

Positive illusions in adolescents: The relationship between academic self-
enhancement and depressive symptomatology

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Abstract

Positive illusions are systematically inflated self-perceptions of competence, and are frequently seen in areas of great difficulty. Although these illusions have been extensively documented in children and adults, the developmental trajectory remains unclear. This study investigated the relationship between positive illusions and depressive symptomatology and school stress in a sample of 78 typically developing adolescents. Adolescents who were achieving slightly below average in math significantly overestimated their performance, but adolescents did not overestimate their performance in spelling. Positive illusions in math, but not in spelling, were negatively related to depressive symptomatology. This relationship was mediated by school stress caused by parental control. Implications for positive illusion theory and development are discussed.

Résumé

Les illusions positives sont des perceptions de soi et de sa compétence systématiquement gonflées, et sont souvent observées dans les domaines de grande difficulté. Bien que ces illusions aient été abondamment documentées chez les enfants et les adultes, la trajectoire de développement reste peu évidente. Cette étude a enquêté sur la liaison entre les illusions positives et la symptomatologie dépressive et le stress scolaire dans un échantillon de 78 adolescents typiques. Les adolescents qui performaient légèrement en-dessous de la moyenne en mathématique ont surestimé leur performance, mais les adolescents n'ont pas surestimé leur exécution en orthographe. Les illusions positives en mathématique, mais pas en orthographe, étaient associées négativement à la symptomatologie dépressive. Le stress scolaire provoqué par le contrôle parental avait un effet médiateur sur cette relation. Les implications pour la théorie d'illusion positive et le développement sont discutées.

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Chapter 1

Introduction

Positive illusions are systematic cognitive errors that individuals make by overestimating their abilities (Taylor, 1989; Taylor & Brown, 1988, 1994).

Psychologists have traditionally stated that mentally healthy individuals have accurate perceptions of themselves and of their environment, and that they can accept their faults and incorporate these into a healthy, realistic view of themselves (e.g., Jahoda, 1953, 1958; Maslow, 1950; Vaillant, 1977). However, Taylor and her colleagues found that people who were facing life threatening and stressful circumstances—such as women living with breast cancer and men living with human immunodeficiency virus (HIV)—had unrealistic perceptions of their ability to cope and improbable views about their future (Taylor, 1983; Taylor, Lichtman, & Wood, 1984; Wood, Taylor, & Lichtman, 1985). For example, women with breast cancer reported having control over the disease, and that they could prevent reoccurrence, through positive thinking and similar means. These perceptions conflicted with the realities of their daily life, and with their doctors' prognosis. Taylor termed these cognitive biases *positive illusions*, noting that the perceptions were impossible, unlikely, or conflicting with objective reality.

Taylor hypothesized that positive illusions served a protective function, buffering against negative affect (Taylor & Brown, 1989, 1994; Taylor et al., 1984). Threats to individuals' self-esteem could lead to increased negative affect. By holding inflated views of their abilities, or by maintaining unrealistically optimistic views of their future, or in their control over their environment,

individuals could diminish these threats to their esteem. Also, Taylor hypothesized that having positive illusions helped maintain motivation (Taylor, 1989; Taylor & Brown, 1994). If individuals living with potentially terminal diseases accepted the reality of their situation, they may be less inclined to continue working to improve their circumstances. Believing that they had control provided them with motivation to actively seek solutions. For example, Taylor and her colleagues found that HIV positive men who had positive illusions used more active coping mechanisms than HIV positive men who did not have positive illusions (Taylor et al., 1992).

Positive illusions in children

Positive illusions have been extensively documented in both typical and atypical populations of children (e.g., Boulton & Smith, 1990; Heath, 1995; Hoza et al., 2004; Shin & Choi, 2002; Spinath & Spinath, 2005). Bjorklund and colleagues (Bjorklund & Green, 1992; Shin, Bjorklund, & Beck, 2007) have argued that positive illusions are adaptive in young children because they are novices at all tasks. They argue that if children had realistic assessments of themselves, they would become discouraged by their inefficacy and stop trying to achieve the most basic tasks. By believing that they are more skilful than they actually are, children continue to practice the tasks and gain expertise with experience (Shin et al., 2007). Children with unrealistically positive views of themselves may be at greater risk for injury because they attempt physical tasks that they are incapable of actually performing (Plumert & Schwebel, 1997), but may also be more likely to take chances and explore their environment (Bjorklund

& Green, 1992). Children with disabilities also exhibit positive illusions in domains of weakness (e.g., Hoza et al., 2002). For example, Hoza et al. (2002) found that boys with attention deficit/hyperactivity disorder (ADHD) overestimated their competence in academic, social and behavioural domains, and also found that boys with comorbid aggression overestimated their social and behavioural competence more prominently, whereas boys with low academic achievement overestimated their academic abilities. These boys had the greatest magnitude of illusion in domains that were objectively most difficult for them, and that were potentially most stressful and threatening for them. The protective nature of positive illusions in children has been empirically evaluated. Diener and Milich (1997) asked children with ADHD to evaluate their interactions with another child. Children with ADHD were unrealistically positive about their social performance, but reduced their overestimation to a more realistic level after receiving positive feedback from their partner. Heath and Glen (2005) subsequently demonstrated that children with learning disabilities (LD) that received positive feedback on their performance reduced their estimates, whereas individuals that received neutral feedback maintained their level of overestimation. These counter-intuitive results are interpreted as evidence that children were using positive illusions protectively. When they received external validation of their ability, they could permit themselves to reduce their positive illusions.

Positive illusions in adults

Positive illusions are seen in typical (e.g., Fletcher, Simpson, Thomas, & Giles, 1999; Heath & Jourden, 1997; Murray & Holmes, 1997) and atypical (e.g., Helgeson & Taylor, 1993; Siegel & Schrimshaw, 2000) adult populations.

Positive illusions were documented by Taylor and her colleagues in adults living with breast cancer, acquired immune deficiency syndrome (AIDS) and heart disease (e.g., Helgeson & Taylor, 1993; Taylor & Armor, 1996; Taylor et al., 1984; Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000; Updegraff, Taylor, Kemeny, & Wyatt, 2002), and have subsequently been documented in adults living with other stressful conditions, including disease, injury, sexual abuse, and war (Eva, Paley, Miller, & Wee, 2009; Himelein & McElrath, 1996; Johnson, 2004; Kenen, Arden-Jones, & Eeles, 2004). These illusions are also theorized to protect against threats to the individual's usual positive self-assessment and sense of control, and promote active and effective coping (Taylor & Armor, 1996).

Conflicting results in adults

Although positive illusions have been extensively documented in populations of children and adults, some have argued that positive illusions decline with age (Robins & Beer, 2001; Stipek, 1981; Yussen & Levy, 1975). For example, Yussen and Levy demonstrated that while preschoolers overestimated their performance on a memory task by 147% and third-graders overestimated by 22%, college students only overestimated their performance by 6%. Others have argued that the role of positive illusions in adults is not clear. Positive illusions may be associated with social and emotional costs that lead mentally healthy

individuals to abandon positive illusions as they mature (Colvin, Block, & Funder, 1995; Johnson, Vincent, & Ross, 1997; Robins & John, 1997). For example, Paulhaus (1998) found that self-enhancing individuals made good first impressions, but that after a few hours, peers began seeing them as hostile, defensive, and prone to bragging. Also, the protective function of positive illusions may diminish with time. For example, Robins and Beer (2001) found that the self-esteem and well-being that was associated with positive illusions decreased over students' college years, and that students who self-enhanced became increasingly disengaged from academia. Also, Ruthig, Perry, Hall and Hladkyj (2004) found that unrealistically optimistic college students that did not receive an "attribution retraining" treatment were at greater risk for voluntary course withdrawal, and had lower academic achievement. So, positive illusions have been conclusively established in children and seem to be definitively beneficial and serve a protective function, but despite extensive documentation in adult populations, positive illusions may diminish with time, experience, and familiarity, and may be associated with important costs in adulthood. The role of positive illusions may change in adolescence and adulthood, but the developmental trajectory of the cognitive bias is unclear.

Thus, the present study seeks to address this gap in the literature by evaluating positive illusions in adolescence. Obtaining a better understanding of positive illusions in this transitional period between childhood and adulthood may help us to better understand the development of positive illusions over time. Evaluating positive illusions and their function in a sample of cognitively average

adolescents may be necessary in order to determine their role in adult emotional regulation. This has important implications for theory on self-perceptions, and emotional resilience.

Chapter 2

Review of Literature

The positive illusory bias is the tendency for people to make unrealistically favourable assessments of themselves (Taylor & Brown, 1988, 1994). People frequently report their abilities in certain domains as being higher than they really are, despite knowing their actual capabilities, and despite having an accurate standard of the average individual's competence in the domain.

Traditional cognitive theories posit that mental health requires an accurate self-perception (e.g., Jahoda, 1953, 1958; Maslow, 1950; Vaillant, 1977). For example, Maslow (1950) argued that self-actualized people are able to accept their faults and the discrepancies between their self-image and their idealized self. In a review of literature, Jahoda (1958) concluded that mentally healthy perception involved perceiving the world accurately, without distortion. Perception must be accurate and objective, and inaccurate assessment was a sign of mental illness.

However, following a review of literature, Taylor and Brown (1988) challenged the idea that people are "naïve scientists", claiming that people make decisions in a self-serving manner. People frequently interpret the world in a biased way, perceiving themselves and their future more optimistically than the evidence would objectively suggest. Taylor and Brown called these biases *positive illusions*. These illusions differ from cognitive errors, as they are systematically made in a particular manner. Specifically, positive illusions occur in three ways: unrealistic self-evaluations about personal characteristics, optimism

about the future that is greater than would be reasonably expected given evidence, and an overly positive sense of control over the environment.

Rather than being a sign of poor psychological health, Taylor and Brown argued that positive illusions enhance psychological well-being, self-esteem, and self-efficacy, which can improve mood and promote happiness. Also, positive illusions promote motivation and perseverance when dealing with challenging problems and adversity. This might be most evident for people living with life-threatening diseases, who can easily feel that their future is bleak, and that they have no control over their lives. For these people, having an elevated perception of their level of control and a slightly illusory optimism about their future may provide them with the self-efficacy and motivation to take active steps to improve their situation, as much as they can.

The model proposed by Taylor and Brown also appeared to receive support by researchers in the parallel field of depressive realism. Depressive realism is the proposition that depressed people are more accurate in their perceptions of reality than non-depressed people. This research has found that people diagnosed with mild and moderate depression are less likely to have an illusory sense of control, and are less likely to enhance their traits and characteristics (e.g., Alloy & Abramson, 1979; Dobson & Franche, 1989; Haaga & Beck, 1995).

