schizophrenia Research, 3*, 247-251.

Addington, J., & Addington, D. (2000). Neurocognitive and social functioning in schizophrenia: A 2.5 year follow-up study. *Schizophrenia Research, 44*, 47-56.

Aleman, A., Hijman, R., de Haan, E., & Kahn, R. (1999). Memory impairment in schizophrenia: A meta-analysis. *American Journal of Psychiatry, 156*, 1358-1366.

Alexandersson, A. (2000). Using panel data to model community functioning of severely mentally ill persons. *Administration and Policy in Mental Health, 27*, 147-152.

American Occupational Therapy Association. (2004). Scope of practice. *American Journal of Occupational Therapy, 58*, 673-677.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders: DSM-IV-TR* (4th text. rev. ed.). Washington, DC: American Psychiatric Association.

American Psychiatric Association. (2004). *Practice guidelines for the treatment of patients with schizophrenia*. Retrieved November 5th 2005, from www.psych.org/cme.

Anthony, W. (1993). Recovery from mental illness: the guiding vision of the mental health service system in the 1990s. *Psychosocial Rehabilitation Journal, 16*, 10-23.

Anthony, W., Cohen, M., Farkas, M., & Gagné, C. (2004). *La réhabilitation psychiatrique.* Charleroi, Belgium: Socrate-Réhabilitation.

Anthony, W., & Liberman, R. (1986). The practice of psychiatric rehabilitation: Historical, conceptual, and research base. *Schizophrenia Bulletin, 12*, 542-559.

Anthony, W., & Nemec, P. (1984). Schizophrenia: Treatment, management and rehabilitation. In A. Bellack (Ed.), *Psychiatric rehabilitation* (pp. 375-413). New York: Grune & Stratton.

Arnadottir, G. (1990). *The Brain and Behavior: Assessing cortical dysfunction through activities of daily living (ADL)*. St-Louis, MO: Mosby.

Arnold, S., & Rioux, L. (2001). Challenges, status and opportunities for studying developmental neuropathology in adult schizophrenia. *Schizophrenia Bulletin, 27*, 395-416.

Arns, P., & Linney, J. (1995). Relating functional skills of severely mentally ill clients to subjective and societal benefits. *Psychiatric Services, 46*, 260-265.

Aubin, G., Chapparo, C., Gélinas, I., Stip, E., & Rainville, C. (2008). Use of the Perceive, Recall, Plan and Perform System of Task Analysis for persons with schizophrenia: A preliminary study. *Australian Occupational Therapy Journal, doi: 10.1111/j.1440-1630.2007.00725.*

Aubin, G., Gélinas, I., Stip, E., Chapparo, C., & Rainville, C. (2007). Les activités quotidiennes et la cognition chez les personnes atteintes de schizophrénie. *Santé mentale au Québec, 32*, 201-208.

Aubin, G., Gélinas, I., Stip, E., Rainville, C., Chapparo, C., & Lamoureux, J. (2008). *Daily task performance and processing strategies: Comparing persons with schizophrenia to controls.* Manuscript submitted for publication.

Aubin, G., Hachey, R., & Mercier, C. (1999). Meaning of daily activities and subjective quality of life in people with severe mental illness. *Scandinavian Journal of Occupational Therapy, 6*, 53-62.

Aubin, G., Hachey, R., & Mercier, C. (2002). La signification des activités quotidiennes chez les personnes souffrant de troubles mentaux graves. *Canadian Journal of Occupational Therapy, 69*, 218-228.

Baillargeon, J. (2003). L'analyse factorielle exploratoire [Electronic Version]. *Université du Québec à Trois-Rivières*. Retrieved September 2nd 2007 from http://www.uqtr.ca/cours/srp-6020/afe/afe.pdf.

Baker, R., & Hall, J. (1988). REHAB: A new instrument for chronic psychiatric patients. *Schizophrenia Bulletin, 14*, 97-111.

Barberger-Gateau, P., Fabrigoule, C., Amieva, H., Helmer, C., & Dartigues, J. F. (2002). The disablement process: A conceptual framework for dementia-associated disability. *Dementia and Geriatric Cognitive Disorders, 13*, 60-66.

Barker, S., Barron, N., McFarland, B., & Bigelow, D. (1994). A community ability scale for chronically mentally ill consumers: Part I. Reliability and validity. *Community Mental Health Journal, 30*, 363-379.

Barker, S., Barron, N., McFarland, B., Bigelow, D., & Carnahan, T. (1994). A community ability scale for chronically mentally ill consumers: Part II. Applications. *Community Mental Health Journal, 30*, 363-379.

Barnett, J. H., Sahakian, B. J., Werners, Hill, K. E., Brazil, R., Gallagher, O., et al. (2005). Visuospatial learning and executive function are independently impaired in first-episode psychosis. *Psychological Medicine, 35*, 1031-1041.

Bartels, S., Mueser, K., & Miles, K. (1997). A comparative study of elderly patients with schizophrenia and bipolar disorder in nursing homes and the community. *Schizophrenia Research, 27*, 181-190.

Bartfai, A., Levander, S., Nybäck, H., & Schalling, D. (1987). Skin conductance and nonhabituation in schizophrenic patients. *Acta Psychiatrica Scandinavica, 75*, 321-329.

Baum, C., & Edwards, D. (1993). Cognitive performance in senile dementia of the Alzheimer's type: The Kitchen task assessment. *American Journal of Occupational Therapy, 47*(5), 431-436.

Bédard, M.-A., Scherer, H., Stip, E., Cohen, H., Rodriguez, J. P., & Richer, F. (2000). Procedural learning in schizophrenia : Further consideration on the deleterious effect of neuroleptics. *Brain and cognition., 43*, 31-39.

Bellack, A., Gold, J., & Buchanan, R. (1999). Cognitive rehabilitation for schizophrenia: Problems, prospects, and strategies. *Schizophrenia Bulletin, 25*, 257-274.

Bellack, A., Green, M., Cook, J., Fenton, W., Harvey, P., Heaton, R., et al. (2007). Assessment of community functioning in people with schizophrenia and other severe mental illnesses: A white paper based on an NIMH-sponsored workshop. *Schizophrenia Bulletin, 33*, 805-822.

Bland, M., & Altman, D. (1997). Cronbach's alpha. *British Medical Journal, 314*, 572.

Boland, K. (2004). *Assessing information processing in the context of pretend play.* Unpublished master's thesis, University of Sydney, Lidcombe, NSW, Australia.

Bowie, C., Reichenberg, A., Patterson, T., Heaton, R. & Harvey, P. (2006). Determinants of real-world functional performance in schizophrenia subjects: Correlations with cognition, functional capacity, and symptoms. *American Journal of Psychiatry, 163*, 418-425.

Braff, D. (1993). Information processing and attention dysfunctions in schizophrenia. *Schizophrenia Bulletin, 19*, 233-259.

Brekke, J., Kohrt, B., & Green, M. (2001). Neuropsychological functioning as a moderator of the relationship between psychosocial functioning and the subjective experience of self and life in schizophrenia. *Schizophrenia Bulletin, 27*, 697-708.

Brekke, J., Raine, A., Ansel, M., Lencz, T., & Bird, L. (1997). Neuropsychological and psychophysiological correlates of psychosocial functioning in schizophrenia. *Schizophrenia Bulletin, 23*, 19-28.

Brenner, H. D., Roder, V., Hodel, B., Kienzle, N., Reed, D., & Libermann, R. (1994). *Integrated psychological therapy for schizophrenic patients.* Seattle, WA: Hogrefe & Huber.

Broerse, A., Crawford, T., & den Boer, J. (2002). Differential effects of olanzapine and risperidone on cognition in schizophrenia? A saccadic eye movement study. *Journal of Neuropsychiatry and Clinical Neurosciences, 14*, 454-460.

Brown, C. (1998). Comparing individuals with and without mental illness using the Daily Activities Checklist. *Occupational Therapy Journal of Research, 18*, 85-98.

Brown, C., Cromwell, R. , Filion, D., Dunn, W., & Tollefson, N. (2002). Sensory processing in schizophrenia: Missing and avoiding information. *Schizophrenia Research, 55*, 187-195.

Buchanan, R. (2007). Persistent negative symptoms in schizophrenia: An overview. *Schizophrenia Bulletin, 33*, 1013-1022.

Burgess, P. (2000). Strategy application disorder: The role of the frontal lobes in human multitasking. *Psychological Research, 63*, 279-288.

Burns, N. & Grove, S. (1993). The practice of nursing research: conduct, critique and utilization. Philadelphia, PA: Saunders Company.

Canadian Association of Occupational Therapists. (2002). *Enabling occcupation: An occupational therapy perspective*. Ottawa, ONT: Author.

Canadian Psychiatric Association. (1998). Canadian clinical practice guidelines for the treatment of schizophrenia. *Canadian Journal of Psychiatry, 43*(Suppl. 2 [rev.]), 34-37.

CANTAB for Windows: Test administration guide. (1999). Cambridge, England: Cenes.

Carpenter, W., Heinrichs, D., & Wagman, A. (1988). Deficit and non-deficit forms of schizophrenia: The concept. *American Journal of Psychiatry, 145*, 578-583.

Carter, C., MacDonald, A. , Ross, L., & Stenger, V. (2001). Anterior Cingulate Cortex Activity and Impaired Self-Monitoring of Performance in Patients With Schizophrenia: An Event-Related fMRI Study. *American Journal of Psychiatry, 158*, 1423-1428.

Censits, D., Ragland, J., Gur, R., & Gur, R. E. (1997). Neuropsychological evidence supporting a neurodevelopmental model of schizophrenia: A longitudinal study. *Schizophrenia Research, 24*, 289-298.

Chapparo, C., & Ranka, J. (1992). *Development of an information processing task analysis to identify errors in self-maintenance performance of brain injured clients: Final category B grants research report.* Lidcombe, NSW, Australia: University of Sydney, Faculty of Health Sciences.

Chapparo, C., & Ranka, J. (1997a). The occupational performance model (Australia): A description of constructs and structure. In C. Chapparo & J. Ranka (Eds.), *Occupational performance model (Australia)* (Vol. 1, pp. 1-23). Lidcombe, NSW, Australia: University of Sydney, Australia.

Chapparo, C., & Ranka, J. (1997b). The Perceive, Recall, Plan, Perform (PRPP) System of Task Analysis In C. Chapparo & J. Ranka (Eds.), *Occupational performance model (Australia)* (Vol. 1, pp. 189-198). Lidcombe, NSW, Australia: University of Sydney, Australia.

Chapparo, C., & Ranka, J. (2003). *The PRPP System of Task Analysis: User's Training Manual.* Lidcombe, NSW, Australia: Discipline of Occupational Therapy, Faculty of Health Sciences, University of Sydney, Australia.

Chapparo, C., & Ranka, J. (2005). *The PRPP System of Task Analysis: User's training manual.* Lidcombe, NSW, Australia: University of Sydney, Australia.

Chen, W., & Faraone, S. (2000). Sustained attention deficits as markers of genetic susceptibility to schizophrenia. *American Journal of Medical Genetics, 97*, 52-57.

Chevignard, M., Pillon, B., Pradat-Diehl, P., Taillefer, C., & Rousseau, S. (2000). An ecological approach to planning dysfunction: Script execution. *Cortex, 36*, 649-669.

Chouinard, G., & Margolese, H. (2005). Manual for the Extrapyramidal Symptom Rating Scale (ESRS). *Schizophrenia Research, 76*, 247-265.

Chouinard, G., Ross-Chouinard, A., Annable, L., & Jones, B. (1980). Extrapyramidal Symptom Rating Scale. *Canadian Journal of Neurological Sciences, 7*, 233.

Ciarlo, J., Brown, T., Edwards, D., Kiresuk, T., & Newman, F. (1986). *Assessing mental health treatment outcome measurement techniques. (DHHS Publication No. ADM 86-1301)*. Washington, D.C.: U.S. Government Printing Office.

Clark, O., & O'Carroll, R. (1998). An examination of the relationship between executive function, memory and rehabilitation status in schizophrenia. *Neuropsychological Rehabilitation, 8*, 229-241.

Cohen, B., & Anthony, W. (1984). Functional assessment in psychiatric rehabilitation. In A. Halpern & M. Fuhrer (Eds.), *Functional assessment in rehabilitation* (pp. 79-100). Baltimore: Paul H. Brookes.

Cohen, C., & Talavera, N. (2000). Functional impairment in older schizophrenic persons: Toward a conceptual model. *American Journal of Geriatric Psychiatry, 8*, 237-244.

Corbière, M., Crocker, A., Lesage, A., Latimer, E., Ricard, N., & Mercier, C. (2002). Factor structure of the Multnomah Community Ability Scale. *Journal of Nervous and Mental Disease, 190*, 399-406.

Cornblatt, B., & Keilp, J. (1994). Impaired attention, genetics, and the pathophysiology of schizophrenia. *Schizophrenia Bulletin, 20*, 31-46.

Cornblatt, B., Lenzenweger, M., Dworkin, R., & Erlenmeyer-Kimling, L. (1992). Childhood attentional dysfunctions predict social deficits in unaffected adults at risk for schizophrenia. *British Journal of Psychiatry, 161*(Suppl. 18), 59-64.

Cornblatt, B., Obuchowski, M., Schnur, D., & O'Brien, J. (1997). Attention and clinical symptoms in schizophrenia. *Psychiatric Quarterly, 68*, 343-359.

Costello, A., & Osborne, J. (2005). Best practices in exploratory factor analysis: four recommendations for getting the most from your analysis [Electronic Version]. *Practical Assessment, Research and Evaluation*, *10*, 1-9. Retrieved October 4th 2007 from http://pareonline.net/pdf/v10n7.pdf.

Crow, T. J. (1980). Molecular pathology of schizophrenia: more than one disease process? *British Medical Journal, 280*, 66-68.

Cyr, M., Toupin, J., Lesage, A., & Valiquette, C. (1994). Assessment of independent living skills for psychotic patients: Further validity and reliability. *Journal of Nervous and Mental Disease, 182*, 91-97.

d'Amato, T. (2003). Épidémiologie génétique. In F. Thibault (Ed.), *Génétique de la schizophrénie* (pp. 29-54). Paris: John Libbey Eurotext.

d'Amato, T., & Saoud, M. (1996). Facteurs de risque et schizophrénie. *L'Encéphale*(Suppl 3), 3-7.

Davidson, L., & McGlashan, T. (1997). The varied outcomes of schizophrenia. *Canadian Journal of Psychiatry 42*, 34-43.

Dawson, M., & Nuechterlein, K. (1984). Psychophysiological dysfunctions in the developmental course of schizophrenic disorders. *Schizophrenia Bulletin, 10*, 204-232.

Dawson, M., Nuechterlein, K., Schell, A., Gitlin, M., & Ventura, J. (1994). Autonomic abnormalities in schizophrenia: State or trait indicators? . *Archives of General Psychiatry, 51*, 813-824.

Dawson, M., Schell, A., & Filion, D. (1990). The electrodermal system. In J. T. Cacioppo & L. G. Tassinary (Eds.), *Principles of psychophysiology: Physical, social and inferential elements* (pp. 295-324). New York: Cambridge University Press.

de Ridder, D., Theunissen, N., & van Dulmen, S. (2007). Does training general practitioners to elicit patients' illness representations and action plans influence their communication as a whole? *Patient Education and Counseling, 66*, 327-336.

Desrosiers J. (2005). Participation and occupation. *Canadian Journal of Occupational Therapy*, 72, 195-204.

Dickerson, A., & Fisher, A. (1997). Effects of familiarity of task and choice on the functional performance of younger and older adults. *Psychology and Aging, 12*, 247-254.

Dickerson, F. (1997). Assessing clinical outcomes: The community functioning of persons with serious mental illness. *Psychiatric Services, 48*, 897-902.

Dickerson, F., Boronow, J., Ringel, N., & Parente, F. (1999). Social functioning and neurocognitive deficits in outpatients with schizophrenia: A 2-year follow-up. *Schizophrenia Research, 37*, 13-20.

Dickerson, F., Ringel, N., & Parente, F. (1999). Predictors of residential independence among outpatients with schizophrenia. *Psychiatric Services, 50*, 515-519.

Dickinson, D., & Coursey, R. (2002). Independence and overlap among neurocognitive correlates of community functioning in schizophrenia. *Schizophrenia Research, 56*, 161-170.

Dickinson, D., Iannone, V., Wilk, C., & Gold, J. (2004). General and specific cognitive deficits in schizophrenia. *Biological Psychiatry, 55*, 826–833.

Dollfus, S., Lombardo, C., Bénali, K., Halbecq, I., Abadie, P., Marié, R., et al. (2002). Executive/attentional cognitive functions in schizophrenic patients and their parents: A preliminary study. *Schizophrenia Research, 53*, 93-99.

Donohue, M. V. (2006). Interrater reliability of the Social Profile: assessment of community and psychiatric group participation. *Australian Occupational Therapy Journal, 53*, 1-10.

Dossenbach, M., Erol, A., Mahfoud Kessaci, M., Shaheen, M., Sunbol, M., Boland, J., et al. (2004). Effectiveness of antipsychotic treatments for schizophrenia: Interim 6-month analysis from a perspective observational study (IC-SOHO) comparing olanzapine, quetiapine, risperdone, and haloperidol. *Journal of Clinical Psychiatry, 65*, 312-321.

Duchek, J., & Abreu, B. (1997). Meeting the challenge of cognitive disabilities. In C. Christiansen & C. Baum (Eds.), *Occupational Therapy: Enabling function and well-being* (2nd ed., pp. 290-311). Thorofare, NJ: Slack.

Dutil, E., Bottari, C., Vanier, M., & Gaudreault, C. (2003). *Profil des AVQ: guide de l'utilisateur-mise en situation* (Émersion ed.). Montréal: Émersion.

Dutil, E., Forget, A., Vanier, M., & Gaudreault, C. (1990). Development of the ADL Profile: An evaluation for adults with severe head injury. *Occupational Therapy in Health Care, 7*, 7-22.

Edwards, M. (1990). The reliability and validity of self-report activities of daily living scales. *Canadian Journal of Occupational Therapy, 57*, 273-278.

Elvevag, B., McCormack, T., Gilbert, A., Brown, G., Weinberger, D., & Goldberg, T. (2003). Duration judgement in patients with schizophrenia. *Psychological Medicine, 33*, 1249-1261.

Evans, J., Chua, S., McKenna, P., & Wilson, B. (1997). Assessment of dysexecutive syndrome in schizophrenia. *Psychological Medicine, 27*, 635-646.

Evans, J. D., Heaton, R. K., Paulsen, J. S., McAdams, L. A., Heaton, S. C., & Jeste, D. V. (1999). Schizoaffective disorder: a form of schizophrenia or affective disorder? *Journal of Clinical Psychiatry, 60*(12), 874-882.

Fabrigar, L., Wegener, D., MacCullum, R., & Strahan, E. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods, 4*, 272-299.

Farkas, M. (2006). Réadaptation psychiatrique: une approche et un processus. *Santé mentale, 106*, 51-58.

Farkas, M. (2007). The vision of recovery today: what it is and what it means for services. *World Psychiatry, 6*, 68-74.

Fischer, E., Shumway, M., & Owen, R. (2002). Priorities of consumers, providers, and family members in the treatment of schizophrenia. *Psychiatric Services, 53*, 724-729.

Fisher, A. (1992). Functional measures, part 2: Selecting the right test, minimizing the limitations. *American Journal of Occupational Therapy, 46*, 278-281.

Fisher, A. (1995). *AMPS: Assessment of motor and process skills.* Fort Collins, COL: Three Star Press.

Fisher, A. (1998). Uniting practice theory in an occupational framework. *American Journal of Occupational Therapy, 52*, 509-521.

Fisher, A. (2003). Why is it so hard to practise as an occupational therapist? *Australian Occupational Therapy Journal, 50*, 193-194.

Forde, E., & Humphreys, G. (2002). The cognitive neuropsychology of everyday actions. *Neurocase, 8*, 59-60.

Fordham, M. (2001). *Perceive, Recall, Plan, Perform (PRPP) Rating Scales (Parent and Teacher) : Reliability and Validity.* Unpublished master's thesis, University of Sydney, Lidcombe, NSW, Australia.

Fortin, S., Godbout, L., Doucet, C., & Braun, C. (2002). Strategic sequence planning and prospective memory in frontally lesioned head trauma patients performing activities of daily living. *Brain and Cognition, 48*, 361-365.

Fossey, E., & Harvey, C. (2001). A conceptual review of functioning: Implications for the development of consumer outcome measures. *Australian and New Zealand Journal of Psychiatry, 35*, 91-98.

Fray, P. J., Robbins, T. W., & Sahakian, B. J. (1996). Neuropsychiatric applications of CANTAB. *International Journal of Geriatric Psychiatry, 11*, 329-336.

Friedman, J., Harvey, P., Coleman, T., Moriarty, P., Bowie, C. R., Parrella, M., et al. (2001). Six-year follow-up study of cognitive and functional status across the lifespan in schizophrenia: A comparison with Alzheimer's disease and normal aging. *American Journal of Psychiatry, 158*, 1441-1448.

Friedman, J., Harvey, P., Kemether, E., Byne, W., & Davis, K. (1999). Cognitive and functional changes with aging in schizophrenia. *Biological Psychiatry, 46*, 921-928.

Friel, C. (2004). Factor Analysis [Electronic Version]. *Notes on Factor Analysis, Criminal Justice Center, Sam Houston State University.* Retrieved December 22nd 2007 from http://www.shsu.edu/~icc_cmf/cj_742/stats9.doc.

Fry, K., & O'Brien, L. (2002). Using the Perceive, Recall, Plan and Perform System to assess cognitive deficits in adults with traumatic brain injury: A case study. *Australian Occupational Therapy Journal, 49*, 182-187.

Fujii, D., Wylie, M., & Nathan, J. (2004). Neurocognition and long-term prediction of quality of life in outpatients with severe and persistent mental illness. *Schizophrenia Research, 69*, 67-73.

Fuller, R., & Jahanshahi, M. (1999). Concurrent performance of motor tasks and processing capacity in patients with schizophrenia. *Journal of Neurological, Neurosurgery, and Psychiatry, 66*, 668-671.

Gefen, D., Straub, D., & Boudreau, M. C. (2000). Structural equation modelling: Guidelines for research practice [Electronic Version]. *Communications of the Association for Information Systems*, *4*, 1-79. Retrieved December 27th 2007 from http://citeseer.ist.psu.edu/gefen00structural.html.

Girard, C., Fisher, A., Short, M., & Duran, L. (1999). Occupational performance differences between psychiatric groups. *Scandinavian Journal of Occupational Therapy, 6*, 119-126.

Gitlin, L. (2001). Measuring performance in instrumental activities of daily living. In C. Baum & W. Dunn (Eds.), *Measuring occupational performance: Supporting best practice in occupational therapy* (pp. 161-182). Thorofare, NJ: Slack.

Godbout, L., Limoges, F., Allard, I., Braun, C., & Stip, E. (2007). Neuropsychological and activity of daily living script performance in patients with positive or negative schizophrenia. *Comprehensive Psychiatry, 48*, 293-302.

Godin, L. (1985). Mon expérience comme fiduciaire de patients psychiatriques. *Santé mentale au Québec, 10*, 93-98.

Goeree, R., Farahati, F., Burke, N., Blackhouse, G., O'Reilly, D., Pyne, J., et al. (2005). The economic burden of schizophrenia in canada in 2004 [Electronic Version]. *Current Medical Research Opinion*, *21*, 2017-2028. Retrieved March 19th 2007 from http://www.medscape.com/viewarticle/520575.

Gold, J. (2004). Cognitive deficits as treatment targets in schizophrenia. *Schizophrenia Research, 72*, 21-28.

Gold, J., Fuller, R., Robinson, B., Braun, E., & Luck, S. (2007). Impaired top-down control of visual search in schizophrenia. *Schizophrenia Research, 94*, 148-155.

Goldberg, T. E., & Green, M. F. (2002). Neurocognitive functioning in patients with schizophrenia: An overview. In K. L. Davis, D. Charney, J. T. Coyle & C. Nemeroff (Eds.), *Neuropsychopharmacology: The Fifth Generation of Progress* (pp. 657-669). Philadelphia: Lippincott Williams & Wilkins.

Golden, C. J. (1978). *Stroop color and word test: A manual for clinical and experimental uses*. Wood Dale, IL: Stoelting.

Goldstein, G. (1994). Neurobehavioral heterogeneity in schizophrenia. *Archives of Clinical Neuropsychology, 9*, 265-276.

Goldstein, J., Seidman, L., Goodman, J., Koren, D., Lee, H., Weintraub, S., et al. (1998). Are there sex differences in neuropsychological functions among patients with schizophrenia? *American Journal of Psychiatry, 155*, 1358-1364.

Gooding, D., & Tallent, K. (2004). Nonverbal working memory deficits in schizophrenia patients: Evidence of a supramodal executive processing deficit. *Schizophrenia Research, 68*, 189-201.

Grant, C., Addington, J., Addington, D., & Konnert, C. (2001). Social functioning in first- and multiepisode schizophrenia. *Canadian Journal of Psychiatry, 46*, 746-749.

Green, M. (1996). What are the functional consequences of neurocognitive deficits in schizophrenia? *American Journal of Psychiatry, 153*, 321-330.

Green, M., Kern, R., Braff, D., & Mintz, J. (2000). Neurocognitive deficits and functional outcome in schizophrenia: Are we measuring the "right stuff"? *Schizophrenia Bulletin, 26*, 119-136.

Green, M., Kern, R. S., & Heaton, R. K. (2004). Longitudinal studies of cognition and functional outcome in schizophrenia: implication for MATRICS. *Schizophrenia Research, 72*, 41-51.

Green, M., & Nuechterlein, K. (1999). Should schizophrenia be treated as a neurocognitive disorder? *Schizophrenia Bulletin, 25*, 309-318.

Green, R. (1993). Three dimensions mental health professionals emphasize when judging levels of functioning of the severely mentally disabled in the community. *Evaluation and Program Planning, 16*, 365-376.

Greenwood, K. E., Landau, S., & Wikes, T. (2005). Negative symptoms and specific cognitive impairments as combined targets for improved functional outcome within cognitive remediation therapy. *Schizophrenia Bulletin, 31*, 910-921.

Guillem, F. (2005). *Test de Stroop*. Montreal, QC: Centre de Recherche Fernand-Séguin, Hôpital L.-H. Lafontaine.

Gur, R. E., Calkins, M. E., Gur, R., Horan, W., Nuechterlein, K., Seidman, L. J., et al. (2007). The consortium on the genetics of schizophrenia: Neurocognitive endophenotypes. *Schizophrenia Bulletin, 33*, 49-68.

Haertl, K., & Minato, M. (2006). Daily occupations of persons with mental illness: Themes from Japan and America. *Occupational Therapy in Mental Health, 22*, 19-32.

Häfner, H., & An Der Heiden, W. (1999). The course of schizophrenia in the light of modern follow-up studies: The ABC and WHO studies. *European Archives of Psychiatry and Clinical Neuroscience, 249*(Suppl. 4), 14-26.

Hagedorn, R. (2000). Basic task analysis. In *Tools for practice in occupational therapy: A structured approach to core skills and processes*. London: Churchill linvingstone.

Hajos, M. (2006). Targeting information-processing deficit in schizophrenia: A novel approach to psychotherapeutic drug discovery. *Trends in Pharmacological Science, 27*, 391-398.

Hamera, E., & Brown, C. (2000). Developing a context-based performance measure for persons with schizophrenia: the Test of Grocery Shopping Skills. *American Journal of Occupational Therapy, 54*, 20-25.

Hamera, E., Brown, C., Rempfer, M., & Davis, N. (2002). Test of grocery shopping skills: Discrimination of people with and without mental illness. *American Journal of Psychiatric Rehabilitation, 6*, 296-311.

Harvey, P., & Davidson, M. (2002). Schizophrenia: Course over the Lifetime. In K. L. Davis, D. Charney, J. T. Coyle & C. Nemeroff (Eds.), *Neuropsychopharmacology: The fifth generation of progress* (pp. 641-655). Philadelphia: Lippincott Williams & Wilkins.

Harvey, P., Green, M., Keefe, R., & Velligan, D. I. (2004). Cognitive functioning in schizophrenia: A consensus statement on its role in the definition and evaluation of effective treatments for the illness. *Journal of Clinical Psychiatry, 65*, 361-372.

Harvey, P. & Keefe, R. (2001). Studies of cognitive change in patients with schizophrenia following novel antipsychotic treatment. *American Journal of Psychiatry, 158*, 176-184.

Harvey, P., Velligan, D., & Bellack, A. (2007). Performance-based measures of functional skills: Usefulness in clinical treatment studies. *Schizophrenia Bulletin, 33*, 1138-1148.

Heinrichs, R., & Zakzanis, K. (1998). Neurocognitive deficit in schizophrenia: A quantitative review of the evidence. *Neuropsychology, 12*, 426-445.

Henik, A., & Salo, R. (2004). Schizophrenia and the Stroop effect. *Behavioral and Cognitive Neuroscience Reviews, 3*, 42-59.

Hintikka, J., Saarinen, P., Tanskanen, A., Koivumaa-Honkanen, H., & Viiinamäki, H. (1998). Gender differences in living skills and global assessment of functioning among outpatients with schizophrenia. *Australian and New Zealand Journal of Psychiatry, 33*, 226-231.

Hoff, A. & Kremen, W. (2003). Neuropsychology in schizophrenia: An update. *Current Opinion in Psychiatry, 16*, 149-155.

Hoff, A., Wieneke, M., Faustman, W., Horon, R., Sakuma, M., Blankfield, H., et al. (1998). Sex differences in neuropsychological functioning of first-episode and chronically ill schizophrenia patients. *American Journal of Psychiatry, 155*, 1437-1439.

Humphreys, G., & Forde, E. (1998). Disordered action schema and action disorganisation syndrome. *Cognitive Neuropsychology, 15*, 771-811.

Humphreys, G., Forde, E., & Riddoch, M. (2001). The planning and execution of everyday actions. In B. Rapp (Ed.), *Handbook of Cognitive Neuropsychology* (pp. 565-589). Philadelphia: Psychology Press.

Hutton, S. B., Murphy, F. C., Joyce, E. M., Rogers, R. D., Cuthbert, I., Barnes, T. R., et al. (2002). Decision making deficits in patients with first-episode and chronic schizophrenia. *Schizophrenia Research, 55*, 249-257.

Hutton, S., Puri, B., Duncan, L.-J., Robbins, T., Barnes, T. & Joyce, E. M. (1998). Executive function in first-episode schizophrenia. *Psychological Medicine, 28*, 463-473.

Ivarsson, A.-B., Carlsson, M., & Sidenvall, B. (2004). Performance of occupations in daily life among individuals with severe mental disorders. *Occupational Therapy in Mental Health, 20*, 33-50.

Jogems-Kosterman, B., Zitman, F., Van Hoof, J., & Hulstijn, W. (2001). Psychomotor slowing and planning deficits in schizophrenia. *Schizophrenia Research, 48*, 317-333.

Johnson-Selfridge, M., & Zalewski, C. (2001). Moderator variables of executive functioning in schizophrenia: Meta-analytic findings. *Schizophrenia Bulletin, 27*, 305-316.

