The role of self-concept clarity in self-other distinction and consequences for social

behavior

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Table of Contents

Abstract	iv
Résumé	vi
Acknowledgements	viii
Statement of Original Contribution	xi
Author Contributions	xiii
General Introduction	1
Article 1	
Abstract	
Introduction	
Study 1	
Methods	35
Results and Discussion	
Study 2	
Methods	40
Results and Discussion	
Study 3	47
Methods	
Results and Discussion	49
General Discussion	54
Tables	72
Figures	78
Bridge to Article 2	82
Article 2	84
Abstract	85
Introduction	86
Study 1	
Methods	
Results and Discussion	
Study 2	97
Methods	
Results and Discussion	102

General Discussion	102
Tables	120
Figures	121
General Discussion	124
General References	138
Appendix A: Supplemental Material for Article 1	155
Appendix B: Supplemental Material for Article 2	165

Abstract

Our sense of self is intimately intertwined with the social world around us. From the moment we are born, the formation of a self-concept critically hinges on social interactions. One important aspect of the self-concept is self-concept clarity (SCC), the extent to which the self-concept is clearly and confidently defined, internally consistent and temporally stable. Extensive research has documented the contribution of social processes to creating and maintaining a clear and coherent sense of self. Importantly, research has also documented a positive contribution of a clear self-concept to a variety of social phenomena and a negative contribution of an unclear sense of self to social functioning. Although research has consistently shown that SCC contributes to social process, the reasons why this association exists remain poorly understood. I hypothesized that self-other distinction, the ability to differentiate between one's own experience and another person's experience, may be one important mechanism underlying this relationship.

Given that empathy is central to social functioning, Article 1 examines the role of SCC in empathy to understand the positive links between a clear sense of self and social processes and investigates self-other distinction as a mediator of this relationship. Across three studies, Article 1 demonstrates that SCC is important for empathy. Specifically, low SCC was associated with higher dispositional empathic personal distress, a self-focused aversive reaction in empathyinducing situations that often leads to withdrawing from the person in need, and lower dispositional empathic concern, an other-oriented response of care. These associations held when participants were confronted with an actual person in need. Moreover, low SCC was also associated with less helping behaviour, an effect that was mediated by empathic personal distress and empathic concern. Importantly, difficulties with self-other distinction mediated the association between SCC and personal distress. Article 2 probes the association between SCC and self-other distinction more deeply by examining if low SCC individuals' difficulties with conceptual self-other distinction extend to difficulties with self-other distinction in their bodily experiences. Across two studies, Article 2 demonstrates that low SCC is associated with difficulties with bodily self-other distinction as indicated by low SCC individuals' greater susceptibility to body illusions.

Taken together, this doctoral dissertation shows that SCC is important for empathy and conversely, that low SCC has detrimental consequences for empathic responding. Moreover, this association appears to be mediated by insufficient distinction between self and other representations. Finally, in addition to having difficulties with self-other distinction at a conceptual level, low SCC people appear to have difficulties with self-other distinction at a body level. Given that much of social cognition and behaviour relies on some degree of self-other distinction, this research suggests that self-other distinction may be one possible mechanism underlying the positive link between SCC and social processes more generally. Moreover, these findings have important implications for understanding possible sources of self-concept confusion.

Résumé

Notre sens de soi est intimement lié au monde social qui nous entoure. Dès la naissance, la formation du concept de soi repose essentiellement sur les interactions sociales. Un aspect important du concept de soi est la clarté de concept de soi (CCS), c'est-à-dire la mesure dans laquelle le concept de soi est défini clairement et avec assurance, est cohérent, et est stable dans le temps. Des recherches ont documenté la contribution des processus sociaux dans la création et le maintien d'un sens de soi clair et cohérent. Par ailleurs, un concept de soi clair contribue positivement à une variété de phénomènes sociaux et contribue négativement au fonctionnement social. Bien que les recherches aient invariablement démontré que la CCS contribue aux processus sociaux, les raisons de cette association restent mal comprises. J'ai émis l'hypothèse que la distinction entre le soi et l'autre, c'est-à-dire la capacité à faire la différence entre sa propre expérience et celle d'une autre personne, pourrait être un mécanisme important sous-jacent à cette relation.

Puisque l'empathie est au cœur du fonctionnement social, l'article 1 examine le lien entre la CCS et l'empathie et examine la distinction entre le soi et l'autre comme médiateur de cette relation. Par le biais de trois études, l'article 1 démontre que la CCS est un facteur important associé à l'empathie. Plus précisément, une faible CCS était associée à une tendance à réagir avec de la détresse personnelle à des situations induisant généralement de l'empathie, une réaction aversive centrée sur soi qui mène souvent à se retirer de la situation plutôt qu'à aider la personne en détresse. Une faible CCS était aussi négativement associée à une préoccupation empathique dans ces mêmes situations, une réponse émotionnelle centrée sur les besoins de l'autre. Ces associations ont également été observées lorsque les participants ont été confrontés à une personne réellement dans le besoin. De plus, une faible CCS était également associée à moins de comportements d'aide envers la personne dans le besoin, effet provoqué par une détresse personnelle et une faible préoccupation empathique. Il est important de noter que l'association entre le CCS et la détresse personnelle était expliquée par la distinction entre le soi et l'autre. L'article 2 approfondit le lien entre la CCS et la distinction entre le soi et l'autre en examinant si la faible distinction entre le soi et l'autre caractérisant les individus avec une faible CCS s'étend au-delà des difficultés conceptuelles jusqu'à leurs expériences corporelles. À travers deux études, l'article 2 démontre qu'une faible CCS est associée à une faible distinction entre le soi et l'autre au niveau corporel, un effet démontré par la plus grande susceptibilité aux illusions corporelles des individus avec une faible CCS.

En somme, cette thèse de doctorat montre que la CCS est un facteur important dans l'empathie et inversement, qu'une faible CCS a des conséquences néfastes sur la réponse empathique. De plus, cette association semble résulter d'une distinction insuffisante entre les représentations du soi et de l'autre. Enfin, en plus d'avoir des difficultés avec la distinction entre le soi et l'autre au niveau conceptuel, les personnes avec une faible CCS semblent avoir des difficultés avec la distinction entre le soi et l'autre au niveau corporel. Considérant qu'une grande partie de la cognition et du comportement social repose sur un certain degré de distinction entre le soi et l'autre, cette recherche suggère que la distinction entre le soi et l'autre pourrait être un mécanisme sous-tendant le lien positif entre la CCS et les processus sociaux en général. De plus, ces résultats ont des implications importantes pour la compréhension de potentielles sources de confusion dans le concept de soi.

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viii

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Statement of Original Contribution

Although research has consistently shown that self-concept clarity (SCC) contributes to social processes, the reasons why this association exists remain poorly understood. The present research addresses this gap by showing that SCC is linked with self-other distinction, the ability to distinguish between one's own experience and another person's experience, and that self-other distinction may be one possible mechanism underlying the positive effects of SCC on social functioning.

Article 1 examined the role of SCC in empathy and investigated self-other distinction as a mechanism underlying this association. Across three studies, my findings are the first to show that SCC is related to empathic functioning. Specifically, I showed that low SCC is associated with more empathic personal distress, a self-focused aversive reaction in empathy-inducing situations, less empathic concern, an other-oriented response of care, and, perhaps most critically, less helping behaviour. Moreover, personal distress and empathic concern mediated the link between SCC and helping. Importantly, I show that difficulties with self-other distinction mediated the low SCC-personal distress association. Given that much of our social lives rely on self-other distinction processes as well as empathy, these findings suggest that self-other distinction may underlie the positive link between SCC and interpersonal processes more generally.

Article 2 probed the association between SCC and self-other distinction more deeply by examining whether the association between low SCC and difficulties with conceptual self-other distinction extend to difficulties with self-other distinction at the level of the bodily self. Specifically, I investigated the association between participants' SCC and their susceptibility to bodily illusions, an indicator of stability in the bodily self. Across two studies, my findings are

xi

the first to demonstrate that low SCC is associated with increased susceptibility to bodily illusions. These results suggest that an unclear sense of self is indicative of pervasive self-confusion across different modalities of self (i.e., the self-concept and the bodily self). Moreover, these findings open a new avenue of research by pointing to unclear bodily experiences as a possible source of self-concept confusion and difficulties with distinguishing between the self and others.

Author Contributions

Two manuscripts are included in the present doctoral thesis. Article 1 was co-authored by myself and Jennifer Bartz. I developed the study concepts and designs with the input of Jennifer Bartz. I collected, analyzed, and interpreted the data; Jennifer Bartz aided with interpretation of the data. I wrote and revised the manuscript and Jennifer Bartz provided critical revisions. Article 1 is currently under review at *Emotion*.

Article 2 was co-authored by myself, Rémi Thériault, Jay Olson, Amir Raz and Jennifer Bartz. I developed the study concept and design for Study 1 with the input of Jennifer Bartz. The study concept and design for Study 2 was developed by Rémi Thériault with input from myself, Jay Olson, and Amir Raz. I collected, analyzed, and interpreted the data for Study 1; Jennifer Bartz aided with interpretation of the data. Rémi Thériault collected and analyzed the data for Study 2; data interpretation was performed by myself with the input of Rémi Thériault. I wrote and revised the manuscript and Rémi Thériault, Jay Olson, and Jennifer Bartz provided editorial assistance. Article 2 is published in *Personality and Social Psychology Bulletin*.