However, research has not unanimously supported the model presented by Taylor and Brown (e.g., Colvin, Block, & Funder, 1995; Knee & Zuckerman, 1996; Kruger, 1999; Paulhaus, 1998). Colvin and Block (1994) reviewed the

literature presented by Taylor and Brown, and critiqued several aspects of their formulation. Colvin and Block argued that the negative relationship between depression and positive illusions was not convincingly presented. They state that depressive realism had not been conclusively demonstrated in real environments outside of the laboratory setting, and may have little ecological validity. They also questioned the operationalization for positive illusions, as there were no external criteria for gauging the accuracy of individual's assessments of their control or future. It is not sufficient to state that people are engaging in positive illusions because they perceive their future or their abilities as being above average, as many people are indeed above average. Colvin and Block suggest that the samples studied—often consisting of middle-class college students—may have been partially justified in perceiving themselves and their future optimistically. Finally, Colvin and Block question Taylor and Brown's operationalization of mental health, stating that the criteria used were often transient mood, or the absence of depression or poor self-esteem, without considering broader criteria like personality traits or other mental disorders. In response, Taylor and Brown (1994) clarify that the research on depressive realism was only a small part of the positive illusions literature, and argued that research had been conducted in many, ecologically valid settings. However, the criticism does underscore the importance of a specific operational definition of positive illusions, and emphasizes the need for clear methodology.

Operational definitions

Positive illusions are defined as inflated self-evaluations relative to reality, but obtaining a good measure for “reality” is frequently a difficult task. In early research, researchers determined patterns of responses that indicated that groups of participants were self-enhancing (e.g., Alicke, 1985; Brown, 1986; Taylor, 1983). Researchers inferred that these perceptions were illusory, since it was logically impossible for more than half of their participants to score above the average. However, because there is no external criterion for actual ability, it is difficult to determine whether individuals are enhancing, or whether they are legitimately above average. As noted by Colvin and Block (1994), this could be a particularly important consideration in experimental work that uses samples of college students, as entire samples could be justified in rating themselves above average in certain domains. In an attempt to measure positive illusions more precisely within the group, recent research has attempted to calculate positive illusions by comparing self-perceptions to measures of reality, including ratings by others (e.g., Hoza, Pelham, Dobbs, Owens, & Pillow, 2002; Murray & Holmes, 1997), or standardized and non-standardized indices (e.g., Heath & Glen, 2005; Schneider, 1998). Using this discrepancy analysis, difference scores are calculated to measure positive illusions. This method produces a conceptually valid score that allows researchers to measure the accuracy of individual perceptions, using criteria that may provide more accurate estimates of real ability.

Research on positive illusions

Positive illusions in children with disabilities. Positive illusions have been documented in children with disabilities, such as ADHD and LD (e.g., Ohan & Johnston, 2002; Owens & Hoza, 2003). Students with ADHD and LD experience many social, academic and emotional difficulties (e.g., Hinshaw, 1992; Hoza et al., 2005; LeFever, Villers, & Morrow, 2002), and commonly experience failure in these domains. These students are at risk for low self-esteem, peer rejection, and academic difficulty, and frequently have behavioural difficulties. Despite this, students with ADHD and LD often report inflated views of their ability (e.g., Heath, 1995; Hoza et al., 2004; Hoza et al., 2002; O'Neil & Douglas, 1991; Whalen, Henker, Hinshaw, Heller, & Huber-Dressler, 1991).

In an early study, Hoza, Pelham, Milich, Pillow, and McBride (1993) compared a sample of boys between the ages of 8 and 13 years who had been diagnosed with ADHD ($n = 27$), with a group that had not been diagnosed with ADHD ($n = 25$). Hoza et al. asked the boys to complete the Self-Perception Profile for Children (SPPC; Harter, 1985), and found that the boys with ADHD did not rate themselves as being less competent or socially appropriate than control boys without ADHD. These perceptions were interpreted as being illusory, given the academic difficulties and social rejection experienced by children with ADHD. The children with ADHD in this study also did not differ from children in the control group on ratings of self-worth and depression. These differences between boys with ADHD and the control group were further reduced when internalizing symptoms were partialled out, indicating that internalizing

symptoms were related to greater self-awareness. Hoza et al. propose that the illusions could be associated with positive behavioural changes, or could protect against negative mood, since accurately perceiving their situation would be distressing, and would reduce their motivation to continue striving for future success. However, despite documenting evidence for positive illusions, Hoza et al. concluded that the boys with ADHD were inflating their self-perceptions based on a lack of group differences in academic, social, and behavioural self-perception between the boys with ADHD and those without ADHD. They did not obtain a positive illusion measure for individual boys. Later studies have attempted to correct for this limitation by comparing individual self-perceptions to a measure of actual ability.

The self-perceptions of boys with ADHD have been compared to others' ratings, and a positive-illusion score has been calculated by measuring the discrepancy between self-ratings and others' ratings. In an experimental study (Hoza, Waschbusch, Pelham, Molina, & Milich, 2000), boys with ($n = 120$) and without ($n = 65$) ADHD between the ages of 7 and 13 were rated by blind raters on their social effectiveness during an interaction with a child confederate. Boys with and without ADHD were asked to convince the confederate child to like them, and each boy participated in a manipulated successful and unsuccessful interaction. A discrepancy analysis was conducted that indicated that although coders who were blind to the manipulation and study purpose rated the boys with ADHD as being less effective than boys in the control group, the boys with ADHD rated themselves more positively than did boys in the control group. The

magnitude of the discrepancy between the boys with ADHD and observer ratings was sometimes more striking following the standardized unsuccessful interaction, indicating that the boys increased their illusions in the presence of failure in this novel task. Although they were rated as being less socially adept, the boys with ADHD were also rated as being less frustrated following a failure event. This result may further suggest that the positive illusions were protecting against distress and allowing the students to maintain their motivation to continue interacting with peers despite failure.

Hoza et al. (2002) compared self-reports of boys diagnosed with ADHD ($n = 195$) and boys not diagnosed with ADHD ($n = 73$) on the Self-Perception Profile for Children (SPPC; Harter, 1985) to teachers reports on the SPPC. They found that boys with ADHD overestimated their competence in academic, social and behavioural domains relative to their teacher's rating, but also found that the boys overestimated most in areas of greatest difficulty. Boys with comorbid aggression had greatest illusions in social and behavioural domains, whereas boys with low academic achievement had the greatest illusions in the academic domain. These studies again suggest that positive illusions are used as a response to adversity, in order to buffer against negative affect. As the children experience failure in these important domains, such as academics and social interactions, they experience a threat to their self-perception and self-esteem. Their cognitive response to this threat is to compensate by artificially enhancing their self-perceptions of ability in order to buffer against negative mood. Indeed, Hoza et al. (2002) found that boys with greater depression scores on the Childhood

Depression Inventory (CDI; Kovacs, 1992) had lower positive illusion scores and lower general self-worth, indicating a negative relationship between positive illusions and depression. This relationship could be interpreted to indicate that children who do not enhance their self-perception were more susceptible to negative affect. Although these studies support the existence of positive illusions in children with ADHD, and may have important implications on the role of positive illusions, it is not clear whether these illusions can be explained as being due to cognitive deficits. Indeed, these were young children with disabilities, and it is possible that they lack the ability to accurately appraise their abilities in their area of greatest weakness. Also, the task used by Hoza et al. (2000) was a novel task, and it is possible that the children with ADHD were not able to fully understand and incorporate the feedback that they were given into their self-assessment.

To test the ability of children with ADHD to evaluate competence, Evangelista, Owens, Golden, and Pelham (2008) investigated the self-perceptions of children with ADHD ($n = 67$, 46 boys, 21 girls) and children not diagnosed with ADHD ($n = 40$, 14 boys, 26 girls) relative to teacher ratings, as well as their evaluation of other's social competence. The children completed the SPPC, and teachers completed the Teacher Rating Scale of Child's Actual Behavior (TRSCAB; Harter, 1985), which corresponds to the SPPC. A positive illusion score was calculated by subtracting the teacher's score on the behaviour, academic, social, and athletic subscales from the child's score. Again the children with ADHD rated their abilities in scholastic, social, athletic and behavioural

domains more highly than their teacher rated them, indicating that they were overestimating their competence in these domains. However, participants were then asked to view video vignettes of child actors engaging in academic and social activities, and rate the characters' performances. The children with ADHD did not differ from the control group in their rating of characters' competence, indicating that the children with ADHD did not differ from children without ADHD in their ability to assess social and academic competence. However, although this result indicates that children with ADHD are able to assess a character's competence, Evangelista et al. did not show the students video of their own performance, so it is still unclear whether students with ADHD were overestimating their abilities in order to protect their affect, or because they were unable to assess their own competence.

The self-protective hypothesis—the hypothesis that individuals enhance their self-assessments to enhance their image and buffer negative esteem and negative affect—has been tested experimentally with children with ADHD (Diener & Milich, 1997). Diener and Milich asked boys with ADHD ($n = 30$) and without ADHD ($n = 90$) to assess their interactions with another child on a cooperative task. The boys with ADHD were paired with a boy without ADHD, and the remaining boys without ADHD were paired together. Following the interaction, participants completed a brief questionnaire rating their and their partner's performance, and their affect. The boys with ADHD were unrealistically positive in rating their interactions, reporting that their partner liked them more than did the comparison boys. In reality, the boys with ADHD's

partners reported liking them less than the comparison boys. Following this questionnaire, boys in a positive feedback condition were told that their partner reported liking them a lot and enjoyed working with them, whereas boys in a neutral feedback condition were not given any feedback. Following a second interaction, boys in the positive feedback condition reduced their self-evaluation to a more realistic level. If the children had self-reported based on a lack of knowledge of their true ability, it would have been expected that they would increase their self-evaluation following positive feedback, rather than reduce it. On the other hand, participants who received neutral feedback maintained their initial level of illusion. Diener and Milich interpret this counter-intuitive result as indicating that the positive feedback provided the children with the external validation that they needed in order to evaluate themselves more realistically.

In another experimental study of the self-protective hypothesis, Heath and Glen (2005) studied the academic self-perceptions of a group of children with learning disabilities ($n = 40$, 23 boys, 17 girls) and without LD ($n = 39$, 22 boys, 17 girls) between 10 and 13 years of age. In this study, Heath and Glen measured the discrepancy between self-perceptions and actual achievement on a standardized academic task, the Wide Range Achievement Test (third edition; WRAT-3; Wilkinson, 1993). Prior to administration of the test, students were asked to predict their performance on the spelling and math subtests. Following the administration, randomly selected students received either positive or neutral feedback, and then estimated their performance a second time. Students with LD held positive illusions in regards to their academic achievement, and predicted

they could do as well as the control students, despite achieving at a lower level. However, students with LD who received the positive feedback reduced their self-evaluation to a more accurate level, whereas students who received neutral feedback continued to inflate their self-evaluation. On the other hand, the non-LD students did not change their predictions, regardless of feedback condition. Converging with the results by Diener and Milich (1997), these findings support the self-protective hypothesis. Giving the children positive feedback reduced the threat to the children's self-esteem, such that they did not need to use positive illusions as a buffer. However, students without disabilities did not inflate their self-appraisal, and did not change their predictions following feedback.