Jones, P., Barnes, T., Davies, L., Dunn, G., Lloyd, H., Hayhurst, K., et al. (2006). Randomized controlled trial of the effect on quality of life of second- vs first-generation antipsychotic drugs in schizophrenia. *Archives of General Psychiatry, 63*, 1079-1087.

Josman, N., & Birnboim, S. (2001). Measuring kitchen performance: What assessment should we choose? *Scandinavian Journal of Occupational Therapy, 8*, 193-202.

Katz, N., Tadmor, I., Felzen, B., & Hartman-Maeir, A. (2007). Validity of the execution function performance test in individuals with schizophrenia. *Occupational Therapy Journal of Research, 27*, 1-8.

Kay, S., Fiszbein, A., & Opler, L. (1987). The positive and negative syndrome scale (PANSS) for schizophrenia. *Schizophrenia Bulletin, 13*, 261-276.

Kay, S. (1990). Positive-negative symptom assessment in schizophrenia: Psychometric issues and scale comparison. *Psychiatric Quarterly, 61*, 163-178.

Keefe, R., Poe, M., Walker, T., Kang, J., & Harvey, P. D. (2006). The Schizophrenia Cognition Rating Scale: An interview-based assessment and its relationship to cognition, real-world functioning, and functional capacity. *American Journal of Psychiatry, 163*, 426-432.

Keefe, R., Silva, S., Perkins, D., & Lieberman, J. (1999). The effects of atypical antipsychotic drugs on neurocognitive impairment in schizophrenia: A review and meta-analysis. *Schizophrenia Bulletin, 25*, 201-222.

Kielhofner, G. (2002). Habituation: Patterns of daily occupation. In *Model of human occupation: Theory and application* (3rd ed., pp. 63-80). Baltimore, MD: Lippincott, Williams & Wilkins.

Kirwan, B., & Ainsworth, L. (1992). *A Guide to Task Analysis*. London: Taylor and Francis.

Klapow, J., Evans, J., Patterson, P., Heaton, R., Koch, W., & Jeste, D. (1997). Direct assessment of functional status in older patients with schizophrenia. *American Journal of Psychiatry, 154*, 1022-1024.

Knapp, M., Mangalore, R., & Simon, J. (2004). The global cost of schizophrenia. *Schizophrenia Bulletin, 30*(2), 279-293.

Knight, M. (2000). *Cognitive function and food preparation ability in schizophrenia.* Unpublished doctoral dissertation, University of Rhode Island, Rhode Island.

Kopelowicz, A., Liberman, R. P., Ventura, J., Zarate, R., & Montz, J. (2005). Neurocognitive correlates of recovery from schizophrenia. *Psychological Medicine, 35*, 1165-1173.

Krupa, T., & Clark, C. (2004). Occupational therapy in the field of mental health: Promoting occupational perspective on health and well-being. *Canadian Journal of Occupational Therapy, 71*, 69-71.

Kurtz, M., Moberg, P., Ragland, J., Gur, R., & Gur, R. E. (2005). Symptoms versus neurocognitive test performance as predictors of psychosocial status in schizophrenia. *Schizophrenia Bulletin, 31*, 167-174.

Lalonde, P. (1999). Schizophrénies. In F. Grundberg & J. Aubut (Eds.), *Psychiatrie clinique: une approche bio-psycho-sociale* (Vol. 1, pp. 244-285). Boucherville, QC: Gaëtan Morin.

Lançon, C., Auquier, P., Lorca, P., Martinez, J. L., Bougerol, T., & Scotto, J. (1997). Étude des propriétés psychométriques de la PANSS dans sa version française dans une population de patients schizophrènes. *L'Encéphale, 23*, 1-9.

Landro, N. (1994). Memory function in schizophrenia. *Acta Psychiatrica Scandinavica, 90*(Suppl 384), 87-94.

Larivière, N. (2008). Analyse du concept de la participation sociale: définitions, cas d'illustration, dimensions de l'activité et indicateurs. *Canadian Journal of Occupational Therapy, 75*, 114-127.

Lavoie, M. (1999). *Étude de fidélité inter-examinateurs de la Grille de comparaison des capacités du travailleur en relation avec les exigences du poste de travail.* Unpublished master's thesis, Université de Montréal, Montreal, Canada.

Law, M. (1992). Evaluating activities of daily living: Directions for the future. *American Journal of Occupational Therapy, 47*, 233-237.

Lawton, M., & Brody, E. (1969). Assessment of older people: Self-maintaining and instrumental activities of daily living. *Gerontologist, 9*, 179-186.

Lebart, L., Piron, M., & Morineau, A. (2006). *Statistique exploratoire multidimensionnelle* (4th ed.). Paris: Dunod.

Leclerc, C., Lesage, A., & Ricard, N. (1997). La pertinence du paradime stress-coping dans l'élaboration d'un modèle de gestion du stress pour personnes atteintes de schizophrénie. *Santé Mentale au Québec, 24*, 233-256.

Lecomte, Y. (2000). *Développement et validation d'un modèle psychosocial de l'adaptation chez les personnes diagnostiquées schizophrènes.*

Unpublished doctoral dissertation, Université du Québec à Montréal, Montreal, Canada.

Lehoux, C., Everett, J., Laplante, L., Émond, C., Trépanier, J., Brassard, A., et al. (2003). Fine motor dexterity is correlated to social functioning in schizophrenia. *Schizophrenia Research, 62*, 269-273.

Lerner, J. (1997). *Learning disabilities: Theories, diagnosis and teaching strategies* (7th ed.). Boston: Houghton Mifflin Company.

Leung, A., & Chue, P. (2000). Sex differences in schizophrenia: A review of the litterature. *Acta Psychiatrica Scandinavica, 101*, 3-38.

Levaux, M.-N., Potvin, S., Sepehry, A., Sablier, J., Mendrek, A., & Stip, E. (2007). Computerized assessment of cognition in schizophrenia: Promises and pitfalls of CANTAB. *European Psychiatry, 22*, 104-115.

Levinson, D., Umapathy, C., & Musthaq, M. (1999). Treatment of schizoaffective disorder and schizophrenia with mood disorder. *American Journal of Psychiatry, 156*(8), 1138-1148.

Lezak, M., Howieson, D., & Loring, D. (2004). *Neuropsychological assessment* (4th ed.). New York: Oxford University Press.

Lezak, M., LeGall, D., & Aubin, G. (1994). Évaluation des fonctions exécutives lors des atteintes des lobes frontaux. *Revue de neuropsychologie, 4*, 327-343.

Liberman, R. (1988). Coping with chronic mental illness: A framework for hope. In P. Liberman (Ed.), *Psychiatric rehabilitation of chronic mental patients* (pp. 1-28). Washington, D.C.: American Psychiatric Press.

Liberman, R. P., Kopelowitz, A., Ventura, J., & Gutkin, D. (2002). Operational criteria and factors associated to recovery from schizophrenia. *International Review of Psychiatry, 14*, 256-272.

Lichtermann, D., Karbe, E., & Maier, W. (2000). The genetic epidemiology of schizophrenia and of schizophrenia spectrum disorders. *European Archives of Psychiatry and Clinical Neuroscience, 250*, 304-310.

Liddle, P. (1987a). Schizophrenic syndromes, cognitive performance and neurological dysfunction. *Psychological Medicine, 17*, 49-57.

Liddle, P. (1987b). The symptoms of chronic schizophrenia, a re-examination of the positive-negative dichotomy. *British Journal of Psychiatry, 151*, 145-151.

Liddle, P. (2000). Cognitive impairment in schizophrenia: Its impact on social functioning. *Acta Psychiatrica Scandinavica, 101*, 11-16.

Liddle, P., & Morris, D. (1991). Schizophrenic syndromes and frontal lobe performance. *British Journal of Psychiatry, 158*, 340-345.

Lieberman, P., Stroup, T. S., McEvoy, J., Swartz, M., Rosenheck, R., Perkins, D., et al. (2005). Effectiveness of antipsychotic drugs in patients with chronic schizophrenia. *New England Journal of Medicine, 353*, 1209-1223.

Light, G. A., & Braff, D. (2005). Mismatch negativity deficits are associated with poor functioning in schizophrenia patients [Electronic Version]. *Archives of General Psychiatry*, *62*, 127-136. Retrieved February 26th 2007.

Linting, M., Meulman, J. J., Groenen, P., & van der Kooij, A. (2007). Nonlinear Principal Components Analysis: Introduction and Application. *Psychological Methods, 12*(3), 336-358.

Lisrel, v.8.72. (2006). Lincolnwood, ILL: Scientific Software International.

Lohri, J. (2005). *Information and sensory processing abilities of young children with autism spectrum disorder.* Unpublished master's thesis, Discipline of Occupational Therapy, Faculty of Health Sciences, University of Sydney, Lidcombe, NSW, Australia.

Lussier, I., & Stip, E. (1999). Attention sélective et schizophrénie avant l'administration de neuroleptiques. *L'Encéphale, 25*, 576-583.

Lussier, I., & Stip, E. (2001). Memory and attention deficits in drug naive patients with schizophrenia. *Schizophrenia Research, 48*, 45-55.

MacCullum, R., Widaman, K., Zhang, S., & Hong, S. (1999). Sample size in factor analysis. *Psychological Methods, 4*, 84-99.

MacLeod, C. (1991). Half a century of research on the Stroop effect: An integrative review. *Psychological Bulletin, 109*, 163-203

MacDonald-Wilson, K., Nemec, P., Anthony, W., & Cohen, M. (2002). Assessment in psychiatric rehabilitation. In B. Boulton (Ed.), *Handbook of Measurement and Evaluation in Rehabilitation* (3rd ed., pp. 423-448). Baltimore: Paul Brookes.

Malla, A., Norman, R., Manchanda, R., & Townsend, L. (2002). Symptoms, cognition, treatment adherence and functional outcome in first-episode psychosis. *Psychological Medicine, 32*, 1109-1119.

Malla, A., Williams, R., Kopala, L., Smith, G., Talling, D., & Balshaw, R. (2006). Outcome on quality of life in a Canadian national sample of patients with schizophrenia and related psychotic disorders. *Acta Psychiatrica Scandinavica, 113*(Suppl. 430), 22-28.

Mancini, A., Stip, E., Prouteau, A., Caron, J., Lecomte, Y., & Pampoulova, T. (2002). Subjective experience of cognitive deficits in schizophrenia. *Schizophrenia Research, 53*(Suppl 1), 144.

Marder, S., & Fenton, W. (2004). Measurement and treatment research to improve cognition in schizophrenia: NIMH MATRICS initiative to support the development of agents for improving cognition in schizophrenia. *Schizophrenia Research, 72*, 5-9.

Martinez-Aran, A., Penadés, R., Vieta, E., Colom, F., Reinares, M., Benabarre, A., et al. (2002). Executive function in patients with remitted bipolar disorder and schizophrenia and its relationship with functional outcome. *Psychotherapy and Psychosomatics, 71*, 39-46.

Matza, L., Buchanan, R., Purdon, S., Brewster-Jordan, J., Zhao, Y., & Revicki, D. (2006). Measuring changes in functional status among patients with schizophrenia: The link with cognitive impairment. *Schizophrenia Bulletin, 32*, 666-678.

McDonald, C., & Murray, R. (2000). Early and late environmental risk factors for schizophrenia. *Brain Research Reviews, 31*, 130-137.

McGrath, J. (2005). Variations in the incidence of schizophrenia: Data versus dogma. *Schizophrenia Bulletin, 32*, 195-197.

McGurk, S., Twamley, E., Sitzer, D., McHugo, G., & Mueser, K. (2007). A meta-analysis of cognitive remediation in schizophrenia. *American Journal of Psychiatry, 164*, 1791-1802.

McKibbin, C., Brekke, J., Sires, D., Jeste, D., & Patterson, T. (2004). Direct assessment of functional abilities: Relevance to persons with schizophrenia *Schizophrenia Research, 72*, 53-67.

Meulman, J. , & Heiser, W. (2004). *SPSS Categories 13.0.* Chicago, IL: SPSS inc.

Meulman, J., Van der Kooij, A., & Heiser, W. (2004). Principal Components Analysis with Nonlinear Optimal Scaling Transformations for Ordinal and Nominal Data. In D. Kaplan (Ed.), *Handbook of Quantitative Methods in the Social Sciences* (pp. 49-70). Newbury Park, CA: Sage Publications.

Milev, P., Ho, B.-C., Arndt, S., & Andreasen, N. (2005). Predictive values of neurocognition and negative symptoms on functional outcome in schizophrenia: A longitudinal first-episode study with 7 year follow-up. *American Journal of Psychiatry, 162*, 495-506.

Militello, L. , & Hutton, R. (1998). Applied cognitive task analysis (ACTA): A practitioner's toolkit for understanding cognitive task demands. *Ergonomics, 41*, 1618-1641.

Millman, J. (1973). Passing scores and test lengths for domain-references measures. *Review of Educational Research, 43*(2), 205-216.

Minzenberg, M., Poole, J., Benton, C., & Vinagradov, S. (2004). Association of anticholinergic load with impairment of complex attention and memory in schizophrenia. *American Journal of Psychiatry, 161*, 116-124.

Moriarty, P., Lieber, D., Bennett, A., White, L., Parrella, M., Harvey, P., et al. (2001). Gender differences in poor outcome patients with lifelong schizophrenia. *Schizophrenia Bulletin, 27*, 103-113.

Morice, R., & Delahunty, A. (1996). Frontal/executive impairment in schizophrenia. *Schizophrenia Bulletin, 22*, 125-137.

Morin, C., Briand, C., & Lalonde, P. (1999). De la symptomatologie à la résolution de problèmes: approche intégrée pour les personnes atteintes de schizophrénie. *Santé Mentale au Québec, 24*, 101-120.

Morrens, M., Hulstijn, W., & Sabbe, B. (2007). Psychomotor slowing in schizophrenia. *Schizophrenia Bulletin, 33*(4), 1038-1053.

Morrison, G., O'Carroll, R., & McCreadie, R. (2006). Long-term course of cognitive impairment in schizophrenia. *British Journal of Psychiatry, 189*, 556-557.

Mueser, K., & McGurk, S. (2004). Schizophrenia. *The Lancet, 363*, 2063-2072.

Muller, M., Muller, K., & Fellgiebell, A. (2006). Detection of depression in acute schizophrenia: Sensitivity and specificity of two standard observer rating scales. *Canadian Journal of Psychiatry, 51*, 387-392.

Munkhetvit, P. (2005). *Cognitive assessment in patients with acquired brain injury in Thailand.* Unpublished doctoral dissertation, University of Sydney, Lidcombe, NSW, Australia.

Nasrallah, H., Targum, S., Tandon, R., McCombs, J., & Ross, R. (2005). Defining and measuring clinical effectiveness in the treatment of schizophrenia. *Psychiatric Services, 56*, 273-282.

Norman, R., Malla, A., Cortese, L., Cheng, S., Diaz, K., McIntosh, E., et al. (1999). Symptoms and cognition as predictors of community functioning: A prospective analysis. *American Journal of Psychiatry, 156*, 400-405.

Nuechterlein, K., Barch, D., Gold, J., Goldberg, T., Green, M., & Heaton, R. (2004). Identification of separable cognitive factors in schizophrenia. *Schizophrenia Research, 72*, 29-39.

Nuechterlein, K., & Dawson, M. (1984). A heuristic vulnerability/stress model of schizophrenic episodes. *Schizophrenia Bulletin, 10*, 300-312.

Nuechterlein, K., Dawson, M., & Green, M. (1994). Information-processing abnormalities as neuropsychological vulnerability indicators for schizophrenia. *Acta Psychiatrica Scandinavica, 90*(Suppl 384), 71-79.

Nunnally, J. (1978). *Psychometric Theory* (2nd ed.). New York: McGraw-Hill.

Nygard, L. (1998). Assessing ADL/IADL in persons with dementia. In A. Wimo, B. Jönsson, G. Karlsson & B. Winblad (Eds.), *Health economics of dementia* (pp. 371-388). New York: Wiley.

Öhman, A., Öhlund, L., Alm, T., Wieselgren, I., Öst, L., & Lindström, L. (1989). Electrodermal non-responding, premorbid adjustment, and symptomatology as predictors of long term social functioning in schizophrenics. *Journal of Abnormal Psychology, 98*, 426-435.

Ottenbacher, K., & Christiansen, C. (1997). Occupational performance assessment. In C. Christiansen & C. Baum (Eds.), *Occupational Therapy: Enabling function and well-being* (2nd ed., pp. 105-135). Thorofare, NJ: Slack.

Palmer, B., Heaton, R., Gladsjo, J., Evans, J., Patterson, T., Golshan, S., et al. (2002). Heterogeneity in functional status among older outpatients with schizophrenia: Employment history, living situation and driving. *Schizophrenia Research, 55*, 205-215.

Palmer, B., Heaton, R., Paulsen, J., Kuck, J., Braff, D., Harris, J., et al. (1997). Is it possible to be schizophrenic yet neuropsychologically normal? *Neuropsychology, 11*, 437-446.

Pantelis, C., Yucel, M., Wood, S. J., McGorry, P., & Velakoulis, D. (2003). Early and late neurodevelopmental disturbances in schizophrenia and their functional consequences. *Australian and New Zealand Journal of Psychiatry, 37*, 399-406.

Patterson, T., Goldman, S., McKibbin, C., Hughs, T., & Jeste, D. (2001). USCD performance-based skills assessment: Development of a new measure of everyday functioning for severely mentally ill adults. *Schizophrenia Bulletin, 27*, 235-245.

Penn, D., Waldheter, E., Perkins, D., Mueser, K., & Lieberman, J. (2005). Psychosocial treatment for first-episode psychosis: a research update. *American Journal of Psychiatry, 162*, 2220-2232.

Perlick, D., Mattis, S., Statsny, P., & Teresi, J. (1992). Neuropsychological discriminators of long-term inpatients or outpatient status in chronic schizophrenia. *Journal of Neuropsychiatry and Clinical Neurosciences, 4*, 428-434.

Perlick, D., Statsny, P., Mattis, S., & Teresi, J. (1992). Contribution of family, cognitive and clinical dimensions to long-term outcome in schizophrenia. *Schizophrenia Research, 6*, 257-265.

Perlstein, W., Carter, C., Barch, D., & Baird, J. (1998). The Stroop task and attention deficits in schizophrenia: A critical evaluation of card and single-trial Stroop methodologies. *Neuropsychology, 12*, 414-425.

Pett, M., Lackey, N., & Sullivan, J. (2003). *Making Sense of Factor Analysis: The Use of Factor Analysis for Instrument Development in Health Care Research.* Thousand Oaks, CA: Sage Publications.

Phelan, M., Wykes, T., & Goldman, H. (1994). Global function scales. *Social Psychiatry and Psychiatric Epidemiology, 29*, 205-211.

Pilling, S., Bebbington, P., Kuipers, E., Garety, P., Martindale, B., Geddes, J., et al. (2002). Psychological treatments in schizophrenia: I. Meta-analysis of randomized controlled trials of social skills training and cognitive remediation. *Psychological Medicine, 32*, 783-791.

Polit, D., & Beck, C. (2004). Assessing data quality. In *Nursing Research: principles and methods* (7th ed., pp. 413-447). Philadelphia: Lippincott, Williams & Wilkins.

Poole, J., Ober, B., Shenaut, G., & Vinogradov, S. (1999). Independent frontal-system deficits in schizophrenia: Cognitive, clinical and adaptive implications. *Psychiatry Research, 85*, 161-176.

Potvin, S., Briand, C., Prouteau, A., Bouchard, R., Lipp, O., Lalonde, P., et al. (2005). CANTAB explicit memory is less impaired in addicted schizophrenia patients. *Brain and Cognition, 59*, 38-42.

Prouteau, A., Verdoux, H., Briand, C., Lesage, A., Lalonde, P., Nicole, L., et al. (2004). Self-assessed cognitive dysfunction and objective performance in outpatients with schizophrenia participating in a rehabilitation program. *Schizophrenia Research, 69*, 85-91.

Prouteau, A., Verdoux, H., Briand, C., Lesage, A., Lalonde, P., Nicole, L., et al. (2005). Cognitive predictors of psychosocial functioning outcome in schizophrenia: A follow-up study of subjects participating in a rehabilitation program. *Schizophrenia Research, 77*, 343-353.

Pulis, J. (2002). *Assessing information processing deficits in children: The PRPP System of task analysis.* Unpublished doctoral dissertation, Discipline of Occupational Therapy, Faculty of Health Sciences, University of Sydney, Lidcombe, NSW, Australia.

Purdon, S., Jones, B., Stip, E., Labelle, A., Addington, D., David, S., et al. (2000). Neuropsychological change in early phase schizophrenia during 12 months of treatment with olanzapine, risperidone, or haloperidol. *Archives of General Psychiatry, 57*, 249-258.

Putzhammer, A., Heindl, B., Broll, K., Pfeiff, L., Perfahl, M., & Hajak, G. (2004). Spatial and temporal parameters of gait disturbances in schizophrenic patients. *Schizophrenia Research, 69*, 159-166.

Rainville, C., Amieva, H., Lafont, S., Dartigues, J. F., Orgogozo, J.-M., & Fabrigoule, C. (2002). Executive function deficits in patients with dementia of the Alzheimer's type: A study with a Tower of London task. *Archives of Clinical Neuropsychology, 17*, 513-530.

Rainville, C., & Passini, R. (2005). Communication, résolution de problème et démence: orientation spatiale dans la maladie d'Alzheimer. In B.-F. Michel, F. Verdureau & P. Combet (Eds.), *Communication et démence* (pp. 137-159). Marseille, France: Solal.

Raykov, T., Tomer, A., & Nesselroade, J. (1991). Reporting structural equation modeling results in psychology and aging: Some proposed guidelines. *Psychology and Aging, 6*, 499-503.

Rector, N., & Beck, A. (2001). Cognitive behavioral therapy for schizophrenia: an empirical review. *The Journal of Nervous and Mental Disease, 189*(5), 278-287.

Reed, K., & Sanderson, S. (1999). Disability. In *Concepts of occupational therapy* (4th ed., pp. 173-193). Baltimore,MD: Lippincott, Williams & Wilkins.

Rempfer, M. (1999). *Independent living skills in people with schizophrenia: Influence of clinical symptoms and cognitive functioning.* Unpublished doctoral dissertation, University of Kansas.

Rempfer, M., Hamera, E., Brown, C., & Cromwell, R. (2003). The relations between cognition and the independent living skill of shopping in people with schizophrenia. *Psychiatry Research, 117*, 103-112.

Revheim, N., & Medalia, A. (2004). The independent livings scales as a measure of functional outcome for schizophrenia. *Psychiatric Services, 55*, 1052-1054.

Revheim, N., Schecter, I., Kim, D., Silipo, G., Allingham, B., Butler, P., et al. (2006). Neurocognitive and symptom correlates of daily problem-solving skills in schizophrenia. *Schizophrenia Research, 83*, 237-245.

Romiszowski, A. (1984). *Designing Instructional Systems: Decision making in course planning and curriculum design*. New York, NY: Nichols Publishing.

Rosen, A., Hadzi-Pavlovic, D., & Parker, G. (1989). The Life Skills Profile: A measure assessing function and disability in schizophrenia. *Schizophrenia Bulletin, 15*, 325-337.

Rosenblatt, A., & Atkisson, C. (1993). Assessing outcomes for sufferers of severe mental disorder: A conceptual framework and review. *Evaluation and Program Planning, 16*, 347-363.

Rössler, W. (2006). Psychiatric rehabilitation today: an overview. World Psychiatry, 5, 151-157.

Roy, M., Mérette, C., & Maziade, M. (2001). Subtyping schizophrenia according to outcome or severity: A search for homogeneous subgroups. *Schizophrenia Bulletin, 27*, 115-138.

Royall, D., Lauterbach, E., Cummings, J., Reeve, A., Rummans, T., Kaufer, D., et al. (2002). Executive control function: a review of its promise and challenges for clinical research. *Journal of Neuropsychiatry and Clinical Neuroscience, 14*, 377-405.

Royall, D., Mahurin, R., True, J., Anderson, B., Brock, I., Freeburger, L., et al. (1993). Executive impairment among the functionally dependent: comparisons between schizophrenic and elderly subjects. *American Journal of Psychiatry, 150*, 1813-1819.

Rund, B. (1998). A review of longitudinal studies of cognitive functions in schizophrenia patients. *Schizophrenia Bulletin, 24*, 425-435.

Rushe, T., Woodruff, P., Murray, R., & Morris, R. (1999). Episodic memory and learning in patients with chronic schizophrenia. *Schizophrenia Research, 35*, 85-96.

Saykin, A., Shtasel, D., Gur, R. E., Kester, D., Mozley, L., Stafiniak, P., et al. (1994). Neuropsychological deficits in neuroleptic naive patients with first-episode schizophrenia. *Archives of General Psychiatry, 51*, 124-131.

Schermelleh-Engel, K., Moosbrugger, H., & Muller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures [Electronic Version]. *Methods of Psychological Research Online, 8*, 23-74. Retrieved February 2nd 2008 from http://user.uni-frankfurt.de/~moosbrug/schermelleh/mpr_Schermelleh.pdf.

Schiffer, R., Sigal, M., & Mintz, M. (1996). Delayed habituation of the skin conductance orienting response correlates with impaired performance on the Wisconsin card sorting task in schizophrenia. *Psychiatry Research, 65*, 107-112.

Schindler, V. P. (2004a). Introduction: Social roles and schizophrenia in forensic psychiatry. *Occupational Therapy in Mental Health, 20*, 1-9.

Schindler, V. P. (2004b). Typical development of roles and the impact of schizophrenia on the development of adult social roles. *Occupational Therapy in Mental Health, 20*, 11-23.

Schraagen, J. M., Chipman, S. F., & Shalin, V. L. (2000). *Cognitive task analysis.* Mahwah, NJ: Lawrence Erlbaum Associates.

Schretlen, D., Jayaram, G., Maki, P., DiCarlo, M., Park, K., & Abebe, S. (2000). Demographic, clinical, and neurocognitive correlates of everyday functional impairment in severe mental illness. *Journal of Abnormal Psychology, 109*, 134-138.

Schwartz, M., Montgomery, M., Buxbaum, L., Lee, S., Carew, T., Coslett, H., et al. (1998). Naturalistic action impairment in closed head injury. *Neuropsychology, 12*, 13-28.

Schwartz, M., Montgomery, M., Fitzpatrick-DeSalme, E., Ochipa, C., Coslette, H., & Mayer, N. (1995). Analysis of a disorder of everyday action. *Cognitive Neuropsychology, 12*, 863-892.

Semkovska, M., Bédard, M., Godbout, L., Limoge, F., & Stip, E. (2004). Assessment of executive dysfunction during activities of daily living in schizophrenia. *Schizophrenia Research, 69*, 289-300.

Semkovska, M., Bédard, M., & Stip, E. (2001). Hypofrontalité et symptômes négatifs dans la schizophrénie: synthèse des acquis anatomiques et neuropsychologiques et perspecives écologiques. *L'Encéphale, 27*, 405-415.

Semkovska, M., Stip, E., Godbout, L., Paquet, F., & Bédard, M. A. (2002). Behavioral dizorganisation in schizophrenia during a daily activity: The Kitchen Behavioral Scoring Scale. *Brain and Cognition, 48*, 546-553.

Shallice, T. (1982). Specific impairment of planning. *Philosophical Transactions of the Royal Society of London, Series B, 298*, 199-209.

Sharma, T., & Antonova, L. (2003). Cognitive function in schizophrenia: Deficits, functional consequences, and future treatment. *Psychiatric Clinics of North America, 26*, 25-40.

Shrout, P. (1998). Measurement reliability and agreement in psychiatry. *Statistical methods in medical research, 7*, 301-317.

Siegel, S., Irani, F., Brensinger, C., Kohler, C., Bilker, W., Ragland, J., et al. (2006). Prognostic variables at intake and long-term level of function in schizophrenia. *American Journal of Psychiatry, 163*, 433-441.

Silver, H., Feldman, P., Bilker, W., & Gur, R. (2003). Working memory deficit as a core neuropsychological dysfunction in schizophrenia. *American Journal of Psychiatry, 160*, 1809-1816.

Silver, H., & Goodman, C. (2007). Impairment in error monitoring predicts poor executive function in schizophrenia patients *Schizophrenia Research, 94*, 156-163.

Silverstein, S. (2000). Psychiatric rehabilitation of schizophrenia: Unresolved issues, current trends, and future directions. *Applied and Preventive Psychology, 9*, 227-248.

Slagle, J., Weinger, M., Dinh, M.-T., Brumer, V., & Williams, K. (2002). Assessment of the intrarater and interrater reliability of an established clinical task analysis methodology. *Anesthesiology, 96*, 1129-1139.

Sood, S., Baker, M., & Bledin, K. (1996). Social and living skills of new long-stay hospital patients and new long-term community patients. *Psychiatric Services, 47*, 619-622.

Spaulding, W., Fleming, S., Reed, D., Sullivan, M., Storzbach, D., & Lam, M. (1999). Cognitive functioning in schizophrenia: Implications for psychiatric rehabilitation. *Schizophrenia Bulletin, 25*, 275-289.

Still, M. (2006). *The relationship between cognition and function in young people with schizophrenia.* Unpublished master's thesis, The University of Sydney, Sydney, Australia.

Still, M., Beltran, R., Catts, S., Chapparo, C., & Langdon, R. (2002). *Cognitive and functional assessment of patients with early psychosis.* Paper presented at the 3rd International Conference on Early Psychosis, Copenhagen, Denmark.

Stip, E. (1996). Memory impairment in schizophrenia: Perspectives from psychopathology and pharmacology. *Canadian Journal of Psychiatry, 41*(Suppl. 2), 27S-34S.

Stip, E., Caron, J., Renaud, S., Pampoulova, T., & Lecomte, Y. (2003). Exploring cognitive complaints in schizophrenia: SSTICS-subjective scale to investigate cognition in schizophrenia. *Comprehensive Psychiatry, 44*, 331-340.

Stip, E., & Lussier, I. (1996a). The effect of risperidone on cognition in patients with schizophrenia. *Canadian Journal of Psychiatry, 41*(Suppl. 2), 35S-40S.

Stip, E., & Lussier, I. (1996b). The heterogeneity of memory dysfunction in schizophrenia. *Canadian Journal of Psychiatry, 41*(Suppl. 1), 14S-20S.

Stip, E., Sablier, J., Sepehry, A., Rivard, S., Cloutier, C., Aubin, G., et al. (2007). Cuisine et schizophrénie: activité carrefour d'une évaluation écologique, ergothérapique et neuropsychologique. *Santé Mentale au Québec, 32*(1), 159-179.

Stip, E., Sepehry, A., Prouteau, A., Briand, C., Nicole, L., Lalonde, P., et al. (2005). Cognitive discernible factors between schizophrenia and schizoaffective disorder. *Brain and Cognition, 59*, 292-295.

Strauss, J., Carpenter, W., & Bartko, J. (1974). The diagnosis and understanding of schizophrenia: Part III, speculations on the processes that underlie schizophrenic symptoms and signs. *Schizophrenia Bulletin, 1*, 61-69.