General Introduction

Humans are fundamentally social beings (Baumeister & Leary, 1995). Even the formation of our self-concept, the cognitive generalization about the self encompassing everything that an individual claims as me or mine (Markus, 1977), critically hinges on social interactions (Baldwin, 1897, Cooley, 1902, Mead, 1934). One important aspect of the selfconcept is self-concept clarity, the extent to which the self-concept is clearly, consistently, and coherently defined (Campbell et al., 1996). Reflecting the understanding that the self is largely socially constructed, a plethora of research documents the importance of the social world for the formation of a clear sense of self (Lodi-Smith & DeMarree, 2017). Conversely, research has also documented a positive contribution of a clear self-concept to a variety of social processes, including establishing and maintaining romantic relationship (McIntyre, Mattingly, & Lewandowski, 2017), managing workplace conflicts (Bechtoldt, Dreu, Nijstad, & Zapf, 2010), and promoting supportive friendships (Becht et al., 2017). What remains unknown is why selfconcept clarity is important for social functioning. That is, why does having a clear, consistent, and coherent sense of self facilitate interpersonal processes? I hypothesized that self-concept clarity enables self-other distinction-that is, a clear sense of self should enable one to differentiate between the self and other people. Given the importance of self-other distinction for social interactions (Guzman, Bird, Banissy, & Catmur, 2016; Steinbeis, 2016), the notion that self-concept clarity is associated with self-other distinction implies that self-other distinction is a possible mechanism that may account for the positive effects of a clear sense of self in a variety of social domains. By contrast, an unclear sense of self should render it difficult to fully appreciate the other as different from the self and consequently impair social functioning. Thus, the aims of the current program of research were twofold. First, I aimed to examine the role of

self-concept clarity in empathy and to investigate self-other distinction as a mechanism underlying this association. Given that empathy shapes much of our social lives (Decety, Bartal, Uzefovsky, & Knafo-Noam, 2016) and relies on self-other distinction (e.g., Batson et al., 1997), empathy served as an ideal context to test my hypothesis that self-other distinction underlies the positive link between self-concept clarity and interpersonal processes more generally. Second, I aimed to probe the association between self-concept clarity and self-other distinction more deeply by investigating whether this association extends to self-other distinction at the level of the bodily self, a distinct modality of the self that refers to the implicit, pre-reflective awareness of the perceptual experiences of one's body in space (Gallagher, 2000; Gallagher & Meltzoff, 1996; Haggard & Wolpert, 2005). An association between low self-concept clarity and difficulties with bodily self-other distinction would suggest that an unclear sense of self is pervasive across modalities. Moreover, given that the bodily self is thought to serve as the foundation for the development of the self-concept (Fonagy, Gergely, Jurist, & Target, 2002), such an association could suggest that an unclear bodily self is a possible source of self-concept confusion and difficulties with self-other distinction.

The Self-Concept

The self-concept is understood as a system of cognitive generalizations about the self, derived from past experiences, that organize and process self-relevant information and guide behaviour (Markus, 1977). In other words, the self-concept encompasses everything that a person claims as "me" or "mine": personality attributes, values, attitudes, beliefs, preferences, goals, emotional states, social roles and physical appearance. Substantial theoretical and empirical research has gone into understanding the development of the self-concept. According to self-perception theory (Bem, 1972), some self-representations result from people making

inferences about their attributes (as well as other self-concept aspects such as beliefs, values, etc.) while observing their own behaviours, similar to inferences that an outside observer might make. Although some self-views are formed through this self-observation, social psychologists have also long noted the importance of interacting with others for the formation of the selfconcept. Over a century ago, Cooley (1902) coined the term "looking glass self" to refer to the idea that how we see ourselves comes from our perception of how others see us. In this way, we may perceive ourselves as generous, for example, because others have told us as such. In line with the notion of the looking glass self, our self-concepts are often quite similar to the views that others have of us, especially close others (Beer, Watson, & McDade-Montez, 2013; Kim, Di Domenico, & Connelly, 2019). In addition to others' perceptions of us, social comparison also serves as an important source of self-knowledge (Suls & Miller, 1977). Beginning in childhood, people compare themselves with others to form accurate conclusions about their relative standing on abilities, attitudes, and opinions. Finally, social identity theory asserts that we draw part of our sense of identity from the social groups to which we belong (Tajfel, 1978). Interacting with others is so central to the formation of our self-concept that symbolic interactionists suggest that all self-knowledge derives from social interactions (Baldwin, 1897, Cooley, 1902, Mead, 1934).

Once formed, people are generally motivated to maintain a clear and consistent selfconcept. Indeed, people are resistant to information that is incongruent with their self-views and often reject explicit feedback that is inconsistent with their notion of self (Swann & Read, 1981a; 1981b). That said, it is also well-established that the self-concept is dynamic and subject to change, especially in response to changes in the social environment or social roles (Markus & Wurf, 1987). Indeed, the self-concept is arguably most likely to change during life transitions, such as going to university or becoming a parent (Kling, Ryff, & Essex, 1997) or in close relationships, as people readily incorporate close others into their sense of self (Aron, Aron, Tudor, & Nelson, 1991; Mashek, Aron, & Boncimino, 2003). Importantly, in the face of these changes, it is thought that the self-concept actively integrates new information and experiences with existing self-knowledge allowing individuals to organize the new and old together to maintain a clear and consistent sense of self (Markus, 1977).

Defining Self-Concept Clarity

Of course, individuals vary in their ability to construct a clear and consistent sense of self; such variability is conceptualized as self-concept clarity. The term self-concept clarity (SCC), or "the extent to which the contents of an individual's self-concept are clearly and confidently defined, internally consistent, and temporally stable" (Campbell et al., 1996, p. 141), was first introduced by Campbell in 1990 (Campbell, 1990). She posited that differences in SCC could account for some of the differences observed between people high and low in self-esteem. Specifically, Campbell observed that compared to individuals who scored higher on measures of self-esteem, those with low self-esteem appeared to have more malleable self-conceptions in response to situational influences. She reasoned that this increased malleability was the result of low self-esteem people's lower certainty and clarity of their self-representations. Across several studies, she found evidence for this idea using indirect measures of SCC. Specifically, she showed that, compared to their higher self-esteem counterparts, people low in self-esteem exhibited less extremity and self-reported confidence when rating themselves on bipolar traits, less temporal stability in trait-ratings, less congruence between self-conceptions and situationspecific behaviour, and longer reaction times when deciding if a trait was self-descriptive or not. She thus concluded that reduced clarity and confidence in self-conceptions accounts for low selfesteem people's self-concept malleability. Following this publication, Campbell and colleagues

published the Self-Concept Clarity Scale (Campbell et al., 1996) which provided researchers with a useful tool for studying this construct. This 12-item self-report includes items that capture different aspects of SCC such as "Even if I wanted to, I don't think I could tell someone what I'm really like" (clarity and confidence), "My beliefs about myself often conflict with one another" (internal consistency), and "My beliefs about myself seem to change very frequently" (consistency). Since Campbell's seminal publications, research into SCC has exploded with researchers interested in understanding this construct and its contribution to a variety of processes, including mental health, identity development, relationship functioning, and conflict management (see below for review).

Some definitional aspects of SCC are worthy of clarification. First, although the selfconcept includes a variety of self-beliefs, SCC refers to clarity and certainty of the whole of one's self-concept rather than of a specific self-conception. In fact, research indicates that all people exhibit variation in the clarity of their self-conceptions in that some self-conceptions are clearer than others (Stinson, Wood, & Doxey, 2008). Thus, a person could be clear about one aspect of their self-concept, such as their athletic ability or political views, but be uncertain of who they are more generally (i.e., low SCC). Second, evident from the above definition, SCC refers to the meta-cognitive evaluation of the structural aspects of the self, rather than the affective evaluation of the contents of the self-concept (i.e., self-esteem). That is, SCC captures the degree to which individuals have clear, well-defined, and stable perceptions of who they are as a person, and not how they feel about who they are as a person. Although SCC and selfesteem are moderately positively correlated (Campbell et al., 1996), a person could be very clear, confident and stable in their perception of themselves (i.e., high SCC) as an awful person who is no good (i.e., low self-esteem). Finally, in addition to being different from self-esteem, SCC can also be contrasted from another structural aspect of the self-concept: self-complexity, the extent to which individuals have many different and relatively independent self-conceptions, which may include social roles, relationships, traits, behaviours, types of activities, and goals (Linville, 1987). For example, compare a woman whose self-concept contains the social identities of lawyer, girlfriend, daughter, dancer, and runner to a man whose self-concept is primarily defined by being a lawyer. The woman would be characterized by high self-complexity whereas the man would be said to have low self-complexity. Theoretically, SCC and self-complexity are independent—a person could possess a highly complex self-concept characterized by many different self-conceptualizations that is, nonetheless lacking in clarity, consistency, and coherence between these different self-conceptions (i.e., low SCC). Conversely, a person's selfconcept could contain a limited number of independent self-descriptions (i.e., low selfcomplexity) but be very clear, consistent and coherent (i.e., high SCC). In sum, SCC is an important structural feature of the self-concept that is separate from self-evaluations and the complexity of the self-concept.

In defining SCC, it is useful to briefly discuss the broader notion of identity as the two ideas clearly overlap. According to Erik Erikson (1959, 1968), achievement of a relatively stable and well-defined set of goals, values, and beliefs—i.e., identity—is an essential part of human development. Identity achievement is generally thought to be an active process; individuals purposely seek out and explore possible choices and subsequently commit to one or more of these choices and integrate them into an overall sense of self (Marcia, 1966). According to Marcia (1966), level of exploration as well as level of commitment each contribute to create four possible identity categories: diffused (low exploration, low commitment), foreclosed (low exploration, high commitment), moratorium (high exploration, low commitment) and achieved

(high exploration, high commitment). Of these four statuses, achieved identity is generally seen as the most mature and stable while diffused identity is seen as the least mature and stable and ill-defined. Perhaps not surprisingly, research shows that achieved identity status is positively associated with SCC while less mature identity statuses (i.e., diffused, foreclosed or moratorium) are negatively associated with SCC (Ickes, Park, & Johnson, 2012). Moreover, moving towards a more mature identity status appears to contribute to the development of SCC as indicated by identity commitments in adolescents predicting increased SCC over time (Schwartz et al., 2011; Schwartz, Klimstra, Luyckx, Hale, & Meeus, 2012). Given the strong relationship between identity achievement and SCC, some researchers have even proposed that the Self-Concept Clarity Scale (described above) can serve as a proxy for the degree to which identity-concerns have been resolved (Dunlop, 2017).