Positive illusions in typically developing children. Positive illusions have also been measured in typically developing children, and have been consistently found in a number of domains, including physical abilities, memories, intelligence, and peer acceptance (e.g., Boulton & Smith, 1990; Plumert & Schwebel, 1997; Shin et al., 2007; Shin & Choi, 2002; Spinath & Spinath, 2005; Stipek, 1981; Stipek, 1984; Yussen & Levy, 1975). Preschool-aged children are particularly prone to overestimating their abilities by vast amounts (e.g., Schneider, 1998; Stipek, 1981; Yussen & Levy, 1975), which has led some to hypothesize that preschool age children do not yet have the cognitive or metacognitive ability to accurately estimate their abilities, or cannot differentiate between expected and desired results (Schneider, 1998; Stipek, 1981). Indeed, research has shown that the amplitude of positive illusions decreases with age (Stipek, 1981; Yussen & Levy, 1975). For example, Yussen

and Levy asked a group of preschoolers ($n = 48$, 24 boys, 24 girls), third graders ($n = 48$, 24 boys, 24 girls) and college students ($n = 48$, 7 male, 41 female) to assess their performance on a memory task. The participants predicted how many pictures out of ten they could remember in order. The preschoolers overestimated by an average of 147%, compared to approximately 22% for third graders and 6% for college students, even when given a norm reference. Also, almost half of the preschoolers predicted they would get all ten correct, even when repeating the experiment after having failed to meet their goal the first time. However, to test whether children could accurately judge performance, Schneider (1998) measured the memory and physical abilities of four year old children ($n = 24$) and six year old children ($n = 24$) on four tasks; jumping distance, ball throwing accuracy, memory span, and object retrieval. The children were asked to predict their performance, and a discrepancy score was calculated by subtracting their actual performance from their expected performance. The children systematically overestimated their abilities, but did not overestimate as dramatically on tasks on which they reported being more familiar. For example, the four year olds overestimated their jumping ability by an average of approximately 40%, compared to approximately 61% for the throwing accuracy. Also, the six year old children overestimated by a smaller margin than the four year olds, as the six year olds overestimated their performance on the jumping task by only 18%. Finally, when asked to observe the performance of another child on the throwing accuracy task and predict how well the peer would perform, the children were much more accurate in their estimates. The results of Yussen and Levy's (1975) and

Schneider's (1998) studies may indicate that children have the ability to judge performance of others, and that their overestimates are specific to their self-evaluations. However, their illusory self-perceptions may decrease with time and experience.

Bjorklund and colleagues (Bjorklund & Green, 1992; Shin et al., 2007) have argued that positive illusions are particularly adaptive to young children. They posit that positive illusions are evolutionarily adaptive, as they motivate children to persevere in the face of persistent failure. By definition, young children are novices in all domains, and are constantly exposed to failure. Children who accurately appraise their nascent abilities may become discouraged and abandon their efforts in the face of that constant failure. Children that overestimate their abilities may be encouraged to persevere, and build their skills through continued practice. On the other hand, children who are more accurate or who underestimate their abilities may be more cautious and avoid taking chances that lead to growth, or risk being left behind or rejected by more extraverted peers. Shin et al. studied this hypothesis in a laboratory experiment with kindergarten ($n = 32$, 15 girls, 17 boys), first ($n = 36$, 19 girls, 17 boys) and third grade ($n = 26$, 14 girls, 12 boys) children. Children were asked to predict how many items they could recall in a series of five difficult sort-recall tasks. The difference between predicted and actual performance on recall for initial sorts was calculated and children were categorized into high- and low-overestimation groups. Children in five of the six groups became less effective at recalling sorts over trials due to fatigue, but kindergarten and grade one children in the high-

overestimation group declined less than their peers in the low-overestimation group on subsequent sorts. Grade three children in the overestimation group were the only group to increase their performance over trials. The authors explain that children with greater illusions about their ability continued to persevere on the task, whereas other children became fatigued and discouraged as the experiment progressed.

So, positive illusions are common in children, and appear to have an adaptive function, but may reduce as children age and gain experience. It is necessary to evaluate positive illusions in cognitively mature populations in order to better understand their function.

Positive illusions in adults with disabilities. Positive illusions are common and appear to be adaptive in young children, but Taylor and Brown suggested that the positive illusory bias might be especially apparent in adverse circumstances, and be particularly constructive in instances that would typically incur depression and lack of motivation. Indeed, they extensively studied adults dealing with life threatening diseases, such as cancer, AIDS, and heart disease (e.g., Helgeson & Taylor, 1993; Taylor & Armor, 1996; Taylor et al., 1984; Taylor et al., 2000; Wood et al., 1985).

In a preliminary study, Taylor (1983) and her colleagues found that individuals going through adversity exhibited illusions regarding themselves and the future. They interviewed women ($n = 78$) with breast cancer, and found that the women held high beliefs in their abilities to cope with the disease, and believed that they had the power to prevent the cancer from returning, despite the

likelihood of recurrence. Two thirds of the women believed that they had personal control over the cancer, because of their positive attitude or positive thinking. As noted earlier, this contrasted with the views expressed by the women's significant others, and went counter to their medical prognosis. Along with this elevated sense of control, all the women made self-enhancing comparisons, as they described themselves as being better adjusted than other, hypothetical patients. The patients also tended to report only positive changes to their lives, despite the pervasive difficulties caused by the cancer. Taylor interpreted these self-evaluations as positive illusions, since they conflicted with realities of living with the disease, and diverged from their significant others', and doctors' reports. In a follow-up study, Taylor et al. (1984) administered a series of tests to these same breast cancer patients, including the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965) and the Profile of Mood States (POMS; McNair & Lorr, 1964), and found that an inflated sense of control was related to better adjustment. Taylor interprets these results as indicating that people adaptively modify their cognitions in the face of adversity in order to return to their typical psychological functioning.

This functional hypothesis was further investigated in HIV positive men ($n = 550$; Taylor et al., 1992) between the ages of 22 and 60 years. The men were administered a series of questionnaires on their knowledge and attitude towards AIDS, life orientation, perceived risk and control over AIDS, psychological distress, and health behaviours. Men who had tested positive for HIV were more likely to perceive themselves as being physically better off, or as being better at

coping with disease than hypothetical other men in their situation. Most strikingly, men who were HIV positive were also more optimistic about not developing AIDS than were men who had not been tested as HIV positive. These men frequently reported that they had developed immunity to the disease, or that they could stave it off by remaining healthy. Again, these views are interpreted as illusory, as they are counter to the reality of the situation, since the men with HIV were not less likely to develop AIDS, and were not physically better off than men without HIV. However, this illusory optimism was related to lower psychological distress, and lower hopelessness and fatalism. Interestingly, positive illusions were also related to more active coping strategies, and to more positive health behaviours. Taylor et al. suggested that positive illusions were not only indicative of better adjustment, but could also lead to positive behaviours and longer term benefits. Taylor and colleagues interpret that the men who endorsed positive illusions retained a sense of control and self-esteem necessary to maintain the motivation to strive to be healthy. As they feel that they can control the disease and are successfully coping with it, they can continue to work at being healthy. These studies may indicate that positive illusions have an adaptive function for adults living through threatening situations. However, the results of these early studies must be interpreted cautiously, as the results may not be readily generalizable. For example, the sample used by Taylor et al. (1992) was recruited from an existing cohort of men who were seeking treatment, and that was largely white, and college educated. These men may not represent the population of men in North America, and may have had reason to be optimistic about their coping

abilities and future prognosis because of their personal characteristics. Also, it is unclear what feedback these patients were receiving from their family and doctors. Patients with chronic illnesses like cancer are often encouraged to “think positively” (e.g., Wilkinson & Kitzinger, 2000), and it is unclear whether these patients received consistent and realistic feedback about their progress.

Extensive research on the effect of positive illusions on the well-being in individuals suffering from chronic disorders such as cancer, heart disease, spinal injury, and obesity has followed this early research (e.g., Eva, Paley, Miller, & Wee, 2009; Helgeson & Taylor, 1993; Kenen, Arden-Jones, & Eeles, 2004; Linde, Jeffery, Finch, Ng, & Rothman, 2004). In these circumstances, perceiving oneself as being competent and in control—even if illusory—may allow the individual to overcome threats to the person’s psychological wellbeing, and allow them to motivate themselves to persevere in the face of adversity.

Positive illusions in typical adult populations. Positive illusions have also been explored in populations that are not directly threatened by extreme or atypical circumstances, in domains such as group dynamics, athletics, and investment (e.g., Heath & Jourden, 1997; Kirschenbaum, O’Connor, & Owens, 1999; Moore, Kurtzberg, Fox, & Bazerman, 1999). For example, mutual fund investors have been found to overestimate their future, and past performance of their portfolios, and amateur golfers overestimate their abilities when selecting a golf club.

One domain that has been extensively explored is interpersonal relationships. Committed relationships are an integral part of an individual’s life,

and threats to that relationship can undermine well-being. Research has demonstrated that individuals in relationships often enhance their partners' attributes (e.g., Flannagan, Marsh, & Fuhrman, 2005; Fletcher et al., 1999; Helgeson, 1994; Murray, Holmes, & Griffin, 1996; Murray & Holmes, 1997; Sprecher, 1999), hold unrealistically optimistic views about the future of their relationships, and have an inflated sense of control over their relationships (Helgeson, 1994; Martz et al., 1998; Murray & Holmes, 1997).

Murray et al. (1996) measured spouses' ($n = 242$, 121 males, 121 females) perceptions of each other on a variety of positive and negative characteristics, such as warmth and assertiveness, by administering the author developed Interpersonal Qualities Scale. They also administered the RSES, an attachment style scale, a relationship satisfaction scale, and relationship conflict scales. Positive illusions were operationally defined as the difference between an individual's rating of their partner, and the partner's self-rating. Spouses generally rated their partners more positively than the partners rated themselves, and more in line with their reported ideal partner. These illusions were in turn highly related to reported marriage satisfaction in both spouses, so that an individual reported more satisfaction if their partner rated them higher, even if it did not match their own reality. Murray et al. argue that holding positive illusions about their partners provide spouses with the motivation to confront inevitable difficulties in the relationship. This argument parallels arguments presented by Taylor, that positive illusions are not merely defensive, but motivate active coping strategies.