Swartz, M., Perkins, D., Stroup, T. S., David, S., Capuano, G., Rosenheck, R., et al. (2007). Effects of antipsychotic medications on psychosocial functioning in patients with chronic schizophrenia: findings from the NIMH CATIE study. *American Journal of Psychiatry, 164*, 428-436.

Tabachnik, B., & Fidell, L. (2001). *Using multivariate statistics* (4th ed.). Boston: Allyn and Bacon.

Takahashi, H., Iwase, M., Nakahashi, T., Sekiyama, R., Tabushi, K., Kajimoto, O., et al. (2005). Spatial working memory deficit correlates with disorganization symptoms and social functioning in schizophrenia. *Psychiatry and Clinical Neurosciences, 59*, 453-460.

Tamminga, C., Buchanan, R., & Gold, J. (1998). The role of negative symptoms and cognitive dysfunction in schizophrenia outcome. *International Clinical Psychopharmacology, 13*(Suppl. 3), S21-S26.

Tessier, L., & Clément, M. (1992). De la réadaptation psychosociale au développement communautaire. In *La réadaptation psychosociale en psychiatrie, défi des années 90.* Boucherville: Gaëtan Morin.

Toglia, J. (1998). A dynamic interactional model to cognitive rehabilitation. In N. Katz (Ed.), *Cognitive rehabilitation models for intervention in occupational therapy* (pp. 104-143). Boston: Andover.

Tohen, M., Strakowski, C., Zarate, C., Hennen, J., Stoll, A., Suppes, T., et al. (2000). The Mc-Lean-Harvard First-Episode Project: 6-month symptomatic and functional outcome in affective and nonaffective psychosis. *Biological Psychiatry, 48*, 467-476.

Townsend, E., & Polatajko, H. (2007). *Enabling occupation II: Advancing an occupational therapy vision for health, well-being and justice through occupation*. Ottawa: CAOT Publications.

Tsuang, M., & Coryell, W. (1993). An 8-year follow-up of patients with DSM-III-R psychotic depression, schizoaffective disorder, and schizophrenia. *American Journal of Psychiatry, 150*, 1182-1188.

Tsuang, M. T., & Faraone, S. V. (1999). The concept of target features in schizophrenia research. *Acta Psychiatrica Scandinavica, 99*(Suppl. 395), 2-11.

Tuulio-Henrikson, A. (2005). *Cognitive dysfunction in schizophrenia: A familial and genetic approach.* Unpublished doctoral dissertation, University of Helsinki, Helsinki, Finland.

Twamley, E., Doshi, R., Nayak, G., Palmer, B., Golshan, S., Heaton, R. K., et al. (2002). Generalized cognitive impairments, ability to perform everyday tasks, and level of independence in community living. *American Journal of Psychiatry, 159*, 2013-2020.

van der Gaag, M. (1992). *The results of cognitive training in schizophrenic patients*. Delft: The Netherlands: Eburon.

van der Gaag, M., Cuijpers, A., Hoffman, T., Remijsen, M., Hijman, R., de Haan, L., et al. (2006). The five-factor model of the Positive and Negative

Syndrome Scale I: Confirmatory factor analysis fails to confirm 25 published five-factor solutions. *Schizophrenia Research, 85*, 280-287.

Van der Linden, M., Meulemans, T., Belleville, S., & Collette, F. (2000a). L'évaluation des troubles de la mémoire. In X. Seron & M. Van der Linden (Eds.), *Traité de neuropsychologie clinique* (pp. 115-155). Marseille, France: Solal.

Van der Linden, M., Meulemans, T., Seron, X., Coyette, F., Andrès, P., & Prairial, C. (2000b). L'évaluation des fonctions exécutives. In X. Seron & M. Van der Linden (Eds.), *Traité de neuropsychologie clinique* (pp. 275-300). Marseille, France: Solal.

Velligan, D., & Bow-Thomas, C. (1999). Executive function in schizophrenia. *Seminars in Clinical Neuropsychiatry, 4*, 24-33.

Velligan, D., Bow-Thomas, C., Mahurin, R., Miller, A., & Halgunseth, L. (2000). Do specific neurocognitive deficits predict specific domains of community function in schizophrenia? *Journal of Nervous and Mental Disease, 188*, 518-524.

Velligan, D., Kern, R., & Gold, J. (2006). Cognitive rehabilitation for schizophrenia and the putative role of motivation and expectancies. *Schizophrenia Bulletin, 32*, 474-485.

Vita, A., Dieci, M., Silenzi, C., Tenconi, F., Giobbio, G., & Invernizzi, G. (2000). Cerebral ventricular enlargement as a generalized feature of schizophrenia: a distribution analysis on 502 subjects. *Schizophrenia Research, 44*, 25-34.

Walkup, J., & Gallagher, S. (1999). Schizophrenia and the life course: National findings on gender differences in disability and service use. *International Journal of Aging and Human Development, 49*, 79-105.

Wallace, C. (1986). Functional assessment in rehabilitation. *Schizophrenia Bulletin, 12*, 604-624.

Wallace, C., Lecomte, T., Wilde, J., & Liberman, P. (2001). CASIG: A consumer-centered assessment for planning individualized treatment and evaluating program outcomes. *Schizophrenia Research, 50*, 105-119.

Wallace, C., Liberman, R., Tauber, R., & Wallace, J. (2000). The independent living skills survey: A comprehensive measure of the community functioning of severely and persistently mentally ill persons. *Schizophrenia Bulletin, 26*, 631-658.

Watkins, M., & Kush, J. (1988). Assessment of academic skills of learning disabled students with classroom microcomputer. *School Psychology Review, 17*(1), 81-88.

Watzke, S., Brieger, P., Kuss, O., Schoettke, H., & Wiedl, K. (2008). A longitudinal study of learning potential and rehabilitation outcome in schizophrenia. *Psychiatric Services, 59*, 248-255.

Wechsler, D. (1997). *Wechsler Adult Intelligence Scale-Third Edition.* San Antonio, Texas: The Psychological Corporation.

Weinberger, D., Aloia, M., Goldberg, T., & Berman, K. (1994). The frontal lobes and schizophrenia. *Journal of Neuropsychiatry and Clinical Neurosciences, 6*, 419-427.

Wiedl, K. (1999). Cognitive modifiability as a measure of readiness for rehabilitation. *Psychiatric Services, 50*, 1411-1419.

Wilson, B., Evans, J., Emslie, H., Alderman, N., & Burgess, P. (1998). The development of an ecologically valid test for assessing patients with a dysexecutive syndrome. *Neuropsychological Rehabilitation, 8*, 213-228.

Wood, S. J., Proffitt, T., Mahony, K., Smith, D. J., Buchanan, J. A., Brewer, W., et al. (2002). Visuospatial memory and learning in first-episode schizophreniform psychosis and established schizophrenia: A functional correlate of hippocampal pathology? *Psychological Medicine, 32*, 429-438.

Woonings, F., Appelo, M., Kluiter, H., Slooff, C., & van der Bosch, R. (2002). Learning (potential) and social functioning in schizophrenia. *Schizophrenia Research, 59*, 287-296.

World Health Organization. (1992). *The ICD-10 classification of mental and behavioural disorders : clinical descriptions and diagnostic guidelines.* Geneva: WHO.

World Health Organization. (2001a). Burden of Mental and Behavioral Disorders In World Health Organization (Ed.), *The world health report 2001: Mental Health, new understanding, new hope* (pp. 1-5). Geneva, Switzerland: Author.

World Health Organization. (2001b). ICF introduction. In World Health Organization (Ed.), *International classification of functioning, disability and health (ICF)* (pp. 1-25). Geneva, Switzerland: Author.

Wykes, T. (2000). The Rehabilitation of Cognitive Deficits. *American Journal of Psychiatric Rehabilitation, 4*(2), 234-248.

Youngstrom, M. J. (2002). Occupational therapy practice framework. *American Journal of Occupational Therapy, 56*, 609-649.

Yuen, K. H., & D'Amico, M. (1998). Deriving directions through procedural task analysis. *Occupational Therapy in Health Care, 11*, 17-25.

Zeijl, E., Dubois-Reymond, M., & Te Poel, Y. (2001). Young adolescents' leisure patterns. *Society and Leisure, 24*(2), 379-402.

Zubin, J., & Spring, B. (1977). Vulnerability: a new view of schizophrenia. *Journal of Abnormal Psychology, 86*, 103-126.

APPENDIX 1 Ethics committees approval

COMITÉ D'ÉTHIQUE DE LA RECHERCHE
Hôpital Saint-Luc du CHUM

CHUM

Le 17 octobre 2002

Docteur Ginette Aubin
687 Rochon
St-Laurent (Québec)
H4L 1T3

SL 02.042 Projet pilote en vue d'étudier la fidélité et la validité d'un instrument mesurant l'impact des déficits cognitifs sur la performance des activités de la vie quotidiennes chez des personnes souffrant de schizophrénie

---

Docteur,

J'accuse réception de votre lettre du 9 octobre 2002 en réponse aux demandes du comité d'éthique ainsi que du formulaire de consentement modifié (version du 10 octobre 2002). Le tout est jugé satisfaisant. Je vous retourne sous pli une copie du formulaire portant l'estampille d'approbation du comité. Seul ce formulaire devra être utilisé pour signature par les sujets.

La présente constitue l'approbation finale par le comité du protocole qui est valide pour un an à compter de la présente. Je vous rappelle que toute modification au protocole et/ou au formulaire de consentement en cours d'étude doit être approuvée par le comité d'éthique.

Vous souhaitant la meilleure des chances dans la poursuite de vos travaux, je vous prie d'accepter, Docteur, mes salutations distinguées.

Le vice-président du comité d'éthique,

André L

André Lavoie, avocat
AL/nf

C:\Mes documents\ethique\Lettres.CE\lettres aux chercheurs\2002\Let. SL 02.042.doc

CENTRE HOSPITALIER DE L'UNIVERSITÉ DE MONTRÉAL

HÔTEL-DIEU (Siège social)
3840, rue Saint-Urbain
Montréal (Québec)
H2W 1T8

HÔPITAL NOTRE-DAME
1560, rue Sherbrooke Est
Montréal (Québec)
H2L 4M1

HÔPITAL SAINT-LUC
1058, rue Saint-Denis
Montréal (Québec)
H2X 3J4

COMITÉ D'ÉTHIQUE DE LA RECHERCHE
Campus Saint-Luc du CHUM

[illegible]

CHUM

Le 14 novembre 2003

Dr Ginette Aubin
Centre de recherche
Hôpital Juif de réadaptation
3205, Alton Goldbloom
Laval (Québec)
H7V 1R2

SL 03.059 Étude de l'impact des déficits cognitifs sur les activités quotidiennes et le fonctionnement dans la communauté des personnes souffrant de schizophrénie.

Docteur,

J'accuse réception de votre lettre du 7 novembre 2003, en réponse aux demandes du comité d'éthique ainsi que des quatre formulaires de consentement modifiés (version du 7 novembre 2003). Le tout est jugé satisfaisant. Je vous retourne sous pli une copie des formulaires portant l'estampille d'approbation du comité. Seuls ces formulaires devront être utilisés pour signature par les sujets.

La présente constitue l'approbation finale par le comité du protocole version finale qui est valide pour un an à compter de la présente. Je vous rappelle que toute modification au protocole et/ou au formulaire de consentement en cours d'étude doit être approuvée par le comité d'éthique.

Je note que les documents suivants ont été déposés au dossier: Échelle d'évaluation des symptômes positifs et négatifs, échelle de dépression de Calgary, échelle d'évaluation des symptômes extrapyramidaux, The PRPP System of Task Analysis : Stage Two Model, échelle des habiletés de vie autonome (version pour les personnes vivant au sein de la communauté), CANTAB neuropsychological assessment et Multonmah Community Ability Scale (MCAS) en version française.

Vous souhaitant la meilleure des chances dans la poursuite de vos travaux, je vous prie d'accepter, Docteur, mes salutations distinguées.

Le vice-président du comité d'éthique,

André Lavoie

André Lavoie, avocat
AL /nf
p.j. formulaires de consentement approuvés

CENTRE HOSPITALIER DE L'UNIVERSITÉ DE MONTRÉAL

HÔTEL-DIEU (Siège social)
3840, rue Saint-Urbain
Montréal (Québec)
H2W 1T8

HÔPITAL NOTRE-DAME
1560, rue Sherbrooke Est
Montréal (Québec)
H2L 4M1

HÔPITAL SAINT-LUC
1058, rue Saint-Denis
Montréal (Québec)
H2X 3J4

CENTRE DE RECHERCHE
Comité d'éthique de la recherche Saint-Luc du CHUM
Édifice Cooper
3981 St-Laurent, Mezzanine 2, Bureau M-207
Montréal (Québec) H2W 1Y5
Téléphone : (514) 890-8000 poste 14528 Télécopieur : (514) 412-7394

CHUM

Le 5 novembre 2004

Dre Ginette Aubin
Centre de recherche
Hôpital juif de réadaptation
3205, place Alton-Goldbloom
Laval (Qc) H7V 1R2

Objet : Approbation finale
SL 04.057 : Étude de l'impact des déficits cognitifs sur les activités quotidiennes et le fonctionnement dans la communauté des personnes souffrant de schizophrénie.

Docteure,

J'ai le plaisir de vous aviser que le comité d'éthique de la recherche a approuvé le projet cité en rubrique.

En vertu des pouvoirs qui me sont délégués par le Comité d'éthique de la recherche du CHUM (procédure d'évaluation accélérée), j'approuve votre projet puisqu'il s'agit d'un projet se situant en dessous du seuil de risque minimal.

Je vous retourne sous pli une copie des formulaires de consentement version (22 octobre 2004) portant l'estampille d'approbation du comité. Seuls ces formulaires devront être utilisés pour signature par les sujets.

La présente constitue l'approbation finale par le comité du protocole qui est valide pour un an à compter de la présente. Je vous rappelle que toute modification au protocole et/ou au formulaire de consentement en cours d'étude doit être approuvée par le comité d'éthique.

CENTRE DE RECHERCHE

Comité d'éthique de la recherche Saint-Luc du CHUM

Édifice Cooper

3981 St-Laurent, Mezzanine 2, Bureau M-207

Montréal (Québec) H2W 1Y5

Téléphone : (514) 890-8000 poste 14528 Télécopieur : (514) 412-7394

CHUM

Vous souhaitant la meilleure des chances dans la poursuite de vos travaux, je vous prie d'accepter, Docteure, mes salutations distinguées.

Le vice-président du comité d'éthique,

André Lavoie, avocat
AL /kb

p.j. :
- Formulaire de consentement "Principal" (français), approuvé et estampillé.
- Formulaire de consentement "À être filmé" (français), approuvé et estampillé.
- Formulaire de consentement "Intervenants auprès des participants ayant un diagnostic de Schizophrénie" (français), approuvé et estampillé.
- Informations destinées aux psychiatres et aux ergothérapeutes en psychiatrie, version 12 août 04, approuvée et estampillée.

CENTRE DE RECHERCHE
FERNAND-SEGUIN

Hôpital Louis-H. Lafontaine

Le 28 août 2002

Dr Emmanuel Stip
Centre de recherche Fernand-Seguin

OBJET : **Projet de recherche :** « Projet pilote en vue d'étudier la fidélité et la validité d'un instrument mesurant l'impact des déficits cognitifs sur la performance des activités de la vie quotidiennes (PRPP) chez des personnes souffrant de schizophrénie. » **Emmanuel Stip, M.D., Isabelle Gélinas, Ph. D., Christine Chapparo, Ph.D., Ginette Aubin, M. Sc..**

Docteur Stip,

La présente est pour vous aviser que votre projet de recherche ci-dessus mentionné, présenté à la réunion du 22 août dernier, est approuvé par le Comité d'éthique de la recherche.

Veuillez agréer, docteur Stip, l'expression de mes sentiments les meilleurs.

Frédéric Grunberg, M.D.
Président Comité d'éthique de la recherche
FG/dr.

c.c. D[r] Pierre-Paul Rompré, psychologie - Directeur scientifique Centre de recherche Fernand-Seguin

7331, rue Hochelaga
Montréal (Québec) H1N 3V2
CANADA
Téléphone: (514) 251-4015
Télécopieur: (514) 251-2617

Affilié à l'Université de Montréal

CENTRE DE RECHERCHE
FERNAND·SEGUIN

Hôpital Louis-H. Lafontaine

Le 3 septembre 2002

Dr Emmanuel Stip
Centre de recherche Fernand-Seguin

OBJET : Projet de recherche : « Projet pilote en vue d'étudier la fidélité et la validité d'un instrument mesurant l'impact des déficits cognitifs sur la performance des activités de la vie quotidiennes (PRPP) chez des personnes souffrant de schizophrénie. » **Emmanuel Stip, M.D., Isabelle Gélinas, Ph. D., Christine Chapparo, Ph.D., Ginette Aubin, M. Sc..**

Docteur Stip,

La présente est pour vous confirmer que votre protocole de recherche ci-dessus mentionné, présenté à la réunion du 22 août dernier, est approuvé par le Comité d'évaluation scientifique.

Le comité suggère aux candidats d'utiliser la statistique du Kappa pour tester la fidélité inter-juge.

Robert Élie, M.D.
Président Comité d'évaluation scientifique
RE/dr.

c.c. : D^r Pierre-Paul Rompré, Ph. D. psychologie
Directeur scientifique Centre de recherche Fernand-Seguin

7331, rue Hochelaga
Montréal (Québec) H1N 3V2
CANADA
Téléphone : (514) 251-4015
Télécopieur : (514) 251-2617

Affilié à l'Université de Montréal

FERNAND-SEGUIN

Le 5 octobre 2004.

Docteur Emmanuel Stip
Centre de recherche Fernand-Seguin

Objet: Emmanuel Stip MD, M. Sc., Isabelle Gélinas, Ph.D., Ginette Aubin, erg., étudiante Ph.D. (collaboratrice) «Etude de l'impact des déficits cognitifs sur les activités quotidiennes et le fonctionnement dans la communauté des personnes souffrants de schizophrenie.»

Docteur Stip,

Cette étude, subventionnée par le FRSQ, est acceptée conditionnellement au retrait du montant de 30$ qui n'est pas mentionné dans la formule du consentement du participant mais qui est indiqué dans les informations destinées aux psychiatres et ergothérapeutes ainsi que dans la feuille d'information destinée aux participants.

Veuillez agréer, Docteur Emmanuel Stip, l'expression de nos sentiments les meilleurs.

Robert Élie, M.D.
President Comité d'éthique de la recherche
RE/cm
c.c. Dr Pierre-Paul Rompré, Ph. D. psychologie - Directeur scientifique Centre de recherche Fernand-Seguin

CANADA

Le 5 octobre 2004,

Docteur Emmanuel Stip
Centre de recherche Fernand-Seguin

Objet: Emmanuel Stip MD, M. Sc., Isabelle Gélinas, Ph.D., Ginette Aubin, erg., étudiante Ph.D. (collaboratrice) «Étude de l'impact des déficits cognitifs sur les activités quotidiennes et le fonctionnement dans la communauté des personnes souffrants de schizophrénie »

La présente est pour vous confirmer que votre projet de recherche ci-dessus mentionné, présenté à la réunion du 30 septembre dernier est déjà approuvé par un comité de pairs d'un organisme subventionnaire (FRSQ). Il est donc d'emblée accepté par le Comité d'Évaluation scientifique.

Veuillez agréer, docteur Stip, l'expression de mes sentiments distingués.

François Guillem, Ph.D. en remplacement de
Richard Boyer, Ph.D.
Président Comité d'évaluation scientifique
FG/cm
c.c. Dr Pierre-Paul Rompré, Ph. D. psychologie - Directeur scientifique Centre de recherche Fernand-Seguin

APPENDIX 2 Consent Forms

FORMULAIRE D'INFORMATION ET DE CONSENTEMENT
Centre hospitalier de l'Université de Montréal

Titre de l'étude : Projet pilote en vue d'étudier la fidélité et la validité d'un instrument mesurant l'impact des déficits cognitifs sur la performance des activités de la vie quotidienne (PRPP) chez des personnes souffrant de schizophrénie.

Chercheurs : Ginette Aubin, erg, étudiante Ph.D., Isabelle Gélinas, PhD., Emmanuel Stip MD.

PARTIE INFORMATION :

1. Préambule :

Nous vous demandons de participer à un projet de recherche sur l'utilisation d'une nouvelle évaluation des activités quotidiennes chez des personnes qui souffrent de schizophrénie.

Avant d'accepter de participer à ce projet, veuillez prendre le temps de lire et de comprendre les renseignements qui suivent. Le présent document peut contenir des termes que vous ne comprenez pas. Nous vous invitons à poser toutes les questions que vous jugez utiles au chercheur et à lui demander de vous expliquer les éléments qui ne sont pas clairs.

2. Nature du projet de recherche:

Nous voulons vous proposer de participer à une étude visant à connaître l'efficacité d'une nouvelle évaluation des activités quotidiennes auprès des personnes qui souffrent de schizophrénie. Cette nouvelle évaluation permettra de mieux comprendre les difficultés qu'éprouvent certaines personnes dans leurs tâches quotidiennes. Une dizaine de personnes seront recrutées pour participer à ce projet au CHUM. Un des objectifs de ce projet est d'étudier la meilleure façon d'utiliser cette évaluation des activités quotidiennes. Cette étude d'une durée de 5 mois, est nécessaire pour la réalisation d'un plus grand projet sur les activités quotidiennes et le fonctionnement dans la communauté.

3. Nature de la participation des sujets :

Si vous êtes intéressé à participer à cette étude, vous serez évalué avec deux outils différents. Deux rencontres sont prévues pour cette étude. À la première rencontre, il vous sera demandé de faire une activité de cuisine consistant en la préparation de quelques plats simples et vous serez filmé pendant que vous ferez cette tâche. Puis, il vous sera demandé de répondre à un questionnaire en ce qui a trait à votre fonctionnement quotidien. En tout temps un chercheur sera présent pour répondre à vos questions. À la deuxième rencontre qui aura lieu à un intervalle d'environ deux semaines, vous referez la même activité de cuisine.

4. Risques, inconvénients et bénéfices :

La participation à cette étude ne présente aucun risque. Le seul désagrément consiste au temps consacré pour accomplir la tâche de cuisine et pour répondre au questionnaire. Vous ne retirerez pas de bénéfice immédiat suite à votre participation, cependant, les données recueillies permettront de mieux comprendre comment les personnes souffrant de maladie psychiatrique effectuent leurs activités quotidiennes. Ceci permettra aux chercheurs et aux cliniciens d'élaborer des interventions de réadaptation répondant mieux aux besoins de ces personnes.

5. Autres moyens thérapeutiques possibles :

Si vous ne participez pas à cette étude, d'autres approches thérapeutiques vous seront proposées. En aucun cas, les services que vous recevrez seront de moindre qualité.

6. Versement d'une indemnité :

Une indemnité de $10.00 vous sera remise pour votre participation à cette étude afin de vous dédommager des dépenses encourues.

7. Confidentialité :

Tous les renseignements recueillis à votre sujet au cours de cette étude demeureront strictement confidentiels et seront conservés de façon à assurer la confidentialité. Vous ne serez identifié(e) que par un code afin de préserver La confidentialité des renseignements recueillis sur vous. Les publications ou présentations qui pourraient résulter de ce projet ne contiendront que des informations concernant des groupes de personnes et il sera impossible d'identifier une personne en particulier.

Votre dossier sera consulté en vue d'extraire des données telles que votre diagnostic, votre médication et votre milieu d'hébergement par certaines personnes de l'équipe de recherche mandatées par le comité d'éthique et de la recherche de cet hôpital. Toutes les informations recueillies resteront confidentielles. En ce qui a trait au filmage avec une caméra vidéo, on vous demandera de signer un formulaire de consentement particulier qui décrira vos droits.

8. Participation volontaire et retrait de l'étude :

Votre participation à cette étude est volontaire. En tout temps, vous avez le droit de vous retirer du projet de recherche et votre décision n'affectera pas la qualité des services que vous recevrez. Vous pouvez faire verbalement votre demande pour quitter l'étude en tout temps durant le projet de recherche.

En acceptant de participer à cette étude, vous ne renoncez à aucun de vos droits ni ne libérez nommément les chercheurs, les organismes, les entreprises ou les institutions impliqués de leurs responsabilités légales et professionnelles

9. Personnes à contacter :

Si vous avez d'autres questions, vous pouvez contacter Madame Ginette Aubin, responsable du projet, au Centre de recherche de l'hôpital Juif de Réadaptation au 450-688-9550 poste 538.

Vous pouvez , en cas de plainte, communiquer avec le ou la responsable des plaintes sur chacun des campus : Campus Hotel-Dieu : Mme Esther Léonard au 514-890-8000, poste 12751 ; Campus Notre-Dame : Mme Louise Brunelle au 890-8000, poste 26047 ; Campus Saint-Luc : M. Mahmoud Dhouib au 514-890-8000 poste 36366.

Vous pouvez également, en cas d'urgence, communiquer avec votre médecin ou vos autres intervenants, ou si votre état le commande, vous rendre à l'urgence de l'hôpital.

PARTIE CONSENTEMENT :

Je déclare avoir lu et compris le présent formulaire de consentement, particulièrement quant à la nature de ma participation au projet de recherche et l'étendue des risques qui en découlent. Je reconnais qu'on m'a expliqué le projet, qu'on a répondu à toutes mes questions et qu'on m'a laissé le temps voulu pour prendre une décision.

Je consens librement et volontairement à participer à ce projet. Je demeure libre de m'en retirer en tout temps sans que cela nuise aux relations avec mon médecin et les autres intervenants et sans préjudice d'aucune sorte.

Je recevrai une copie signée du présent formulaire d'information et de consentement.

Nom du participant (en lettre moulées):______________________________
Signature du participant:______________________________
Date:______________________

Témoin de la signature:______________________________
Date:______________________

J'ai déclare avoir clairement expliqué le projet de recherche et les procédures au candidat qui a accepté de participer à cette étude.

Chercheur (en lettre moulées) :______________________________
Date :______________________

De plus, J'accepte______
Je refuse______
qu'un résumé des données recueillies avec l'évaluation PRPP lors de ma participation à cette étude puisse être déposé à mon dossier médical et consulté par mes intervenants.

Signature du participant______________________________
Date______________________

Témoin de la signature______________________________
Date______________________

CHUM CENTRE HOSPITALIER DE L'UNIVERSITÉ DE MONTRÉAL

FORMULAIRE DE CONSENTEMENT À ÊTRE FILMÉ

Centre Hospitalier De l'Université de Montréal

Projet pilote en vue d'étudier la fidélité et la validité d'un instrument mesurant l'impact des déficits cognitifs sur la performance des activités de la vie quotidienne (PRPP) chez des personnes souffrant de schizophrénie.

INFORMATION

Dans le cadre de cette étude nous vous demandons l'autorisation de vous filmer pendant que vous accomplirez une tâche quotidienne. Ces vidéos serviront à des fins d'apprentissage dans le cadre du doctorat de Mme Ginette Aubin et dans le but d'étudier la fidélité de l'instrument de mesure PRPP.

Il est entendu que toute utilisation éventuelle du matériel recueilli sera faite en respectant les règles de confidentialité et exigeant un engagement de confidentialité par les chercheurs, les professeurs et les ergothérapeutes qui visionneront ces vidéos. Il est entendu que vous pouvez révoquer cette autorisation en tout temps. Ces films seront détruits dès la fin de l'étude.

Si vous avez d'autres questions, vous pouvez contacter Madame Ginette Aubin, responsable du projet, au Centre de recherche de l'hôpital Juif de Réadaptation au 450-688-9550 poste 538.

CONSENTEMENT

Dans le cadre de cette étude, j'accepte d'être filmé(e) au moyen d'une caméra vidéo pendant que j'accomplis une tâche quotidienne.

Je recevrai une copie signée du présent formulaire d'information et de consentement.

Nom du participant (en lettre moulées):____

Participant____Date______________________

Témoin____Date______________________

Chercheur_______________________________________Date______________________

De plus, J'accepte______ Je refuse______ que ces vidéos puissent aussi servir à l'enseignement ou des présentations auprès d'étudiants en ergothérapie ou d'autres ergothérapeutes se formant à l'évaluation PRPP.

Nom du participant (en lettre moulées):____

Participant____ Date____________________

Témoin____Date____________________

Chercheur_______________________________________Date____________________

FERNAND-SEGUIN

Hôpital Louis-H. Lafontaine

FORMULAIRE DE CONSENTEMENT ÉCLAIRÉ

Hôpital Louis-H. Lafontaine

Projet pilote en vue d'étudier la fidélité et la validité d'un instrument mesurant l'impact des déficits cognitifs sur la performance des activités de la vie quotidiennes (PRPP) chez des personnes souffrant de schizophrénie.

Le présent projet pilote est réalisé dans le cadre du doctorat en Sciences de la Réadaptation à l'Université McGill de Mme Ginette Aubin, ergothérapeute, supervisée par le Dr. Emmanuel Stip (psychiatre, Hôpital Louis-H. Lafontaine), le Dr. Isabelle Gélinas (Université McGill) et le Dr. Christine Chapparo (Université de Sydney).

L'objectif principal de cette étude est l'expérimentation d'une nouvelle évaluation permettant de mieux comprendre la réalisation des activités quotidiennes des personnes qui souffrent de schizophrénie.

Si vous êtes intéressé à participer à cette étude, vous serez évalué avec deux outils différents. Deux rencontres sont prévues pour cette étude. À la première rencontre, il vous sera demandé de faire une activité de cuisine consistant en la préparation de quelques plats simples et de répondre à un questionnaire en ce qui a trait à votre fonctionnement quotidien. Ce questionnaire sera complété en rencontre individuelle et en tout temps un chercheur sera présent pour répondre à vos questions. À la deuxième rencontre qui aura lieu à un intervalle d'environ deux semaines, vous referez la même activité de cuisine.

CANADA

Le personnel de recherche aura également à consulter votre dossier médical et ce, pour extraire des données telles que votre diagnostic, votre médication et votre milieu d'hébergement. Toutes les informations recueillies resteront confidentielles et anonymes.

Cette étude n'est pas un traitement. Vous ne retirerez pas de bénéfice immédiat suite à votre participation, cependant, les données recueillies permettront de mieux comprendre comment les personnes souffrant de maladie psychiatrique effectuent leurs activités quotidiennes. Ceci permettra aux chercheurs et aux cliniciens d'élaborer des interventions de réadaptation répondant mieux aux besoins de ces personnes. Les publications qui pourraient résulter de ce projet ne contiendront que des informations concernant des groupes de personnes et il sera impossible d'identifier une personne en particulier.

Il est important de souligner qu'aucun risque important pour votre santé est anticipé dans cette étude. Une compensation de $20.00 vous sera remise pour votre participation aux deux rencontres prévues dans cette étude pour vous dédommager des frais encourus.