Another important notion when discussing SCC is accuracy of self-knowledge. Although the original conceptualization of SCC viewed it as independent of individuals' actual knowledge of themselves (Campbell et al., 1996), more recent work shows that high SCC is indeed indicative of accuracy of self-beliefs. In a study conducted by Lewandowski and Nardone (2012), participants self-reported on their SCC and rated themselves on various personality traits as well as the extent to which they engage in particular activities (e.g., spending time with others, talking on the phone). Participants were also rated on these same personality traits and behaviours by a close other. Results showed that participants with higher SCC demonstrated higher agreement (i.e., higher correlation) with their close others about their own personality traits and behaviours. In addition, higher SCC participants were also more accurate in predicting their performance on a laboratory task. These findings indicate that a clear and consistent sense of self predicts accuracy of self-knowledge.

Finally, SCC is generally conceptualized as a trait-like construct. Consistent with this conceptualization, SCC shows high rank-order stability, meaning that indicators of SCC are highly correlated, ranging from 0.36 to 0.93, when measured in the same sample across two times points. This also means that individuals retain their SCC placement relative to other people over time (Lodi-Smith & Crocetti, 2017). However, rank-order stability does not preclude the possibility of changes to SCC. Indeed, research indicates that SCC fluctuates with age (Lodi-Smith & Roberts, 2010) and across situations. For example, the break-up of a romantic relationship (Slotter, Gardner, & Finkel, 2010), being rejected (Ayduk, Gyurak, & Luerssen, 2009), or simply experiencing negative daily events (Nezlek & Plesko, 2001) can decrease SCC while thinking about one's mortality can temporarily increase SCC (Landau, Greenberg, Sullivan, Routledge, & Arndt, 2009). Others have shown that SCC can also be manipulated experimentally (Csank & Conway, 2004; Emery, Walsh, & Slotter, 2015; Setterlund & Niedenthal, 1993). For example, Emery and colleagues (2015) randomly assigned participants to a self-concept confirmation or self-concept confusion condition. Those in the self-concept confirmation condition wrote about self-aspects (e.g., traits, beliefs, attitudes, social roles) that complement each other in their everyday life (e.g., "ambitious" and "intelligent") while those in the confusion condition wrote about self-aspects that contradict each other in their everyday life (e.g., "ambitious" and "lazy"). They found that, on average, the confirmation group exhibited higher SCC than the confusion group and a control group. The confusion group also demonstrated lower SCC than the control group. Taken together, research shows that, although SCC is generally conceptualized as a trait-like construct, it can be temporarily altered by features of the current situation.

Self-Concept Clarity and Well-Being

An abundance of research documents the importance of SCC for psychological wellbeing. For example, correlational evidence shows that SCC is negatively associated with neuroticism, ruminative self-focus (Campbell et al., 1996), loneliness (Light & Visser, 2013), depression, and perceived stress (Treadgold, 1999) and positively associated with self-esteem (Campbell et al., 1996), perception of meaning in life (Bigler, Neimeyer, & Brown, 2001), and general life-satisfaction (Ritchie, Sedikides, Wildschut, Arndt, & Gidron, 2011). Importantly, many of these associations hold controlling for self-esteem, itself an important contributor to mental health (for review, see DeMarree & Bobrowski, 2017). Moreover, longitudinal research provides empirical evidence for the unique contribution of SCC to well-being. In a sample of 12 to 16 year-olds that were assessed annually for five years, Schwartz et al. (2012) showed that higher SCC prospectively predicted lower symptoms of anxiety and depression at later time points. Similarly, Van Dijk et al. (2014) observed that SCC predicted depressive symptoms in a longitudinal study of adolescents aged 13 to 18. These findings are consistent with the idea that a clear, coherent, and consistent sense of self improves well-being, whereas an unclear, incoherent, and unclear sense of self erodes well-being.

Low self-concept clarity has also been linked with psychopathology. In addition to the findings reviewed above associating SCC with depression and anxiety, evidence shows that an unclear sense of self is related to social anxiety, even when accounting for depression and self-esteem (Stopa, Brown, Luke, & Hirsch, 2010). Moreover, SCC has also been linked with other indicators of psychopathology. For example, low SCC is associated with disordered eating (Perry, Silvera, Neilands, Rosenvinge, & Hanssen, 2008), such as more frequent bulimic behaviors (Cahill & Mussap, 2007; Vartanian, 2009), high autistic traits (Berna et al., 2016), and

appears to be characteristic of individuals with schizophrenia (Cicero, Martin, Becker, & Kerns, 2016) and borderline personality disorder (Pollock, Broadbent, Clarke, Dorrian, & Ryle, 2001). These results lend further support to the conclusion that SCC is important for psychological wellness.

Interestingly, culture appears to moderate the importance of SCC for well-being. While low SCC is associated with poor well-being outcomes in Western cultures, people living in Eastern cultures show little or no relationship between SCC and various indicators of well-being (Campbell et al., 1996; English & Chen, 2011). This cultural dependency is understood as resulting from differing cultural ideals. SCC refers to an independent self-construal that is predominant in Western cultures (Markus & Kitayama, 1991); thus, inconsistencies in the self—i.e., straying from the cultural ideal—are understandably distressing to individuals living in independent cultures. By contrast, Eastern cultures view the self as interdependent (Markus & Kitayama, 1991); the self is viewed as flexible and responsive to the social environment. Thus, inconsistencies in the self are in fact expected in Eastern cultures and are thus not related to indicators of well-being. Although self-consistency across different contexts appears to be less important for individuals with interdependent selves compared to those with independent selves, English and Chen (2011) showed that those with interdependent selves still benefit from consistency within specific social contexts over time; that is, maintaining stable relationshipspecific selves (i.e., behaving in the same manner with the same person over time). While inconsistency of trait self-perceptions across different relationship contexts was associated with lower subjective authenticity and relationship quality for European Americans but not East Asians, inconsistency within the same relationship context over time showed similar negative associations with well-being for both European Americans and East Asians (English & Chen,

2011). Thus, although SCC appears to be more consequential for well-being to Westerners overall, SCC within specific relationships is equally important across cultures.

Antecedents of Self-Concept Clarity

Reflecting the understanding that the self-concept is largely socially created and defined (Cooley, 1902), the development of SCC hinges on the interactions that people have with others and the social worlds they inhabit. Given that the family is, for most people, the first exposure to the social world, research has focused on understanding the influence of the family on adolescents' developing self-concepts. For example, Crocetti and colleagues (2016) measured SCC annually in a large sample of 13 year-olds and their parents for six years. They found that fathers' and mothers' SCC predicted adolescents' SCC over time. Importantly, adolescent SCC did not influence parents' SCC, indicating a unidirectional intergenerational transmission of SCC. Other work has sought to understand the mechanisms responsible for parents' positive impact on adolescent SCC. Cross-sectional studies indicate that affectionate, warm and autonomy-supportive parent-child relationships positively contributed to participants' SCC (Davis, 2013; Perry et al., 2008; Wu, 2009). Similarly, longitudinal evidence suggests that open communication with parents during adolescence predicted higher SCC over time (Van Dijk et al., 2014). Given that developing a clear and consistent sense of self is a core developmental task during adolescence (Erikson, 1959, 1968), these findings suggest that a positive relationship with parents may indirectly contribute to SCC by allowing adolescents to explore possible ideas about the self and to foster commitments to identity choices.

Beyond adolescence, as one would be expected, SCC generally continues to increase with age until mid-life (Light & Visser, 2013; Lodi-Smith & Roberts, 2010). According to the social investment hypothesis (Roberts, Wood, & Smith, 2005), investing in age-normative social roles

is one of the driving mechanisms of personality development in young adulthood and investment in these roles shapes long-term adult identity. Consistent with this notion, commitments and consolidations of social role identities appear to be central contributors to age differences in SCC. While the transition from adolescence to emerging adulthood is associated with an initial drop in SCC due to increased exploration of possible social roles and associated re-organization of the self-concept (Crocetti, Moscatelli, et al., 2016), young adulthood is characterized by commitment to social roles and thus represents a period of growing SCC. For example, greater investment in community roles (i.e., religion and volunteerism) in adulthood is associated with higher SCC (Lodi-Smith & Roberts, 2010). By midlife, people have largely moved past identification of social roles and are instead engaging in experiences that solidify these social roles. Accordingly, midlife represents the peak of SCC (Light & Visser, 2013; Lodi-Smith & Roberts, 2010).

Just as social role engagements are predictive of higher SCC, loss of a social role or difficulties with engagement in a social role have been shown to result in less SCC (Crocetti, Rubini, Branje, Koot, & Meeus, 2016; McIntyre, Mattingly, Jr, & Simpson, 2014; Light & Visser, 2013; Lodi-Smith & Roberts, 2010; Slotter & Walsh, 2017). For example, Light and Visser (2013) showed that experiencing a greater number of "role exits", such as getting divorced or losing a job, over the last year predicted reduced SCC. Thus, although midlife may be a time of general stability in SCC, individual experiences with social role transitions may contribute to non-normative fluctuations in SCC for a given person. Moreover, because changes in identity-defining roles are normative in older adulthood, such as retirement or the loss of loved ones, late life may be a period associated with reductions in SCC. Indeed, cross-sectional work shows that although SCC generally increases with age for young and middle-aged adults, it decreases for older adults (Light & Visser, 2013; Lodi-Smith and Roberts, 2010).