However, individuals in committed relationships have also been found to enhance their partners' physical attractiveness above their own attractiveness (Dijkstra & Barelds, 2008; Swami & Furnham, 2008; Swami, Stieger, Haubner, Voracek, & Furnham, 2009). This bias—which has been called the *love-is-blind bias*—is said to be illusory, as it is statistically impossible for more than half of all partners to be more attractive than their spouses. The love-is-blind bias appears to run counter to positive illusion theory, which would predict that individuals would overestimate their own attractiveness. Swami et al. (2009) studied the bias in 156 participants (113 males, 143 females), and administered a series of questionnaires that measured self-esteem, perceived partner attractiveness, relationship satisfaction, and personality style. Swami et al. found that participants rated their partners' physical attractiveness more highly than their own attractiveness. The discrepancy between partner attractiveness rating and self-rating was associated with marriage satisfaction. Swami et al. suggest that illusions concerning a partner's physical appearance “trump” self-enhancing illusions, because they enhance the perception of the commitment, and help maintain the relationship. This in turn indirectly enhances the self, which is associated with the relationship. The discrepancy scores were negatively correlated with relationship length, but were not correlated with chronological age. This indicates that participants exhibited this bias at all ages, but the illusions seemed to decrease as the relationship grew longer. This decrease could be interpreted to mean that a nascent relationship represents a greater threat to self-esteem than an established relationship. Alternatively, this decrease could parallel the decline in positive

illusions seen in child literature (e.g., Schneider, 1998; Yussen & Levy, 1975), which suggested that the magnitude of illusions diminish with experience and familiarity.

Another committed relationship that has been investigated is the parent-child relationship. Having children incurs financial, personal, and marital stress (Nomaguchi & Milkie, 2003), and has been associated with reduced psychological well-being in most parents. This threat to well-being has again been found to be associated with positive illusions. Parents systematically rate their children more positively than hypothetical children, and hold unrealistic views about their child and their relationship with them (Mazur, 2006; Wenger & Fowers, 2008). In a study of parental positive illusions, Wenger and Fowers (2008) measured the perceptions of parents ($n = 78$, 61 females, 17 males) of children between the ages of 2 and 5 years. Participants completed an author-created Illusions of Parenting Scale (IPS), the RSES, and the Cleminshaw–Guidubaldi Parent Satisfaction Scale (CGPSS; Guidubaldi & Cleminshaw, 1985). Wengers and Fowers found that approximately 90% of parents rated their children more positively than the average child, endorsing that their “children are nearly perfect”, and that their “children and (they) get along perfectly”. These results indicate parental positive illusions, as it is statistically impossible for 90% of children to be above average. Consistent with the research on marital illusions, Wenger and Fowers found that inflated perceptions of the child were associated with higher self-perceptions, greater satisfaction with their relationship with their child, and greater parenting satisfaction. In these cases, holding positive illusions

about a significant other in turn enhances self-evaluations and protects against threats to well-being. Wengers and Fowers suggested that enhancing perceptions of children may help maintain the relationship, and may also promote positive behaviour, as the parents give their children more praise and the children live up to more positive expectations. However, the authors did not test how these parental illusions change over time, as they selected participants that had children under the age of 5. The authors report having wanted to eliminate the potential confounds of the school experience and teacher feedback, but this control does not allow us to determine how experience and time affect the maintenance of positive illusions.

Thus, research seems to converge on the adaptive value of positive illusions in the short term, suggesting that the bias buffers self-esteem and protects from negative affect, but not all research has demonstrated the benefits of holding positive illusions (e.g., Colvin et al., 1995; Paulhaus, 1998). Robins and Beer (2001) explored positive illusions in an undergraduate population in a pair of studies that assessed academic self-perceptions. In a preliminary study, they compared a group of undergraduate's ($n = 360$, 205 females, 155 males) self-ratings on a group decision-making task to peer ratings of performance on the task. A positive illusion score was calculated by subtracting self-rating score by peer rating score. Participants also completed the Narcissistic Personality Inventory (NPI; Raskin & Terry, 1988), the Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988), and a researcher constructed measure of ego involvement. They found that participants who had the greatest

positive illusions rated higher on a measure of narcissism, were more invested in the task, and had more positive affect. In a follow-up study, Robins and Beer measured the self-perceptions of undergraduates ($n = 508$, 56% female) from the first week of university until the end of the fourth year. The participants completed measures including the NPI, the PANAS, and the RSES. Robins and Beer compared academic self-perceptions, as measured by an eight item questionnaire administered in the first week, with actual academic ability based on a composite of high school grade point average (GPA) and Scholastic Assessment Test (SAT) results. Similarly to their first study, self-enhancement was initially positively related to emotional well-being, but there was a decline in well-being over the four years of the study. There was also a decline in self-esteem for self-enhancers over the four years of college. Self-enhancers did not achieve differently from non-enhancers, and graduated college in the same proportion as non-enhancers. Robins and Beer interpret that positive illusions are beneficial in the short term, and allow individuals to buffer self-esteem, but as they continue to receive negative feedback, it is increasingly difficult to maintain the illusion. The positive illusions become less effective in the long term, and the individual will eventually come to realize that they are not as able as they initially believed, which can lead to a loss of self-esteem and to negative affect.

Positive illusions in adolescents. Although positive illusions have been extensively studied in elementary aged children and adults, less research has been performed evaluating the bias in adolescent populations. However, some studies have investigated overestimation of adolescents with LD in an academic context

(Alvarez & Adelman, 1986; Meltzer, Roditi, Houser, & Perlman, 1998; Stone, 1997; Stone & May, 2002).

To examine adolescents' perceptions of their academic abilities, Stone (1997) asked adolescents ($n = 26$) in grades 9 to 12, as well as their parents and teachers, to rate their abilities relative to their classmates in 21 academic skill areas, such as social skills, grammar, and motivation. The parents' ratings differed negligibly from the teachers' ratings, but the adolescents' ratings were systematically higher than their parents' on all skills. However, the parents' and adolescents' ratings were highly correlated ($r = .80$). This may indicate that the adolescents were not deluded in their self-perceptions, but rather were inflating the reality in a self-serving fashion.

Stone and May (2002) further expanded on this research by comparing a sample of adolescents with LD ($n = 52$, 19 girls, 33 boys) to adolescents without LD ($n = 49$, 24 girls, 25 boys). The adolescents were shown an author-created vocabulary and arithmetic test and were asked to predict how many questions they would correctly answer. A discrepancy score was calculated by subtracting their predictions by their actual performance on the task. Students also completed a Skills Rating Survey (SRS; Stone 1997) and the Multidimensional Self-Concept Scale for Children (MSCS; Bracken, 1992), and parents and teachers completed parallel versions of these scales. Interestingly, both the LD and non-LD group overestimated their performance, although the LD group had a larger discrepancy between predicted and actual performance. In this sample, the LD group also had lower mean scores on the MSCS than the non-LD group, and rated themselves

lower on 17 academic skills than the non-LD group. However, the non-LD students underestimated their skills relative to their teachers' and parents' ratings. Although this study demonstrated that typically developing adolescents as a group exhibited positive illusions, there may be reason to question the measure used by the authors. Stone and May used an author developed test with which the participants had no experience and for which there were no standard measures. Although the participants were allowed to briefly look over the test, they were not given a benchmark of how average adolescents scored on the test, so it may have been particularly difficult for the participants to accurately judge their performance on this task. Also, Stone and May did not examine within group differences for the non-LD students, focusing instead on the students as a group.

Summary and rationale

Positive illusions have been conclusively documented in typical and atypical populations of children (e.g., Hoza et al., 2002; Hoza et al., 2004; Shin et al., 2007), and the adaptive function of these illusions has been convincingly argued (e.g., Bjorklund & Green, 1992; Diener & Milich, 1997). Children are novices in all domains, and children with disabilities face great challenges in many specific domains, so having an illusory perception of their abilities may allow them to persevere and improve their abilities despite persistent failure. Likewise, positive illusions have been documented in typical adult populations (e.g., Fletcher et al., 1999; Murray et al., 1996), as well as samples of adults who are living with chronic diseases and disabilities (e.g., Taylor et al., 2000; Wood et al., 1985). Although there is general consensus that positive illusions buffer

negative self-esteem and affect, there is still debate about whether positive illusions are adaptive in the longer term (Colvin et al., 1995; Robins & Beer, 2001). Indeed, the magnitude of positive illusions may decrease with age, experience, and familiarity (Stipek, 1981; Yussen & Levy, 1975), and the beneficial effect of positive illusions decreases as individuals continue to receive accurate negative feedback about their performance and abilities (Robins & Beer, 2001). It appears that the role of positive illusions may change by the time individuals reach adulthood, but the developmental trajectory of self-enhancement is unclear.

This underscores a gap in the literature. Understanding positive illusions in adolescence—a developmental stage between childhood and adulthood—may allow us to better understand how positive illusions change over time. Stone and May (2002) found that typically developing adolescents exhibited positive illusions, but the measurement used in their study may have been questionable, and the protective function was not investigated. Indeed, the relationship between self-enhancement and depressive symptomatology has not been assessed in adolescents. This may be particularly important given the elevated levels of depression in adolescences. Studying positive illusions and their function in adolescence may be necessary in order to determine their role in adult emotional regulation.

Objectives and hypotheses

The goal of this study was twofold; to explore existence of the positive illusory bias in a sample of typically developing adolescents, and to examine its

function. The aim of this research study was to evaluate whether adolescents are overestimating, underestimating or accurately estimating their performance on two academic tasks, spelling and arithmetic, and whether there was a difference in the estimates of adolescents who are facing academic difficulty, versus those who are not. The study also aimed to assess the relationship between positive illusions and depressive symptomatology. Researchers hypothesize that positive illusions can act as a buffer to prevent negative affect, and this study will assess this relationship. Finally, the relationship between positive illusions and school stress was discerned, in order to interpret whether students who have higher positive illusions report less school related stress.

Objective 1. The first objective is to evaluate the existence of positive illusions in typically developing adolescents, by examining the level of overestimation in a sample of adolescents.

Hypothesis for objective 1. As positive illusions are a cognitive response to challenges in a significant domain of an individual's life, it is expected that individuals who are struggling in the area would endorse more positive illusions than those who are successful. In order to verify that this was true in this sample, the participants were divided into groups based on their performance on the math and spelling tasks. It is hypothesized that adolescents who are facing difficulty in school will demonstrate school-related positive illusions. That is, adolescents who are achieving below the mean for their grade in spelling or math will overestimate their performance on that task. However, the adolescents who are achieving above the mean for their grade will not overestimate their performance.

Objective 2. The second objective of this study is to evaluate the relationship between positive illusions and depressive symptomatology in a sample of typically developing adolescents in two academic domains, math and spelling. It will be examined whether depressive symptoms predict positive illusions, above and beyond the effect of achievement.

Hypothesis for objective 2. In order to control for the effect of relative achievement on positive illusions, the predictive power of depressive symptoms on positive illusions above and beyond achievement will be examined. It is hypothesized that depressive symptomatology will be a significant predictor of positive illusions, even when achievement is controlled. This relationship will be negative, such that as positive illusions increase, depressive symptoms decrease. It is expected that depressive symptoms will significantly predict the use of positive illusions above and beyond relative achievement.