En tout temps, vous avez le droit de vous retirer du projet de recherche et votre décision n'affectera pas la qualité des services que vous recevrez. Vous pouvez faire verbalement votre demande pour quitter l'étude en tout temps durant le projet de recherche. En acceptant de participer à cette étude, vous ne renoncez à aucun de vos droits ni ne libérez nommément les chercheurs, les organismes, les entreprises ou les institutions impliqués de leurs responsabilités légales et professionnelles

Ce projet est confidentiel, ce qui veut dire que seul le personnel de recherche aura accès à l'information que vous fournirez. Si vous avez d'autres questions, vous pouvez contacter Madame Ginette Aubin, coordonnatrice du projet, au Centre de recherche de l'hôpital Juif de Réadaptation au 450-688-9550 poste 538.

Pour toute question sur vos droits à titre de sujet de recherche ou pour tout problème éthique concernant les conditions dans lesquelles se déroule votre participation à ce projet, vous pouvez contacter M^{me} Elise St-Amant, Commissaire local à la qualité des services - Hôpital Louis-H. Lafontaine -7401, rue Hochelaga - Montréal (Québec) H1N 3M5 - téléphone : (514) 251-4000 poste 2920.

Par la présente, je, ________________________________, accepte de participer à l'étude décrite plus haut. Le projet de recherche m'a été clairement décrit. J'ai pu poser l'ensemble de mes questions et on m'a répondu de façon claire. J'ai eu le temps voulu pour prendre ma décision et en aucun temps on m'a forcé à participer.

Participant :_______________________________________
Nom en lettres moulées

Participant :______________________________ Date :__________
Signature

Témoin de la signature: _________________________________
Nom en lettres moulées

Témoin de la signature::______________________ Date :__________
Signature

De plus, J'accepte______

Je refuse______

qu'un résumé des données recueillies avec l'évaluation PRPP lors de ma participation à cette étude puisse être déposé à mon dossier médical et consulté par mes intervenants.

Participant :_______________________________________
Nom en lettres moulées

Participant :______________________________ Date :__________
Signature

Témoin de la signature :________________________________
Nom en lettres moulées

Témoin de la signature::______________________ Date :__________
Signature

J'ai clairement expliqué le projet de recherche et les procédures au candidat qui a accepté de participer à cette étude.

Chercheur : ____
Nom en lettres moulées

Chercheur : ____ Date : _______________
Signature

CENTRE DE RECHERCHE
FERNAND-SEGUIN

Hôpital Louis-H. Lafontaine

FORMULAIRE DE CONSENTEMENT ÉCLAIRÉ
VIDÉO
Hôpital Louis-H. Lafontaine

Projet pilote en vue d'étudier la fidélité et la validité d'un instrument mesurant l'impact des déficits cognitifs sur la performance des activités de la vie quotidiennes (PRPP) chez des personnes souffrant de schizophrénie.

Par la présente, j'accepte que l'étude à laquelle je participe soit filmée au moyen d'une caméra vidéo. Il est entendu que toute utilisation éventuelle du matériel recueilli sera faite en respectant les règles de confidentialité et exigeant un engagement de confidentialité par les chercheurs, les professeurs et les ergothérapeutes qui visionneront ces vidéos. Ces vidéos serviront à des fins d'apprentissage dans le cadre du doctorat de Mme Ginette Aubin et dans le but d'étudier la fidélité de l'instrument de mesure PRPP.

Il est entendu que je peux révoquer cette autorisation en tout temps.

Participant____
Nom en lettres moulées

Participant__________________________________ Date_____________________
Signature

Témoin____
Nom en lettres moulées

Témoin____________________________________ Date_____________________
Signature

7331, rue Hochelaga
Montréal (Québec) H1N 3V2
CANADA
Téléphone : (514) 251-4015
Télécopieur : (514) 251-2617

 (version 22-08-02)

De plus, J'accepte______

Je refuse______

Que ces vidéos puissent aussi servir à l'enseignement auprès d'étudiants en ergothérapie ou d'autres ergothérapeutes se formant à l'évaluation PRPP.

Participant____
Nom en lettres moulées

Participant_______________________________________ Date______________________
Signature

Témoin____
Nom en lettres moulées

Témoin____ Date______________________
Signature

Chercheur____
Nom en lettres moulées

Chercheur____ Date_________________
Signature

CHUM CENTRE HOSPITALIER DE L'UNIVERSITÉ DE MONTRÉAL

FORMULAIRE D'INFORMATION ET DE CONSENTEMENT
Centre hospitalier de l'Université de Montréal

Titre de l'étude : Étude de l'impact des déficits cognitifs sur les activités quotidiennes et le fonctionnement dans la communauté des personnes souffrant de schizophrénie : validation d'une grille d'analyse de tâche.(SL 03.059)

Chercheurs : Ginette Aubin, erg, étudiante Ph.D., Isabelle Gélinas, PhD., Emmanuel Stip MD, Christine Chapparo, Ph.D..

PARTIE INFORMATION :

1. Préambule :

Nous vous demandons de participer à un projet de recherche sur l'utilisation d'une nouvelle évaluation des activités quotidiennes chez des personnes qui souffrent de schizophrénie.

Avant d'accepter de participer à ce projet, veuillez prendre le temps de lire et de comprendre les renseignements qui suivent. Le présent document peut contenir des termes que vous ne comprenez pas. Nous vous invitons à poser toutes les questions que vous jugez utiles au chercheur et à lui demander de vous expliquer les éléments qui ne sont pas clairs.

2. Nature du projet de recherche:

Nous voulons vous proposer de participer à une étude visant à connaître l'efficacité d'une nouvelle évaluation des activités quotidiennes auprès des personnes qui souffrent de schizophrénie. Cette nouvelle évaluation permettra de mieux comprendre les difficultés qu'éprouvent certaines personnes dans leurs tâches quotidiennes et dans leur fonctionnement dans la communauté. Trente personnes avec un diagnostic de schizophrénie seront recrutées pour participer à ce projet au CHUM.

3. Nature de la participation des sujets :

Si vous êtes intéressé à participer à cette étude, vous nous demanderons de répondre à des questionnaires, à des tests et d'accomplir une activité quotidienne. Deux ou trois rencontres pourront être nécessaires pour cette étude. D'abord, il vous sera demandé de répondre à des questions concernant vos symptômes et de faire des tests évaluant vos capacités cognitives. Lors de la dernière rencontre, il vous sera demandé de faire une activité de cuisine consistant en la planification et la préparation de quelques plats simples et vous serez filmé pendant que vous ferez cette tâche. Puis, il vous sera demandé de répondre à un questionnaire en ce qui a trait à votre fonctionnement quotidien. En tout temps un chercheur sera présent pour répondre à vos questions. Un de vos intervenants (par exemple ergothérapeute, psychologue, travailleur social) sera aussi sollicité pour répondre à des questions concernant votre fonctionnement quotidien.

4. Risques, inconvénients et bénéfices :

La participation à cette étude ne présente aucun risque. Le seul désagrément consiste au temps consacré pour accomplir la tâche de cuisine et pour répondre au questionnaires et compléter les tests. Vous ne retirerez pas de bénéfice immédiat suite à votre participation, cependant, les données recueillies permettront de mieux comprendre comment les personnes souffrant de maladie psychiatrique effectuent leurs activités quotidiennes. Ceci permettra aux chercheurs et aux cliniciens d'élaborer des interventions de réadaptation répondant mieux aux besoins de ces personnes.

5. Autres moyens thérapeutiques possibles :

Si vous ne participez pas à cette étude, d'autres approches thérapeutiques pourront vous être proposées. En aucun cas, les services ou les soins que vous recevrez ne seront affectés par votre refus.

6. Versement d'une indemnité :

Une indemnité de $25.00 vous sera remise pour votre participation à cette étude afin de vous dédommager des dépenses encourues.

7. Confidentialité :

Tous les renseignements recueillis à votre sujet au cours de cette étude demeureront strictement confidentiels et seront conservés de façon à assurer la confidentialité. Vous ne serez identifié(e) que par un code afin de préserver La confidentialité des renseignements recueillis sur vous. Les publications ou présentations qui pourraient résulter de ce projet ne contiendront que des informations concernant des groupes de personnes et il sera impossible d'identifier une personne en particulier.

Votre dossier sera consulté en vue d'extraire des données telles que votre diagnostic, votre médication et votre milieu d'hébergement par certaines personnes de l'équipe de recherche mandatées par le comité d'éthique et de la recherche de cet hôpital. Toutes les informations recueillies resteront confidentielles. En ce qui a trait au filmage avec une caméra vidéo, on vous demandera de signer un formulaire de consentement particulier qui décrira vos droits.

8. Participation volontaire et retrait de l'étude :

Votre participation à cette étude est volontaire. En tout temps, vous avez le droit de vous retirer du projet de recherche et votre décision n'affectera pas la qualité des services que vous recevrez. Vous pouvez faire verbalement votre demande pour quitter l'étude en tout temps durant le projet de recherche.

En acceptant de participer à cette étude, vous ne renoncez à aucun de vos droits ni ne libérez nommément les chercheurs, les organismes, les entreprises ou les institutions impliqués de leurs responsabilités légales et professionnelles

9. Personnes à contacter :

Si vous avez d'autres questions, vous pouvez contacter Madame Ginette Aubin, responsable du projet, au Centre de recherche de l'hôpital Juif de Réadaptation au 450-688-9550 poste 538.

Vous pouvez , en cas de plainte, communiquer avec la Commissaire locale à la qualité des services au Campus Hotel-Dieu : Mme Michèle Morin au 514-890-8000, poste 12761 ; avec la Commissaire locale adjointe à la qualité des services au Campus Notre-Dame : Mme Louise Brunelle au 890-8000, poste 26047 ; et au Campus Saint-Luc : Mme Louise Siclait au 514-890-8000 poste 36366.

Vous pouvez également, en cas d'urgence, communiquer avec votre médecin ou vos autres intervenants, ou si votre état le commande, vous rendre à l'urgence de l'hôpital.

PARTIE CONSENTEMENT :

Je déclare avoir lu et compris le présent formulaire de consentement, particulièrement quant à la nature de ma participation au projet de recherche et l'étendue des risques qui en découlent. Je reconnais qu'on m'a expliqué le projet, qu'on a répondu à toutes mes questions et qu'on m'a laissé le temps voulu pour prendre une décision.

Je consens librement et volontairement à participer à ce projet. Je demeure libre de m'en retirer en tout temps sans que cela nuise aux relations avec mon médecin et les autres intervenants et sans préjudice d'aucune sorte.

Je recevrai une copie signée du présent formulaire d'information et de consentement.

Nom du participant (en lettre moulées):________________________________
Signature du participant:________________________________
Date:________________________

Témoin de la signature:________________________________
Date:________________________

J'ai déclare avoir clairement expliqué le projet de recherche et les procédures au candidat qui a accepté de participer à cette étude.

Chercheur (en lettre moulées) :________________________________
Date :________________________

De plus, J'accepte______
Je refuse______
qu'un résumé des données recueillies avec les questionnaires, les tests et l'évaluation PRPP lors de ma participation à cette étude puisse être déposé à mon dossier médical et consulté par mes intervenants.

Signature du participant________________________________
Date________________________

Témoin de la signature________________________________
Date________________________

CHUM CENTRE HOSPITALIER DE L'UNIVERSITÉ DE MONTRÉAL

2003/11/14

FORMULAIRE D'INFORMATION ET DE CONSENTEMENT
Intervenants auprès des participants ayant un diagnostic de schizophrénie
Centre hospitalier de l'Université de Montréal

Titre de l'étude : Étude de l'impact des déficits cognitifs sur les activités quotidiennes et le fonctionnement dans la communauté des personnes souffrant de schizophrénie : validation d'une grille d'analyse de tâche. (SL 03.059)

Chercheurs : Ginette Aubin, erg, étudiante Ph.D., Isabelle Gélinas, PhD., Emmanuel Stip MD, Christine Chapparo, Ph.D..

PARTIE INFORMATION :

1. Préambule :

Nous vous demandons de participer à un des volets d'un projet de recherche sur l'utilisation d'une nouvelle évaluation des activités quotidiennes chez les personnes ayant un diagnostic de schizophrénie. Cette nouvelle évaluation permettra de mieux comprendre les difficultés qu'éprouvent certaines personnes dans leurs tâches quotidiennes et ainsi que dans leur fonctionnement dans la communauté.

Avant d'accepter de participer à ce projet, veuillez prendre le temps de lire et de comprendre les renseignements qui suivent. Le présent document peut contenir des termes que vous ne comprenez pas. Nous vous invitons à poser toutes les questions que vous jugez utiles au chercheur et à lui demander de vous expliquer les éléments qui ne sont pas clairs.

2. Nature du projet de recherche:

Nous vous proposons de participer à une étude visant à connaître l'efficacité d'une nouvelle évaluation des activités quotidiennes auprès des personnes qui souffrent de schizophrénie. Des personnes ayant un diagnostic des schizophrénie ainsi qu'un de leurs intervenants les connaissant bien sont recrutés en vue de participer à cette étude.

3. Nature de la participation des sujets :

Si vous êtes intéressé à participer à cette étude, vous serez rencontré une seule fois afin de compléter un questionnaire sur le fonctionnement quotidien d'un des participants ayant un diagnostic de schizophrénie. En tout temps un chercheur sera présent pour répondre à vos questions.

4. Risques, inconvénients et bénéfices :

La participation à cette étude ne présente aucun risque. Le seul désagrément consiste au temps consacré pour répondre au questionnaire. Vous ne retirerez pas de bénéfice immédiat suite à votre participation, cependant, les données recueillies permettront de mieux comprendre comment ce qui différencie le fonctionnement des personnes souffrant de maladie psychiatrique des personnes sans diagnostic dans leurs activités quotidiennes. Ceci permettra aux chercheurs et aux cliniciens d'élaborer et de raffiner leurs interventions de réadaptation.

5. Versement d'une indemnité :

Aucune indemnité ne vous sera remise pour votre participation à cette étude.

6. Confidentialité :

Tous les renseignements recueillis au cours de cette étude demeureront strictement confidentiels et seront conservés de façon à assurer la confidentialité. Vous ne serez identifié(e) que par un code afin de préserver la confidentialité des renseignements recueillis . Les publications ou présentations qui pourraient résulter de ce projet ne contiendront que des informations concernant des groupes de personnes et il sera impossible d'identifier une personne en particulier.

Toutes les informations recueillies par l'équipe de recherche mandatée par le comité d'éthique et de la recherche de cet hôpital resteront confidentielles

7. Participation volontaire et retrait de l'étude :

Votre participation à cette étude est volontaire. En tout temps, vous avez le droit de vous retirer du projet de recherche. Vous pouvez faire verbalement votre demande pour quitter l'étude en tout temps durant le projet de recherche.

En acceptant de participer à cette étude, vous ne renoncez à aucun de vos droits ni ne libérez nommément les chercheurs, les organismes, les entreprises ou les institutions impliqués de leurs responsabilités légales et professionnelles

8. Personnes à contacter :

Si vous avez d'autres questions, vous pouvez contacter Madame Ginette Aubin, responsable du projet, au Centre de recherche de l'hôpital Juif de Réadaptation au 450-688-9550 poste 538.

Vous pouvez , en cas de plainte, communiquer avec la Commissaire locale à la qualité des services au Campus Hotel-Dieu : Mme Michèle Morin au 514-890-8000, poste 12761 ; avec la Commissaire locale adjointe à la qualité des services au Campus Notre-Dame : Mme Louise Brunelle au 890-8000, poste 26047 ; et au Campus Saint-Luc : Mme Louise Siclait au 514-890-8000 poste 36366.

PARTIE CONSENTEMENT :

Je déclare avoir lu et compris le présent formulaire de consentement, particulièrement quant à la nature de ma participation au projet de recherche et l'étendue des risques qui en découlent. Je reconnais qu'on m'a expliqué le projet, qu'on a répondu à toutes mes questions et qu'on m'a laissé le temps voulu pour prendre une décision.

Je consens librement et volontairement à participer à ce projet. Je demeure libre de m'en retirer en tout temps sans que cela nuise aux relations avec mon médecin et les autres intervenants et sans préjudice d'aucune sorte.

Je recevrai une copie signée du présent formulaire d'information et de consentement.

Nom du participant (en lettre moulées):_______________________________________
Signature du participant:____
Date:____________________________

Témoin de la signature:____
Date:____________________________

J'ai déclare avoir clairement expliqué le projet de recherche et les procédures au candidat qui a accepté de participer à cette étude.

Chercheur (en lettre moulées) :____
Date :____________________________

CHUM CENTRE HOSPITALIER DE L'UNIVERSITÉ DE MONTRÉAL

2003/11/14

FORMULAIRE DE CONSENTEMENT À ÊTRE FILMÉ

Centre Hospitalier De l'Université de Montréal

Étude de l'impact des déficits cognitifs sur les activités quotidiennes et le fonctionnement dans la communauté des personnes souffrant de schizophrénie : validation d'une grille d'analyse de tâche (SL 03.059)

INFORMATION

Dans le cadre de cette étude nous vous demandons l'autorisation de vous filmer pendant que vous accomplirez une tâche quotidienne. Ce vidéo servira à des fins d'apprentissage dans le cadre du doctorat de Mme Ginette Aubin et dans le but d'étudier la fidélité et la validité de l'instrument de mesure PRPP.

Il est entendu que toute utilisation éventuelle du matériel recueilli sera faite en respectant les règles de confidentialité et exigeant un engagement de confidentialité par les chercheurs, les professeurs et les ergothérapeutes qui visionneront ces vidéos. Il est entendu que vous pouvez révoquer cette autorisation en tout temps. Dans tous les cas, ces films seront détruits dès la fin de l'étude.

Si vous avez d'autres questions, vous pouvez contacter Madame Ginette Aubin, responsable du projet, au Centre de recherche de l'hôpital Juif de Réadaptation au 450-688-9550 poste 538.

CONSENTEMENT

Dans le cadre de cette étude, j'accepte d'être filmé(e) au moyen d'une caméra vidéo pendant que j'accomplis une tâche quotidienne.

Je recevrai une copie signée du présent formulaire d'information et de consentement.

Nom du participant (en lettre moulées):________________________________

Participant________________________________Date________________

Témoin________________________________Date________________

Chercheur________________________________Date________________

De plus, J'accepte______ Je refuse______ que ces vidéos puissent aussi servir à l'enseignement ou des présentations auprès d'étudiants en ergothérapie ou d'autres ergothérapeutes se formant à l'évaluation PRPP.

Nom du participant (en lettre moulées):________________________________

Participant________________________________Date________________

Témoin________________________________Date________________

Chercheur________________________________Date________________

FORMULAIRE D'INFORMATION ET DE CONSENTEMENT
Personnes sans diagnostic psychiatrique
Centre hospitalier de l'Université de Montréal

Titre de l'étude : Étude de l'impact des déficits cognitifs sur les activités quotidiennes et le fonctionnement dans la communauté des personnes souffrant de schizophrénie : validation d'une grille d'analyse de tâche. (SL 03.059)

Chercheurs : Ginette Aubin, erg, étudiante Ph.D., Isabelle Gélinas, PhD., Emmanuel Stip MD, Christine Chapparo, Ph.D..

PARTIE INFORMATION :

1. Préambule :

Nous vous demandons de participer à un des volets d'un projet de recherche sur l'utilisation d'une nouvelle évaluation des activités quotidiennes chez les personnes ayant un diagnostic de schizophrénie. Cette nouvelle évaluation permettra de mieux comprendre les difficultés qu'éprouvent certaines personnes dans leurs tâches quotidiennes et ainsi que dans leur fonctionnement dans la communauté.

Avant d'accepter de participer à ce projet, veuillez prendre le temps de lire et de comprendre les renseignements qui suivent. Le présent document peut contenir des termes que vous ne comprenez pas. Nous vous invitons à poser toutes les questions que vous jugez utiles au chercheur et à lui demander de vous expliquer les éléments qui ne sont pas clairs.

2. Nature du projet de recherche:

Nous vous proposons de participer à une étude visant à connaître l'efficacité d'une nouvelle évaluation des activités quotidiennes auprès des personnes qui souffrent de schizophrénie. Pour connaître la sensibilité de cette évaluation, nous voulons comparer les habiletés des personnes sans diagnostic psychiatrique à celles des personnes ayant un diagnostic de schizophrénie. Vingt-trois personnes sans diagnostic psychiatrique seront recrutées au CHUM pour participer à ce volet du projet.

3. Nature de la participation des sujets :

Si vous êtes intéressé à participer à cette étude, vous serez évalué avec des outils différents. Deux rencontres sont prévues pour cette étude. À la première rencontre, il vous sera demandé de faire des tests évaluant vos capacités cognitives. À la deuxième rencontre, il vous sera demandé de faire une activité de cuisine consistant en la planification et la préparation de quelques plats simples et vous serez filmé pendant que vous ferez cette tâche. En tout temps un chercheur sera présent pour répondre à vos questions.

4. Risques, inconvénients et bénéfices :

La participation à cette étude ne présente aucun risque. Le seul désagrément consiste au temps consacré pour passer les tests et accomplir la tâche de cuisine. Vous ne retirerez pas de bénéfice immédiat suite à votre participation, cependant, les données recueillies permettront de mieux comprendre comment ce qui différencie le fonctionnement des personnes souffrant de maladie psychiatrique des personnes sans diagnostic dans leurs activités quotidiennes. Ceci permettra aux chercheurs et aux cliniciens d'élaborer et de raffiner leurs interventions de réadaptation.

5. Versement d'une indemnité :

Une indemnité de $20.00 vous sera remise pour votre participation à cette étude afin de vous dédommager des dépenses encourues.

6. Confidentialité :

Tous les renseignements recueillis à votre sujet au cours de cette étude demeureront strictement confidentiels et seront conservés de façon à assurer la confidentialité. Vous ne serez identifié(e) que par un code afin de préserver la confidentialité des renseignements recueillis sur vous. Les publications ou présentations qui pourraient résulter de ce projet ne contiendront que des informations concernant des groupes de personnes et il sera impossible d'identifier une personne en particulier.

Toutes les informations recueillies par l'équipe de recherche mandatée par le comité d'éthique et de la recherche de cet hôpital resteront confidentielles. En ce qui a trait au filmage avec une caméra vidéo, on vous demandera de signer un formulaire de consentement particulier qui décrira vos droits.

PARTIE CONSENTEMENT :

Je déclare avoir lu et compris le présent formulaire de consentement, particulièrement quant à la nature de ma participation au projet de recherche et l'étendue des risques qui en découlent. Je reconnais qu'on m'a expliqué le projet, qu'on a répondu à toutes mes questions et qu'on m'a laissé le temps voulu pour prendre une décision.

Je consens librement et volontairement à participer à ce projet. Je demeure libre de m'en retirer en tout temps sans que cela nuise aux relations avec mon médecin et les autres intervenants et sans préjudice d'aucune sorte.

Je recevrai une copie signée du présent formulaire d'information et de consentement.

Nom du participant (en lettre moulées):______________________________
Signature du participant:______________________________________
Date:________________________

Témoin de la signature:______________________________________
Date:________________________

J'ai déclare avoir clairement expliqué le projet de recherche et les procédures au candidat qui a accepté de participer à cette étude.

Chercheur (en lettre moulées) :______________________________
Date :________________________

FORMULAIRE D'INFORMATION ET DE CONSENTEMENT
Centre hospitalier de l'Université de Montréal

Titre de l'étude : Étude de l'impact des déficits cognitifs sur les activités quotidiennes et le fonctionnement dans la communauté des personnes souffrant de schizophrénie

Chercheurs : Emmanuel Stip, MD, et Isabelle Gélinas, Ph.D., Ginette Aubin, erg, étud. Ph.D., et Christine Chapparo, Ph.D.

Organisme subventionnaire : Fonds de la recherche en santé du Québec (FRSQ).

PARTIE INFORMATION :

1. Préambule :

Nous vous demandons de participer à un projet de recherche sur l'accomplissement des activités quotidiennes chez des personnes qui souffrent de schizophrénie.

Avant d'accepter de participer à ce projet, veuillez prendre le temps de lire et de comprendre les renseignements qui suivent. Le présent document peut contenir des termes que vous ne comprenez pas. Nous vous invitons à poser toutes les questions que vous jugez utiles au chercheur et à ses adjoints et à leur demander de vous expliquer les éléments qui ne sont pas clairs.

2. Nature du projet de recherche:

Nous voulons vous proposer de participer à une étude visant à mieux comprendre comment les personnes qui souffrent de schizophrénie effectuent leurs activités quotidiennes. Cette étude permettra de mieux comprendre les difficultés causées par des problèmes de concentration, de mémoire et de résolution de problèmes qu'éprouvent certaines personnes dans leurs tâches quotidiennes et dans leur fonctionnement dans la communauté. Cent personnes participeront à cette étude. Environ cinquante d'entre elles seront recrutées pour participer à ce projet au CHUM au cours de la prochaine année.

3. Nature de la participation des sujets :

Si vous êtes intéressé à participer à cette étude, vous nous demanderons de répondre à des questionnaires, à des tests et d'accomplir une activité quotidienne. Deux ou trois rencontres pourront être nécessaires pour cette étude. Ces rencontres auront lieu dans un local situé dans un pavillon du CHUM.

D'abord, il vous sera demandé de répondre à des questions concernant vos symptômes et de faire des tests évaluant vos capacités cognitives. Lors de la dernière rencontre, il vous sera demandé de faire une activité de cuisine consistant en la planification et la préparation d'un repas simple. Puis, il vous sera demandé de répondre à un questionnaire en ce qui a trait à vos activités quotidiennes. En tout temps un chercheur sera présent pour répondre à vos questions. Un de vos intervenants (par exemple ergothérapeute, psychologue, travailleur social) sera aussi sollicité pour répondre à des questions concernant votre fonctionnement quotidien.

4. Risques, inconvénients et bénéfices :

La participation à cette étude ne présente aucun risque. Le seul désagrément consiste au temps consacré en déplacement et pour accomplir la tâche de cuisine, pour répondre au questionnaires et compléter les tests. Vous ne retirerez pas de bénéfice immédiat suite à votre participation. Cependant, les données recueillies permettront de mieux comprendre comment les personnes souffrant de maladie psychiatrique effectuent leurs activités quotidiennes. Ceci permettra aux chercheurs et aux cliniciens d'élaborer des interventions de réadaptation répondant mieux aux besoins de ces personnes.

5. Autres moyens thérapeutiques possibles :

Si vous ne participez pas à cette étude, en aucun cas, les services ou les soins que vous recevrez ne seront affectés par votre refus.

6. Arrêt du projet par le chercheur :

Si un problème de tout ordre (financier, santé, etc.) survenait dans l'équipe de recherche et que cette étude devait être cessée, en aucun cas votre santé ou votre sécurité seraient affectés.

7. Versement d'une indemnité :

Une indemnité de $30.00 vous sera remise pour votre participation à cette étude afin de vous dédommager des dépenses encourues.

8. Confidentialité :

Tous les renseignements recueillis à votre sujet au cours de cette étude demeureront strictement confidentiels et seront conservés de façon à assurer la confidentialité. Vous ne serez identifié(e) que par un code afin de préserver la confidentialité des renseignements recueillis sur vous. Les publications ou présentations qui pourraient résulter de ce projet ne contiendront que des informations concernant des groupes de personnes et il sera impossible d'identifier une personne en particulier.

Votre dossier médical sera consulté en vue d'extraire des données pertinentes à cette étude telles que votre diagnostic, votre médication et votre milieu d'hébergement par certaines personnes de l'équipe de recherche mandatées par le comité d'éthique et de la recherche de cet hôpital. Toutes les informations recueillies resteront confidentielles et seront gardées dénommalisées.

9. Participation volontaire et retrait de l'étude :

Votre participation à cette étude est volontaire. En tout temps, vous avez le droit de vous retirer du projet de recherche et votre décision n'affectera pas la qualité des services que vous recevrez. Vous pouvez faire verbalement votre demande pour quitter l'étude en tout temps durant le projet de recherche.

En acceptant de participer à cette étude, vous ne renoncez à aucun de vos droits ni ne libérez nommément les chercheurs, les organismes, les entreprises ou les institutions impliqués de leurs responsabilités légales et professionnelles.

10. Personnes à contacter :

Si vous avez d'autres questions, vous pouvez contacter Madame Ginette Aubin, responsable du projet, au Centre de recherche de l'hôpital Juif de Réadaptation au 450-688-9550 poste 538.

Vous pouvez , pour toute question concernant les droits du sujet de recherche, communiquer avec la Commissaire locale à la qualité des services au Campus Hotel-Dieu : Mme Michèle Morin au 514-890-8000, poste 12761 ; avec la Commissaire locale adjointe à la qualité des services au Campus Notre-Dame : Mme Louise Brunelle au 890-8000, poste 26047 ; et au Campus Saint-Luc : Mme Christine Siclait au 514-890-8000 poste 36366.

Vous pouvez également, en cas d'urgence, communiquer avec votre médecin ou vos autres intervenants, ou si votre état le commande, vous rendre à l'urgence de l'hôpital.

PARTIE CONSENTEMENT :

Je déclare avoir lu et compris le présent formulaire de consentement, particulièrement quant à la nature de ma participation au projet de recherche et l'étendue des risques qui en découlent. Je reconnais qu'on m'a expliqué le projet, qu'on a répondu à toutes mes questions et qu'on m'a laissé le temps voulu pour prendre une décision.

Je consens librement et volontairement à participer à ce projet. Je recevrai une copie signée du présent formulaire. En signant le présent formulaire, je ne renonce à aucun de mes droits légaux ni ne libère le chercheur, l'hôpital ou le commanditaire de leur responsabilité civile et professionnelle.

Nom du participant (en lettre moulées):____

Signature:________________________________Date:_____________________

Nom du témoin (en lettres moulées):_____________________________________

Signature :________________________________Date:______________________

Je déclare avoir clairement expliqué au sujet la nature du projet de recherche ainsi que le contenu du présent formulaire, avoir répondu à toutes ses questions et avoir indiqué qu'il reste à tout moment libre de mettre un terme à sa participation. Je lui remettrai une copie signée du présent formulaire de consentement.

Chercheur ou personne désignée par lui (en lettre moulées) :

____

Signature : __________________________Date :___________________________

De plus, J'accepte______ Je refuse______
qu'un résumé des données recueillies avec les questionnaires, les tests et lors de l'activité quotidienne pendant de ma participation à cette étude puisse être déposé à mon dossier médical et consulté par mes intervenants.

Signature du participant____
Date____________________________

Témoin ______________________________Date_________________________

CHUM CENTRE HOSPITALIER DE L'UNIVERSITÉ DE MONTRÉAL

FORMULAIRE DE CONSENTEMENT À ÊTRE FILMÉ

Centre Hospitalier De l'Université de Montréal

Titre de l'étude : Étude de l'impact des déficits cognitifs sur les activités quotidiennes et le fonctionnement dans la communauté des personnes souffrant de schizophrénie

Chercheurs : Emmanuel Stip MD, Isabelle Gélinas, PhD., Ginette Aubin, erg, étud. Ph.D., et Christine Chapparo, Ph.D.

Organisme subventionnaire : Fonds de la recherche en santé du Québec (FRSQ).

INFORMATION

Dans le cadre de cette étude nous vous demandons l'autorisation de vous filmer pendant que vous accomplirez une tâche quotidienne. Ce vidéo servira à s'assurer de la fidélité des évaluateurs qui participent à cette étude quant à leurs observations et leurs analyses des activités quotidiennes.