In addition to changes in social roles, the groups we identify with shape our SCC. Taylor (1997) argued that having a clear collective identity—clear knowledge about the values, traits, ideological positions, shared behaviours, experiences, and history that are associated with one's social group—is essential for the development of a clear sense of self. Specifically, he argued that the contents of the self-concept (e.g., attributes, beliefs) are derived from a comparative process. That is, when a person perceives a characteristic to be self-descriptive (e.g., artistic), it is because they have compared themselves to a clear reference group and drawn conclusions about their relative standing on that characteristic (e.g., "I am artistic because I am more interested in art than other people in my group"). Thus, a clearly defined collective identity can serve as such a prototype and clarify the self-concept. By contrast, without a clear collective identity, there is no clear, available prototype for a person to compare themselves to and consequently it may be very difficult for them to construct a clear and coherent sense of self. Support for this notion comes from research conducted by Usborne and Taylor (2010). Across a series of five studies conducted in a culturally diverse sample, they showed that cultural identity clarity, the extent to which beliefs about one's cultural group are perceived as clear and confidently defined, is indeed associated with SCC. Given that social groups are an important source of self-knowledge, loss of a social group should negatively impact SCC. To test this idea, Slotter, Winger, & Soto (2015) had participants imagine and write about no longer being able to be a member of an important social group (e.g., book club, LGBT awareness group) or continuing to be a member of such a group. Participants who imagined losing their group membership and who were strongly identified with their group reported reduced SCC as well as

self-concept change compared with other participants. Thus, the groups we identify with and the clarity of our group identity appear to be important determinants of SCC.

Finally, the extent to which others view us the way we view ourselves also influences SCC. Indeed, consistent with self-verification theory (Swann, 1983), numerous studies have shown that SCC is bolstered when self-beliefs are confirmed by others and undermined when self-beliefs are disconfirmed by others (e.g., Slotter & Gardner, 2014; Slotter, Winger, & Soto, 2015; Stinson et al., 2010). For example, Slotter and Gardner (2014) gave pre-med students the threatening feedback that they were unlikely to be successful medical doctors in the future. Participants then imagined interacting with either a friend who could offer emotional support or a friend who could offer evidence from the individual's past that reconfirmed the threatened idea of self-as-doctor. Findings showed that participants who imagined receiving evidentiary support, i.e., having their self-beliefs reconfirmed by someone, experienced increased SCC compared to those individuals who imagined receiving emotional support. Similar results were found when participants actually experienced these interactions in person. Stinson et al., (2010) showed that receiving information that is inconsistent with self-beliefs, even if this information is positive, negatively impacts SCC. Participants first reported on self-esteem and were then asked to imagine instances in which they received feedback that they were valued by others (e.g., recent compliment, someone behaving warmly towards them) or instances in which they received feedback that they were not valued by others (e.g., recent criticism, someone behaving coldly towards them). Among high self-esteem individuals, invoking information that they are valued by others boosted SCC more than information that they are not valued by others. By contrast, among those with low self-esteem, recalling instances where they were not valued resulted in more SCC while thinking about receiving feedback that they are valued by others lowered SCC.

These results suggest that positive feedback does not necessarily increase SCC; rather, information consistent with self-perceptions, even if those perceptions are negative, bolsters SCC. In this way, these findings further highlight the dissociation between SCC and self-esteem.

In sum, across the lifespan, from adolescence to old age, research demonstrates that our social world influences our SCC. In adolescence, warm, affectionate relationships with parents contribute to the development of a clear sense of self. Throughout adulthood, SCC generally increases as a result of greater commitment and engagement with social roles. Accordingly, loss of important social roles contributes to declines in SCC in late life. Finally, our group memberships and the extent to which others share our self-beliefs also influence SCC. The formation of a clear, coherent, and stable sense of self is intimately dependent on interpersonal processes.

Influence of Self-Concept Clarity on Social Behaviour

From the research reviewed so far, it is clear that our social world fundamentally shapes the clarity and coherence of our sense of self and that this has important consequences for psychological well-being. Given that the self-concept is known to guide the interpretation of and participation in social experiences (Markus & Wurf, 1987), clarity and coherence of the self should also affect social processes. However, comparatively little research has examined the influence of SCC on relationships and social behaviour more generally. Of the work that has been done in this area, the majority focuses on the role of SCC in romantic relationships.

Self-concept clarity and romantic relationships. Research consistently shows that SCC is positively associated with romantic relationship involvement, functioning, and maintenance. For example, individuals with higher SCC report that their relationship is more central to their lives (Gurung, Sarason, & Sarason, 2001) and are more invested in their relationship (LodiSmith & Roberts, 2010). Moreover, greater SCC is associated with both relationship satisfaction and commitment, an effect that is mediated by self-esteem (Lewandowski et al., 2010). In general, the positive association between SCC and relationship quality is thought to result from people being able to "read" their partner better if their partner has high SCC. That is, people with a clear and coherent sense of self tend to be more consistent and stable in their behavior (Lewandowski & Nardone, 2012) which allows their partner to more accurately perceive their personality (Funder, 1995). Accurate perception of personality, in turn, fosters liking (Human, Carlson, Geukes, Nestler, & Back, 2018; Human, Sandstrom, Biesanz, & Dunn, 2013) as well as greater relationship satisfaction and functioning (Luo & Snider, 2009; Neff & Karney, 2005). Interestingly, relationship quality is not only associated with one's own SCC, but also with clarity of our perceptions of our partner's self-concept; individuals who view their partner's selfconcept as more clear report fewer conflicts with their partner as well greater relationship depth, more support from their partner, and higher relationship satisfaction (Gurung et al., 2001).

In addition to being associated with perceptions of relationship quality, SCC is also related to how people behave in romantic relationships. Research shows that those low in SCC tend to have higher levels of relationship visibility on Facebook, such as reporting that they are in a relationship in their "relationship status" section and having their romantic partner in their profile picture, perhaps as a means of shaping their public identity and boosting their clarity and confidence in their relational self-beliefs (Emery, Muise, Dix, & Le, 2014). Although much of the research into SCC and relationships is correlational, Emery and colleagues (2015) experimentally manipulated SCC to provide evidence for a causal role of SCC in relationship functioning. Specifically, they showed that individuals with low SCC have reduced interest in self-expansion, the cognitive re-organization of the self-concept that often occurs as a result of

the formation and maintenance of romantic relationships (Aron, Aron, Tdor, & Nelson, 1991). Specifically, compared to controls, participants primed with low SCC were less interested in non-relational self-expansion (e.g., having new experiences) and were less likely to actually selfexpand by incorporating attributes of a potential romantic partner into their self-concept. Given that self-expansion within a relationship is associated with greater relationship satisfaction and commitment (Mattingly, Lewandowski, & McIntyre, 2014), this research suggests that low SCC people may experience lower relationship quality by avoiding potential self-expansion opportunities.

In addition to showing that SCC plays a role in romantic relationships, research has also demonstrated that relationship experiences influence SCC. For example, interpersonal rejection can reduce state SCC. Ayduk and colleagues (2009) showed that participants who were sensitive to rejection reported significantly lower SCC when they experienced rejection from a confederate compared to participants who did not experience rejection. These results were replicated in the context of couples with people with higher rejection sensitivity showing lower SCC following an interpersonal conflict with their partners (Ayduk et al., 2009). In a series of studies, Slotter and colleagues (2010) examined how losing a romantic relationship, a particularly serious rejection, affects SCC. Across three studies, the dissolution of a romantic relationship undermined SCC. Specifically, single participants who reported having experienced greater self-concept change following a recent break-up also reported less clear self-conceptions. Similarly, blog posts written by people who had recently gone through a break-up expressed less SCC, compared to posts written about other topics, as indicated by greater frequency of words reflecting self-concept confusion, such as "uncertain", "confuse", "contradict", and "I don't know". Finally, a causal role of romantic break-up on reductions in SCC was confirmed by a

longitudinal study showing that the SCC of individuals who broke up declined over time relative to the SCC of individuals whose relationships remained intact. Additionally, across studies, reduced SCC uniquely predicted post-break-up emotional distress (Slotter, Gardner & Finkel, 2010). Taken together, romantic relationships have important influence over SCC.

Self-concept clarity and social behaviour more generally. Beyond research into romantic relationships, research examining the role of SCC in social processes is sparse. Of the available work, consistent with the literature on romantic relationships, findings converge on the conclusion that SCC is positively related to social functioning. Because of their lack of clear and confident internal standards of self-definition, as originally suggested by Campbell (1990), low SCC individuals may be more dependent on external cues that convey self-relevant information. Consistent with this idea, low SCC is associated with a greater tendency to make upward social comparisons (Butzer & Kuiper, 2006). Moreover, another demonstration of low SCC people's tendency to rely on external information comes from a study conducted by Rahimi and Strube (2007) in which undergraduate participants estimated the prevalence of characteristics possessed by African-Americans. One week later, participants were informed that their views were either more negative or more positive compared to their fellow students' judgments. Results showed that individuals with low SCC were more likely to adjust their attitudes to be in line with the new consensus information.