Objective 3. The third objective is to examine the relationship between positive illusions and school stress in a sample of typically developing adolescents. The predictive power of school stress on positive illusions above and beyond the effect of achievement will be determined.

Hypothesis for objective 3. As was the case for objective 2, the effect of relative achievement is partialled out in order to assess the relationship of school stress above and beyond the effect of achievement. It is hypothesized that school stress will be a significant predictor of positive illusions, even when controlling for relative achievement. This relationship will be negative, such that as positive illusions increase, perceived stress will decrease.

Chapter 3

Methods

The sample used in this project was drawn from a larger project that examined the effect of depressive symptomatology and feedback on students' academic self perceptions. Participants were recruited from secondary schools in a major metropolitan area, from grades seven to eleven. The principal researcher obtained consent from a school board to recruit from schools in their jurisdiction, and then contacted individual schools to set dates for classroom recruitment. A total of 12 public schools were contacted and 4 schools agreed to participate in the project, for a participation rate of 33.3%. The schools that agreed to participate were mainstream schools in a public school board. The schools that did not agree to participate said no because of prior commitments, or because of a lack of time or interest by the teachers or staff.

Research assistants visited classrooms during homeroom period in order to present the project to students and invite adolescents to volunteer. Students were told that the project focused on stress coping in an academic setting, and that volunteers would be taken out of class at appropriate times to speak to a research assistant and to complete some academic activities. All students were given a form to be completed by a guardian, which included an outline of the premise of the project, a space for guardian signature, and a choice of boxes to be checked off agreeing or not to participate in the study. These forms also outlined the benefits of the study for parents and students, which included a short individualized report for parents of their child's strengths and weaknesses, as well as a list of strategies that have been shown to help students with these difficulties.

The forms were to be returned to the school main office and were periodically collected by a research assistant. Students were told that whether they volunteered or not, those that returned the form were included in a lottery draw for a fifty dollar gift certificate to a local movie theatre or entertainment retail store. Approximately 2400 consent forms were distributed, and approximately 200 consent forms were returned, for a return rate of approximately 8.3%. Of the forms that were returned, 152 adolescents agreed and were able to participate in the project.

Exclusionary factors

The aim of this study was to investigate the positive illusory bias in typically developing adolescents. Positive illusions have already been established in children with LD (e.g., Heath, 1995) and children with ADHD (e.g., Hoza et al., 2002), so students with these disorders were excluded from the sample in order to focus more precisely on typically developing adolescents. Participants were screened for LD using the Wechsler Abbreviated Scale of Intelligence (WASI; Wechsler, 1999) and the Wide Range Achievement Test – Third Edition (WRAT-3; Wilkinson, 1993). Participants were classified in a learning disability category if they scored at least in the average range on the WASI (a score of 85 or more), but scored at least one standard deviation below the mean on at least one of the subscales of the WRAT-3 (a score less than 85). For example, if a student scored 100 on the WASI, 100 on the reading subscale and 100 on the arithmetic subscale of the WRAT-3, but scored 80 on the spelling subscale, the student would have been classified in the LD group and would be excluded from the

sample. Students were classified as not having an LD if they scored at least in the average range of the WASI (a score of 85 or more), and scored at least in the average range of all subscales of the WRAT-3 (a score of 85 or more). So a student scoring 100 on the WASI and 100 on all three of the spelling, reading and math subscales of the WRAT-3 would be classified in the non-LD group.

Students scoring below one standard deviation from the mean on the WASI (a score less than 85) were classified in an intellectual disability category and were excluded from the sample.

Students were screened for ADHD using the Conners' Parent Rating Scale – Revised: Long Form (CPRS – R:L; Conners, 2001), which was administered to parents by a research assistant by telephone. Students scoring in the clinical range on the ADHD Global Index scale (a score above 60) were classified in the ADHD category, and were excluded from the sample.

Participants

The final sample included 75 participants aged 13.25 to 16.58 years ($M = 14.74$, $SD = 0.92$), and included 24 boys and 51 girls. All participants attended one of four public high schools in the greater Montreal area.

Measures

The measures used in this study included the Wechsler Abbreviated Scale of Intelligence (WASI; Wechsler, 1999), the Conners' Parent Rating Scale – Revised: Long Form (CPRS-R:L; Conners, 2001), the Wide Range Achievement Test – Third Edition (WRAT-3; Wilkinson, 1993), the Children's Depression

Inventory (CDI;) and the Early Adolescent School Role Strain Inventory (EASRSI; Fenzel, 1989).

Wechsler Abbreviated Scale of Intelligence. The WASI is a short form test of cognitive function normed for use with children and adults between the ages of 6 to 89. The WASI includes four subscales; Vocabulary and Similarities, which are used to estimate a verbal IQ score (VIQ), and Block Design and Matrix Reasoning, which are used to estimate a Performance IQ (PIQ) score. These four subscales are used to generate a Full scale IQ (FIQ) score. The test-retest reliability of the WASI was good, ranging from .88 for the 2 subtest FIQ, to .92 for the 4 subtest FIQ. Scores on the WASI are also highly correlated with full measure of intelligence (Sattler, 2008).

The Conners' Parent Rating Scale Revised Long Version. The CPRS-R:L is an inventory designed to measure the presence and severity of ADHD symptoms. It contains 80 items that are completed by the child's parent, and is used to estimate ten scales: Oppositional behaviour, Cognitive Problems/Inattention, Hyperactivity, Anxiety, Perfectionism, Social problems, Psychosomatic problems, a Conners' Global Index, a DSM-IV symptom subscale, and an ADHD Index. The scale is designed to be used for routine screening and assessment of ADHD and comorbid behaviours based on DSM-IV criteria. Internal reliability was good, with coefficients ranging from .75 to .94. A direct discriminant function analysis indicated good validity, with 93.4% of children being correctly classified into ADHD and non-ADHD groups.

Wide Range Achievement Test – Third Edition. The WRAT-3 is a standardized achievement test that assesses achievement in spelling, arithmetic and decoding in children and adults. The spelling subtest consists of 40 words to be spelled by the student. The examiner dictates the words, and terminates the test when the student has made ten consecutive errors. The arithmetic subtest is a timed test consisting of 40 computational math problems presented in print form. The student completes as many as possible in fifteen minutes. The reading portion comprises 40 printed words of increasing difficulty to be read by the student. The examiner stops the test when the student has incorrectly decoded ten consecutive words. The internal reliability of the WRAT-3 ranged from .92 to .95 for the three combined tests, and test-retest reliability ranged from .91 to .98 (Wilkinson, 1993).

Children's Depression Inventory. The CDI is a self-report scale used to assess the cognitive, emotional and behavioural symptoms of depression in children aged 7 to 17. The inventory consists of 27 items that children are asked to respond to relative to their experience and feelings of the prior two weeks. Each item has three possible responses. For example, one item includes the choice of "I am sad once in a while", "I am sad many times" and "I am sad all the time". Item 9, which inquires about suicidal ideation, was covered with an opaque label before being administered to the students in this project, because of requirement of the Research Ethics Boards and request by the school board. The CDI score is divided into 5 subscales, Negative mood, Interpersonal difficulty,

Negative self-esteem, Ineffectiveness (lack of a sense of efficacy), and Anhedonia (the loss of ability to experience pleasure), as well as a global scale of depression.

The internal consistency of the CDI is good, with coefficients ranging from .71 to .89. Test-retest reliability ranged from .82 over 2 week intervals to .67 over a 6 week interval (Finch, Saylor, Edwards, & McIntosh, 1987).

Early Adolescence School Role Strain Inventory. The EASRSI is a self-report checklist designed to measure school-related stress from school, home and peers. The inventory consists of 27 items that the student responds to on a four point scale ranging from “none” to “extreme”. Items include “My teachers give too much homework” and “Kids make fun of me if I do well in school”. The EASRSI is separated into four subscales, Peer Interaction (school stress emanating from peer group), School Demands (school stress originating from work pressure), Parental Control (school stress emanating from parents) and Teacher Relations (school stress emanating from teachers). The EASRSI had good internal reliability, with Cronbach’s alpha values ranging from .87 to .90 (Fenzel, 1989). Convergent validity was tested by correlating results on the EASRSI with measures of self-worth and trait anxiety. Full scale score was negatively related to self-worth ($r = -.46, p < .001$), and positively correlated with trait anxiety ($r = .51, p < .001$).

Procedure

Students who had parental consent and who agreed to participate in the project were individually taken out during class time by a research assistant (RA) and joined the RA in a separate room within the school for a total of three sessions. During the first session, a research assistant read a consent form aloud,

outlining the research protocol and describing the rights of the participant. Following consent and assent, the RA administered the WASI and the CDI. The RA read the CDI aloud for the student in order to avoid errors due to reading ability. In a second session, an RA individually administered the WRAT-3. A second RA first informed students how many words were correctly spelled and how many arithmetic problems were correctly completed by students in their grade on average. This was calculated by referring to the scores corresponding to the average range in the normative sample for that student's grade level. The students were then asked to predict how many words out of 40 they would be able to spell correctly, and how many math problems out of 40 they would be able to correctly complete. After this prediction was completed, a second RA administered the WRAT-3. Finally, the student completed the EASRSI during a third session. Again, an RA read the EASRSI aloud for the student.

Once the three sessions with the student were complete, the parent listed on the consent form was contacted by an RA by telephone. The RA administered a questionnaire that included demographic questions, as well as questions regarding the student's educational history. The RA then administered the CPRS-R:L by reading the items and noting the parent's responses.

Data analysis

This study investigated three research objectives regarding the existence and function of positive illusions in typically developing adolescents. In order to evaluate these objectives, a positive illusion score was calculated in math and spelling for each individual in the sample. The positive illusion scores were

calculated by taking a difference score between the score that the adolescent had predicted they would obtain on the task and the actual score that was obtained on the achievement test. This method of measuring positive illusions is consistent with literature in the area (Diener & Milich, 1997; Heath & Glen, 2005). Since the actual score was subtracted from the predicted score, a positive difference would indicate the presence of a positive illusion, a difference score near zero would indicate an absence of illusions, and a negative difference score would indicate the presence of negative cognitive errors.

Objective 1: The existence of positive illusions. The existence of positive illusions was initially explored by evaluating the descriptive statistics of the distribution of difference scores in math and spelling. If positive illusions are endorsed by typically developing adolescents, the proportion of positive difference scores will be greater than zero.