Il est entendu que toute utilisation éventuelle du matériel recueilli sera faite en respectant les règles de confidentialité et exigeant un engagement de confidentialité par les chercheurs, les professeurs et les ergothérapeutes qui visionneront ces vidéos. Il est entendu que vous pouvez révoquer cette autorisation en tout temps. Dans tous les cas, ces films seront détruits dès la fin de l'étude prévue dans deux ans, à moins que vous ne consentiez qu'ils servent à l'enseignement auprès des étudiants en ergothérapie et d'autres ergothérapeutes se formant à ce type d'évaluation (PRPP).

Si vous avez d'autres questions, vous pouvez contacter Madame Ginette Aubin, responsable du projet, au Centre de recherche de l'hôpital Juif de Réadaptation au 450-688-9550 poste 538.

CONSENTEMENT

Dans le cadre de cette étude, j'accepte d'être filmé(e) au moyen d'une caméra vidéo pendant que j'accomplis une tâche quotidienne.

Je recevrai une copie signée du présent formulaire d'information et de consentement.

Nom du participant (en lettre moulées):______________________________

Participant______________________________Date________________

Témoin______________________________Date________________

Chercheur______________________________Date________________

De plus, J'accepte______ Je refuse______ que ces vidéos puissent aussi servir à l'enseignement ou des présentations auprès d'étudiants en ergothérapie ou d'autres ergothérapeutes se formant à l'évaluation PRPP.

Nom du participant (en lettre moulées):______________________________

Participant______________________________Date________________

Témoin______________________________Date________________

Chercheur______________________________Date________________

CHUM CENTRE HOSPITALIER DE L'UNIVERSITÉ DE MONTRÉAL

FORMULAIRE D'INFORMATION ET DE CONSENTEMENT
Intervenants auprès des participants ayant un diagnostic de schizophrénie
Centre hospitalier de l'Université de Montréal

Titre de l'étude : Étude de l'impact des déficits cognitifs sur les activités quotidiennes et le fonctionnement dans la communauté des personnes souffrant de schizophrénie

Chercheurs : Emmanuel Stip MD, Isabelle Gélinas, PhD., Ginette Aubin, erg, étud. Ph.D., Christine Chapparo, Ph.D.

Organisme subventionnaire : Fonds de la recherche en santé du Québec (FRSQ).

PARTIE INFORMATION :

1. Préambule :

Nous vous demandons de participer un projet de recherche sur l'accomplissement des activités quotidiennes chez les personnes ayant un diagnostic de schizophrénie. Cette étude permettra de mieux comprendre les difficultés qu'éprouvent certaines personnes dans leurs tâches quotidiennes et ainsi que dans leur fonctionnement dans la communauté.

Avant d'accepter de participer à ce projet, veuillez prendre le temps de lire et de comprendre les renseignements qui suivent. Le présent document peut contenir des termes que vous ne comprenez pas. Nous vous invitons à poser toutes les questions que vous jugez utiles au chercheur et à lui demander de vous expliquer les éléments qui ne sont pas clairs.

2. Nature du projet de recherche:

Nous vous proposons de participer à une étude visant à décrire comment les personnes qui souffrent de schizophrénie effectuent leurs activités quotidiennes. Cette étude permettra de mieux comprendre les difficultés causées par des problèmes de concentration, de mémoire et de résolution de problèmes qu'éprouvent certaines de ces personnes dans leurs tâches quotidiennes et dans leur fonctionnement dans la communauté. Des personnes ayant un diagnostic de schizophrénie ainsi qu'un de leurs intervenants les connaissant bien sont recrutés en vue de participer à cette étude.

3. Nature de la participation des sujets :

Si vous êtes intéressé à participer à cette étude, vous serez rencontré une seule fois afin de compléter un questionnaire sur le fonctionnement quotidien d'un des participants ayant un diagnostic de schizophrénie qui participe à cette étude et que vous connaissez bien. En tout temps un chercheur sera présent pour répondre à vos questions.

4. Risques, inconvénients et bénéfices :

La participation à cette étude ne présente aucun risque. Le seul désagrément consiste au temps consacré pour répondre au questionnaire. Vous ne retirerez pas de bénéfice immédiat suite à votre participation, cependant, les données recueillies permettront de mieux comprendre le fonctionnement des personnes souffrant de maladie psychiatrique. Ceci permettra aux chercheurs et aux cliniciens d'élaborer et de raffiner leurs interventions de réadaptation.

5. Versement d'une indemnité :

Aucune indemnité ne vous sera remise pour votre participation à cette étude.

6. Confidentialité :

Tous les renseignements recueillis au cours de cette étude demeureront strictement confidentiels et seront conservés de façon à assurer la confidentialité. Vous ne serez identifié(e) que par un code afin de préserver la confidentialité des renseignements recueillis. Les publications ou présentations qui pourraient résulter de ce projet ne contiendront que des informations concernant des groupes de personnes et il sera impossible d'identifier une personne en particulier.

Toutes les informations recueillies par l'équipe de recherche mandatée par le comité d'éthique et de la recherche de cet hôpital resteront confidentielles

7. Participation volontaire et retrait de l'étude :

Votre participation à cette étude est volontaire. En tout temps, vous avez le droit de vous retirer du projet de recherche. Vous pouvez faire verbalement votre demande pour quitter l'étude en tout temps durant le projet de recherche.

En acceptant de participer à cette étude, vous ne renoncez à aucun de vos droits ni ne libérez nommément les chercheurs, les organismes, les entreprises ou les institutions impliqués de leurs responsabilités légales et professionnelles.

8. Personnes à contacter :

Si vous avez d'autres questions, vous pouvez contacter Madame Ginette Aubin, responsable du projet, au Centre de recherche de l'hôpital Juif de Réadaptation au 450-688-9550 poste 538.

Vous pouvez , en cas de plainte, communiquer avec la Commissaire locale à la qualité des services au Campus Hotel-Dieu : Mme Michèle Morin au 514-890-8000, poste 12761 ; avec la Commissaire locale adjointe à la qualité des services au Campus Notre-Dame : Mme Louise Brunelle au 890-8000, poste 26047 ; et au Campus Saint-Luc : Mme Christine Siclait au 514-890-8000 poste 36366.

PARTIE CONSENTEMENT :

Je déclare avoir lu et compris le présent formulaire de consentement, particulièrement quant à la nature de ma participation au projet de recherche et l'étendue des risques qui en découlent. Je reconnais qu'on m'a expliqué le projet, qu'on a répondu à toutes mes questions et qu'on m'a laissé le temps voulu pour prendre une décision.

Je consens librement et volontairement à participer à ce projet. Je demeure libre de m'en retirer en tout temps sans que cela nuise aux relations avec mon médecin et les autres intervenants et sans préjudice d'aucune sorte.

Je recevrai une copie signée du présent formulaire d'information et de consentement.

Nom du participant (en lettre moulées):____________________________________
Signature du participant:____
Date:__________________________

Témoin de la signature:____
Date:__________________________

J'ai déclare avoir clairement expliqué le projet de recherche et les procédures au candidat qui a accepté de participer à cette étude.

Chercheur ou personne désignée par le chercheur (en lettre moulées) :

____
Date:__________________________

FORMULAIRE D'INFORMATION ET DE CONSENTEMENT HÔPITAL LOUIS-H. LAFONTAINE

Titre de l'étude : Étude de l'impact des déficits cognitifs sur les activités quotidiennes et le fonctionnement dans la communauté des personnes souffrant de schizophrénie

Chercheurs : Emmanuel Stip MD, Isabelle Gélinas, PhD.

Organisme subventionnaire : Fonds de la recherche en santé du Québec (FRSQ).

PARTIE INFORMATION :

1. Préambule :

Nous vous demandons de participer à un projet de recherche sur l'accomplissement des activités quotidiennes chez des personnes qui souffrent de schizophrénie.

Avant d'accepter de participer à ce projet, veuillez prendre le temps de lire et de comprendre les renseignements qui suivent. Le présent document peut contenir des termes que vous ne comprenez pas. Nous vous invitons à poser toutes les questions que vous jugez utiles au chercheur et à ses adjoints et à leur demander de vous expliquer les éléments qui ne sont pas clairs.

2. But du projet de recherche:

Nous voulons vous proposer de participer à une étude visant à mieux comprendre comment les personnes qui souffrent de schizophrénie effectuent leurs activités quotidiennes. Cette étude permettra de mieux comprendre les difficultés causées par des problèmes de concentration, de mémoire et de résolution de problèmes qu'éprouvent certaines personnes dans leurs tâches quotidiennes et dans leur fonctionnement dans la communauté. Cent personnes participeront à cette étude. Environ cinquante d'entre elles seront recrutées pour participer à ce projet au CHUM au cours de la prochaine année.

3. Nature de la participation des sujets :

Si vous êtes intéressé à participer à cette étude, vous nous demanderons de répondre à des questionnaires, à des tests et d'accomplir une activité quotidienne. Deux ou trois rencontres pourront être nécessaires pour cette étude. Ces rencontres auront lieu dans un local situé dans un pavillon du CHUM.

D'abord, il vous sera demandé de répondre à des questions concernant vos symptômes et de faire des tests évaluant vos capacités cognitives. Lors de la dernière rencontre, il vous sera demandé de faire une activité de cuisine consistant en la planification et la préparation d'un repas simple. Puis, il vous sera demandé de répondre à un questionnaire en ce qui a trait à vos activités quotidiennes. En tout temps un chercheur sera présent pour répondre à vos questions. Un de vos intervenants (par exemple ergothérapeute, psychologue, travailleur social) sera aussi sollicité pour répondre à des questions concernant votre fonctionnement quotidien.

4. Risques, inconvénients et bénéfices :

La participation à cette étude ne présente aucun risque. Le seul désagrément consiste au temps consacré en déplacement et pour accomplir la tâche de cuisine, pour répondre au questionnaires et compléter les tests. Vous ne retirerez pas de bénéfice immédiat suite à votre participation. Cependant, les données recueillies permettront de mieux comprendre comment les personnes souffrant de maladie psychiatrique effectuent leurs activités quotidiennes. Ceci permettra aux chercheurs et aux cliniciens d'élaborer des interventions de réadaptation répondant mieux aux besoins de ces personnes.

5. Autres moyens thérapeutiques possibles :

Si vous ne participez pas à cette étude, en aucun cas, les services ou les soins que vous recevrez ne seront affectés par votre refus.

6. Arrêt du projet par le chercheur :

Si un problème de tout ordre (financier, santé, etc.) survenait dans l'équipe de recherche et que cette étude devait être cessée, en aucun cas votre santé ou votre sécurité seraient affectés.

7. Versement d'une indemnité :

Une indemnité de $30.00 vous sera remise pour votre participation à cette étude afin de vous dédommager des dépenses encourues.

8. Confidentialité :

Tous les renseignements recueillis à votre sujet au cours de cette étude demeureront strictement confidentiels et seront conservés de façon à assurer la confidentialité. Vous ne serez identifié(e) que par un code afin de préserver la confidentialité des renseignements recueillis sur vous. Les publications ou présentations qui pourraient résulter de ce projet ne contiendront que des informations concernant des groupes de personnes et il sera impossible d'identifier une personne en particulier.

Votre dossier médical sera consulté en vue d'extraire des données telles que votre diagnostic, votre médication et votre milieu d'hébergement par certaines personnes de l'équipe de recherche mandatées par le comité d'éthique et de la recherche de cet hôpital. Toutes les informations recueillies resteront confidentielles et seront gardées anonymes.

9. Participation volontaire et retrait de l'étude :

Votre participation à cette étude est volontaire. En tout temps, vous avez le droit de vous retirer du projet de recherche et votre décision n'affectera pas la qualité des services que vous recevrez. Vous pouvez faire verbalement votre demande pour quitter l'étude en tout temps durant le projet de recherche.

En acceptant de participer à cette étude, vous ne renoncez à aucun de vos droits ni ne libérez nommément les chercheurs, les organismes, les entreprises ou les institutions impliqués de leurs responsabilités légales et professionnelles.

10. Personnes à contacter :

Si vous avez d'autres questions, vous pouvez contacter Madame Ginette Aubin, responsable du projet, au Centre de recherche de l'hôpital Juif de Réadaptation au 450-688-9550 poste 538.

Pour toute question sur vos droits à titre de sujet de recherche ou pour tout problème éthique concernant les conditions dans lesquelles se déroule votre participation à ce projet, vous pouvez contacter Mme Élise St-Amant, Commissaire local à la qualité des services – Hôpital Louis-H. Lafontanie- 7401 rue Hochelaga- Montréal (Québec) H1N 3M5 – téléphone : (514) 251-4000 poste 2920. Vous pouvez également, en cas d'urgence, communiquer avec votre médecin ou vos autres intervenants, ou si votre état le commande, vous rendre à l'urgence de l'hôpital.

PARTIE CONSENTEMENT :

Je déclare avoir lu et compris le présent formulaire de consentement, particulièrement quant à la nature de ma participation au projet de recherche et l'étendue des risques qui en découlent. Je reconnais qu'on m'a expliqué le projet, qu'on a répondu à toutes mes questions et qu'on m'a laissé le temps voulu pour prendre une décision.

Je consens librement et volontairement à participer à ce projet. Je recevrai une copie signée du présent formulaire. En signant le présent formulaire, je ne renonce à aucun de mes droits légaux ni ne libère le chercheur, l'hôpital ou le commanditaire de leur responsabilité civile et professionnelle.

Nom du participant (en lettres moulées):______________________________

Signature:______________________________

Date:____________________

Nom du témoin (en lettres moulées):______________________________

Signature :______________________________

Date:____________________

De plus, J'accepte______ Je refuse______
qu'un résumé des données recueillies avec les questionnaires, les tests et lors de l'activité quotidienne pendant de ma participation à cette étude puisse être déposé à mon dossier médical et consulté par mes intervenants.

Signature du participant______________________________

Date____________________

Témoin ______________________________Date____________________

FORMULE D'ENGAGEMENT DU CHERCHEUR OU DE LA PERSONNE QU'IL A DÉLÉGUÉE :

Je déclare avoir clairement expliqué au sujet la nature du projet de recherche ainsi que le contenu du présent formulaire, avoir répondu à toutes ses questions et avoir indiqué qu'il reste à tout moment libre de mettre un terme à sa participation. Je lui remettrai une copie signée du présent formulaire de consentement.

Chercheur ou personne désignée par lui (en lettre moulées) :

____

Signature : ______________________________ Date : ___________________________

FORMULAIRE DE CONSENTEMENT À ÊTRE FILMÉ

HÔPITAL LOUIS-H. LAFONTAINE

Étude de l'impact des déficits cognitifs sur les activités quotidiennes et le fonctionnement dans la communauté des personnes souffrant de schizophrénie

Chercheurs : Emmanuel Stip MD, Isabelle Gélinas, PhD.

Organisme subventionnaire : Fonds de la recherche en santé du Québec (FRSQ).

INFORMATION

Dans le cadre de cette étude nous vous demandons l'autorisation de vous filmer pendant que vous accomplirez une tâche quotidienne. Ce vidéo servira à s'assurer de la fidélité des évaluateurs qui participent à cette étude quant à leurs observations et leurs analyses des activités quotidiennes.

Il est entendu que toute utilisation éventuelle du matériel recueilli sera faite en respectant les règles de confidentialité et exigeant un engagement de confidentialité par les chercheurs, les professeurs et les ergothérapeutes qui visionneront ces vidéos. Il est entendu que vous pouvez révoquer cette autorisation en tout temps. Dans tous les cas, ces films seront détruits dès la fin de l'étude, à moins que vous ne consentiez qu'ils servent à l'enseignement auprès des étudiants en ergothérapie et d'autres ergothérapeutes se formant à l'évaluation des activités quotidiennes.

Si vous avez d'autres questions, vous pouvez contacter Madame Ginette Aubin, responsable du projet, au Centre de recherche de l'hôpital Juif de Réadaptation au 450-688-9550 poste 538.

Pour toute question sur vos droits à titre de sujet de recherche ou pour tout problème éthique concernant les conditions dans lesquelles se déroule votre participation à ce projet, vous pouvez contacter Mme Élise St-Amant, Commissaire local à la qualité des services – Hôpital Louis-H. Lafontanie- 7401 rue Hochelaga- Montréal (Québec) H1N 3M5 – téléphone : (514) 251-4000 poste 2920.

CONSENTEMENT

On m'a expliqué le déroulement du projet de recherche. J'ai pris connaissance que des enregistrements vidéos seront effectués pour permettre une analyse subséquente par un ou plusieurs chercheurs. On m'a expliqué les raisons de ces enregistrements. J'ai eu l'occasion de poser des questions auxquelles on a répondu. On a garanti, à ma satisfaction, la confidentialité de ces enregistrements et on m'a informé de la durée de garde de ces enregistrements. Après réflexion, j'accepte que ces enregistrements soient effectués mais je conserve le droit de demander en tout temps que ces enregistrements soient détruits.

Participant:____

Date:____

Témoin de la signature:_________________________________

Date:____

De plus, J'accepte______ Je refuse______ que ces vidéos puissent aussi servir à l'enseignement ou des présentations auprès d'étudiants en ergothérapie ou d'autres ergothérapeutes se formant à l'évaluation des évaluations quotidiennes.

Nom du participant (en lettre moulées):_____________________

Participant____

Date____

Témoin____

Date____

FORMULE D'ENGAGEMENT DU CHERCHEUR OU DE LA PERSONNE QU'IL A DÉLÉGUÉE :

Je déclare avoir clairement expliqué au sujet la nature et les procédures du projet de recherche ainsi que le contenu du présent formulaire, avoir répondu à toutes ses questions et avoir indiqué qu'il reste à tout moment libre de mettre un terme à sa participation. Je lui remettrai une copie signée du présent formulaire de consentement.

Chercheur ou personne désignée par lui (en lettre moulées) :

____

Signature : ____

Date :____

APPENDIX 3 Studies on cognition and community functioning

Cross sectional studies using global cognitive score

Study	Sample	Outcome measure	Cognitive assessments	Major findings relative to the association of community functioning and cognition
Bowie, C. R., Reichenberg, A., Patterson, T. L., Heaton, R. K., & Harvey, P. D. (2006)	78 outpatients (% men unknown) mean age: 58.4 s.d. 7.3 community living, outside any institutional setting	Community functioning: Specific Level of function scale: 43 items, caretaker report across domains: physical functioning, personal care skills, interpersonal skills, community activities, work skills Community activities include IADLs (shopping, paying bills, etc). Three domains were close to ceiling, so only interpersonal skills, community activities and work skills scores used for analysis Functional capacity: UCSD Performance-based skills assessment for severely mentally ill, older outpatients; performance of everyday functioning through the use of props and standardized situations; domains of household management, problem solving, organization, financial skills, communication, transportation	Composite cognitive score from: Attention (WAIS digit span), motor skills (CERAD constructional praxis assessment), verbal learning and memory (Rey Auditory verbal learning test), verbal fluency (CERAD Boston naming Test), executive functioning (WCST, Trail making tests part A and B, Stroop) working memory (WAIS letter-number sequencing)	Composite cognitive score (r=.50) and functional capacity (r=.63) correlated to community functioning In community activities prediction model, composite cognitive score has a direct influence and an indirect influence on community functioning when mediated by functional capacity. Functional capacity has a direct influence on community functioning. Negative symptoms have no effect on community functioning.
Keefe, R., S.E., Poe, M., Walker, T. M., Kang, J. W., & Harvey, P. D. (2006)	60 inpatients, most from a rehabilitation center (% men unknown)	Community functioning: Independent Living Skills Inventory (ILSI): interview with participant; 89 items covering 11 subscales: personal management,hygiene and grooming, cloting, basic skills, interpersonal skills,	Schizophrenia cognition rating Scale (SCORS): 18 item interview-based assessment of cognitive deficits and how they affect day-to-day	Both cognitive composite scores, SCORS (r= -.48) and BACS (r=.42) and functional capacity (r=.40) correlated to community functioning Functional capacity correlated to

	mean age: 35.07 s.d. 9.74	home maintenance, money management, cooking, resource utilization, general occupational skills and medication management. Funtional capacity: UCSD Performance-based skills assessment	functioning; three scores: patient, informant and interviewer composite score Brief assessment of cognition in schizophrenia: composite score from: Verbal memory (list learning test), working memory (Digit sequencing test), motor speed (token motor task), semantic fluency (category instances test), letter fluency (Controlled Oral Word Association test), Reasoning and problem solving (Tower of London), attention and processing speed (symbol coding)	both cognitive composite scores SCORS composite score explained 22% of variance in community functioning.
Moriarty, P., Lieber, D., Bennett, A., White, L., Parrella, M., Harvey, P., et al. (2001)	205 long-stay inpatients in a state psychiatric center, (male n=89) mean age: 74.78, s.d. 7.7	Social Adaptive Functional Evaluation (SAFE): 17 items for geriatric psychiatric patients, in social-interpersonal, basic, and instrumental daily life skills on a 0–4 scale. Items include bathing, dressing, feeding, neatness, mobility, communication, conversational skills, instrumental social skills, social appropriateness, friendships, recreation, and participation	Mini Mental State Examination (MMSE) CERAD Battery composite score (for Alzheimer's disease) word list learning and delayed recall, praxic drawings, modified Boston naming test and category fluency	MMSE (r= -.77) + CERAD (r=-.75) composite score and negative symptoms (r= .73) correlated to SAFE

		in activities.		
Cohen, C., & Talavera, N. (2000)	117 living in community residence and apartments (male n=30) mean age: 63 s.d.(unmentioned)	Functional impairment scale: 8 items measuring activities of daily living: prepare meals, shop, bathe, dress, groom, perform light or heavy chores. Impaired persons could not perform 2 or more tasks	Severe cognitive impairment based on cut-off on 11 items on cognitive functioning scale of SHORT-CARE, including orientation, short and long term memory	Severity of cognitive impairment not associated to impaired functioning Negative symptoms, anti Parkinson medication and abnormal moves explain variance in abnormal functioning but not cognition

Cross sectional studies using specific cognitive functions scores

Study	Sample	Outcome measure	Cognitive assessment	Major findings relative to community functioning and daily activities
Dickinson & Coursey (2002)	40 outpatients (male n= 26) ; mean age : 39 s.d. 10.6.	Composite score from: Multnomah Community Ability Scale (MCAS) and Life skills Profile (LSP), both were rated by director of rehabilitation program MCAS : 17 items addressing: social competence, behavioural problems, interference with functioning and adjustment to community living. LSP: 39 items behavioural problems, treatment compliance, routine self-care and living skills, and basic social skills.	WAIS-III: Full scale IQ, Verbal comprehension, perceptual organization, working memory and processing speed indexes	Full scale IQ, Verbal comprehension, perceptual organization, working memory and processing speed indexes were correlated to Functional composite (r values ranging between 0.32 to 0.53). Processing speed and working memory explained 28% and 9% of Functional composite variance. When adding symptom variables, BPRS anergia accounted for 31%, working memory for 21% and BPRS thought disturbance for 13% of functional outcome variance
Martinez-Aran, Penadés, Vieta, Colom, Reinares, Benabarre et al. (2002)	49 outpatients (male n= 38) ; mean age :30.4 s.d. 7.5	Global assessment of Functioning (GAF): is a numeric scale (0 through 100) assessing social and occupational functioning by interview with	Premorbid intelligence, (WAIS vocabulary subtest), attention and immediate memory	WCST and negative symptoms explain 40% of the variance of GAF

		participant	(WAIS digit subtest), executive function (WCST), verbal fluency (FAS from COWAT), executive ability (Trail Making test A/B)	
Poole, Ober, Shenaut & Vinogradov (1999)	26outpatients : (male n= 14), mean age : 40 s.d.10 18 controls	Social, vocational and clinical variables based on demographic and historic information on psychosocial adaptation given by provider including: Premorbid functioning (PAS), treatment oucome (SADS Outcome prior illness), marital history, GAF, current work functioning, sense of purpose/planning, interaction/engagement skills (QLS scale 3 items) and age, education and hospitalization frequency	Frontal functioning: WCST, Motor Signs Inventory (MSI) 7 tasks, reaction time (semantic priming) Three factors were obtained: Executive dysfunction, Response disinhibition, Motor coordination	Executive dysfunction (WCST, and sequenced drawing) associated with: lower IQ, reduced interactive skills , marriage, sense of purpose/planning, work functioning, younger illness onset, and lower GAF. Motor dyscoordination (fine motor coordination and hand shapes test) associated with poorer treatment outcome and lower education.
Lehoux, C., Everett, J., Laplante, L., Émond, C., Trépanier, J., Brassard, A., et al. (2003)	36 outpatients, (male n= 31); 19 living in the community without supervision, 17 from long-term wards and highly structured housing mean age: 43.9 s.d. 6.4	Social and Occupational Functioning Scale (SOFAS): is a numeric scale (0 through 100) assessing social and occupational functioning unconfounded by symptom severity by interview with participant	Sustained attention (Reaction time), immediate verbal memory (WAIS digit span subtest), secondary verbal memory and verbal learning (WAIS associate learning subtest), executive functioning (Computerized Card Sorting Test and Tower of London), fine motor dexterity (Purdue Pegboard test).	Fine motor dexterity, secondary verbal memory, executive functioning (Card sorting test and tower of London) associated to SOFAS Fine motor dexterity and executive functioning explained 52% variance in SOFAS scores

Clark, O., & O'Carroll, R. (1998)	40 : 22 inpatients, 18 outpatients (male n= 34) mean age: 41 s.d. 12.8	REHAB scale: rated on the basis of staff observation in the preceding week, with flowing sections deviant behaviour, general behaviour (social activity, disturbed speech, self-care, community skills), overall score, total score.	Episodic memory (Rivermead Behavioural Memory test), premorbid intelligence (National Adult Reading test), MMSE, planning and organisational abilities over time (The Six Elements Test, MSET)	No association found between Episodic memory, MMSE, executive fct (MSET) and REHAB Variance in REHAB was explained by disorganisation and psychomotor syndrome only
Revheim, N., Schecter, I., Kim, D., Silipo, G., Allingham, B., Butler, P., et al. (2006	38: 24 inpatients and 14 outpatients (male n=28) mean age 39.2 s.d. 9.9	Independent Living Scales, problem-solving factor subscale (ILS-PB) that evaluate abstract reasoning and judgment required for daily living.: administered to participant; 33 items related to money, home management, health and safety issues and social adjustment.	Fine motor (grooved pegboard), sensory processing (tone matching test), visual memory (Brief visual memory test), semantic fluency (Categorical Verbal fluency), attention (Continuous performance test), executive functioning (WCST), verbal memory (WMS logical memory), visual perception (WAIS Bock design, Picture arran-gement, Picture comple-tion, Matrix reasoning), Processing speed (WAIS symbol search and digit symbol coding), working memory (WAIS letter number sequencing, spatial span)	Sensory processing, attention, verbal memory, Processing speed, working memory were associated to ILS-PB Working memory and negative symptoms explain 73% of ILS-PB variance ILS-PB scores: lower scores for inpatients compared to outpatients but not on cognitive scores

Takahashi, Iwase, Nakahashi, Sekiyama, Tabushi, Kajimoto et al. (2005)	50 inpatients,: (male n=25), mean age: 36.7 s.d.11.3 34 controls, male n=12, mean age 33.5 s.d. 10.1	REHAB scale, completed by a psychometrician: General Behavior (GB) scale only: 16 items, five subscales: social activity, speech disturbance, speech skills, self-care skills, community skills	Wechsler Adult Intelligence Scale revised (WAIS-R), but only Spatial working memory (computerized Advanced trail making test) is studied	Spatial working memory, is associated to REHAB subscales: speech disturbance, self-care skills, community skills and total GBscore
Kopelowicz, A., Liberman, R. P., Ventura, J., Zarate, R., & Montz, J. (2005)	28 recovered, male n= 21, mean age = 38.2 s.d.10.6 28 non-recovered, male n=19, mean age=40 s.d. 11.5	Recovered vs non-recovered: Participants included in the « **recovered** » subgroup, had to fulfill the following criteria in a stable way for at least two years: to have little or no positive or negative symptoms, to be working or studying at least on a part time basis, to have a good social network and to live alone without supervision. Persons in the "**non-recovered**" subgroup did not fill these criteria but had to be clinically stable for at least one year.	Verbal learning (California verbal learning test), executive functions (WCST), verbal fluency (Controlled Word Association test), visuo-perceptual skills (Rey complex figure test), verbal working memory (Auditory consonant trigrams test), early visual processing (Forced-choice span of apprehension)	non recovered < Recovered = controls on executive functioning, verbal fluency and verbal working memory non-recovered < Recovered < controls on verbal learning and early visual processing non-recovered = Recovered = controls on visuo-perceptual skills

Longitudinal studies using specific cognitive functions scores

Study	Sample	Outcome measure	Cognitive assessment	Major findings relative to community functioning and daily activities
Kurtz, Moberg, Ragland, Gur & Gur, 2005)	Follow up 1 year: 70: (male n =42 male), mean age 28 s.d. 8.1 Follow up 4 yrs: 26, (male n=14) mean age 29.8	Quality of life scale (QLS) : 21-item , subjective questions regarding life satisfaction with objective indicators of social and occupational role functioning. Objective indicators are: (1) sense of purpose and motivation; (2)	Executive functioning (WCST), attention (the Gordon Diagnostic System Continuous Performance Test), Verbal learning and memory (California	At the 1year follow up, executive function and sustained visual vigilance were related total score on the QLS and on the common activities subscale. Verbal learning was associated to common activities.

	s.d. 8.7	interpersonal relations (3) instrumental role related to work functioning (4) common objects and activities which measures engagement in the community by possession of common objects and participation in a range of activities.	Verbal Learning Test, CVLT)	Sustained visual vigilance predicted the majority of the variance (21%), Psychomotor poverty symptom predicted 7% more. Psychomotor poverty and disorganization factor scores were most closely linked with psychosocial status at the 1year follow up. At the 4 years follow up, sustained visual vigilance, verbal learning associatede to QLS and common activities. Executive functioning ass. to common activities only. Sustained visual attention predicted the majority of the variance (35%), Psychomotor poverty accounted for an additional 21% of the variance.
Milev, Ho, Arndt & Andreasen (2005)	99 first episode inpatients: (male n=69), mean age: 24 s.d. 5; mean follow up of 7 years	"Comprehensive assessment of Symptoms and history and the Psychiatric Status You Currently Have" instruments: from interview with participants, informants, medical records 4 outcome measures: global psychosocial functioning, relationship impairment, participation and enjoyment of recreational activities and work impairment. Global psychosocial functioning includes functioning in the area of	27 tests grouped in 5 domains: Verbal memory, processing speed and attention, language skills, visuospatial skills and problem solving	Verbal memory and processing speed and attention predicted global psychosocial functioning and recreation. Processing speed and attention predicted work impairment. Verbal memory predicted relationship impairment. Negative symptoms, memory and attention and processing speed explained 15% of variance in follow-up global psychosocial functioning.

		work, satisfaction, interpersonal relations, sex as well as whether the level of functioning is consistent with subject's education and social background.		
McGurk, Moriarty, Harvey, Parrella, White & Davis (2000)	168 chronically institutionalized; (male n = 81), mean age :74.2 s.d. 6.6 mean follow up 15 months	SAFE scale	CERAD cognitive battery composite score: Verbal memory (Word list learning), praxis (praxic drawing), verbal fluency (Boston naming test, category fluency)	Baseline SAFE score account for 45.2% and praxis for 3.5% of the variance of SAFE follow up score.
Prouteau, Verdoux, Briand, Lesage, Lalonde, Nicole et al. (2005)	55 outpatients : (male n=6) ; mean age 34.3 s.d. 12 Mean follow up 15-16 months	MCAS Client's assessment of Strengths, Interests and Goals (CASIG): Quality of life subscale	Cambridge Neuropsychological Test Automated Battery (CANTAB): visuomotor coordination (Motor screening), visual memory (Paired associates learning), speed of processing (Reaction time), sustained attention (Rapid visual information processing), planning (Stockings of Cambridge)	Visual memory predicted MCAS total score, adjustment to living and interference with functioning. Improvement of adjustment for living was likely to increase with higher planning and lower visual memory baseline scores. Improvement of behavioural problems was likely to increase with lower sustained attention baseline scores. Improvement of social competence was likely to increase with higher visual memory baseline scores.