In addition to being linked with social perception, SCC is also tied to how we behave in social situations. In a series of studies, Bechtoldt, Dreu, Nijstad, and Zapf (2010) examined the link between SCC and conflict management. Participants were exposed to hostile remarks online from an ostensible interaction partner and were given an option to respond. Individuals with higher SCC showed more cooperative problem-solving behaviour and were overall more active

in the discussion. This finding was replicated in a longitudinal daily-diary study of employees from various organizations reporting on their workplace conflicts with employees with higher SCC employees reporting more problem-solving and less avoidance when work conflicts occurred. In addition, when participants were paired together to arrive at a joint decision in a laboratory task, dyad members with higher SCC engaged in more problem-solving than those with lower SCC. Finally, in this study the positive relationship between SCC and cooperative behaviour was mediated by less rumination. These findings suggest that a clear sense of self may allow individuals to deal effectively with interpersonal conflicts, whereas having a less clear sense of self may engender avoidance and less problem-solving when conflicts arise. This conclusion is consistent with work demonstrating that higher SCC is associated with reduced aggression (Stucke & Sporer, 2002). Finally, longitudinal evidence suggests that SCC affects the way that others' respond to us and that this association is causal. Specifically, a five year study that followed adolescents between the ages of 13 and 18 demonstrated that adolescent SCC predicts later support from close friends and parents as well as fewer negative interactions with parents (Becht et al., 2017). As noted above, positive interactions with parents also foster subsequent gains in adolescent SCC; thus, Becht et al.'s findings (2017) suggests that adolescent SCC and positive parenting reciprocally reinforce each other. Taken together, research investigating romantic relationships as well as other social contexts consistently demonstrates that a clear, consistent and coherent sense of self facilitates interpersonal processes.

Self-Other Distinction as a Mediator Between Self-Concept Clarity and Social Processes

Although evidence collected to date indicates that SCC is important for social functioning, the reasons why this association exists remain poorly understood. A few mediators have been examined to explain the effect of SCC on a specific outcome variable. For example, as

reviewed above, Lewandowski et al. (2010) showed that self-esteem mediated the association between SCC and relationship quality (see also McIntyre, Mattingly, & Lewandowski, 2017) while Bechtoldt et al. (2010) demonstrated that the SCC-cooperative problem-solving link was mediated by rumination. However, a framework for understanding SCC's positive effect on social functioning more generally, rather than examining specific mediators of specific effects, is lacking. That is, the literature has yet to answer the question: why is SCC beneficial for social behaviour in general? Here, I propose that self-other distinction may be one important factor underlying the positive association between SCC and social functioning.

Social interactions involve trying to understand others' internal states—their thoughts, feelings, motivations, attitudes—while dealing with the overpowering influence of our own concurrent internal states. Successful social interactions thus depend on self-other distinction, the ability to differentiate between simultaneous representations of our current experiences and others' experiences (see Guzman, Bird, Banissy, & Catmur, 2016 and Steinbeis, 2016 for reviews). The importance of differentiating between the self and others is particularly welldocumented for empathy, a fundamental social process that entails understanding and sharing another person's emotional state (Bird & Viding, 2014; de Vignemont & Singer, 2006; Decety & Jackson, 2004; Lamm, Bukowski, & Silani, 2016). Without adequate self-other distinction, research shows that sharing another person's emotions can induce personal distress, a selffocused aversive reaction that often leads to withdrawing from the person in need, rather than empathic concern, an other-oriented response of care (Batson, 1987; Batson et al., 1997). Although less research has examined self-other distinction in other social processes, some degree of differentiation between the self and other is likely important for a variety of social domains since all social interactions, be it resolving a conflict with a colleague, enjoying dinner with a

loved one, or engaging in small talk with the cashier at the grocery store, involve representing others' internal states.

The ability to distinguish between the self and other entails having a self-concept as well as having a concept of the other person. Evidence suggests that to understand others and to form a concept of another we rely, at least partly, on projecting our own self-concept—that is, projecting what we think, feel, believe, etc., onto the other person. This projection must then be adjusted according to knowledge about what is unique to the self that is unlikely to apply to the other as well as knowledge about what differentiates the other person from the self and other people (Mitchell, 2009; Nickerson, 1999). Because forming an accurate concept of others depends on having an accurate concept of the self, it follows that lacking a clear sense of self should render it difficult to appreciate differences between the self and other. Put another way, without a clear and coherent sense of self to draw upon, low SCC should be associated with impaired self-other distinction which should ultimately impair social functioning. Given that all social interactions rely on some degree of self-other distinction, the notion that SCC is associated with self-other distinction implies that self-other distinction is a possible mechanism that may account for SCC's effect on a variety of social domains.

The hypothesis that low SCC is related to difficulties with distinguishing the self from the other is consistent with Campbell's (1990) original theorizing that individuals with an unclear and inconsistent sense of self are characterized by a more malleable self-concept. This idea is also consistent with previous research (described above) showing that low SCC people are more susceptible to external sources of self-relevant information (Butzer & Kuiper, 2006; Rahimi & Strube, 2007). A particularly poignant demonstration of this is the observation that, following a brief interaction, individuals with a weak sense of self changed their personality ratings to be

more similar to those of the strong-sense-of-self interaction partner (Cuperman, Robinson, & Ickes, 2014). However, to date, no one has provided explicit evidence of the relationship between low SCC and lower self-other distinction. Moreover, the downstream consequences of this relationship on interpersonal processes have also not been explored.

The Present Work

To address this gap in the literature, the aims of this program of research were twofold. First, I aimed to investigate the role of SCC in empathy and to examine self-other distinction as a mechanism underlying the SCC-empathy association. Given that empathy shapes much of our social lives (Decety et al., 2016) and relies on self-other distinction (see above), empathy served as an ideal context to test my hypothesis that self-other distinction underlies the positive link between SCC and interpersonal processes more generally. Second, I aimed to probe the association between SCC and self-other distinction more deeply by examining whether the association between SCC and conceptual self-other distinction extends to self-other distinction at level of the bodily self, a distinct modality of the self that refers to the implicit, pre-reflective awareness of the perceptual experiences of one's body in space (Gallagher, 2000; Gallagher & Meltzoff, 1996; Haggard & Wolpert, 2005). An association between low SCC and difficulties with bodily self-other distinction would suggest that an unclear sense of self is pervasive across modalities. Moreover, given that the bodily self is thought to serve as the foundation for the development of the self-concept (Fonagy et al., 2002), such an association could point to an unclear bodily self as a possible source of self-concept confusion and difficulties with self-other distinction. Across five studies in two articles, I provide evidence that low SCC is detrimental for empathic responding, an association that is underpinned by low self-other distinction, and that, in addition to difficulties with conceptual self-other distinction, low SCC is associated with difficulties with self-other distinction at the level of the bodily self.

Article 1 sought to establish that SCC is associated with empathy, a fundamental capacity implicated in social cognition and behaviour, and that this relationship is mediated by self-other distinction. In Study 1, I show that low SCC is associated with higher dispositional empathic personal distress and lower dispositional empathic concern. In Study 2, using Batson's classic Katie Banks paradigm, I show that these associations hold in an actual empathy-inducing situation. Moreover, SCC also predicted helping behavior; an effect that is mediated by feelings of empathic personal distress and empathic concern. In addition, in Study 2 I show that difficulties with self-other distinction mediated the low SCC-personal distress association. Finally, Study 3 examines the role of SCC in empathy and helping in an experimental context. Specifically, I experimentally manipulated SCC and, using the same Katie Banks paradigm, I show that individuals primed with self-concept confusion experienced lower SCC which led to more empathic personal distress, less empathic concern, and less helping compared to their higher SCC counterparts. I also replicated the mediating effect of self-other distinction in the relationship between SCC and personal distress within this experimental framework.

Article 2 aimed to probe more deeply the association between SCC and self-other distinction by looking at self-other distinction across modalities. Specifically, I investigated the association between participants' SCC and their susceptibility to bodily illusions, an indicator of stability in the bodily self, the implicit, pre-reflective awareness of the perceptual experiences of one's body in space that is distinct from the self-concept. In Study 1, participants completed the rubber hand illusion, a paradigm in which synchronous (versus asynchronous) stimulation between a prosthetic hand and one's own hand leads one to "embody" the prosthetic hand.
Whereas participants were equally susceptible to the rubber hand illusion during synchronous stroking, low SCC individuals were more vulnerable to the illusion during asynchronous stroking, when the effect is unwarranted. In Study 2, I conceptually replicated this finding by demonstrating that low SCC individuals were more susceptible to the body-swap illusion—the impression that another person's body is one's own. These results demonstrate that low SCC people's difficulties with conceptual self-other distinction extend to difficulties with self-other distinction in the bodily domain. This suggests that low SCC people are characterized by pervasive self-confusion across different modalities of self (i.e., self-concept and bodily self). Moreover, given that the bodily self is thought to serve as the foundation for the development of the self-concept, these results could point to the bodily self as a possible source of self-concept confusion and difficulties with self-other distinction.

Article 1

The Self and Empathy:

Lacking a Clear and Stable Sense of Self Undermines Empathy and Helping Behavior*

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Abstract

Empathy is fundamental to social functioning. Although empathy involves sharing the emotional experience of another, research also highlights the importance of distinguishing the self from the other for optimal empathic responding. Without adequate self-other distinction, sharing another person's emotions can induce personal distress, a self-focused aversive reaction that often leads to withdrawing from the situation, rather than empathic concern, an otheroriented response of care. To date, no work has examined the psychological factors that might facilitate such self-other distinction in the context of empathy. We show that self-concept clarity (SCC), the extent to which the self is clearly defined, coherent, and temporally stable, predicts empathic responding. In Study 1 (N=452, student sample), we show that low SCC is associated with more dispositional empathic personal distress and less empathic concern. We replicate these dispositional associations in Study 2 (N=319, community sample) and, using Batson's classic Katie Banks paradigm, show that these associations hold in an actual empathy-inducing situation. Moreover, in Study 2, SCC predicts helping behavior an effect that is mediated by feelings of personal distress and empathic concern. Finally, in Study 3 (N=658, community sample), we again use the Katie Banks paradigm but in an experimental framework; consistent with Study 2, state SCC predicts empathic personal distress, empathic concern and helping behavior. Our findings highlight the importance of a clear, coherent and stable self-concept for empathy, and suggest that interventions aimed at increasing empathy may be futile in the presence of a weak and unclear sense of self.