The mean score on the math and spelling tasks was calculated for each grade, and a relative achievement score was computed by taking the difference between each individual score and its respective mean. So, if a student was in grade 8, his score on the math section was subtracted by the mean math score for grade 8 students and his score on the spelling section was subtracted by the mean spelling score for the grade. As the mean score was subtracted from the individual score, a positive relative achievement score indicated that the individual had scored above the mean and they were classified in the above-average group, whereas a negative relative achievement score indicated that the individual had scored below the mean for the grade and were placed in the low-

achieving group. Since this calculation was performed separately for math and spelling, a total of four groups were formed; low-achieving spelling, above-average spelling, low-achieving math, and above-average math. Each individual was classified into two of the groups independently, so that they could be in the low-achieving group for spelling and the above-average group for math. So as to avoid judgement calls about group placement, students who scored equal to the mean were excluded from this part of the analysis. Seven students scored at the mean on the spelling task, and five students scored at the mean on the arithmetic task.

Using these groupings, two independent-samples t-tests were performed to determine whether there was a significant difference in mean positive illusion scores between low-achieving students and achieving students. The first t-test was performed using spelling positive illusion scores, and the second was performed using math positive illusions scores. Also, the mean positive illusion score for each of the groups was tested to determine if it was significantly different from zero using four one-sample t-tests. If students who are struggling are endorsing positive illusions, the mean positive illusion score will be significantly greater than 0, whereas the positive illusion score for the group of students scoring above the mean will not be significantly different from 0.

Objective 2: The relationship between positive illusions and depressive symptomatology. Next, in order to investigate the relationship between positive illusions and depressive symptoms, two multiple regressions were performed. In the first regression, positive illusion scores in math (math PI)

were used as the outcome variable, whereas positive illusion scores in spelling (spelling PI) were used as the outcome in the second regression. Full scale T scores on the CDI were used as a predictor variable in both regressions. Because differences in achievement could explain differences in positive illusion scores, relative achievement in the domain was entered as the first predictor of each regression. This allows us to account for performance and evaluate the effect of depressive symptoms above and beyond the effect of performance on positive illusions scores.

Objective 3: The relationship between positive illusions and school stress. Finally, in order to evaluate the relationship between positive illusions and school stress, scores on the subscales of the EASRSI were included in the hierarchical multiple regression. One participant had missing data on the EASRSI, and was excluded from this part of the analysis. Positive illusion scores in math (math PI) were used as the outcome variable in the first regression, and positive illusion scores in spelling (spelling PI) were used as the outcome variable in the second regression. The scores on the four subscales of the EASRSI – Parent Control, School Demands, Peer Influence, and Teacher Relations – were then entered as other predictors. This was again done in order to account for the effect of achievement on positive illusion scores and to determine whether school stress was predictive of positive illusion scores above and beyond the level of achievement. If positive illusions are related to school stress, EASRSI scores will significantly account for more variance than relative achievement alone.

Chapter 4

Results

Objective 1: The existence of positive illusions

The math difference scores were approximately normally distributed, with scores ranging from -22 to 13 ($M = .53$, $SD = 5.90$). There were no problems with skewness or kurtosis, with scores of -.61 and 1.95 respectively. Forty-five students (57.69%) predicted they would score higher than they actually scored, and 11 students (14.10%) of students obtained a positive illusion score greater than 1 standard deviation above the mean of difference scores.

The spelling difference scores were also approximately normally distributed, and scores ranged from -13 to 8 ($M = -1.41$, $SD = 4.32$). Skewness (-.28) and kurtosis (-.17) were not problematic. A total of 31 students (39.74%) had a difference score greater than 0, and 9 students (11.54%) students obtained a positive illusion score greater than one standard deviation above the mean.

Descriptive statistics are shown in Table 1.

Table 1. Descriptive statistics of spelling and math difference scores

	N	Range	M	SD	Kurtosis	Skewness
Spelling difference scores	75	-13 to 8	-1.41	4.32	-.28	-.17
Math difference scores	75	-22 to 13	.533	5.90	1.95	-.61

Two independent-samples t-tests were performed to determine whether there was a significant difference in positive illusion scores between low-achieving students and achieving students, in spelling and in math. Table 2 shows

the difference scores for spelling and math, and Table 3 shows the results of the t-tests. In spelling, there was a significant difference between students in the low-achieving group ($M = .67$, $SD = 3.9$) and those in the above-average group ($M = -3.22$, $SD = 4.10$), $t(65) = 3.96$, $p < .000$, $d = .98$, $CI_{.95} = [1.92, 5.84]$. The observed power of the test was high (.976). In math, there was also a significant difference between students in the low-achieving group ($M = 2.89$, $SD = 4.84$) compared to those in the above-average group ($M = -2.09$, $SD = 6.12$), $t(68) = 3.79$, $p < .000$, $d = .90$, $CI_{.95} = [2.35, 7.60]$. The observed power was high (.95).

Table 2. Difference scores for low achieving and above-average students in spelling and math

Domain	Sample Size		Mean		Standard deviation	
	Low achieving	Above average	Low achieving	Above average	Low achieving	Above average
Spelling	30	37	.67	-3.22	3.90	4.10
Math	36	34	2.89	-2.09	4.84	6.12

Table 4 shows the results of the t-tests that were performed to evaluate the magnitude of positive illusions for low-achieving and above-average adolescents. For the spelling section, the mean positive illusion score for low-achieving students ($M = .67$, $SD = 3.9$) was not significantly greater than 0, $t(29) = .96$, $p = .351$, $d = .17$, whereas the above-average spelling students had a positive illusion score ($M = -3.22$, $SD = 4.10$) that was significantly below 0, $t(36) = -4.77$, $p < .000$, $d = .79$, indicating that these students systematically underestimated their performance on the spelling task. On the math task, low achieving math students had positive illusion scores ($M = 2.89$, $SD = 4.84$) that were significantly greater

than 0, $t(35) = 3.58, p < .001, d = .60$, indicating that they systematically overestimated their performance on the task. On the other hand, above-average math students did not have a positive illusion score ($M = -2.09, SD = 6.12$) that significantly differed from 0, $t(33) = -1.99, p = .055, d = .34$, indicating that they were more accurate in the assessment of their performance.

Table 3. Results of independent sample t-tests for spelling and math

	<i>T</i>	df	<i>p</i>	95% Confidence interval
Spelling	3.96	65	.000	[1.92,5.84]
Math	3.79	68	.000	[2.35,7.60]

Table 4. Results of one-sample t-tests for difference scores of low-achieving and above-average students in spelling and math

	<i>T</i>	df	<i>p</i>
Low-achieving spelling	.96	29	.351
Above-average spelling	-4.77	36	.000
Low-achieving math	3.58	35	.001
Above-average math	-2.09	33	.055

These results indicate that adolescents are indeed endorsing positive illusions. In order to determine why they are making these errors, the relationship between positive illusions and depressive symptomatology and school stress was investigated.

Objective 2: The relationship between positive illusions and depressive symptomatology

Total t scores on the CDI were not significantly correlated with difference scores in spelling, $r = -.18$, $n = 74$, n.s. In the spelling PI regression, the model that only included relative achievement significantly predicted positive illusion scores, $F(1, 72) = 12.86$, $p = .001$, and accounted for 15.2% of the variance in positive illusion scores. The model that included the CDI scores did not significantly improve the achievement only model, $F(1, 71) = 2.38$, $p = .13$. The CDI scores accounted for 2.7% of the variation in positive illusion scores in spelling. The correlations are summarized in Table 5, and results of the multiple regressions are shown in Table 6.

Table 5. Correlations between positive illusions in spelling and measures of depression and school stress ($n = 74$)

Variable	1	2	3	4	5	6
1. Positive illusions	-	-.18	.055	-.078	.034	.035
2. CDI total t score		-	.60**	.56**	.49**	.52**
3. EASRSI Parental control			-	.59**	.67**	.63**
4. EASRSI School demands				-	.54**	.73**
5. EASRSI Peer influence					-	.65**
6. EASRSI Teacher relations						-

Note. * $p < .05$, ** $p < .01$

Total t scores on the CDI were marginally correlated with positive illusions in math, $r = -.19$, $n = 74$, $p = .055$. In the math PI regression, the model that only included relative achievement accounted for 23.4% of the variation in

positive illusions scores, and significantly predicted positive illusions scores in math, $F(1, 72) = 22.05, p = .000$. The full model with relative achievement and CDI total T scores accounted for 28.3% of the variance in positive illusion scores, which was a change in R^2 of .048. This was a significant improvement over the relative achievement only model, $F(1, 71) = 4.79, p = .032$, confirming that depression scores significantly predicted positive illusion scores above and beyond the effect of relative achievement. The results of correlations are shown in Table 7, and results of the regression are shown in Table 8.

Table 6. Summary of hierarchical regression analysis for variables predicting positive illusions in spelling

Variable	<i>B</i>	<i>SE B</i>	<i>B</i>
Step 1			
Constant	-1.348**	.469	
Spelling relative achievement	-.448**	.125	-.389
Step 2			
Constant	2.169	2.328	
Spelling relative achievement	-.472**	.125	-.410
CDI Total T score	-.074	.048	-.167
Step 3			
Constant	3.054	2.530	
Spelling relative achievement	-.487**	.133	-.423
CDI Total T score	-.079	.064	-.177
EASRSI Parent control	.752	1.181	.107
EASRSI School demands	-1.515	1.184	-.215

EASRSI Peer influence	.863	1.196	.117
EASRSI Teacher relations	.112	1.386	.015

Note. $R^2 = .152$ for Step 1 ($p = .000$); $\Delta R^2 = .027$ for Step 2 (n.s.); $\Delta R^2 = .033$ for Step 3 (n.s.).

* $p < .05$. ** $p < .01$.

Objective 3: The relationship between positive illusions and school stress

Scores on the EASRSI subscales were not significantly correlated to positive illusion scores in spelling, but scores on each subscale were significantly correlated with total t score on the CDI. Table 5 shows the results of the correlation analysis. When adding the EASRSI scores to the spelling PI regression model, the full model accounted for 21.2% of the variation in positive illusion scores, which was an improvement of 3.3% over the achievement and CDI model. This was not a significant change in R^2 , $F(4, 67) = .71$, $p = .59$. Results of the regression are shown in Table 6.

Scores on the Parent control subscale of the EASRSI were significantly correlated with positive illusion scores in math, $r = -.21$, $n = 74$, $p = .038$. Scores on the other subscales were not significantly correlated with positive illusion scores, but scores on all subscales were significantly correlated with total t scores on the CDI. Results of the correlation analysis are shown in Table 7. In the math PI regression, the full model that included the scores on the EASRSI subscales along with relative achievement and CDI scores accounted for 31.9% of the variation, which was an improvement of 3.7% over the relative achievement and CDI model. This was not a significant improvement, $F(4, 67) = .90$, $p = .47$. However, when including the four EASRSI subscales into the model, the CDI

scores were no longer significant, $t(73) = -1.67, p = .16$, indicating that the relationship between depressive symptomatology and positive illusions was partially moderated by school stress. Results of the regression are shown in Table 8.