APPENDIX 4 Studies on cognition and daily activities

Cross sectional studies using performance-based assessment in many ADLs and IADL s and a global cognitive score

Study	Sample	Outcome measure brief description	Cognitive assessments	Major findings relative to daily activities performance
Bowie, C. R., Reichenberg, A., Patterson, T. L., Heaton, R. K., & Harvey, P. D. (2006)	78 outpatients (% men unknown) mean age: 58.4 yrs, s.d. 7.3 community living, outside any institutional setting	Community functioning: Specific Level of function scale: 43 items, caretaker report across domains: physical functioning, personal care skills, interpersonal skills, community activities, work skills Community activities include IADLs (shopping, paying bills, etc). Three domains were close to ceiling, so only interpersonal skills, community activities and work skills scores used for analysis Functional capacity: UCSD Performance-based skills assessment for severely mentally ill, older outpatients; performance of everyday functioning through the use of props and standardized situations; domains of household management, problem solving, organization, financial skills, communication, transportation Points are given for each correct step	Composite cognitive score from: Attention (WAIS digit span), motor skills (CERAD constructional praxis assessment), verbal learning and memory (Rey Auditory verbal learning test), verbal fluency (CERAD Boston naming Test), executive functioning (WCST, Trail making tests part A and B, Stroop) working memory (WAIS letter-number sequencing)	Functional capacity is associated to cognitive score ($r = .63$)and community activities ($r =.61$), as well as with positive ($r =-.27$) and negative symptoms ($r =-.29$). In community activities prediction model, functional capacity predicts community functioning and mediates the effect of composite cognitive score on community functioning.
Keefe, R., S.E., Poe, M., Walker, T. M., Kang, J. W., & Harvey, P. D. (2006)	60 inpatients (% men unknown) mean age: 35.07 yrs, s.d. 9.74	Community functioning: Independent Living Skills Inventory (ILSI): interview with participant; 89 items covering 11 subscales: personal management, hygiene and grooming, clothing, basic skills, interpersonal	Schizophrenia cognition rating Scale (SCORS): 18 item interview-based assessment of cognitive deficits and how they affect day-to-day	Functional capacity correlated to community functioning ($r =.406$) and both cognitive composite scores ($r =.65$ and $r=.525$). Functional capacity does not explain variance in community

		skills, home maintenance, money management, cooking, resource utilization, general occupational skills and medication management. Functional capacity: UCSD Performance-based skills assessment	functioning; three scores: patient, informant and interviewer composite score Brief assessment of cognition in schizophrenia (BACS): composite score from: Verbal memory (list learning test), working memory (Digit sequencing test), motor speed (token motor task), semantic fluency (category instances test), letter fluency (Controlled Orla Word Association test), Reasoning and problem solving (Tower of London), attention and processing speed (symbol coding)	functioning over SCORS composite score (22%)
Klapow, J., Evans, J., Patterson, P., Heaton, R., Koch, W., & Jeste, D. (1997)	55 outpatients (male n = 24) from outpatient clinics mean age: 56.1yrs, s.d. 8.9 72 normal comparison group	Direct Assessment of Functional Status (DAFS): developed for older adults with Alzheimer's disease and related disorders; includes simulated daily activity tasks (ADL and IADL) with items on time orientation, communication, transportation, finance, shopping, grooming and eating Points are given for each correct step	Mini-Mental state examination (MMSE): is intended to screen for the presence of cognitive impairment over a number of areas.	MMSE only predictor of total DAFS score (partial correlation 0.57) over age, education, gender, symptoms, illness duration, and medication

Cross sectional studies using performance-based assessment in many ADLs and IADL s and specific cognitive functions scores

Study	Sample	Outcome measure brief description	Cognitive assessment	Major findings relative to functioning
Schretlen, D., Jayaram, G., Maki, P., DiCarlo, M., Park, K., & Abebe, S. (2000	105 inpatients: schizophrenia patients n =35; male n=unknown, mean age of schizophrenia pts: unknown mean age of total sample: 38.2 yrs s.d.12.4	Milwaukee Evaluation of Daily living Skills (MEDLS): designed to assess daily living of patients with severe mental illness; includes observations on ward and specific assigned tasks in ADL and IADL: in independence for eating, personal health care, safety at home and in community, time awareness, medication management, use of telephone, money and public transportation Scores on success or failure of steps	Estimates of IQ (WAIS-R), long term memory (Hopkins verbal learning test), auditory divided attention (Brief test of attention), verbal fluency (Controlled Oral Word Association test).	Only auditory divided attention associated to MEDLS for patients with schizophrenia 44% of MEDLS variance explained by auditory divided attention and long term memory and having a diagnosis of schizophrenia
Twamley, E., Doshi, R., Nayak, G., Palmer, B., Golshan, S., Heaton, R. K., et al. (2002	111 subjects, 86 with schizophrenia and schizoaffective disorder, male n in total sample: 58; mean age: 54.6 yrs, s.d. 9.6	UCSD Performance-based skills assessment for severely mentally ill, older outpatients; performance of everyday functioning through the use of props and standardized situations; domains of household management, problem solving, organization, financial skills, communication, transportation Points are given for each correct step Level of residential independence	Mattis dementia rating scale: includes subscales of attention, construction, initiation/perseveration, conceptualization and memory. Neurocognitive tests of verbal ability, attention/working memory, psychomotor ability, motor ability, learning, memory, abstraction/cognitive flexibility.	Mattis dementia scale + verbal ability, working memory, attention, motor ability, memory, cognitive flexibility, psychomotor ability, learning and negative symptoms associated to UCSD subscales scores Degree of residential independence associated to UCSD Residential independence associated to cognitive composite score and Mattis dementia scale 51.2 % UCSD variance explained memory subscale (41.1%) and neg sx (10.1%) in n=74

Cross sectional studies using a task analysis of a daily activity and specific cognitive functions scores

Study	Sample	Outcome measure brief description	Cognitive assessment	Major findings relative to daily task performance
Knight, M. (2000)	10 outpatients, male n= 7, aged between 33 and 58 yrs. Successful group n= 3, intermediate group n=3, unsuccessful group n=4	Food preparation: two dishes separately: tuna fish sandwich and macaroni and cheese from a box. Ratings were done on level of independence for each step of task, and observations were recorded	Sustained attention (CPT), verbal memory (Logical memory and verbal paired associates of WMS-R) and executive function (WCST)	Successful group (n=3): completed with minimal assistance, had a better judgment, better organization and problem solving. Intermediate (n=3) with little assistance, had more difficulty to maintain and elaborate a plan, to maintain attention on task, to solve problem, used unsafe methods. Unsuccessful group (n=4), needed partial to full assistance, inability to recognize problems, safety concern, problems with use of feedback, with the food preparation process, to wait and know task duration to follow instructions and to maintain attention and motivation. Better attention and memory scores in intermediate group, better WCST scores in categories in successful group, lower scores in all tests in the unsuccessful group.
Semkovska, M., Stip, E., Godbout,	17 outpatients, (male n= 7), mean age:	Kitchen Behavioural Scoring Scale: preparation of a four dishes meal.	Planning and shifting (Porteus Maze and Trail	Controls did less macro-sequencing errors, omissions and

L., Paquet, F., & M.A., B. (2002)	26.9yrs s.d.7.9 14 controls (male n= 6), mean age; 27.2 yrs, s.d. 9.6	Scoring is done on behaviours according to macrostructure subdivisions of actions (omission, repetition, sequencing errors), which in turn are divided in micro-step sequence of actions, as well as delay for completion of the meal and delay of completion between first and last dish	Making tests), attention and executive functioning (Stroop, Ruff 2 and 7 Selective attention test), episodic memory immediate and delayed recall (Weschler Memory scale-R)	repetitions Patients had longer first last dishes delay Selective attention (Stroop) associated to macrosequencing errors, repetitions and delay (r=.87, .73, .76) Shifting (TMT) associated to omissions and microsequencing errors (r= .62) and planning (Porteus Maze) associated to microsequencing errors (r=.61) Negative symptoms associated to macrosequencing errors (r=.72) and delay first-last dish (.80)
Rempfer, M., Hamera, E., Brown, C., & Cromwell, R. (2003)	73 outpatients, male n =40, mean age: 39.46yrs, s.d.9.9	Test of Grocery Shopping Skills (TOGSS): research assistant records time, accuracy of items, movements in the aisle. Outcome scores are: 1) accuracy, according to the choice of correct item, size and lowest price 2) redundancy, measures shopping efficiency, determined by the excess aisles 3) time, as the total duration of the task	Long term memory (verbal recall and learning, Rey auditory verbal learning test), sustained attention (letter cancellation), executive functioning (Stroop, WCST), verbal fluency (COWAT), Allen Cognitive Level test (ACL)	Accuracy associated to executive function (WCST) (r= .23) and word and color naming of Stroop (.29, .32) (thought to reflect processing speed and sustained attention). Redundancy associated to executive functioning (WCST) (r= .23, -.39), Stroop (r= -.20, -.26), memory (verbal recall) (r= -.34), verbal fluency (-.27) and sustained attention (letter cancellation) (.24). Time associated to memory (learning) (.24).
Semkovska, M., Bédard, M.-A.,	17 outpatients, 10 inpatients, male n =11,	Assessment of ADL: 1) Choosing a menu among a choice of 12, 2)	Memory: verbal and visual immediate and	Schizophrenia subjects made more omission errors in the menu

Godbout, L., Limoge, F., & Stip, E. (2004)	mean age: 27.2 yrs, s.d. 8.5 27 matched controls, male n = 11, mean age : 26.4 yrs, s.d. 9	shopping for missing ingredients, 3) preparing a meal for two. Financial, recipe and time constraints were presented. Videotapes scored by two observers, scoring scale. Scale built by researchers, based on most efficient sequence of action that would produce the less time cost in each ADL. Scores are number of sequencing errors, omission and repetition	delayed recall (Weschler Memory scale-R), Attention and executive functioning (Stroop, Ruff 2 and 7 Selective attention test, Ruff 2 and 7 divided attention test), planning (Porteus Maze), verbal fluency (Controlled Oral Word Associatin), executive search strategy (animal naming), sequential thinking (WAIS-R picture arrangement subtest)	task, more sequencing and repetition errors in the shopping task and more sequencing, repetition, omission, macro-step planning errors in meal tasks and longer delay between first-last dishes than controls Episodic memory, (verbal and visual) associated to omission errors in menu task(r= -.40, -.40 and -.47), and to sequencing (r=-.44), repetition (r=-.44) and omission errors in the meal task (r= -.51, -.42, -.44), Executive functioning associated to omission errors in menu task (r range between .39 to .73, all tests are associated) Stroop interference and flexibility associated to all errors and delay of completion in the meal preparation task (r ranges between .42 to .60). Fluency associated to sequencing (r= -.48), selective attention, picture arrangement and fluency associated to omission (-.42, .49; -.50; -.62, -.47), picture arrangement to macro-step planning (-.43) and delay in the meal task. Positive symptoms associated to

				sequencing errors in the menu task (r= .48). Negative symptoms associated to omission errors in menu task (r= .59), delay (.61), planning (.58) and repetition errors in meal task (.58).
Greenwood, K. E., Landau, S., & Wikes, T. (2005)	53 in-outpatients: 28 with negative symptoms (male n= 20; mean age 35.1 s.d. 8.8) and 25 without negative symptoms (male n = 19; mean age 35.3 s.d. 10.6) 22 controls (male n= 16; mean age; 36.2, s.d. 12.9)	Test of Grocery Shopping Skills (TOGSS) adapted: Outcome scores are: 1) accuracy, according to the choice of correct item, size and lowest price 2) redundancy, measures shopping efficiency, determined by the excess aisles 3) efficiency: time, as the total duration of the task 4) strategy, number of items selected when using an ordered progression	Executive function: verbal working memory (letter number span task), response initiation-inhibition (Phonological Fluency test, Hayling task), strategy use (spatial: Key search task from BADS; verbal: Phonological Fluency test, Hayling task)	Accuracy: negative < non-negative <controls Efficiency: negative < non-negative = controls Redundancy: negative > non-negative and controls; non-negative < controls Strategy: negative < non-negative <controls Verbal working memory: negative = non-negative; negative <controls Response initiation: negative = non-negative<controls Spatial strategy use: negative < non-negative =controls Outcome measures (Accuracy, Efficiency, Redundancy and Strategy) were all associated to cognitive measures (Premorbid IQ, spatial strategy, working memory, response initiation). The effects sizes are not reported here because of space needs. For all groups: Spatial strategy

				use predicts accuracy and working memory predicts efficiency In negative gr: premorbid IQ predicts efficiency ; working memory predicts accuracy In control groups: working memory predicts strategy and response initiation predicts redundancy.
Still, 2006	23 outpatients experiencing a first-episode of psychosis, male n = 22, mean age 21 s.d. 1.8	Shopping task assessed with the PRPP system of task analysis, giving scores on 2 stages: stage one: errors of accuracy, omission, repetition and timing and stage 2: 34 descriptors rated on a 3-point scale, resulting in 4 quadrant scores (Perceive, Recall, Plan and Perform) and a total score. Functioning assessments: SOFAS, Heinrich Quality of life Scale (QLS), Allen Cognitive Levels screen (ACLs)	NART, Wisconsin Card Sorting Test (WCST), Tower of London (TOL), Continuous performance test (CPT 3-7), Logical memory, immediate and delayed recall (WMS), Controlled Oral Word Association Test, Digit Span forward and backward (WAIS), Visual memory forward and backward span (WMS),	More errors of accuracy were done by the participants than errors of omission, repetition and timing. PRPP total score, Recall and Plan quadrant and correlated with visual memory forward (.57, .48 and .54) and backward (.52, .47 and .49). Perceive quadrant correlated with visual memory forward (.49). Recall and Plan quadrants correlated with TOL (.42 and .42). Perform quadrant and PRPP total correlated with negative symptoms (-.45 and -.46). No association between PRPP quadrant and total scores with SOFAS or QLS. WCST correlated with SOFAS (-.45).

				Negative symptoms account for 23% of SOFAS scores.
Godbout, Limoges, Allard, Braun & Stip (2007)	33 patients (community living status not indicated) male n=25, mean age: 28.09 s.d.8.24 distributed in 2 subgroups: negative symptoms n=17, positive symptoms n=16 16 matched controls, male n = 11, mean age 28.19 s.d. 6.8	Activity of daily living task: similar to Semkovska et al (2004). Script generation task also performed (not reported here). Scoring at 2 levels: ability to achieve the goal: Composite score of "failure to reach goals in ADL tasks"; specific errors: sequence, omission, perseverative and irrelevant intrusion (commission) errors. Composite errors scores based on errors committed on neuropsychological tests, scrpt generation task and ADL task (not reported here)	**Working memory** composite score: Picture arrangement subtest (WAIS-R), Thurstone verbal fluency test, Trail making test, Stroop-rev and a dual task based on Ruff's 2 and 7 test **Visual scanning** composite: Resistance to errors on the trail making test for A, detection on Ruff's 2 and 7 test, resistance to naming errors on the Stroop color naming **Clerical speed** composite: speed on trail making A, Luria seriation, color naming and reading on Stroop **Memory composite**: Memory quotient of the Weschler memory scales-rev.	Participants with schizophrenia compared to controls: longer time beyond limit in grocery and serving courses, less able to respect the budget, more failure to meet goals on grocery and meal task, more omission and perseveration errors. All composite scores associated to average failure to reach goal in ADL except for clerical speed: executive function (-.53), visual scanning (-.47), memory (-.52). Negative subgroup: more impaired on memory quotient. All cognitive composite scores associated to negative symptoms: executive function (-.43), visual scanning (-.43), clerical speed (-.59), memory (-.49).
Stip, Sablier, Sephery, Rivard, Cloutier, Aubin, Godbout & Limoges	23 outpatients, male n= 12, divided in 2 groups according to their score on AMPS	Activity of daily living task: similar to Semkovska et al (2002). Comparison of the ADL task performance of both groups (high	Logical memory, immediate and delayed recall, list learning immediate and delayed	On the ADL task, groups differ on delay between first and second dish: longer delay for lower functioning group and tendency to

(2007)	and to their level of residential independence Gr. 1 higher functioning/autonomy: n=12, mean age: 25.17 s.d. 5.37, Gr. 2 lower functioning/autonomy: n =11, mean age 25.55 s.d. 6.31, more negative symptoms	functioning/autonomy and low functioning/autonomy)	recall from the WMS-rev. ; Stroop, Trail making test and verbal fluency	make more omission errors. On neurocognitive tests, groups differ on logical memory delayed recall only

APPENDIX 5 Measurement tools

Measurement tools

Clinical assessments

In order to assess psychopathology and the effect antipsychotic medication may have on motor control, clinical data were collected with the following instruments:

The Positive and Negative Syndrome Scale (PANSS): The original version (Kay, Fiszbein, & Opler, 1987) has been studied extensively and its psychometric properties demonstrated in numerous studies (Kay, 1990). This scale was translated and validated into French and its psychometric qualities were demonstrated after translation (Lançon et al., 1997). Interrater reliability was good, with a mean kappa of 0.49 for the total scale and a weighted mean kappa of 0.73 (Lançon et al., 1997). Validity of the internal structure of the PANSS, using principal components and factor analysis, revealed 3 and 5 factors solutions. This author favoured the 5 factors solution explaining more variance, where Factor 1, called negative, includes mostly negative symptom items; Factor 2, called excitation, includes mostly general psychopathology items; Factor 3, called positive, includes items of the positive scale; Factor 4, called disorganization, reflects disorganized behaviour and thought; and Factor 5, called anxiety, is composed of items reflecting anxiety disorders. Other authors have reviewed and further developed this 5-factor model (van der Gaag et al., 2006).

The PANSS is made up of 30 items assessing the symptoms observed in patients with psychosis, particularly schizophrenia. The scale is completed following a semi-structured interview. Items are scored on a 7-point scale, representing degrees of psychopathology, from 0 (absent) to 7 (extreme), and are calculated according to three dimensions: positive symptoms (7 items), negative symptoms (7 items), and general psychopathology (16 items). A PANSS total score is also calculated. Norms and percentile ranks have been published for the PANSS subscales by Kay, Fiszbein, and Opler (1987).

The Calgary Depression Scale (CDS): As depression can potentially affect daily functioning and cognition, it was important to consider this aspect of psychopathology in people with schizophrenia in order to eventually take it into account in the analyses. The CDS is specifically designed to assess depression in people with schizophrenia, with the exclusion of other psychopathological dimensions (Addington, Addington, & Schissel, 1990). Interrater reliability and internal consistency have been demonstrated in a number of studies, with ICCs ranging between 0.89 and 0.96, and Cronbach's alphas ranging between 0.79 and 0.84 (Addington, Addington, & Maticka-Tyndale, 1994; Addington, Addington, Maticka-Tyndale, & Joyce, 1992). Sensitivity in detecting mild and severe depression has been demonstrated to be higher in the CDS than in other depression scales (Muller, Muller, & Fellgiebell, 2006). The CDS includes nine items and is completed through a structured interview. Each item is measured according to a four-level scale (0 = absence of difficulty, 3 = severe difficulty). The cut-off score for mild depression has been established at ≥ 3 (Muller, Muller, & Fellgiebel, 2006).

The Extrapyramidal Symptoms Rating Scale (ESRS): In addition to depression symptoms, extrapyramidal symptoms induced by medication were considered to potentially affect motor activity in daily task performance. The ESRS uses a questionnaire and examination to assess the presence and severity of extrapyramidal symptoms associated with antipsychotic medication (Chouinard, Ross-Chouinard, Annable, & Jones, 1980). Interrater reliability coefficients ranged between 0.80 and 0.97 (Chouinard, Ross-Chouinard, Annable, & Jones, 1980). The scale's sensitivity and validity have been established through a number of clinical trials (Chouinard & Margolese, 2005).

The questionnaire includes 12 questions about the subjective experience of extrapyramidal symptoms. A standardized examination procedure includes eight items that assess Parkinsonism, two items that assess dystonia, and seven items that assess dyskinesia. The results of the questionnaire, examination, and the evaluator's clinical experience yield three overall scores for Parkinsonism, dystonia, and dyskinesia, known as the clinical global impression of severity (CGI-S). These are rated on an 8-point scale (0 = absent, 8 = extremely severe), and were used in this study.

Cognitive assessments

According to the literature review, attention, memory and executive functions are the more impaired cognitive functions in people suffering from schizophrenia. More precisely, the following cognitive functions were evaluated: basic visuo-motor skills, visual memory, spatial working memory, selective attention and inhibition of interference and planning. Participants also performed an assessment of their own cognitive functioning.

Participants were individually administered four subtests from the Cambridge Neuropsychological Test Automated Battery (CANTAB) (Fray, Robbins, & Sahakian, 1996), as well as one classical test, the Stroop color-word test, Golden version (Golden, 1978). CANTAB is made up of computerized assessments of cognitive functions and has been used with various populations, including people with schizophrenia (Barnett et al., 2005; Fray et al., 1996; Levaux et al., 2007; Potvin et al., 2005). Acceptable-to-high levels of test-retest reliability and concurrent validity have been demonstrated (Fray et al., 1996). CANTAB had been standardized on a wide range of populations (Levaux et al., 2007). Detailed scores and standard scores are calculated for each subtest by a computer program. The total duration for the cognitive subtests ranged from 45 to 90 minutes. The four subtests were the Motor Screening subtest, the Paired Associate Learning Task, the Spatial Working Memory subtest, and the Stockings of Cambridge. This study used CANTAB eclipse version 2.0. Descriptions of the tests are taken from the *CANTAB for Windows: Test administration guide* (1999) and from http://www.cantabeclipse.com/cantab.

1) The *Motor Screening (MOT)* subtest screens for visual, movement, and comprehension difficulties and assesses visuo-motor coordination. During this task which lasts about 3 minutes, and is given at the beginning of the session, participants must touch the flashing cross which is shown in different locations on the screen as fast as possible. The mean latency time reflects speed of response.

2) The *Paired Associate Learning Task* (PAL) subtest assesses visuo-spatial explicit memory. In this test, the participants are required to remember patterns associated with different locations on the screen. During the test phase, as each pattern is presented, and the participants points to the

appropriate location. The test starts gradually increases in difficulty. List memory or recall is measured by number of patterns correctly located after the first presentation (first trial memory score, range = 0–26) and associative learning is measured by the adjusted number of errors committed before completing the test (total errors adjusted).

3) The *Spatial Working Memory* (SWM) subtest is a self-ordered search task that assesses visuo-spatial working memory and strategy. This is a test of the subject's ability to retain spatial information and to manipulate remembered items in working memory. A trial begins with a number of coloured boxes being shown on the screen. The participant must touch each box in turn until one opens with a blue square inside (a search). These squares are used to fill up an empty column on the right hand side of the screen. Returning to an empty box already sampled on this search is an error. The total number of errors between searches and a strategy score indicating the use of a more systematic strategy are measured (score range = 8–56).

4) The *Stockings of Cambridge* (SOC) subtest is based on the classic Tower of London test (Shallice, 1982) briefly described in section 2.2., and assesses executive function, specifically planning abilities. The measure used is the number of problems solved in minimum moves (score range = 0–12).

As a fifth test, the *Stroop Color-Word test* (Golden version, Golden, 1978) was administered. This is a paper and pencil test that assesses selective attention, cognitive flexibility (i.e., maintaining task set or switching between tasks), the ability to inhibit habitual responses (i.e., reading words), and resistance to interference from outside stimuli (Golden, 1978; Henik & Salo, 2004). This test has often been used with people with schizophrenia (Henik & Salo). A French version of the test was used (Guillem, 2005). The Golden version, which can be administered very quickly, is typically used with people with schizophrenia (Henik & Salo, 2004; Perlstein, Carter, Barch, & Baird, 1998). In the traditional card version of the Stroop task, people with schizophrenia exhibit increased interference, and the interference score is the measure generally used (Golden, 1978; Henik & Salo, 2004; MacLeod, 1991). The person is required to read three different cards, each with five columns of 20 items. On the first card, items are the names of colours printed in black; on the second card, the name of a colour is printed in that same colour; on the third card, the names of colours are printed but in a different colour than the named colour. The number of items read correctly on each card in 45 seconds is used to calculate the interference score, which is based on normative data (*T* scores for general population range = 35–65).

The Subjective Scale to Investigate Cognition in Schizophrenia (SSTICS): This self-report questionnaire was designed to collect the complaints of people with schizophrenia about their cognition. The psychometric properties of the SSTICS were evaluated with a group of 114 French-speaking participants with schizophrenia in Montreal, Quebec. Good internal consistency was found for the global score (alpha = 0.88) and the subscales (0.57–0.72) (Stip, Caron, Renaud, Pampoulova, & Lecomte, 2003). SSTICS total scores for healthy individuals differed significantly from those of individuals with schizophrenia (Mancini et al., 2002).

The SSTICS is composed of 21 items. It explores the cognitive complaints of people with schizophrenia on several cognitive dimensions that have been reported to be impaired in schizophrenia. Questions address everyday life difficulties that the respondents may encounter. The questionnaire explores explicit memory (9 items); working memory (2 items); attention (5 items); executive functioning (3 items); language (1 item); and praxia (1 item). Participants rate the frequency of their cognitive difficulties according to a 4-point scale (0 = never, 4 = very often).

Community functioning assessments

In this thesis, assessment of community functioning was based on two different perspectives: that of the participant and that of the mental health professional. In accordance with the definition of community functioning, the dimensions assessed included the performance of role-related tasks in different life domains as reported by participants and mental health professionals, in addition to behaviours that affect role functioning as assessed by mental health professionals.

The *Independent Living Skills Survey (ILSS):* This questionnaire collects information about autonomy and daily living activities among people with serious mental illness (Wallace, 1986). The interview format of the French version of the questionnaire was used (Cyr, Toupin, Lesage, & Valiquette, 1994). The selected version was developed for people who returned to the community after discharge from hospital. This version includes nine scales with 56 items. These scales measure personal hygiene, appearance and clothing, food habits and preparation of meals, domestic maintenance, health maintenance skills and use of social and health services, financial management, transportation (use of public transport), and leisure and job seeking. Participants answer based on their experience within the last month. There are three possible answers: yes, no, and does not apply. Cyr et al. (1994) found the ILSS to have good internal consistency and test-retest reliability (correlations varying between 0.62 and 0.85) and that it is able to discriminate between respondents according to their diagnosis, gender, and type of housing. A factorial analysis identified two factors: basic activities and more complex activities. This scale was found to be sensitive to treatment effects, as significant differences were found in food preparation, money management, and health maintenance scales in a group of people with severe mental illness who received skills training compared to other types of interventions (Wallace, Liberman, Tauber, & Wallace, 2000).

The *Multnomah Community Ability Scale (MCAS):* This 17-item instrument is completed by the clinician who knows the participant and measures the ability of people with severe mental illness to function in the community (Barker, Barron, McFarland, & Bigelow, 1994). The coefficient for test-retest reliability for the total score was equal to 0.83; the interrater reliability coefficient for the total score was 0.85; and the four subscales ranged between 0.70 and 0.78, which was considered quite good (Barker, Barron, McFarland, & Bigelow). The measure of internal consistency was equal to a Cronbach's alpha of 0.90 (Barker, Barron, McFarland, & Bigelow). The validated French version of this tool was used in this study (Corbière et al., 2002). The items are divided into four sections: obstacles to functioning (5 items); daily life adaptation (3 items); social competency (5 items); and behavioural problems (4 items). These sections deal with participants' functioning during the last three months, except for the section "behavioural problems," which relates to functioning during the last six months. Each item is evaluated on a 5-point scale. The total score determines the level of functioning according to three categories: low (scores ≤ 47), average (48–62), and high (63–85); (Barker, Barron, McFarland, Bigelow, & Carnahan, 1994).

Daily activities performance assessment

The daily activities performance assessment was chosen as it better answered the needs of this study for a performance-based, criterion-referenced, skill oriented assessment with a cognitive perspective and using process task analysisto describe problematic functional skills. Familiarity with meal preparation was also assessed with a questionnaire built for this study.

The *Perceive, Recall, Plan and Perform (PRPP) System of Task Analysis:* The PRPP System of Task Analysis is a standardized, criterion-referenced assessment that has two stages of analysis. In Stage 1, task performance is broken down into steps. The assessment identifies errors of accuracy (an attempt is made to perform a step, but performance is incorrect or inaccurate), omission (no attempt is made to perform the step), repetition (person does not stop to perform the step), and timing (steps are performed too quickly or too slowly).

In Stage 2, a cognitive task analysis is used to describe the efficiency of the information processing strategies underlying task performance. These strategies are categorized into four processing quadrants: attention and sensory perception (Perceive), memory (Recall), response planning and evaluation (Plan), and performance monitoring (Perform). Each quadrant is divided into three sub-quadrants, each of which contains two or three "descriptors." These are illustrated in the PRPP System conceptual model in Figure 1, Chapter 3 (Chapparo & Ranka, 2005). A total of 34 observable behavioural descriptors, thought to represent a cognitive event, are used individually or cumulatively to identify processing strengths and deficits. Scores are derived from the 34 descriptors, which are scored on a 3-point rating scale. A score of 1 indicates that the descriptor behaviour negatively affects task performance to the extent that the task is not completed to the expected level or performance requires significant prompting; a score of 2 indicates some qualitative difficulties with the behaviour; and a score of 3 indicates that performance shows no deficit in the behaviour. From summed descriptor scores, a global PRPP processing score and specific PRPP quadrant and sub-quadrant scores are calculated. Although originally developed in the 1980s, the PRPP in its current form is a relatively new assessment tool. A number of studies have been conducted across various client groups that support its use. High agreement among six testers has been achieved in identifying the breakdown of steps in Stage 1 for dressing, hygiene, and meal preparation tasks in typical adults (Chapparo & Ranka, 1997b). Acceptable-to-high interrater and intra-rater agreement was obtained in identifying Stage 1 errors in a sample of clients with acquired brain injury, along with evidence of face and content validity using a panel of experts approach (Chapparo & Ranka, 1992). Interrater and test-retest reliability across a number of studies ranges from 0.64 to 0.99 (Lohri, 2005; Munkhetvit, 2005; Pulis, 2002). Studies using the PRPP System of Task Analysis have demonstrated agreement between PRPP quadrant and sub-quadrant scores and neuropsychological measures of cognition in adolescents with early psychosis (Still, Beltran, Catts, Chapparo, & Langdon, 2002).