Keywords: self-concept clarity, self, empathy, prosocial behaviour, self-other distinction

The Self and Empathy:

Lacking a Clear and Stable Sense of Self Undermines Empathy and Helping Behavior

"The state of empathy, or being empathic, is to perceive the internal frame of reference of another with accuracy and with the emotional components and meanings which pertain thereto as if one were the person, *but without losing the as-if condition*." (Carl Rogers, 1959, p. 210; italics added for emphasis)

Empathy is fundamental to human nature and a crucial component of social interactions. Indeed, empathy plays a critical role in moral development (Eisenberg-Berg & Mussen, 1978), establishing and maintaining close relationships (Eisenberg & Miller, 1987), altruism (Batson, Duncan, Ackerman, Buckley, & Birch, 1981), promoting intergroup relations (Gutsell & Inzlicht, 2010), and inhibiting aggressive behaviour (Miller & Eisenberg, 1988). Moreover, empathy-related deficits characterize numerous psychopathologies, such as schizophrenia, autism spectrum disorders, and psychopathy (Blair, 2005; Lysaker, Dimaggio, Buck, Carcione, & Nicolò, 2007). Despite its clear importance, a precise definition of empathy remains the subject of debate due to its complex and multi-faceted nature. As illustrated by the quote above, empathy is generally viewed as a process by which we come to accurately understand and share another's emotions. Although empathy is thought to have evolved to enable prosocial responding, the experience of empathy does not automatically lead to helping the person in need (Preston & de Waal, 2002). Indeed, empathy can lead to either personal distress or empathic concern, two motivational states that have differential consequences for prosocial behaviour (Batson, 1987). Whereas "personal distress" often leads to withdrawing from the situation to alleviate one's own uncomfortable state, "empathic concern" is more likely to promote otheroriented helping to alleviate the distress of the person in need (Batson, Fultz, & Schoenrade, 1987).

As Rogers noted in the quote above, empathy involves sharing the experience of the other "as if one were the person" (Rogers, 1959, p. 210). Indeed, most empathy researchers today agree that empathy, by definition, requires some degree of emotional overlap with the other's experience (e.g., de Vignemont & Singer, 2006; de Waal, 2008; Hein & Singer, 2008; see Cuff, Brown, Taylor, & Howat, 2014 for review). Interestingly, the italicized section of Rogers' description of empathy-that is, "...but without losing the as-if condition"-is often omitted from this quote. This sentence, however, highlights a vital, but frequently overlooked, ingredient: to empathize with another, we need to not only share their experience, but also recognize that the self and other are separate entities. That is, empathy requires knowledge that the source of one's emotional state is the other person. In fact, losing this as-if condition is associated with experiencing empathic personal distress (Batson et al., 1997). Although many researchers have noted the importance of self-other distinction in empathy (e.g., Bird & Viding, 2014; de Vignemont & Singer, 2006; Decety & Jackson, 2004; Lamm, Bukowski, & Silani, 2016), to our knowledge, no work has investigated the psychological factors that facilitate this self-other distinction. Self-concept clarity (Campbell, 1990; Campbell et al., 1996), the extent to which the self-concept is clearly, coherently, and consistently defined, may be important in this respect.

As noted, empathy is a multi-faceted construct. Cognitive empathy refers to the ability to identify and understand another person's mental and emotional state, whereas affective empathy entails having an emotional reaction that is somewhat congruent with the other's emotional experience. Importantly, it is this ability to share another's emotions, rather than emotionally-neutral cognitive empathy, that is thought to serve as a critical catalyst of prosocial behaviour

(Batson, 1987; de Waal, 2008). But how do we come to share another person's emotions? According to the perception-action model of empathy (Preston & de Waal, 2002), observing or imagining others in a given emotional state automatically activates shared representations, along with their associated autonomic and somatic responses, causing a matching emotional state in the observer. In other words, we "catch" others' emotions without conscious awareness that this is happening, i.e., emotional contagion (Hatfield, Cacioppo, & Rapson, 1993). Supporting this notion, newborns mimic their mother's facial expressions and cry in response to other infants' cries (Havilan & Lelwica, 1987). This automatic mimicry persists into adulthood, with people continuing to unconsciously mimic facial expressions and moods (Chartrand & Bargh, 1999). Moreover, neuroimaging studies have consistently demonstrated that observation of another's emotional state activates similar neural regions to those involved in the direct experience of that state, such as pain, disgust, fear, and sadness (see Bernhardt & Singer, 2012 for review). Taken together, this automatic mimicry and subsequent emotional contagion are thought to provide the basic foundation of affective empathy, an important driver of helping behaviour.

Although empathy involves sharing the mental and emotional state of the target, theory and research suggest that this sharing needs to be accompanied by self-other distinction in the perceiver. As Rogers and others have emphasized, to respond appropriately to the other person, individuals must recognize that the source of their emotional experience is the other; that is, they must appreciate that the emotional pain they are experiencing is not their own pain but that of the other person (Bird & Viding, 2014; de Vignemont & Singer, 2006; Decety & Jackson, 2004; Lamm, Bukowski, & Silani, 2016). Indeed, such self-other distinction (or lack thereof) has important consequences for the motivational states that stem from affective empathy and downstream prosocial behaviour. As Batson and colleagues noted (Batson, Fultz, & Schoenrade, 1987; Batson et al., 1997), difficulties with self-other distinction can make one vulnerable to "empathic personal distress"—a self-focused, aversive reaction, that often leads to withdrawing from the empathy-inducing situation to alleviate one's own discomfort. This can be contrasted with "empathic concern," an other-oriented reaction that is thought to induce a motivation to relieve the other's suffering, which is generally viewed as the mature and desired outcome of vicarious emotional arousal. Importantly, early work by Batson and colleagues shows that empathic concern is associated with greater self-other distinction (Batson et al., 1997), suggesting that the capacity to differentiate the self from the other, and attribute one's own simulated state to the target, is critical for mature, affective empathy to take place.

More recent work also supports the importance of self-other distinction in empathy. For example, training self-other distinction in the motor domain increased self-reported empathy for that person's pain (Guzman, Bird, Banissy, & Catmur, 2016). Moreover, Chiu and Yeh (2018) showed that, in the context of a visuospatial perspective-taking task, faster self-other distinction after adopting the other's perspective was associated with heightened affective empathy. Neuroscience research also supports the role of self-other distinction in empathy. As noted, empathizing with another's emotional experience recruits similar neural circuits to those involved in the direct experience of that emotion. Importantly, however, these two types of processing (imagining the other's experience versus our own experience) also recruit nonoverlapping brain regions. For example, Jackson, Brunet, Meltzoff, and Decety (2006) showed participants pictures of people's hands or feet in painful situations and instructed them to imagine the level of pain experienced when a) adopting the other person's perspective or b) imaging themselves in the painful situation. They found that both the other- and self-perspectives activated the neural network involved in pain processing; however, the other perspective, which requires separating the self from the other's pain, resulted in unique activations in the right temporo-parietal junction (rTPJ), a brain region often shown to be activated when empathizing with another (see Decety & Lamm, 2007 for a review). Interestingly, other work shows that inhibition of the rTPJ decreases empathy (Coll, Tremblay, & Jackson, 2017), and impairs performance on a self-other discrimination task (Uddin, Molnar-Szakacs, Zaidel, & Iacoboni, 2006). These findings have led researchers to conclude that the rTPJ plays a vital role in distinguishing the self from other on a neural level and, as Batson long ago argued, that this selfother distinction is important for empathic responding.

Although researchers may have identified a neural mechanism that is involved in distinguish the self from the empathy target, to our knowledge, the psychological factors associated with this self-other distinction are not well defined. We propose that self-concept clarity may be important in this respect. The self-concept includes all the personality attributes, values, attitudes, preferences, emotional states, roles, etc. that an individual claims as "me" or "mine" (Markus, 1977). Self-concept clarity (SCC; Campbell et al., 1996; see also Lodi-Smith & DeMarree, 2017) is a meta-cognitive evaluation of these structural aspects of the self, and specifically captures the extent to which one's self-concept is clearly and confidently defined (e.g., "Even if I wanted to, I don't think I could tell someone what I'm really like"), internally consistent (e.g., "My beliefs about myself often conflict with one another"), and stable (e.g., "My beliefs about myself seem to change very frequently"). Although SCC is now mainly assessed via self-report (Campbell et al., 1997), early work provides behavioural evidence to support the validity of the construct and indicates that SCC is not simply capturing how people think about themselves but reflects, at least to some degree, how people actually are across situations. In her landmark study, Campbell (1990) assessed SCC indirectly, with low SCC being captured by less

self-reported confidence and extremity in people's ratings of themselves on bipolar traits, less temporal stability in trait-ratings, longer reaction times when deciding if a trait was selfdescriptive or not, and less congruence between self-conceptions and situation-specific behaviour. Recent research indicates that SCC is also indicative of self-knowledge as individuals with lower SCC demonstrate poorer agreement with close others about their own personality traits and are less accurate in predicting their own behaviour (Lewandowski & Nardone, 2012).