Table 7. Correlations between positive illusions in spelling and measures of depression and school stress ($n = 74$)

Variable	1	2	3	4	5	6
1. Positive illusions	-	-.19*	-.21**	-.029	-.10	-.13
2. CDI total t score		-	.60***	.56***	.49***	.52***
3. EASRSI Parental control			-	.59***	.67***	.63***
4. EASRSI School demands				-	.54***	.73***
5. EASRSI Peer influence					-	.65***
6. EASRSI Teacher relations						-

Note. * $p < .1$, ** $p < .05$, *** $p < .01$

Table 8. Summary of hierarchical regression analysis for variables predicting positive illusions in math

Variable	<i>B</i>	<i>SE B</i>	<i>B</i>
Step 1			
Constant	.587	.606	
Math relative achievement	-.731**	.156	-.484
Step 2			
Constant	6.901*	2.946	
Math relative achievement	-.753**	.152	-.499
CDI Total T score	-.134*	.061	-.220
Step 3			

Constant	6.943*	3.225	
Math relative achievement	-.787**	.162	-.521
CDI Total T score	-.116	.081	-.191
EASRSI Parent control	-2.103	1.484	-.220
EASRSI School demands	.419	1.554	.044
EASRSI Peer influence	2.533	1.529	.251
EASRSI Teacher relations	-.929	1.720	-.090

Note. $R^2 = .234$ for Step 1 ($p = .000$); $\Delta R^2 = .048$ for Step 2 ($p = .032$); $\Delta R^2 = .037$ for Step 3 (n.s.).

* $p < .05$. ** $p < .01$.

Chapter 5

Discussion

Existence of positive illusions

Positive illusions in math. The first objective of this study was to determine whether typically developing adolescents exhibited positive illusions in an academic domain. This was clearly demonstrated in math, as over half of participants overestimated their performance in math. This overestimation was systematic, as students who scored below the mean on the math task had significantly greater mean difference scores than students who scored above the mean on the task. That is, students who struggled in this domain had greater positive illusion scores. This result clearly provides evidence that typically developing adolescents endorse positive illusions, and parallels results obtained in literature (Stone & May, 2002). Stone and May had demonstrated the existence of positive illusions in a sample of typically developing adolescents, but this study improves upon their study in important ways. Primarily, this study used a standardized test of spelling and math as a measure of the participants' actual performance. Positive illusions are defined as a positive discrepancy between self-evaluations and reality, but accurately measuring reality can be challenging. Stone and May used an author developed test to measure the student's actual achievement, but the students did not have a benchmark against which to estimate their performance. They did not know how an average student would perform. In the present study, using a standardized test allowed the students to know how an average student in their grade would perform. This meant that the participants

could gauge their abilities and compare themselves to the average student in their grade before predicting their performance.

Research has documented the existence of positive illusions in typical and atypical child populations (e.g., Falbo, Poston, Triscari, & Zhang, 1997; Heath & Glen, 2005; Hoza et al. 2004; Mazur, Wolchik, & Sandler, 1992), but it could be argued that members of these populations are not cognitively mature enough to adequately appraise their abilities, or that these populations are somehow qualitatively different. For example, Owens, Goldfine, Evangelista, Hoza, and Kaiser (2007) stated that children with ADHD are cognitively unique and that the way they endorse positive illusions is different from other children. Bjorklund and colleagues (Bjorklund & Green, 1992) posited that positive illusions are specifically beneficial for children because they are novices at all tasks and have not developed their abilities. However, the participants in this study were typical adolescents, likely with average experience and cognitive maturity. These adolescents did not meet criteria for LD, or behavioural disabilities, and did not have Owens et al.'s sample's cognitive uniqueness. Although the students who overestimated their performance were those who were achieving below the mean in math, they scored less than one SD below the mean, and were within the average range. Together, this suggests that the use of positive illusions is not unique to a set of atypical populations, and that those who exhibit positive illusions are not qualitatively different from those who do not have these cognitive biases. Rather, positive illusions are likely a normal process, endorsed by typical individuals who are experiencing some difficulty in a domain.

Positive illusions in spelling. The results on the spelling task were not as clear as the results on the math task. Over a third of participants overestimated their performance in spelling, and there was a significant difference between low achieving and above-average spelling students. However, although the mean difference score for low-achieving students was positive, the overestimation was not significantly greater than 0. This may be due to a very low observed power for this test (power = .065), but the low power was partially due to a small effect size ($d = .17$).

Thus, low-achieving adolescents in spelling and math rate themselves more positively relative to their performance than adolescents who are achieving above-average. In math, this meant positive illusions, whereas in spelling, this meant more accurate estimation relative to underestimation for above-average adolescents. Although it is unclear why this difference exists between the two academic domains, we might speculate that the differences in estimation may be related to differences in the amount of feedback that has been received over the individual's life. Research (e.g., Johnson, 2004; Langens, 2007) has demonstrated that positive illusions may decrease in adults as they continue to receive explicit, realistic feedback about their performance. As this feedback that undermines the individual's illusions accumulates, their level of positive illusions decreases. In school, students may receive more feedback on their spelling than on their arithmetic skills, which could explain the difference in illusions. The current math curriculum in Quebec—as outlined by the Quebec Education Program (QEP; Ministère de l'Éducation, 2004)—places an emphasis on

reasoning, problem solving and mathematical communication (Ministère de l'Éducation, 2004). Furthermore, the curriculum encourages students to recognize when technology can be used to solve problems, which may de-emphasize the use of computational arithmetic tested by the WRAT-3. Therefore, it is possible that students do not receive as much feedback on their arithmetic—which was tested in this study—as they do on their spelling. The language arts curriculum continues to encourage students to write daily throughout their academic career (Ministère de l'Éducation, 2004). Students even receive feedback on their spelling when using technology, since most word processors identify when the student has made a spelling error. However, in order to conclude that the differences in illusions are related to amount of feedback accumulated throughout a student's academic career, empirical evidence supporting the proposition that these students receive more feedback in spelling than in arithmetic must be established.

This study is among the first to document the existence of positive illusions in this population, which is crucial in better understanding the development of academic cognitive bias. Positive illusions have been documented in children, but the literature is unclear on the development of positive illusions over time. While positive illusions have been documented in many adult populations, there is also evidence that positive illusions may decrease over time (Colvin et al., 1995; Robins & Beer, 2001; Stipek, 1981; Yussen & Levy, 1975). The difference in academic positive illusions between the math and spelling domains that was observed in this study may begin to explain this

developmental trajectory. Positive illusions may be particularly beneficial to young children, and promote activity and exploration, and may continue to be beneficial in maintaining motivation as children develop. However, as children receive extensive formal feedback on their abilities over more than a decade of school, they continue to be confronted with the reality of their abilities and cannot maintain the illusions. Illusions regarding illness and marriage satisfaction in adulthood may not follow the same trend, as the feedback is frequently either informal, or not as consistent (e.g., Brehm, Miller, Perlman, & Campbell, 2002; Rao, Anderson, Inui, & Frankel, 2007).

Underestimation. The low-achieving students in math overestimated their performance, but results also indicate that above-average students underestimated their performance. The difference score was significantly below zero for spelling, and was marginally significantly below zero in math. The observed power for the math t-test was low (power = .15), and it is likely that the result would have been statistically significant if the power had been slightly greater. This may initially seem to counter positive illusion literature, but positive illusions are cognitive biases meant to buffer negative affect in the presence of adversity; positive illusions are frequently exhibited in areas of greatest difficulty. In the case of above-average students in this sample, there is no need to endorse positive illusions, as there is no threat to their self-esteem. These students are achieving above-average and presumably do not need to worry about their self-image in this domain. In fact, there may be a benefit to underestimating their performance when they are confident about their ability. Individuals use positive

illusions as a protective technique, but positive illusions are not without disadvantages. Research indicates that individuals who endorse positive illusions are sometimes seen as being more conceited, narcissistic, and hostile by their peers (Dunning, Meyerowitz, & Holzberg, 1989; Gosling, John, Craik, & Robins, 1998; John & Robins, 1994; Paulhaus, 1998). Research indicates that modesty or slight self-effacement helps maintain belongingness in a group (Anderson, Srivastava, Beer, Sparato, & Chatman, 2006), and is perceived very positively by peers (Ashton, Lee, & Goldberg, 2004; Bond, Kwan, & Li, 2000; Sedikides, Gregg, & Hart, 2007). By underestimating their performance on the task, the above-average students may present as modest, and maintain a favourable impression with their peers, avoiding the cost associated with self-enhancement. There may also be a benefit of managing expectations. Business managers and consultants frequently seek to influence client expectations so that they can continue to meet or beat benchmarks, and reap the rewards of success (Karten, 1994; Vickers, 1999). By slightly underestimating their performance, above-average students can both be perceived as modest and keep expectations achievable, allowing them to more easily continue to meet and beat expectations.

Relationship between positive illusions and depressive symptomatology

The second objective of this study was to evaluate the relationship between positive illusions and depressive symptomatology. Research indicates that positive illusions may serve a protective function, and buffer individuals against negative self-esteem and negative affect (e.g., Hoza et al., 2002; Taylor & Armor, 1996). In the present study, positive illusions in math were negatively

related to depressive symptoms, when controlling for relative achievement. So, as positive illusions increase, depressive symptoms decrease and when depressive symptoms increase, positive illusions decrease. However, this relationship was not significant for spelling.

The relationship in math is consistent with predicted results, and can be interpreted in light of the self-protective hypothesis (Diener & Milich, 1997). Since the positive illusions are expected to buffer negative affect, depressive symptoms decrease as positive illusions increase because these individuals saw themselves more positively than indicated by their performance. They were able to diminish the threat to their self-esteem, and could maintain their positive view of self. Therefore, they did not experience as much negative affect. This result parallels the results obtained in a child population by Hoza et al. (2002). However, this result had not previously been replicated in a typical adolescent population.

The relationship between spelling positive illusions and depressive symptomatology was not significant. In this sample, the mean positive illusion score was negative, and positive illusions were not conclusively documented, as the low-achieving group was statistically accurate in their predictions, and the above-average group underestimated their performance. The absence of positive illusions may be indicative that the level of threat experienced by students was not great. Threat to self-esteem has been found to be related to symptoms of depression (e.g., Campbell, Baumeister, Dhavale, & Tice, 2003; Gruenwald, Kemeny, Aziz, & Fahey, 2004), and negative affect may be more prominent the

greater the threat to self-esteem (Campbell et al., 2003). If the threat to self-esteem caused by the spelling task in this study was not high, it may not have been enough to affect the participants' self-esteem and impact their mood, so that positive illusions were not necessary to protect their affect. The specific level of threat was not fully evaluated in this study, and further research is needed to investigate this hypothesis.