After a preliminary study on the use of the PRPP System with people with schizophrenia (Aubin, Chapparo, Gélinas, Stip, & Rainville, 2007), interrater reliability was measured again with the two raters of the main study. Intraclass correlations (ICC) values ranged between .95 for the Recall, .88 for the Plan, .79 for the Perform quadrant and .91 for the total PRPP Sytem score. Results for the Perceive quadrant were lower (ICC = .26). Subsequently, definitions and rating criteria were reviewed and a rating grid was developed with the objective of obtaining high agreement between both raters for this quadrant.

The *Familiarity with meal preparation task*: Before starting the meal preparation task, participants answered a brief questionnaire evaluating their level of familiarity with the kitchen where they were preparing the meal and with the preparation of each dish. The questionnaire was created specifically for this study and was inspired by the questionnaires used by Chevignard et al. (2000) and Dickerson and Fisher (1997). A four-point scale was used, where: 0 = never used the kitchen or cooked this dish, 1 = already used this kitchen or cooked this dish some time ago, 2 = has used the kitchen recently or has prepared this dish occasionally, 3 =cooks this dish regularly.

Sociodemographic and clinical data

Sociodemographic data were collected through a questionnaire and from medical files. Information gathered included age, sex, level of education, date of first hospitalization, DSM IV diagnosis, medication, and type of housing.

Questionnaire sur la familiarité avec la préparation du repas

Sujet no.__________

À compléter en même temps que l'évaluation PRPP

Date de l'évaluation: ___________________________

Site : CHUM ☐
LHL ☐

Degré de familiarité avec la cuisine du service d'ergothérapie :

☐ 0 = N'a jamais utilisé
☐ 1 = A utilisé lors d'une évaluation ou un groupe, il y a plus de 6 mois (dernière fois : date :______________)
☐ 2 = A utilisé dernièrement et/ou régulièrement (moins de 6 mois)
☐ 3 = Autre,
spécifier____

Degré de familiarité avec la préparation du repas

Dessert:

☐ 0 = jamais fait

☐ 1 = déjà fait ou rarement = + de 6 mois (en faisait occasionnellement il y a quelques
années ou en fait une fois par année)

☐ 2 = fait occasionnellement ou souvent fait = moins de 6 mois (en faisait souvent il y a
quelques années ou en fait quelques fois par année

☐ 3 = en fait à chaque mois et plus

Patates:

☐ 0 = jamais fait

☐ 1 = déjà fait ou rarement = + de 6 mois (en faisait occasionnellement il y a quelques
années ou en fait une fois par année)

☐ 2 = fait occasionnellement ou souvent fait = moins de 6 mois (en faisait souvent il y a
quelques années ou en fait quelques fois par année

☐ 3 = en fait à chaque mois et plus

Viande:

☐ 0 = jamais fait

☐ 1 = déjà fait ou rarement = + de 6 mois (en faisait occasionnellement il y a quelques
années ou en fait une fois par année)

☐ 2 = fait occasionnellement ou souvent fait = moins de 6 mois (en faisait souvent il y a
quelques années ou en fait quelques fois par année

☐ 3 = en fait à chaque mois et plus

APPENDIX 6 Characteristics of Participants

Table 1 Socio-demographic characteristics and diagnosis of participants from CHUM (n = 50) and L.H. Lafontaine hospital (n = 32)

	CHUM *n*=50 *M (s.d.)*	**LHL** *n*=32 *M (s.d.)*	**Statistic** *t test/ Chi square*	*p**
Age (years)	41.7 (9.47)	41.6 (10.67)	.025[a]	.980
Education (years)	11.76 (2.92)	11.63 (2.92)	.204[a]	.839
Sex (m/f)	33/17	19/13	.369[b]	.543
Diagnosis			4.04[c]	.399
Paranoid schizophrenia	29 (56%)	24 (75%)		
Schizo-affective type	15 (32%)	5 (16%)		
Undifferentiated type	2 (4%)	2 (6%)		
Residual type	2 (4%)	1 (3%)		
Disorganised type	2 (4%)	0 (0%)		
Ethnicity:				
Canadian	42	25		
Italian	1	3		
Asian	1	0		
African	3	1		
Haitian	2	0		
Latino-american	1	2		
Chilian	0	1		
Marital status				
Unmarried	44	29		
Married/spouse	1	1		
Widow	3	0		
Divorced	2	2		
Occupation				
No paid work	38	20		
Occasional work	0	2		
Competitive work (pt. t.)	2	0		
Competitive work (fl. t.)	2	0		
Social integration program	6	6		
Student	0	1		
Volunteer	2	3		
Housing				
Family	3	5		
Appartment/room	18/9	12/1		
Supervised appartments	10	8		
Group home	2	2		
Boarding home/Highly structured residence	7	4		

* Significant difference at $p \leq .005$

[a] *df*(80)

[b] *df*(1)

[c] *df*(4)

Table 2 Functional and cognitive characteristics of participants from CHUM (n = 50) and from Louis-H. Lafontaine hospital (n = 32)

	CHUM n = 50 *M (SD)*	LHL n = 32 *M (SD)*	*t*	*df*	*p*
PRPP total	85.34 (5.35)	84.84(5.24)	0.41	80	.681
Perceive	20.76 (1.36)	20.47 (1.25)	0.97	80	.332
Recall	23.44 (1.47)	23.30 (1.35)	0.42	80	.676
Plan	18.01 (2.44)	18.15 (2.59)	-0.26	80	.797
Perform	23.13 (0.82)	22.91 (0.70)	1.23	80	.222
ILSS	72.79 (5.16)	70.86 (5.59)	-1.34	80	.184
MCAS*	66.80 (7.74)	71.81 (5.58)	-3.17	80	.001*
Familiarity with meal preparation	5.38 (2.11)	5.50 (2.28)	-0.24	80	.809
Total duration of meal preparation (minutes)	43.74 (14.60)	50.53 (15.17)	-2.02	80	.049*
Visuo-Motor Coordination					
MOT Mean latency (milliseconds)	1225,64 (289,66)	1183,33 (237,14)	0,69	80	.492
Visuo-spatial Memory					
PAL first trial memory	15.58 (4.56)	15.90 (4.38)	-0.32	80	.750
PAL total errors adjusted	35.94 (35.50)	35.81 (41.72)	0.02	80	.988
Spatial Working Memory	n =50	n =31			
SWM Strategy	36.36 (5.28)	33.74 (6.53)	1.98	79	.051
SWM between search	40.50 (19.97)	32.71 (20.05)	1.70	79	.092
Planning	n =50	n =31			
SOC Problem solved in min. moves	7.48 (2.20)	7.77 (1.93)	-0.61	79	.541
Selective attention and inhibition	n =49	n =32			
Stroop interference	-1.85 (7.48)	-1.62 (10.24)	-0.12	79	.904

* significant difference at $p \leq .005$

Table 3 Clinical characteristics of participants from CHUM (*n* = 50) and from Louis-H. Lafontaine hospital (*n* = 32)

	CHUM (*n*=50) *M (SD)*	LHL (*n*=32) *M (SD)*	*t*	*df*	*p*
PANSS total*	84.26 (16.78)	63.15 (11.53)	6.26	80	.000*
PANSS Positive sympt.*	20.10 (5.75)	17.15 (4.24)	2.49	80	.009*
PANSS Negative sympt.*	23.66 (6.99)	14.87 (4.26)	6.38	80	.000*
PANSS* Psychopathology	42.24 (7.68)	32.65 (6.38)	5.81	80	.000*
Calgary Depression scale	2.36 (1.65)	1.96 (1.97)	0.97	80	.335
Extra-pyramidal Symptom Rating Scale	6.25 (5.71)	6.16 (5.64)	0.07	79	.945
STICSS	25.49 (10.71)[a]	27.09 (10.58)	-0.66	77	.513

* significant difference at p ≤ .005

[a] *n* = 47

APPENDIX 7 Comparison of the matched sub-group with the remaining group of participants

Table 1a
Paired subgroup (*n* =28) and unpaired subgroup (*n* =54) socio-demographic characteristics (part 1)

	Paired subgroup *n* =28 *M (SD)*	**Unpaired subgroup** *n* =54 *M (SD)*	**Statistic *t* test/ Chi square**	*df*	*p*
Age (years)	43.4 (9.96)	40.8 (9.83)	1.13	80	.260
Education (years)	12.18(2.72)	11.46 (2.98)	1.06	80	.293
Sex (m/f)	18/10	34/20	0.369	1	.543
Psychiatric follow-up (years) [a]	15.56 (10.09)	15.75 (8.79)	-0.085	79	.933
Mean no. of hospital stays [b]	5.46 (6.11)	5.43 (5.31)	0.023	79	.982
Diagnosis			6.497	4	.165
Paranoid schizophrenia	13 (46.4%)	40 (74.1%)			
Schizo-affective type	10 (35.7%)	10(18.5%)			
Undifferentiated type	2 (7.1%)	2 (3.7%)			
Residual type	2 (7.1%)	1 (1.9%)			
Disorganised type	1 (3.6%)	1 (1.9%)			
Ethnicity:					
Canadian	23 (82.1%)	44 (85.1%)	5.93	5	.313
Italian	1 (3.6%)	3 (5.6%)			
Middle-East	1 (3.6%)	2 (3.8%)			
Asian	0 (0%)	1 (1.9%)			
African	2 (7.2%)	0			
Haitian	1 (3.6%)	1 (1.9%)			
Hispanic (latino-american)	0	3 (5.6%)			

Significant difference at $p \leq .005$
[a] Paired subgroup *n* = 27
[b] Unpaired subgroup *n* = 53

Table 1b
Paired subgroup (*n* =28) and unpaired subgroup (*n* =54) socio-demographic characteristics (part 2)

	Paired subgroup N=28 *M (SD)*	**Unpaired subgroup** N=54 *M (SD)*	**Statistic *t* test/ Chi square**	*df*	*p*
Marital status					
Unmarried	22 (78.6%)	51 (94.4%)	6.98	3	.073
Married/spouse	1 (3.6%)	1 (1.9%)			
Widow	3 (10.7%)	0 (0%)			
Divorced	2 (7.1%)	2 (3.7%)			
Occupation			6.68	7	.463
No paid work	18 (64.3%)	38 (70.4%)			
Occasional work	0 (0%)	2 (3.7%)			
Competitive work (part time)	2 (7.1%)	0 (0%)			
Competitive work (full time)	1 (3.6%)	1 (1.9%)			
Social integration program	4 (14.2%)	8 (14.8%)			
Student	0 (0%)	1 (1.9%)			
Volunteer	3 (10.7%)	4 (7.4%)			
Housing			3.04	6	.804
Family	2 (7.1%)	6 (11.1%)			
Appartment	10 (35.7%)	20 (37%)			
Foster home	5 (17.9%)	6 (11.1%)			
Boarding home (highly structured)	0 (0%)	1 (1.9%)			
Group home	1 (3.6%)	3 (5.6%)			
Supervised appartments	5 (17.9%)	13 (24.0%)			
Room	5 (17.9%)	5 (9.3%)			

* significant difference at $p \leq .005$

Table 2
Functional and cognitive characteristics of paired subgroup (*n* =28) and unpaired subgroup (*n* =54)

	Paired subgroup N=28 *M (SD)*	Unpaired subgroup N=54 *M (SD)*	*t*	*df*	*p*
PRPP total	85.40 (5.21)	85.01 (5.36)	0.313	80	.755
Perceive	20.80 (1.25)	20.56 (1.35)	0.776	80	.440
Recall	23.50 (1.38)	23.32 (1.44)	0.557	80	.579
Plan	17.94 (2.52)	18.13 (2.49)	-0.315	80	.754
Perform	23.14 (0.84)	22.99 (0.74)	0.813	80	.418
ILSS	72.29 (5.43)	71.91 (5.40)	-0.311	80	.756
MCAS	65.71 (7.74)	70.33 (6.70)	-2.804	80	.006
Familiarity with meal preparation	5.54 (2.32)	5.37 (2.11)	0.325	80	.746
Visuo-Motor Coordination					
MOT Mean latency (milliseconds)	1288.84 (278.62)	1167.81 (257.84)	1.96	80	.053
Visuo-spatial Memory					
PAL first trial memory	15.46 (4.47)	15.83 (4.51)	-0.352	80	.726
PAL total errors	37.32 (34.10)	35.15 (39.87)	0.245	80	.807
Spatial Working Memory					
SWM Strategy [a]	37.64 (4.74)	34.15(6.12)	2.62	79	.010*
SWM between search [a]	42.10 (20.24)	35.09 (20.01)	1.49	79	.139
Planning					
SOC Problem solved in min. moves [a]	7.28 (2.40)	7.75 (1.91)	-0.960	79	.340
Selective attention and inhibition					
Stroop interference[a]	-1.03 (6.55)	-2.14 (9.57)	0.617	79	.583
Total duration of meal preparation (minutes)	43.71 (14.60)	47.78 (15.28)	-1.15	80	.250
Time between end of first and end of last dish	10.04 (8.42)	12.69 (13.19)	-0.964	80	.338

* significant difference at $p \leq .005$
[a] Unpaired subgroup *n* = 53

Table 3
Clinical characteristics of paired subgroup and unpaired subgroup

Tests	**Paired subgroup** (*n* =28) *M (SD)*	**Unpaired subgroup** (*n* =54) *M (SD)*	*t*	*df*	*p*
PANSS total	81.03 (18.55)	73.42 (17.52)	1.828	80	.071
PANSS positive sx	19.60 (6.36)	18.61 (4.83)	0.792	80	.431
PANSS negative sx	22.89 (7.55)	18.85 (7.04)	2.404	80	.019*
PANSS psychopathology	40.32 (8.00)	37.55 (8.77)	1.393	80	.167
Calgary Depression scale	1.92 (1.24)	2.35 (2.00)	-1.18	80	.243
Extra-pyramidal Symptom Rating Scale					
C.G.I. of severity of Dyskinesia	.86 (1.08)	.94 (1.27)	-0.308	80	.759
C.G.I. of severity of Parkinsoninsm	1.61 (1.22)	1.07 (1.19)	-1.89	80	.061
C.G.I. of severity of Dystonia[a]	.18 (.61)	.42 (.82)	-1.46	79	.184
STICSS[b]	24.50 (11.26)	27.03 (10.24)	-1.017	77	.312

* significant difference at $p \leq .005$
[a] Unpaired subgroup *n* = 53
[b] Unpaired subgroup *n* = 51

Table 4

Type of errors during each dish preparation of paired subgroup and unpaired subgroup

	Paired subgroup *n* =28 *M (SD)*	Unpaired subgroup *n* =54 *M (SD)*	*t*	*df*	*p*
Cake					
Accuracy errors	6.57 (3.41)	5.87 (3.01)	.954	80	.343
Repetition errors	0.14 (0.35)	.33 (.54)	-1.89	75.86	.062
Omission errors	0.42 (0.63)	0.59 (.87)	-.87	80	.384
Timing errors	0.21 (0.78)	0.38 (.83)	-.916	80	.362
Potatoes					
Accuracy errors	4.17 (2.05)	4.42 (2.22)	-.48	80	.626
Repetition errors	0.10 (0.31)	0.16 (0.42)	-.655	80	.514
Omission errors	0.14 (0.52)	0.22 (0.50)	-.669	80	.505
Timing errors	0.03(0.18)	0.42 (0.81)	-3.34	80	.001*
Meat					
Accuracy errors	3.21 (1.97)	3.09 (1.99)	.263	80	.793
Repetition errors	0.10 (0.31)	0.111 (.37)	-.048	80	.962
Omission errors	0.78 (0.56)	0.96 (.84)	-1.13	74.56	.322
Timing errors	0.14 (0.35)	0.09 (.29)	.684	63.22	.496

* significant difference at $p \leq .005$

APPENDIX 8 PRPP System interpretation grid

no.______________

Sujet

Date____________________

Étapes PRPP

Planification et maintien du but

Routine

Routine/erreurs	**Pré**	**Rép**	**Om**	**Rang /Séq***	**Observations / Fin de cuisson/Durée totale**
Écouter les consignes					
Faire cuire le gâteau					**Début de cuisson :** **Fin de cuisson :** **Différence :**
Faire cuire les pommes de terre					**Fin de cuisson :**
Faire cuire la viande en boulettes					**Fin de cuisson :**
Les pommes de terre, la viande et le gâteau sont cuits en même temps.					**Temps entre le premier et le dernier plat :**
Servir les pommes de terre et la viande pour une personne					
Ranger et nettoyer la cuisine pendant la tâche et à la fin					
Durée totale					**Début :** **Fin :** **Durée totale (différence) :**

no.______________

Sujet

Date____________________

Tâches

Étapes /Erreurs	**Pré**	**Rép**	**Om**	**Ry**	**Observations**
Gâteau					
Sortir boîte de l'armoire					
Lire instructions gâteau (peut être fait plusieurs fois)					
Ouvrir le four à 350 F					
Sortir moule (et bol) et ustensiles					
tasse à mesurer					
Ouvrir la boîte et sachet gâteau					
Verser poudre dans moule ou bol					
Mesurer ¾ tasse d'eau					
Verser ¾ t. d'eau dans mélange					
Brasser mélange					
Verser mélange dans le moule					
Mélange gâteau au four					
Vérifier l'horloge au début, en cours et à la fin					
Cuire gâteau 20-28 minutes					
Sortir mitaines à four					
Sortir gâteau du four					
Vérifier la cuisson du gâteau					
Fermer four					
Se servir un morceau de gâteau (facultatif)					
Ranger matériel de cuisine sale dans évier					
Jeter déchets					

Nettoyer espace de travail (incluant armoires)					
Étapes /Erreurs	**Pré**	**Rép**	**Om**	**Ry**	**Observations**
Pommes de terre					
Sortir patates pour une personne					
Ranger sac ou patates au besoin					
Sortir chaudron et ustensiles					
Sortir planche ou assiette (pour couper)					
Sortir ustensiles (pour peler et couper)					
Eau dans chaudron					
Ouvrir le rond,					
Chaudron de patates sur rond et peut vérifier si l'eau réchauffe					
Peler (et rincer) patates (1 pers.)					
Couper patates sur planche ou assiette (facultatif)					
Cuire patates pour une personne					
Facultatif : Ajouter sel					
Vérifier la cuisson des patates					
Fermer rond patates					
Enlever le chaudron du rond chaud					
Servir patates dans assiette (pour 1 personne)					
Ranger matériel de cuisine sale dans évier					
Jeter déchets					
Nettoyer espace de travail					

(incluant armoires)					
Étapes /Erreurs	**Pré**	**Rép**	**Om**	**Ry**	**Observations**
Viande					
Sortir poèle et ustensiles					
Sortir margarine (facultatif)					
Sortir viande pour une personne					
Ranger viande					
Ouvrir rond					
Poèle sur rond et peut Vérifier si la poèle se réchauffe					
Mettre margarine (si margarine sortie)					
Façonner boulette(s) de steak pour une personne					
Facultatif : ajouter sel et poivre					
Se laver les mains après avoir touché à la viande					
Cuire viande					
Vérifier la cuisson de la viande					
Fermer rond viande					
Enlever la poèle du rond chaud, mettre en sécurité					
Servir viande dans assiette (pour 1 personne)					
Ranger margarine					
Ranger sel, poivre si utilisé					
Ranger matériel de cuisine sale dans évier					
Jeter déchets					

Sujet

Date ______________

Nettoyer espace de travail et armoires					

Erreurs Observées
Routine

Obs.	No.	Description de l'erreur	Commentaires
		L'évaluateur doit interpeller le participant plus fortement une deuxième fois parce qu'il **n'oriente pas ni ne porte** son attention vers l'évaluateur qui lui parle (différencier d'un problème de gêne) parce qu'il est distrait par quelque chose (incluent ses pensées) coter **oriente =1.**	
	1	Ne commence pas la routine même s'il sait ce qu'il a à faire et a besoin de stimulation pour commencer: **coter commence, question, analyse, judge** (possiblement **maintient, module** si distrait par autre chose) **= 1**	
	1.1	Si hésite mais commence sans stimulation : coter **idem =2**	
	1.2	Commence à écouter les consignes puis se met en action avant que l'évaluateur ait terminé ses explications **=2,** coter **maintient**, **module, cont. p/r temps, id. obst.** et autres dépendant du résultat	
	2	La personne ne prépare pas un des plats ou ne fait pas une étape importante (gâteau, patates, viande) : **recall steps, knows goal, questionne, analyse et juge,** (possiblement **continues), maintains, module =1**	
	3	Manque une étape moins importante faisant partie des consignes : N'a pas servi les patates et la viande dans l'assiette, les laisse dans le chaudron et la poèle : **recall steps, knows goal,** possiblement **continues (si se rappelle des étapes), questionne, analyse et juge =2**	
	3.1	Veut ajouter un plat et le demande: Est-ce que je peux ajouter du maïs en crème, etc… ? On lui demande de suivre les consignes et il acquiesce, coter **Connaît le but, se rappelle des étapes, choisit, QAJ=2.** Si prépare le maïs ou autre quand même, idem =1	
	4	Aucun nettoyage n'est fait, les comptoirs ne sont pas nettoyés, les déchets ne sont pas jetés ou la vaisselle rangée dans l'évier, etc. : **searches, locates**, possiblement **réagit, recall steps, knows goal, question, analyse, judge, possiblement continues** (si cesse parce que tanné mais se rappelle des étapes), **id. obstacles** si s'accroche dans matériel =1	
	5	**Plats cuits en même temps :** délai de moins de 10 minutes entre le premier et le dernier, avec séquence optimale =3	

	5.1	délai de moins de 10 minutes entre le premier et le dernier, si séquence non-optimale, **=3,** toutefois, **vérifier la durée de préparation des plats : si trop court (ex. pas assez cuit), coter contextualise to duration, to time, id. obstacle, sequence, QAJ, etc et autres descripteurs = 2 ou 1**	
	5.2	**Dépendant s'il se rappelle de la consigne ou non:** entre 10 et 15 minutes de délai entre le premier et le dernier plat**, si séquence optimale**, coter **times,** (possiblement **knows goal, id. obstacle), flows** si retard dû à une longue pause ou autres descripteurs, **cont. p/r durée, cont. p/r temps, QAJ, etc =2**	
	5.3	Entre 10 et 15 minutes de délai entre le premier et le dernier **si séquence non-optimale,** coter **sequence, times,** (possiblement **knows goal, id. obstacle), (flows** si retard du à une longue pause ou autres descripteurs**, cont. p/r durée, cont. p/r temps, etc), QAJ = 2**	
	5.4	plus de 15 minutes avec séquence optimale **(durée totale trop longue): times, (possiblement knows goal, id. obstacles), (flows** si retard du à une longue pause ou autres descripteurs, **cont. p/r durée, cont. p/r temps, etc), QAJ =1**	
	5.5	plus de 15 minutes avec séquence non-optimale, coter **cont. p/r temps, p/rdurée, sequence, (possiblement knows goal, id.obstacles, se rappelle des étapes), times (flows** si retard du à une longue pause**), QAJ = 1**	
	6	Arrête la routine parce qu'il ne se croit pas capable de résoudre une difficulté (ex. suivre la recette) : **persiste, id. obstacles** (si la personne identifie trop d'obstacles et cesse la tâche pour cette raison), **continue**, **questionne, analyse, juge = 1 et** possiblement d'autres descripteurs dépendant du problème qui cause la frustration ou l'arrêt : ex **maintains, cherche, locates, recall steps, organise, sequence, choisit, coordinates, etc.**	
	7	Recommence à préparer une des tâches (pommes de terre, viande ou gâteau) qui sont déjà commencées ou complétées, s'en rend compte et s'arrête: coter **réagit, recall steps, (possiblement id. obstacles), choisit, question, analyse, juge =2**	
	7.1	Ne s'en rend pas compte, coter **réagit, recall steps, possiblement id. obstacles, choisit, questions, analyse, juge =1**	
	9	Durée de la tâche trop longue soit à cause d'un problème de **séquence** ou de lenteur d'exécution **(times)** (ou les 2), de durée **(cont. p/r durée)** ou faire les choses au bon moment **(cont. p/r temps)** ou de **flows** prend des pauses trop longues) : durée entre 50 et 55 minutes, **times (possiblement d'autres descripteurs)** = 2, impact	

		mineur	
	9.1	durée de plus de 55 minutes **times** (possiblement d'autres descripteurs, **ex cont. p/r durée)** =1, impact majeur	

Autres erreurs :

No.	Description de l'erreur + descripteurs impliqués + score

Séquences des plats :

No.

___ Préparer et faire cuire le gâteau (commencer par lire la recette du gâteau et ouvrir le four)

___ Après le gâteau, avant la viande, préparer et faire cuire les pommes de terre pour une personne (sortir la bonne quantité de pommes de terre)

___ Préparer la viande en vue de la faire cuire

___ Faire cuire la viande pour 1 pers. lorsque la cuisson des pommes de terre est assez avancée (au moment approprié)

___ Servir les pommes de terre et la viande en même temps, pour une personne

___ Sortir le gâteau

___ Ranger et nettoyer la cuisine pendant la tâche et à la fin

Descripteurs non utilisés : discrimine, apparie, reconnaît, nomme, catégorise, cont. p/r lieu, utilise les objets, utilise son corps, se rappelle des étapes, flows ?, coordinates, ajuste

Erreurs Observées
Gâteau

Obs.	No.	Description de l'erreur	Commentaires
	1	Commence à lire la recette, s'arrête après quelques instants pour faire quelque chose dans une autre tâche (ex vérifier la cuisson des patates), reprend la lecture : **coter maintient, module, cont. p/r temps, sequence = 2,** si des interruptions fréquentes affectent la durée = **1**	
	2	Pendant la lecture de la recette «**j'ai de la misère à me concentrer »,** mais fait des efforts quand même**, coter maintient =2**	
	3	Brasse la pâte, lit la recette, revient brasser la pâte : **séquence logique, acceptable**	
	4	Choisit le moule à muffin pour faire cuire le gâteau : possiblement parce que c'est le premier qu'elle trouve dans l'armoire, parce qu'elle lit la recette des muffins sur la boîte ou parce qu'elle trouve cela plus intéressant, coter **moduler**, possiblement **cherche, localise**, et **recall steps**, **choisit, knows goal, questions, analyse, juge = 1**	
	4.1	Se rend compte de son erreur et change : **moduler**, **recall steps, choisit, knows goal, questions, analyse, juge = 2** (possiblement **cherche** et **localise**)	
	5	N'ouvre pas le four en premier pour préparer le gâteau, tel qu'écrit dans la recette coter **recall steps, cont. p/r temps, id. obstacle, séquence, QAJ** = 2	
	6	Trouve l'information ou l'accessoire après une longue recherche sur la boîte à gâteau, ou dans l'armoire, coter **cherche, localise,** possiblement **module, séquence =2**	
	6.1	Ne trouve pas, dans la recette, la quantité d'eau à mettre dans le mélange et a besoin qu'on l'aide : **cherche, localise,** possiblement **module, QAJ = 1**	
	7	<u>Demande de l'aide plutôt que de chercher lui-même</u> pour savoir où se trouve le bol, le moule ou la quantité d'eau à mettre dans le mélange… **choisit, cherche, localise,** possiblement <u>**persiste**</u> et **id. obstacles, QAJ =2**	
	8	Ne trouve pas, dans l'armoire ou le tiroir, le bol ou l'accessoire et a besoin qu'on l'aide :	

		pc que la recherche n'est pas planifiée en séquences ordonnées **: cherche, localise,** possiblement **module et discrimine, séquence, QAJ = 1**	
	8.1	Ne trouve pas, dans l'armoire ou le tiroir, le bol ou l'accessoire et a besoin qu'on l'aide : pc qu'il ne la « voit » pas, bien que l'objet soit visible dans l'armoire et que sa recherche est bien organisée : coter **localise et** possiblement **discrimine** si l'armoire est encombrée **=1**	
	9	Retourne plusieurs fois de suite chercher des ustensiles pour la même tâche,(ex. cherche bol, verse la poudre, va chercher cuillère) : va les chercher un à un pour les rassembler, coter **organise, séquence, (**possiblement **QAJ) =2**	
	10	Choisit un ustensile inadéquat (pas le plus approprié) après avoir fait une recherche: ex. couteau trop gros pour les besoins de la tâche, coter **choisit,** possiblement **id. obstacles, cherche, localise, réagit, question, analyse, judge =2** ;	
	11	A de la difficulté à ouvrir le sachet de gâteau avec ses mains, et ne fait pas de recherche pour trouver un meilleur outil (ex. des ciseaux), coter **choisit, questionne, analyse, juge =2,** possiblement **chercher =2** si on voit que la personne jette un coup d'œil et s'arrête.	
	11.1	Déchire le sachet avec ses dents lorsqu'elle a de la difficulté à l'ouvrir avec ses mains plutôt que de chercher des ciseaux ; possiblement **utilise son corps**, **choisit, questionne, analyse, juge = 2**	
	11.2	Scie le sachet du gâteau avec un couteau de façon non-sécuritaire, coter **utilise les objets, choisit, id. obstacles, questionne, analyse, judge =1 ou 2**	
	11.3	Ouvre le sachet avec ses mains en forçant très fort parce que le sac est difficile à ouvrir et échappe la poudre sur lui et sur la table, fait un dégât: possiblement **calibre, choisit,** possiblement **id. obstacle, questionne, analyse, juge =2 (**parce que pas blessé, voir patates et pelures)	
	12	Montre un bol en plastique et se demande si c'est un moule à gâteau, se réajuste et choisit le moule, coter **reconnaît, utilise les objets =2**	
	12.1	Utilise le bol en plastique ou un chaudron comme un moule pour le mettre au four (intervention nécessaire), coter **reconnaît, utilise les objets, id. obstacles, questionne,**	

		analyse, juge =1	
	13	Verse l'eau de la tasse avec difficulté, ne sait comment placer son bras et sa main : a un mouvement bizarre : **utilise son corps, ajuste =2**	
	14	Cherche et trouve les indications « visibles » pour la mesure de l'eau sur la tasse à mesurer après plusieurs essais de recherche, coter **cherche**, **localise =2 ;**	
	14.1	Si ne les trouve pas et a besoin d'aide coter **cherche**, **localise, possiblement QAJ =1**	
	15	Mesure mal (ou ne vérifie pas avec précision) et verse trop ou pas assez d'eau dans le mélange à gâteau, dépendant du surplus : 1/4 de tasse et moins : **cherche, localise, (**possiblement **module, réagit**, **contextualise à la durée** si verse trop rapidement ou trop lentement**), questionne, analyse, juge** = 2,	
	15.1	au-delà de ¼ tasse **cherche, localise, identifie les obstacles, (**possiblement **contextualise à la durée** si verse trop rapidement ou trop lentement**)**, possiblement **réagit, questionne, analyse, juge =1**	
	15.2	Ne mesure pas l'eau qu'il verse dans le mélange à gâteau (ex prend l'eau qui est dans la bouilloire, se sert de la tasse sans regarder la mesure, ou met le moule directement sous le robinet), coter **recall steps, choisit, id. obstacles, question, analyse, judge =2**	
	15.3	Ne mesure pas et ne met pas assez d'eau et le gâteau est trop sec, coter **réagit, (**possiblement **recall step** si ne mesure pas, **contextualise à la durée** si verse trop rapidement ou trop lentement**), choisit, id. obstacles, question, analyse, judge =1**	
	16	Vérifie plusieurs fois la quantité d'eau sur la tasse, si se trompe et met trop ou pas assez d'eau, **cherche, questionne, analyse =2, localise,** possiblement **se rappelle des étapes, choisit, juge =1** (cherche, questionne, analyse restent à 2 parce que le questionnement est là, l'analyse est faite par de multiples façons, par contre la décision finale est problématique car ne se rappelle pas de la quantité)	
	17	Verse une tasse d'eau dans la tasse à mesurer, vérifie la recette, se place pour verser l'eau dans le bol, s'arrête pour vérifier la recette à nouveau, verse l'eau : coter **se rappelle des étapes, séquence, questionne, analyse, juge,** (possiblement **arrête, agit avec fluidité)**	