Of note, SCC does not reflect people's affective evaluation of the self; that is, while SCC is typically correlated with self-esteem (indeed, Campbell's seminal study (1990) aimed to demonstrate that people with low self-esteem also had an unclear sense of self), research indicates that these two aspects of the self-concept are different (see Lodi-Smith & DeMarree, 2017). That said, numerous studies have shown that SCC is important for well-being and adjustment. For example, SCC is negatively associated with neuroticism and ruminative self-focus (Campbell et al., 1996), as well as loneliness (Light & Visser, 2013), depression, and perceived stress (Treadgold, 1999). SCC is also positively associated with perception of meaning in life (Bigler, Neimeyer, & Brown, 2001), general life-satisfaction (Ritchie, Sedikides, Wildschut, Arndt, & Gidron, 2011) and higher relationship quality (Lewandowski, Nardone, & Raines, 2009).

We hypothesized that having a clear, coherent and stable sense of self is critical for mature empathic responding. A strong sense of self should allow one to share the experience of another in distress, while maintaining an awareness of whose feelings belong to whom and, in this way, facilitate empathic concern and, ultimately, helping the person in need. Conversely, without a clear sense of self to draw upon, low SCC individuals may have trouble separating the other's distress from their own. That is, they may be more vulnerable to losing the "as-if condition" Rogers highlighted, and become overwhelmed by personal distress and, consequently, withdraw rather than engage in prosocial action. In Figure 1 we illustrate our theoretical model; as can be seen, we hypothesize that those low in SCC would be more susceptible to empathic personal distress (Hypothesis 1a) and would be less likely to experience empathic concern (Hypothesis 1b) as well as less likely to engage in helping behaviour when confronted with another in distress (Hypothesis 2). Moreover, we expect that the SCC-helping relationship would be mediated by empathic personal distress (Hypothesis 3a) and empathic concern (Hypothesis 3b). Finally, we hypothesize that high self-other merging (i.e., low self-other distinction) would account for low SCC individuals' vulnerability to empathic personal distress (Hypothesis 4).

To test this theoretical model, we conducted three studies. In Study 1, we first sought to establish that low SCC is associated with impaired empathy and, specifically, a tendency to experience more dispositional empathic personal distress (Hypothesis 1a) and less dispositional empathic concern (Hypothesis 1b). In Study 2, we used Batson's classic Katie Banks paradigm to investigate whether low SCC is associated with actual helping behaviour, typically viewed as the desired outcome of affective empathy (Batson et al., 1987). We predicted that individuals with low SCC would show less helping toward someone in need (Hypothesis 2). In addition, we aimed to show that low SCC individuals' reduced helping behaviour stems from their empathic difficulties. That is, we hypothesized that greater empathic personal distress (Hypothesis 3a) and lower empathic concern (Hypothesis 3b) would mediate the relationship between SCC and helping behaviour. Finally, in Study 2, we also examined whether low SCC people's difficulties with self-other distinction accounts for their excessive empathic personal distress when confronted with someone in need (Hypothesis 4). In Study 3, we aimed to test our theoretical model in an experimental framework; we experimentally manipulated SCC and, again using the

Katie Banks paradigm, sought to show that low experimentally-induced SCC leads to more empathic personal distress (Hypothesis 1a), less empathic concern (Hypothesis 1b), as well as less helping behaviour (Hypothesis 2). Study 3 also allowed us to examine if the mediational effects in Study 2 replicate.

Of note, given that empathic personal distress and empathic concern are often simultaneously elicited in empathy-inducing situations (Batson, Early, & Salvarani, 1997) and are often correlated, we controlled for the alternate construct (i.e., empathic concern when looking at effects of SCC on empathic personal distress, and empathic personal distress when looking at effects of SCC on empathic concern) in our statistical analyses across studies to establish the specificity of the associations.

Study 1

In this initial study, we investigated whether SCC is in fact associated with empathy and, more specifically, the hypotheses that those low in SCC are more vulnerable to empathic personal distress (Hypothesis 1a) and less empathic concern (Hypothesis 1b). To investigate this, we used a well-established self-report measure of SCC and the most commonly used self-report measure of dispositional empathy, the Interpersonal Reactivity Index (IRI; Davis, 1983), which includes an empathic personal distress subscale, assessing self-oriented feelings of anxiety and unease when exposed to another's negative experience, as well as an empathic concern subscale, assessing other-oriented feelings of sympathy and concern for the person in need (as noted earlier, the mature and desired outcome of vicarious emotional arousal). We predicted that those low in SCC would report higher empathic personal distress and lower empathic concern. Moreover, as noted above, SCC is often associated with self-esteem (Campbell, 1990); we thus conducted additional analyses controlling for self-esteem to demonstrate that a clear and coherent sense of self is uniquely predictive of empathic personal distress and empathic concern.

Of note, in addition to measuring empathic personal distress and empathic concern, the IRI includes two other subscales: perspective taking, assessing the tendency to spontaneously adopt others' perspectives, or cognitive empathy, and fantasy, assessing the tendency to imagine oneself in fictional situations. Although our predictions primarily concerned the empathic personal distress and empathic concern subscales, we included all four subscales in our assessment to preserve the psychometric properties of the IRI and we report the associations between SCC and the other two subscales for the interested reader.

Methods

Participants. Data for Study 1 was obtained from 463 participants recruited for studies taking place in our lab between 2015 and 2018 in which we measured, at the outset of the study, SCC and the IRI. Participants were recruited through online Classified ads posted on the University website, Facebook, and in introductory psychology classes to gain extra credit. After excluding 10 participants with incomplete data, our final sample consisted of 453 participants (94 men, 1 whose gender was unreported; 18-37 years old, mean age = 21.67 ± 3.23). Table 1 presents demographic characteristics of the sample. All procedures (as well as those in Studies 2 and 3) were approved by the McGill University Institutional Review Board. Participants received a 10 CAD Amazon.ca gift card, 10-12 CAD cash (depending on the study) or course credit as compensation.

Procedure. Participants first gave their informed consent and then completed the Self-Concept Clarity Scale, the IRI, and the Rosenberg Self-Esteem Scale (described below). Following these measures, participants completed other questionnaires and/or tasks, depending on the study, that are not relevant to the present investigation; total testing time was approximately 1 hour. At the end of the study, participants were debriefed, and compensated.

Self-Concept Clarity scale (Campbell et al., 1996). This is a 12-item self-report measure of the extent to which one's self-concept is clearly and confidently defined (e.g., "Even if I wanted to, I don't think I could tell someone what I'm really like"), internally consistent (e.g., "My beliefs about myself often conflict with one another"), and stable (e.g., "My beliefs about myself seem to change very frequently"). Participants indicate their agreement to each item using a five-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5). The majority of items are reverse coded (see example items) and SCC is calculated by taking the mean of all items; higher scores reflect greater SCC.

Interpersonal Reactivity Index (IRI, Davis, 1983). This is the most widely used selfreport measure of dispositional empathy. As noted, the 28-item measure is divided into four subscales: Empathic Personal Distress (e.g. "When I see someone who badly needs help in an emergency, I go to pieces"); Empathic Concern (e.g., "I often have tender, concerned feelings for people less fortunate than me"); Perspective-taking (e.g., "I sometimes try to understand my friends better by imagining how things look from their perspective"); and Fantasy (e.g. "I daydream and fantasize, with some regularity, about things that might happen to me"). Participants answer each item using a 5-point Likert scale ranging from "does not describe me well" (1) to "describes me very well" (5). Subscales are calculated by taking the mean of the items of that subscale.

Rosenberg Self-Esteem Scale (Rosenberg, 1965). This 10-item measure is the most widely used measure of global self worth. Participants indicate their agreement with each item using a 4-point Likert scale ranging from 1 = strongly disagree to 4= strongly agree (e.g., "On

the whole, I am satisfied with myself."). We included this scale because evidence suggests that SCC is positively related to self-esteem (Campbell, 1990).

Results and Discussion

Table 2 presents the descriptive statistics and correlations between the IRI subscales and SCC. As predicted (Hypothesis 1a and 1b), linear regression analyses revealed a significant effect of SCC on empathic personal distress, controlling for empathic concern (SCC: b = -0.28, t(450) = -7.05, p < 0.01, 95% CI: -0.36, -0.20; empathic concern: b = 0.43, t(450) = 11.59, p < 0.01, p < 0.01,0.01; 95% CI: 0.36, 0.51) as well as a significant effect SCC on empathic concern, controlling for personal distress (SCC: b = 0.22, t(450) = 4.95, p < 0.01; 95% CI: 0.13, 0.31; personal distress: b = 0.51, t(450) = 11.36, p < 0.01; 95% CI: 0.43, 0.60). This suggests that low SCC people have a tendency to get overwhelmed by their own distress when confronted with another's plight and react with less other-oriented feelings of sympathy and concern. Of note, these effects held when controlling for self-esteem, which was correlated with SCC (r = 0.49, p < 0.490.001). Specifically, linear regression analyses that included self-esteem as a covariate revealed that SCC remained a significant predictor of empathic personal distress (b = -0.29, t(449) = -6.39, p < 0.001, 95% CI: -0.38, -0.20) and empathic concern (b = 0.16, t(449) = 3.12, p < 0.01; 95% CI: 0.06, 0.26; see Table S1 and Supplemental Material for details). These results indicate that a lack of a clear and coherent sense of self is uniquely associated with more empathic personal distress and less empathic concern, beyond any contribution of positive selfevaluations. Finally, our results also held when sex was entered as a covariate (see Table S2 and Supplemental Material for details).

With regard to the other two IRI subscales, SCC was not significantly related to perspective-taking (r = 0.09, p = 0.072), suggesting that a weak sense of self does not necessarily

impair one's ability to know other's mental states. Interestingly, SCC was associated with the fantasy subscale (r = -0.10, p = 0.043), with individuals lower in SCC being more likely to endorse such items as "After seeing a play or movie, I have felt as though I were one of the characters". Given that this subscale reflects people's tendency to lose themselves in the lives and feelings of fictitious characters, this finding provides preliminary evidence that low SCC people are less able to distinguish themselves from others (Hypothesis 4). That said, given that we did not predict an association between SCC and proclivity to fantasy, and given the uncertainty of what this scale measures (Davis, 1994; Nomura & Akai, 2012), this finding should be interpreted with caution.