Relationship between positive illusions and stress

The final objective of the study was to evaluate the relationship between positive illusions and school related stress. Past research indicates that positive illusions are frequently used as a response to adversity, so positive illusions in academic domains could be related to school stress. However, there was not a significant relationship between the measure of school stress and positive illusions in math or spelling in this study.

Due to the nature of null-hypothesis testing, it is impossible to determine whether the non-significant result in this sample is indicative of a true non-relationship between stress and positive illusions in adolescents. However, including the EASRSI scores to the math positive illusions regression eliminated the significant relationship between CDI total t scores and positive illusions. Furthermore, math positive illusion score, CDI total t score and the EASRSI Parental control subscale scores are all individually correlated to each other. These relationships satisfy the requirements for a mediating relationship (Baron & Kenny, 1986), and indicate that the relationship between depressive symptomatology and positive illusions may be partially mediated by stress caused

by parental control. This may indicate that school stress caused by parental control has an influence on the development of positive illusions.

It is impossible to draw specific conclusions from these results, given the nature of null-hypothesis testing, but it is possible that students in both groups were experiencing similar levels of stress. This may indicate that the underachieving students in math were protected by their positive illusions. However, it is possible that the inventory used to measure school stress did not adequately tap into actual academic stress. The EASRSI is a self-report measure of stress with high face validity, and it is possible that students were responding in a socially desirable fashion. Finally, the non-significant results may be partially due to low variation in EASRSI scores. There was a bias in this sample towards reporting low levels of stress, and the range of results on the EASRSI was relatively low. Because there was low variation in predictor variables, the results may not have been reliable (Howell, 2007).

Implications for school psychology

The implications of this study for the field of school psychology are important. This study shows that adolescents who are struggling in an academic domain may overestimate their abilities. This may be evident even if the adolescent does not meet criteria for a behavioural or learning disability, and is achieving within the average range. This could potentially be problematic, as students who have positive illusions may be less likely to seek help because they believe they are more able than they really are. Therefore, these students who are struggling a little may not get the help they need, and may not receive attention

for their difficulties because they have not received an LD label that highlights their need for extra support. This combination of circumstances may result in a student falling further behind until they need extensive remediation.

Students who systematically overestimate their abilities may also experience social difficulties, as individuals who endorse positive illusions are sometimes perceived as being more hostile, narcissistic and defensive (Johnson et al., 1997; Paulhaus, 1998; Robins & John, 1997). However, we must be cautious in helping students set realistic goals and seek appropriate help, as their illusions may be tied to their affect. Removing their positive illusions without replacing them with another positive source of self-esteem may lead to increased depressive symptoms, and may reduce their motivation to persevere in the presence of difficulty.

Finally, we must continue to be aware of the home environment when working with adolescents at school. In this study, the relationship between positive illusions in math and depression was partially mediated by school stress related to perceived parental control. Research indicates that individuals that perceive having little control at home are at higher risk for depression and anxiety (e.g., Griffin, Fuhrer, Stansfeld, & Marmot, 2002). Consulting with parents, and helping them set appropriate levels of control and structure for their children may help reduce some of the stress that led to depressive symptoms.

Limitations and future directions

An important limitation of this study was the low return rate of consent forms, and low participation rate of students that were approached in the schools. It is unclear whether the students who returned the consent form and agreed to participate in the study differed from students who did not, but it is possible that the sample did not represent the population of adolescents as a whole.

It is always necessary to be cautious when interpreting regression or correlational analysis, as it is difficult to determine the causal direction. The results of this study were interpreted in the light of past research on the self-protective function of positive illusions, which was conducted using parallel populations. However, it is possible that a third variable is responsible for causing the relationship between the variables in this study. One potentially confounding variable that was controlled was relative achievement. However, other variables may play a role in this relationship.

It is also important to note that this study documented the existence of positive illusions in adolescents at a single time point, and did not seek to follow these adolescents over time to evaluate changes in positive illusions, or changes in related affect. Indeed, in a sample of adult undergraduates, Robins and Beer (2001) found that the relationship between academic positive illusions and positive self-esteem decreased over time. They interpreted that the participants' views of themselves became threatened as the reality of post-secondary education invariably undermined their illusions. It is unclear whether the relationship between positive illusions and depressive symptoms would have changed over

time in this sample, or indeed whether the positive illusions that were documented are reliable or whether participants' level of illusion fluctuates. Future studies will be required to empirically study the evolution of positive illusions as students continue to receive feedback on their abilities and performance.

Despite these limitations, this study has important implications for the study of cognitive illusions, and fills a significant gap in the literature. This study expands our understanding the development and maintenance of positive illusions, and allows up to better comprehend child, adolescent, and adult emotional resilience.

Chapter 6

References

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Appendix A
Parent Consent Form

The Affect of Mood, Self-Esteem, and Feedback on Students' Academic Perceptions



PROJECT: SECONDARY

Dear Parent/Guardian,

I am a professor in the Faculty of Education at McGill University and I am working on a project looking at adolescents' self-esteem and mood, as well as their responses to instructional encouragement and their understanding of how they are doing in different school subjects. The purpose of this letter is to tell you about the project and to ask for consent if you and your son/daughter wish to participate.

Description:

Previous work in the field of education has shown that students' views of how they are doing in school seem less related to how they are actually doing and more related to how they feel in terms of mood and self-esteem. However, it is unclear how students' thoughts about how they do are affected by feedback from teachers or instructors. Therefore, in our project, we wish to look at how adolescents predict their performance in reading, spelling, and math. We also wish to observe how these predictions can be affected by mood, self-esteem, and/or encouragement from an instructor or teacher. This project will demonstrate the relationship between students' emotional functioning (mood and self-esteem) and academic achievement. Furthermore, this project will also serve to illustrate the critical role of instructional encouragement and feedback. These findings will have significant implications for teaching and learning of students with diverse educational needs.

Project Activities:

Specifically, your son/daughter will be asked to complete some school tasks (reading, spelling, and math), as well as answer some questions about how he/she does on these kind of school tasks and about how he/she is feeling (mood and self-esteem). This will be done in three sessions of approximately 1 to 1 ½ hours each. These sessions will be scheduled at a time that is agreed upon with your son/daughter's teacher in order to make sure he/she will not be missing important course material.

We wish to work with adolescents with all different achievement levels and academic profiles (e.g. strong in math, but some difficulty in reading; difficulty in both areas; or strong in both areas). For this reason, not all students who do the first (screening) session will complete the follow-up sessions. Nevertheless, all students will receive the project benefits, as listed below.

Parents will be contacted and briefly interviewed regarding how they feel their son/daughter is doing in different academic areas and in general (self-esteem and mood). Please note that all information collected will be kept confidential, and all completed questionnaires will be kept in a locked cabinet accessible only to the primary project leader. No identifying information will be used in any written or oral presentation of the results. Consent to participate may be withdrawn at any time by either you OR your son/daughter.

Benefits:

- Following the completion of your son/daughter's sessions, we will provide you with a summary report. This report will provide information regarding your son/daughter's strengths and of his/her areas for improvement, as well as home and school strategies for working in the areas. Information on reading, spelling, and arithmetic will be provided.
- We will also provide a list of resources for use by yourself and your son/daughter to aid in his/her future academic success.

- Upon completion of the project (June 2008) all participating families will be provided with a final report documenting the findings of the project and the implications for working with students on academic subjects. The role of self-esteem, mood, and instructional feedback in students' beliefs about their school abilities will be shared.

- Parents and students participating will be provided with a series of free workshops on demand, presented by Dr. Heath and her project team. These workshops will address common concerns in adolescence, for both parents and students. Possible topics include “*Motivating My Teenager for School Success*” (parent workshop) and “*End of Year Planning and Preparation for Final Exams*” (student workshop).

Summary:

We would appreciate your participation in this important project that focuses on better understanding the complicated link between self-esteem, encouragement, and school performance.

On the attached consent form, please indicate whether or not you consent to your son/daughter’s participation. This form should be returned to school as soon as possible. **All students who return a signed consent form will be entered in a draw** for a \$50 gift certificate to HMV or a \$50 gift certificate to Famous Players (whether you check “yes” or “no”).

Should you have any questions about the project, please feel free to contact me or my research lab director at the coordinates listed below.

Sincerely,

Nancy Heath, Ph.D.

McGill University, Faculty of Education

Associate Professor

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The Affect of Mood, Self-Esteem, and Feedback on Students' Academic Perceptions

CONSENT TO PARTICIPATE IN PROJECT – *PARENT*

- I understand that by returning this signed consent form that I am providing consent for myself and my son/daughter to participate in the project described in the attached letter.
- Participation in this project involves my son/daughter completing three sessions in which he/she will be asked to complete some academic tasks (reading, spelling, and math), say how he/she thinks he will do on these tasks, as well as answer some questions about his/her self-esteem, mood, and general well being (including how he/she feels that he/she is doing academically). Each session will last between 1 to 1 ½ hours. These sessions will be scheduled at a time that is convenient for the school and my son/daughter's teacher.
- I understand that I will also be asked to complete a short interview (in person or over the phone) that asks questions about how my son/daughter is doing academically and their overall well being. This will take no more than 20 minutes to complete.
- I understand that my son/daughter will also be asked if they consent to participate before the first session. In the event that he/she does not agree to provide consent, my son/daughter will NOT participate. Thus, both parent and student consent is required for participation.
- My son/daughter and I are both free to withdraw from the study, at anytime, without any penalty or prejudice.
- All information collected will be kept confidential, and all completed questionnaires from the project will be kept in a locked cabinet accessible only to the primary project leader. No identifying information will be used in any written or oral presentation of the results.

I have read the above and I understand all of the conditions. I freely consent and voluntarily agree to have my son/daughter participate in this project.

☐ YES, I consent

☐ NO

Signature: _____

Date: _____

Name of parent/guardian (please print):

Name of student (please print):

Student's date of birth (month/day/year): _____

Grade: _____

Homeroom class: _____

Parent telephone number (to contact for parent interview):

Appendix B
Student Consent Form

CONSENT TO PARTICIPATE IN PROJECT – *STUDENT*

- I agree to participate in the research project described to me. I understand that my parents have already said that I am allowed to participate in this project.
- Participation in this project involves completing three sessions in which I will be asked to complete some academic tasks (reading, spelling, and math), say how I think I will do on these tasks, as well as answer some questions about my self-esteem, mood, and general well being (including how I think I am doing in school). These sessions will be approximately 4 hours total, and will be scheduled in advance with my teacher or my parents.
- I understand that my parents will also be asked to complete a short interview that asks questions about my well being and how I am doing in school.
- I am free to withdraw from the study, at anytime, without any penalty or prejudice.
- All information collected will be kept anonymous and confidential.
- No identifying information will be used in any written or oral presentation of the results.
- My classroom work and grades will not be affected by my decision to participate or not to participate.

I have read the above and I understand all of the conditions. I freely consent and voluntarily agree to participate in this project.

Name (please print):

Signature: _____

Date: _____