		=2.	
	18	Met de l'eau bouillante dans le mélange à gâteau (on voit la vapeur et les pépites fondent dans la pâte), coter **réagit, recall step, choisit, id. obstacles, question, analyse, juge =2**	
	19	La pâte à gâteau n'est pas assez mélangée (reste de la poudre dans le bol) et la verse quand même dans le moule; coter **réagit, (cont. p/r durée** si brasse pas assez longtemps), **cont. p/r temps, id. obstacle, questionne, analyse, juge =2 ou 1**	
	19.1	Dépendant du résultat final de la cuisson du gâteau : ex. si reste beaucoup de poudre sur le gâteau**, coter : réagit, (cont. p/r durée** si brasse pas assez longtemps)**, cont. p/r temps, id. obstacle, questionne, analyse, juge =2 ou 1**	
	20	Ne s'arrête pas de brasser la pâte à gâteau même lorsqu'elle est bien mélangée, brasse trop longtemps même si on voit bien que la pâte est OK: coter **stops, réagit, cont. p/r durée, cont. p/r temps, question, analyse, juge =2,** si a un effet sur le temps total, ajouter **times =2 ; =1** si persévération importante	
	21	Graisse le moule alors que la recette indique d'utiliser un moule « non-graissé » n'a pas lu la recette avant de le graisser : **recall steps, sequence, choisit =2**	
		Vérifie la recette après et se corrige ou fait la remarque, coter **sequence = 2** A lu la recette, et graisse le moule quand même **: se rappelle des étapes, choisit =2**	
	22	Ne sait pas ce que représentent les symboles sur la cuisinière et a besoin d'aide pour les comprendre, coter **nomme, id. obstacles =1**	
	23	Dit « un chaudron » pour dire un moule, **nomme =2 (sans grande conséquence).**	
	24	Ouvre le four au mauvais degré (ex. 325 au lieu de 350) : **choisit,** (possiblement **cherche, locates, module), id. obstacles, QAJ =2**	
	25	Ne vérifie pas l'heure au moment de **placer** le **gâteau** au four, mais vérifie la cuisson de temps en temps, et vérifie que le gâteau est cuit lorsqu'elle le sort, **recall steps, id. obstacles, sequence, possiblement choisit =2**	
	25.1	Vérifie l'heure en retard, après avoir mis le gâteau au four et tente d'ajuster la durée : **Se rappelle des étapes cont. p/r temps**, **sequence,** possiblement **id. obstacles =2** et vérifie que le gâteau est cuit lorsqu'elle le sort.	
	25.2	Ne vérifie pas l'heure au moment **de placer** le **gâteau** au four, ni si le gâteau est cuit : **recall steps, choisit, id. obstacles, questionne, analyse, juge =1**	
	26	Respecte le temps de cuisson du gâteau avant de fermer le four, mais ne vérifie pas la	

		cuisson du gâteau : **questionne, analyse, juge = 2 ou 3** (dépendant de l'allure du gâteau, pas un problème majeur…	
	27	Sort le gâteau trop tôt (ex après 15 minutes), il n'est pas cuit (pâte molle au centre) mais le laisse quand même sorti : possiblement **module**, (si vérifie et ne remarque pas que la pâte n'est pas cuite, coter **réagit)**, , **cont. p/r temps, cont. p/r durée**, possiblement **searches, locates et recall steps** si n'a pas vérifié la cuisson, possiblement **choisit** si veut faire arriver les plats en même temps, **id. obstacles, questionne, analyse, juge=1**	
	27.1	Si le vérifie (après avoir fermé le rond) et le remet au four : **cont. p/r temps, cont. p/r durée, séquence,** possiblement **id. obstacles, questionne, analyse, juge=2**	
	27.2	Si le sort du four rapidement et visiblement pour vérifier la cuisson **:** (possiblement **id. obstacles), choisit =2** (pas d'impact majeur)	
	27.3	Sort le gâteau plus tôt (5 min. et moins)(durée pas tout à fait assez longue), mais il vérifie et il est cuit, puis <u>ferme le four</u>, : **cont. p/r durée, cont. p/r temps, id. obstacles =2 (on questionne les descripteurs : a-t-il été chanceux ?)**	
	27.4	Le gâteau est <u>un peu brûlé</u> à cause de la durée de cuisson trop longue : coter **cont. p/r temps, cont. p/r durée,** (possiblement **sequence), question, analyse, juge,** **recall steps et id. obstacles** si oublie de mesurer ou de vérifier le temps ou oublie de vérifier la cuisson, (possiblement **cherche, locates** si a mis le rond trop élevé)**… = 2**	
	28	Mange la pâte <u>au fur et à mesure</u> en mélangeant le gâteau (à la cuillèrée), coter **cont. p/r temps, sequence, choisit, QAJ =2** (pas majeur, tout dépend de la quantité)	
	29	Pendant l'attente de la cuisson du gâteau et des patates, se distrait (ex. en lisant la boîte à gâteau, en explorant un objet ou le contenu des armoires) et **doit être rappelé de reprendre la tâche** parce qu'il est trop absorbé (intervention nécessaire), coter **maintient, moduler, cont. p/r temps, knows goal, questionne, analyse, juge, starts, (possiblement flows et times) = 1**	

	29.1	Pendant l'attente de la cuisson du gâteau et des patates, se distrait, **mais recommence** la tâche **après un délai** inutile, coter **maintient, moduler, cont. p/r temps, knows goal, questionne, analyse, juge, starts, (possiblement flows ?) = 2**	
	30	Utilise les ustensiles ayant servi à la viande crue pour vérifier la cuisson du gâteau : **se rappelle des étapes, choisit, id. obstacles, questionne, analyse, juge =1**	
	31	Ne sort pas le gâteau tout de suite après avoir fermé le four (selon ce qui est écrit dans la recette) et le laisse dans le four quelques minutes : **cont. p/r temps, se rappelle des étapes, id. obstacles, séquence, QAJ = 2**	
	32	Place le gâteau chaud directement sur la table, (sans sous-plat), **cont. p/r lieu, se rappelle des étapes, id. obstacle, QAJ =2**	
	33	Oublie de fermer le four après la cuisson du gâteau ou les ronds après la cuisson des patates et/ou de la viande : **recall steps, cherche, localise, id. obstacles, question, analyse, judge = 1**	
		Nettoyage mal fait, reste des choses à ranger ou de la saleté, **cherche, localise**, possiblement **se rappelle des étapes** si oublie de nettoyer une partie des surfaces de travail, possiblement **réagit** si laisse de la saleté visible, **questionne, analyse, juge** =2 (possiblement **continues si arrêt volontaire**) ; =1 si très incomplet	
		Nettoie la surface de travail et prend du temps à s'arrêter de frotter même quand la surface est propre: **stops, cherche, localise, questionne, analyse, juge =2**	
		Échappe boîte et tasse, pcque va vite	
		Brasse un peu trop énergiquement la pâte :	

Erreurs Observées
Patates

Obs.	No.	Description de l'erreur	Commentaires
	1	Choisit une trop grande quantité de patates par rapport à sa portion habituelle (ex.5 patates, 4 boulettes (dépendant de la stature de la personne!): coter **choisit, id. obstacles**, **question, analyse et judge =1 (=2** si quantité questionnable, moindre)	
	2	Retourne plusieurs fois de suite chercher des ustensiles pour la même sous-tâche, va les chercher un à un pour les rassembler, coter **organise, séquence, QAJ** =2	
	3	Demande de l'aide plutôt que de chercher lui-même pour savoir où se trouve le couteau, le pèle-patates …**choisit, cherche, localise,** possiblement **persiste** et **id. obstacles, QAJ =2**	
	3.1	Demande plusieurs fois ou demande exagérée (où se trouve l'évier ?) **choisit, cherche, persiste =1, ~~knows goal~~, id.obstacles,** possiblement **persiste =2**	
		Trouve l'information ou l'accessoire après une longue recherche sur la boîte à gâteau, ou dans l'armoire, coter **cherche, localise,** possiblement **module, séquence =2**	
	4	Choisit un ustensile inadéquat (pas le plus approprié) pour peler les patates après avoir fait une recherche bien qu'il y en ait des plus adéquats: ex. couteau trop gros pour les besoins de la tâche, coter **cherche, (**possiblement **locates)**, **choisit, id. obstacles, question, analyse, judge =2**	
	5	Oublie de peler les patates : **recall steps = 2,** possiblement **réagit** si l'eau devient brune a cause de la terre qui décolle des patates	
	6	Commence à peler les pommes de terre (avec pèle-patates), interrompt pour chercher couteau dont il aura besoin tout à l'heure et revient continuer de peler avec pèle-patates, coter **maintient, module, séquence = 2**	
	7	Pèle des patates avec un pèle-patates qui n'est pas assez aiguisé, mais ne change pas d'outil, même si ça va mal et que c'est très long : **choisit, réagit , id. obstacle,**	

		questionne, analyse, juge =2	
	8	Appuie la pomme de terre sur elle pour la stabiliser pendant qu'elle pèle et elle salit ses vêtements : **utilise son corps, cont. p/r lieu, se rappelle des étapes, id. obstacles choisit, questionne, analyse, juge =2 (si léger) =1 si appuie fortement et se salit ++**	
	9	Se coupe avec couteau ou pèle-patate, coter **calibre et/ou coordinates =1**	
	10	Difficulté à coordonner les mouvements pour couper les patates : **coordinates =2**	
	11	La patate glisse de ses mains pendant qu'elle pèle **calibre, coordinates =2 ou 1** si tombe par terre ou glisse avec vitesse sur le comptoir	
	12	Pèle avec trop de vigueur, et les pelures tombent à terre et sur son chandail et lent à s'ajuster : **réagit, calibre, ajuste, id. obstacles, QAJ = 2**	
	13	Pèle les pommes de terre, se lave les mains, retourne prendre les pommes de terre (séquence non-logique), coter **séquence, cont. p/r temps, questionne, analyse, juge = 2**	
	13.1	Si se lave les mains à répétition (compulsion= souvent et longtemps), coter **séquence, cont. p/r temps, id. obstacles, questionne, analyse, juge** = 1 (impact majeur)	
	14	Continue de peler la pomme de terre même lorsqu'elle est complètement pelée; coter **réagit**, **stops, id. obstacles, questionne, analyse, juge=2,** si reste un dé à coudre =1	
	15	Remarque une tasse à mesurer qui traîne, interrompt la préparation des patates et range la tasse à mesurer…coter **module, maintient, séquence** =2	
	16	Utilise des ciseaux (ou quelque chose de semblable) pour couper les patates : **utilise les objets, choisit, id. obstacles, QAJ =1**	
	17	Coupe les patates sur du papier brun qui se déchire (morceaux de papier dans les patates), coter **réagit, utilise les objets**, **choisit, id. obstacles, QAJ =2**	
	17.1	Coupe les patates directement sur le comptoir ou la table plutôt que sur une planche à découper, **cont. p/r lieu, recall steps, QAJ, choisit =2**	

	18	Le couteau est à l'envers, lame vers le haut et continue de couper, se blesse ou ne change pas la lame de côté malgré la difficulté : **discrimine, réagit, id. obstacles, choisit, QAJ** =1	
	18.1	Après un certain temps, change de stratégie, mais ça lui prend du temps avant de remarquer ce problème, **discrimine, réagit, id. obstacles, choisit QAJ=2**	
	19	Touche l'intérieur de la poubelle ou du couvercle de la poubelle en tenant le couvercle ouvert et retourne toucher les aliments sans se laver les mains : **se rappelle des étapes, id. obstacles, questionne, analyse, juge =1**	
	20	Mouvements brusques pendant qu'elle brasse les patates, l'eau déborde à côté dans la poêle, coter **calibre, ajuste, id. obstacles,** (possiblement **réagit** si ne diminue pas de force) **=2**	
	20.1	Se corrige, coter **calibre** seulement =2	
	21	Demande si elle peut ajouter d'autres ingrédients dans les pommes de terre, mais ne le fait pas : **pas de problème**	
	21.1	Ajoute de la margarine dans les patates à la cuisson ou après : acceptable	
	21.2	Si elle ajoute d'autres ingrédients (ex. œufs ou lait), coter **recall steps, knows goal, choisit** = **2**	
	22	Se déplace plusieurs fois du comptoir à la cuisinière avec quelques morceaux de patates à la fois (2 surfaces de travail non-adjacentes et doit se déplacer de plusieurs pas), **coter organise, séquence, choisit, QAJ =2 , =1 si vraiment problématique (ex** ralentit ++ la tâche)	
	23	Met la main sur le rond pour savoir si le rond est chaud, coter **utilise son corps**, **choisit, id. obstacles, questions, analyse, juge =2 ou 1** si se brûle (elle réagit avec un retrait rapide)	
	24	Mentionne que le chaudron est trop petit, mais ne fait pas de recherche (ou ne fait pas de recherche suffisante) pour le remplacer : si vraiment trop petit: **cherche, id. obstacles, choisit, analyse, juge = 1 si ce choix cause un problème** Si le chaudron est OK malgré sa plainte, coter **id. obstacles, choisit, cherche, analyse, juge =2**	
	25	Allume le mauvais rond ou place le chaudron sur le mauvais rond après avoir ouvert le rond (possiblement parce qu'elle a de la difficulté à comprendre et associer les concepts	

		représentés par les symboles et les boutons de la cuisinière), ou qu'elle n'a pas porté attention suffisamment : si s'en rend compte tout de suite et corrige son erreur : **problème de catégorise et** possiblement **module, chercher, localiser =2 ou acceptable.**	
	25.1	Si elle poursuit la tâche (fait autre chose) et qu'elle prend du temps avant de s'apercevoir que c'est le mauvais rond qui est ouvert, (elle prend du temps avant de remarquer les indices et de faire un changement) : **coter catégorise,** possiblement **module, cherche, localise, réagit, choisit, id. obst., QAJ =2** Si très long avant de s'en apercevoir **(+10min.)** possiblement **contextualise p/r temps et durée =1**	
	25.2	Si elle ouvre le four au lieu d'un rond et prend du temps avant de s'en apercevoir: coter possiblement **module, discrimine, utilise les objets, nomme** dépendant du problème, **catégorise, cherche, localise, choisit, id. obst. QAJ = 1** (les boutons sont différents) Si très long avant de s'en apercevoir **(+10min.),** possiblement **contextualise p/r temps et durée =1**	
	26	Attend que l'eau soit bouillante avant de mettre les patates à cuire (comme pour les pâtes (attente inutile qui prolonge la durée de préparation du repas) : si elle a mis l'eau à bouillir dès le début et que cela ne retarde pas la préparation du repas : **acceptable**	
	26.1	Si l'attente de l'eau bouillante retarde la préparation du repas (ex. pèle les patates puis met l'eau à bouillir), **cont. p/r temps, recall step**, possiblement **id. obstacles, et séquence, questionne, analyse, juge** (possiblement **times) =2**	
	27	Ajuste le rond à plusieurs reprises en peu de temps, après vérification ou non, pendant la cuisson des patates (monte, baisse le rond): répète une action trop souvent ce qui pourrait ralentir la progression de la tâche : possiblement **se rappelle des étapes et cont. p/r durée,** possiblement **id. obstacles, choisit, questionne, analyse, juge =2**	
	28	Range le sel à sa place trop tôt et doit le ressortir pour l'utiliser encore : coter **cont. p/r temps, organise**, **séquence, = 2**	
	29	La cuisson des patates prend possiblement trop de temps, mais pas d'impact majeur sur la durée totale de la préparation du repas, ▪ Si ne sont pas coupées en morceaux, ▪ n'ajuste pas la chaleur du rond, (chaleur trop basse) : coter **cont. p/r durée, id. obstacles, choisit, QAJ, times = 2**	
	29.1	La cuisson des patates prend trop de temps et a un impact majeur sur la durée totale de la	

		préparation du repas (attente prolongée de min. 5 minutes), coter **cont. p/r durée**, **id. obstacles**, **choisit, QAJ, times =1**	
	30	Pendant la cuisson, pique les patates avec la fourchette ou le couteau à répétition, et avec peu de délai entre chaque « pique » pour vérifier si elles sont cuites… **(possiblement stops ?)**, **cont. p/r durée, cont. p/r temps, questionne, analyse, juge=2**	
	31	Ne remarque pas que l'eau des patates bout +++ ou que les boulettes de viande cuisent trop fort pcq trop concentré sur une autre partie de la tâche et ne réagit pas ou prend du temps avant de réagir: coter **réagit, module, id. obstacle, questionne, analyse, juge = 2 si problème de débordement, ou 3**	
	31.1	Prend trop de temps à remarquer que l'eau bout +++ ou que la viande cuit trop fort ce qui fait que le chaudron déborde ou que les boulettes de viande brûlent (et ce n'est pas ce qu'elle souhaite), coter **réagit, module, id. obstacle, questionne, analyse, juge = 1**	
	32	Fait des patates pilées parce que c'est son habitude, oublie la consigne de faire des patates bouillies (dit « je fais toujours des patates pilées ») coter **recall step**, **choisit et knows goal, QAJ =1**	
	33	Ne vérifie pas si les patates sont cuites avant de cesser la cuisson et de les mettre dans l'assiette, mais elles sont assez cuites : coter **recall steps, id. obstacles**, **questionne, analyse, juge = 2**	
	33.1	N'a pas vérifié la cuisson et doit remettre les patates à cuire parce que pas assez cuites, coter seulement **recall steps, id. obstacles**, **questionne =2**	
	33.2	A vérifié les patates : elles ne sont pas assez cuites (encore croquantes), mais les laisse dans l'assiette quand même, coter **cont. p/r durée, cont. p/r temps, id. obstacle, choisit, analyse, judge (** possiblement **recall steps et question** si n'a pas vérifié avant de les mettre dans l'assiette) **= 1** **Vérifier s'il aime les patates pas trop cuites (croquantes) : si oui, pas de problème**	
	34	Mange les patates et la viande au fur et à mesure pendant qu'il les fait cuire, coter possiblement **module**, **cont. p/r temps, sequence, choisit, QAJ =2** (pas majeur, tout dépend de la quantité)	
	35	Oublie de fermer le rond après la cuisson des patates et/ou de la viande : **recall steps, id. obstacles, question, analyse, judge = 1**	
	36	Sort deux assiettes pour servir un repas pour deux personnes **(le but est différent)** coter	

		knows goal, choisit, id. obstacles, question, analyse, juge = 1; se corrige elle-même avant d'avoir terminé **knows goal, choisit, id. obstacles, question, analyse, juge = 2**	
	36.2	Difficulté à assortir une assiette avec une pile d'assiettes de même grandeur lorsque la range dans l'armoire (une assiette avec une autre de même grandeur, coter **matches (assortir) =2 (et d'autres : chercher, localiser, etc)**	
	36.3	Met les patates dans assiette ayant eu la viande crue, coter **choisit, recall steps, id. obstacles, question, analyse, judge= 1**	
	37	Nettoyage mal fait, reste des choses à ranger ou de la saleté, **cherche, localise**, possiblement **se rappelle des étapes** si oublie de nettoyer une des surfaces de travail possiblement **réagit** si laisse de la saleté visible**, questionne, analyse, juge** =2 (possiblement **continues si arrêt volontaire**) ; =1 si très incomplet	
	37.1	Nettoie la surface de travail et prend du temps à s'arrêter de frotter même quand la surface est propre: **stops, cherche, localise, questionne, analyse, juge =2**	
	38	La porte du réfrigérateur n'est pas complètement fermée lorsqu'il termine (qq centimètres) : possiblement **cherche, localise, réagit, et id. obstacle, questionne, analyse,** ~~**juge,** possiblement **calibre =2**~~ **juge =1** possiblement **calibre =2**	

Erreurs Observées
Viande

Obs.	No.	Description de l'erreur	Commentaires
	1	Choisit une trop grande quantité de viande par rapport à sa portion habituelle (ex. 4 boulettes (dépendant de la stature de la personne!): coter **choisit, questionne, analyse et juge =1 (=2** si quantité questionnable, moindre)	
	1.1	Si elle reconnaît que la quantité est trop grande lorsque l'assiette est servie, coter **choisit, question, analyse =1, juge** = 2;	
	2	Retourne plusieurs fois de suite chercher des ustensiles pour la même sous-tâche, va les chercher un à un pour les rassembler, coter **organise, séquence, QAJ** =2	
	3	Choisit un ustensile inadéquat (pas le plus approprié) après avoir fait une recherche bien qu'il y en ait des plus adéquats: ex. couteau trop gros pour les besoins de la tâche, coter **cherche,** (possiblement **locates**), **choisit,** possiblement **id. obstacles si ça cause problème, questionne, analyse, juge =2**	
	4	A besoin d'aide pour trouver la viande ou la poèle, bien que sa recherche est organisée: pc qu'il ne la « voit » pas (bien que l'objet soit visible) : coter **localise,** possiblement **discrimine =1**	
	4.1	pc que la recherche n'est pas planifiée en séquences ordonnées pour faciliter la recherche; coter **cherche, localise,** possiblement **module et discrimine** (si l'objet est visible mais que le réfrigérateur est encombré), **séquence, QAJ = 1**	
	5	<u>Demande de l'aide plutôt que de chercher lui-même</u> pour savoir où se trouve une spatule, la poèle… **choisit, cherche, localise,** possiblement **persiste** et **id. obstacles, QAJ =2**	
	5.1	Demande plusieurs fois ou demande exagérée (où se trouve l'évier ?) **choisit =2, cherche, localise, QAJ,** possiblement **persiste =2**	
	6	Dépose la viande crue directement sur la table : coter **cont. p/r lieu**, **QA juge = 2**	
	7	Après avoir fait les boulettes, laisse **le reste de viande crue** sur le comptoir tout le long de la cuisson et tarde avant de mettre le reste de viande crue au réfrigérateur : **cont. p/r temps, au lieu, juge** =2	
	7.1	Range la viande au frigo dans une assiette, ▪ mais sans l'emballer : **recall step, id. obstacles, questionne analyse, juge =1**	

	7.2	▪ et couvre la viande avec une assiette parce qu'il n'a pas trouvé le papier-saran: **cherche, localise, choisit, questionne, analyse, juge =2**	
	8	Mange de la viande crue : **id. obstacles, choisit, question, analyse, judge =1**	
	9	Passe ses mains dans ses cheveux, ou sous son nez pendant la préparation dans la cuisine (et/ou avant ou après avoir manipulé la viande), sans se laver les mains, coter **cont. p/ r temps, recall steps, id. obstacles, question, analyse, juge =1**	
	9.1	Éternue dans ses mains, au-dessus des aliments, coter **cont. p/r lieu**, possiblement **recall step, id. obst., QAJ**	
	10	Oublie de faire des boulettes de viande et fait cuire la viande en « miettes », coter **recall steps, knows goal, choisit, QAJ =1**	
	11	Oublie de faire cuire la boulette de viande parce qu'il l'a rangé au frigo : coter possiblement **moduler, recall steps, knows goal, QAJ, commence =1**	
	12	Ne se lave pas les mains après avoir manipulé la viande, coter possiblement **cont. p/r temps, recall steps, réagit, id. obstacles, Q. A., juge =1**	
	12.1	Si se lave les mains à répétition, ie souvent et non-nécessaire, coter possiblement **discrimine**, **cont. p/r temps, séquence, questionne, analyse, juge** et aussi possiblement **flows = 1** (impact majeur sur la tâche, ex temps total)	
	13	Ajoute des ingrédients (œuf, oignon, etc) ou des épices supplémentaires à la viande, ex. sauce Worcestershire: **acceptable**	
	14	Allume le mauvais rond ou place le chaudron sur le mauvais rond après avoir ouvert le rond (possiblement parce qu'elle a de la difficulté à comprendre et associer les concepts représentés par les symboles et les boutons de la cuisinière), ou qu'elle n'a pas porté attention suffisamment : si s'en rend compte tout de suite et corrige son erreur : **problème de catégorise et** possiblement **module, chercher, localiser =2 ou acceptable.**	
	14.1	Si elle poursuit la tâche (fait autre chose) et qu'elle prend du temps avant de s'apercevoir que c'est le mauvais rond qui est ouvert, (elle prend du temps avant de remarquer les indices et de faire un changement) : **coter catégorise,** possiblement **module, cherche, localise, réagit, choisit, id. obst., QAJ =2** Si très long avant de s'en apercevoir **(+10min.)** possiblement **contextualise p/r temps et durée =1**	
	14.2	Si elle ouvre le four au lieu d'un rond et prend du temps avant de s'en apercevoir: coter possiblement **module, discrimine, utilise les objets, nomme** dépendant du problème,	

		catégorise, cherche, localise, choisit, id. obst. QAJ = 1 (les boutons sont différents) Si très long avant de s'en apercevoir **(+10min.)**, possiblement **contextualise p/r temps et durée =1**	
	15	Remarque une tasse à mesurer qui traîne, interrompt la préparation de la viande et range la tasse à mesurer…coter **module, maintient, séquence,** possiblement **agit avec fluidité** si hésite **=2**	
	16	Touche l'intérieur de la poubelle ou du couvercle de la poubelle en tenant le couvercle ouvert et retourne toucher les aliments sans se laver les mains : **se rappelle des étapes, questionne, analyse, juge =2**	
	17	Met la main dans la poèle ou sur le rond pour savoir s'il est assez chaud, coter **utilise son corps, id. obstacles, choisit, questions, analyse, juge =2 ou 1** si se brûle (elle réagit avec un retrait rapide)	
	18	Met la poêle vide sur un rond ouvert trop longtemps, parce que s'éloigne pour peler les patates et long délai avant de revenir à la poèle, celle-ci est devenue très chaude (risque de se brûler) : ▪ coter **moduler**, **cont. p/r temps, séquence =2** (mauvais moment pour revenir); **réagit, QA juge** (ne réagit pas à la fumée, à l'odeur) **=2**;	
	18.1	▪ si le délai est trop long, fumée et danger imminent de se brûler : **séquence=2 moduler**, **réagit, cont. p/r temps, QA juge = 1**	
	19	Ouvre le rond trop fort, fait cuire la viande et elle brûle : **recall steps, choisit, réagit, id. obstacles, questionne, analyse, juge, =2 ou 1**	
	20	Fait chauffer la poèle très fort et met de la margarine dans la poèle très chaude et risque de brûlure : possiblement **module, réagit**, **recall steps, et cont. p/r temps, id. obstacles, choisit, questionne, analyse, juge =2 ou 1**	
	21	Ajuste le rond à plusieurs reprises en peu de temps, après vérification ou non, pendant la cuisson de la viande (monte, baisse le rond): répète une action trop souvent ce qui pourrait ralentir la progression de la tâche : possiblement **se rappelle des étapes et cont. p/r durée,** possiblement **id. obstacles, choisit, questionne, analyse, juge =2**	
	22	Manque de force et échappe la boulette dans la poèle (n'applique pas la force qu'il faudrait), **calibre** =2	
	23	Ne tient pas la poèle pendant qu'elle tape les boulettes ou retourne les boulettes de viande pendant la cuisson, la poêle se déplace dangereusement sur le rond (ne fait rien ou lente avant de la stabiliser) : **utilise son corps, réagit, id. obstacle, choisit, questionne,**	

		analyse, juge, adjusts =2 ; si tombe ou échappe =**1**	
	23.1	Tape trop fort avec la spatule sur la viande qui cuit dans la poèle ce qui rend celle-ci instable, et prend du temps avant de s'ajuster coter idem à précédent (**utilise son corps, réagit, id. obstacle, choisit, questionne, analyse, juge, adjusts =2 ;** si tombe ou échappe **=1**) et aussi **calibre =2 ou 1** dépendant de la force exercée	
	24	Range le sel à sa place trop tôt et doit le ressortir pour l'utiliser encore : coter **cont. p/r temps, organise**, **sequence, = 2**	
	25	La viande n'est pas cuite assez longtemps, elle est encore rose lorsqu'il cesse la cuisson : **cherche, localise, cont. p/r durée, id. obstacle, question, analyse, judge,** possiblement **continues ? = 1** ; s'il vérifie la cuisson et se trompe quand même, les descripteurs sont idems, **sauf questionne =2**	
	26	Met la viande cuite dans assiette ayant eu la viande crue, coter **choisit, recall steps, id. obstacles, question, analyse, judge= 1**	
	27	Sert les patates mais oublie de mettre la viande dans l'assiette : **recall steps,** (possiblement **searches, locates**), **continues, knows goal, id. obstacles, question, analyse, juge =2 ou 1**	
	28	Verse la viande dans l'assiette en mobilisant « en bloc » son bras, son épaule et le haut de son corps (elbow-up) ce qui rend le mouvement maladroit : **utilise son corps, ajuste =2**	
	29	Mange les patates et la viande <u>au fur et à mesure</u> pendant qu'il les fait cuire, coter possiblement **module**, **cont. p/r temps, sequence, choisit, QAJ =2** (pas majeur, tout dépend de la quantité)	
	30	Utilise les ustensiles ayant servi à la viande crue pour vérifier la cuisson du gâteau : **choisit, se rappelle des étapes, id. obstacles, questionne, analyse, juge=2 ou 1**	
	31	Nettoyage mal fait, reste des choses à ranger ou de la saleté, **searches, locates**, possiblement **se rappelle des étapes** si oublie de nettoyer une des surfaces de travail possiblement **réagit** si laisse de la saleté visible**, question, analyse, judge** =2 (possiblement **continues**) ; =1 si très incomplet	
	32	Nettoie la surface de travail et prend du temps à s'arrêter de frotter même quand la surface est propre: **stops, searches, locates, question, analyse, juge =2**	
	33	La porte du réfrigérateur n'est pas complètement fermée lorsqu'il termine (qq centimètres) : possiblement **cherche, localise, réagit, et id. obstacle, questionne, analyse, juge,** possiblement **calibre =2**	

	34	Ne vérifie pas si les ronds ou le four sont fermés et laisse un rond ouvert : **recall steps, questionne, analyse, juge, id. obstacles =1**	