Study 2

Having established that low SCC is associated with a tendency to experience more empathic personal distress and less empathic concern, we wanted to extend our findings to investigate whether SCC is associated with an important downstream consequence of affective empathy: actual helping behaviour. To this end, we used Batson's classic Katie Banks' Need paradigm (Coke, Batson, & McDavis, 1978), adapted for on-line use (Habashi, Graziano, & Hoover, 2016), to investigate the association between SCC and prosocial behavior. In brief, participants learned about a young woman, Katie Banks, whose parents (and one sibling) had died in a car crash. Katie was left alone to raise her other siblings while she tried to finish school. Participants were given an opportunity to donate money to Katie; we predicted that those low in SCC would be less likely to donate money to help Katie (i.e., show less helping behavior; Hypothesis 2).

In addition to establishing an association between SCC and helping, we also aimed to examine if this relationship is mediated by empathic reactions. As noted, research shows that empathic personal distress often leads to withdrawing from the target of empathy to alleviate one's own emotional discomfort, rather than helping the person in need. By contrast, empathic concern induces a motivation to relieve the other's suffering (Batson et al., 1987). Given findings from Study 1, we hypothesized that SCC would influence helping behaviour through its associations with empathic personal distress and empathic concern. Specifically, we predicted that low SCC would lead to more personal distress (Hypothesis 3a) and less empathic concern (Hypothesis 3b) which would in turn each lead to less helping behaviour.

Finally, we took this opportunity to investigate one hypothesized mechanism responsible for low SCC individuals' empathic difficulties—heightened perceptual overlap between the self and other (i.e., low self-other distinction), also known as "self-other merging" (Myers & Hodges, 2012). Although some researchers show that self-other merging facilitates empathy and subsequent prosocial behaviour (e.g., Cialdini, Brown, Lewis, Luce, & Neuberg, 1997), others argue that high levels of self-other merging can lead to empathic personal distress (presumably because the self and other are difficult to disentangle; Batson, Fultz, & Schoenrade, 1987; Batson et al., 1997). Based on these latter findings, we propose that those low in SCC will be more vulnerable to excessive self-other merging because their self-concept is so malleable. That is, without a clear and coherent sense of self to draw upon, low SCC individuals may be more prone to incorporating aspects of the other into the self, thus exhausting their already fragile sense of self; this, then, should lead them to experience the other's distress as *personal* distress and, consequently, to withdraw rather than engage in helping behavior to alleviate the other's suffering. Thus, we expected that self-other merging would mediate the relationship between SCC and personal distress (Hypothesis 4). We did not have specific predictions about the relationship between self-other merging and empathic concern.

Methods

Participants. We aimed to have a sample of approximately 160 participants following previous research that investigated personality predictors of helping behaviour using the same online Katie Banks paradigm (Habashi et al., 2016). Recognizing that a sizeable portion of our sample may not comply with study procedures, as is typical of online studies, we recruited 430 participants (approximately 2.5 times our projected sample) through the crowd-sourcing website CrowdFlower (http://www.crowdflower.com). Participants received \$1 (which is standard for crowd-sourcing websites such as CrowdFlower) in compensation for a study putatively investigating the effects of personality on reactions to a pilot radio broadcast. As expected, several participants did not have usable data; 74 participants had missing data, and 36 failed an attention check (described below). Thus, the final sample consisted of 319 participants (167 women; 18-73 years old, mean age = 32.47 ± 10.44). Table 1 presents the demographic characteristics of the sample.

Procedure. After being recruited through CrowdFlower, interested participants were given a link to an online survey administered via FluidSurveys (http://www.fluidsurveys.com). Participants first gave their informed consent. Based on a variation of Batson's classic Katie Banks paradigm adapted for online use (Habashi, Graziano, & Hoover, 2016; Coke et al., 1978), participants were informed that they would be listening to a pilot radio broadcast for a university radio program entitled *News from the Personal Side*. In this broadcast, participants listened to an interview of a university student, Katie Banks. They learned that Katie's parents and one of her siblings had recently died in a car accident, leaving her with no money and two younger siblings to look after. Katie described struggling to support her siblings while also trying to finish her university degree (materials available upon request). After answering an attention check question

("What happened to Katie's parents?"), participants rated their empathic reaction to Katie's story (i.e., personal distress and empathic concern) and completed two widely used measures of selfother merging. Of note, previous research has shown that self-other merging has two dimensions: conceptual overlap between self and other and perceived closeness (Myers & Hodges, 2012). Because we had no specific predictions about which dimension of self-other merging would be related to SCC, we administered measures reflecting each dimension (see *Measures* for details). Following the completion of these self-other merging measures, participants were then informed that since Katie's interview was being used for research purposes, her interview would not air on public radio and she would not have the opportunity to ask for help. Participants were told that they would be given a surprise 0.30 bonus payment¹ and that they could donate any amount of this bonus to a fund set up by the researchers to help Katie. They were told that they could keep any of the money not donated. At this point, participants were shown an e-mail supposedly from Katie politely explaining that any monetary assistance would be greatly appreciated. After reading this e-mail, participants were asked to specify how much (if any) of the money they would like to donate. Finally, in keeping with the cover story, participants answered several questions assessing their interest in the radio program as well as a battery of filler personality questionnaires that included, as per Study 1, the Self-Concept Clarity scale (Campbell et al., 1996), the Interpersonal Reactivity Index (Davis, 1983), and the Rosenberg Self-Esteem Scale (Rosenberg, 1965). At the end of the survey, participants were debriefed about the true nature of the study and received a code that they could input into CrowdFlower to be compensated. All participants were paid \$1.30 (original compensation plus bonus payment).

¹ Although \$0.30 may seem trivial, it is important to keep in mind that total compensation was \$1.00.

Empathic Reaction Questionnaire. Participants rated the extent to which they felt different empathic states while listening to the broadcast (1 = "not at all", 7 = "extremely"). Following prior research (Batson, 1987; Batson et al., 1997; Maner et al., 2002) and factor analytic work examining empathic responses to another's suffering (Fultz, Schaller, & Cialdini, 1988), averaged responses to the items *worried, alarmed, grieved, troubled, distressed, upset, perturbed,* and *disturbed* formed our measure of empathic personal distress, whereas averaged responses to the items *sympathetic, soft-hearted, warm, compassionate, tender,* and *moved* served as our empathic concern index.

Self-Other Overlap in Perceived Attributes (Batson et al., 1997). Using a 9-point Likert scale, participants rated the extent to which of each of sixteen personality attributes was descriptive of them (1 = "not at all", 9 = "extremely"). They then rated Katie on each of the same sixteen traits. The mean absolute difference between the ratings of oneself and of Katie reflects self-other merging. More specifically, recent work shows that this measure captures the perceived overlap between one's own self-concept and that of the other person's (Myers & Hodges, 2012). For ease of interpretation, we reverse coded this measure (i.e., we subtracted scores from one unit larger than the highest score) so that higher numbers reflected greater self-other merging.

Inclusion of the Other in the Self (IOS) scale (Aron, Aron, & Smollan, 1992). The IOS scale is a single item measure of the perceived closeness dimension of self-other merging (Myers & Hodges, 2012). It presents seven pictures of two increasing overlapping circles, ranging from non-overlapping circles (1) to almost completely overlapping circles (7). Considering one circle as "self" and the other circle as Katie, participants indicated which picture best represented their relationship with Katie.

Results and Discussion

Relationship between SCC and empathic reactions and helping. To examine if SCC is associated with empathic reactions, we ran linear regression analyses with SCC predicting empathic personal distress and empathic concern separately. In line with Study 1, empathic concern was included as a covariate in the analysis for personal distress and vice versa.

Replicating findings from Study 1, SCC was negatively associated with dispositional empathic personal distress (SCC: b = -0.47, t = -11.96, p < 0.001, 95% CI = -0.54, -0.39; empathic concern: b = 0.09, t = 1.89, p = 0.059, 95% CI = 0.00, 0.19) and positively associated with dispositional empathic concern (SCC: b = 0.32, t = 6.37, p < 0.001, 95% CI = 0.22, 0.42; personal distress: b = 0.12, t = 1.89, p = 0.059, 95% CI = -0.01, 0.25)². Extending these findings, SCC was also negatively associated with state empathic personal distress (SCC: b = -0.38, t = -0.38, t5.64, p < 0.001, 95% CI = -0.51, -0.25; empathic concern: b = 0.66, t = 12.59, p < 0.001, 95% CI = 0.56, 0.77; Hypothesis 1a) and positively associated with state empathic concern (SCC: b = 0.35, t = 5.96, p < 0.001, 95% CI = 0.23, 0.46; personal distress: b = 0.50, t = 12.59, p < 0.001, 95% CI = 0.43, 0.58; Hypothesis 1b), indicating that people with lower SCC experienced more personal distress, and less empathic concern, specifically in response to listening to Katie's story (see Table 3 for correlations between key variables). Finally, as predicted, individuals with lower SCC donated less money to Katie (r = 0.21, p < 0.001), suggesting that a weak sense of self is not only associated with less mature empathic responding, but also less prosocial helping behavior when confronted with another's plight (Hypothesis 2). Of note, these associations held controlling for self-esteem (consistent with Study 1, SCC was positively associated with selfesteem, r = 0.59) indicating that SCC is a unique predictor of state empathic personal distress,

² Consistent with Study 1, SCC was also negatively correlated with the Fantasy subscale (r = -0.17, p < 0.01) and not reliably associated with the Perspective-Taking subscale (r = 0.10, p = 0.065).

state empathic concern, and helping (see Table S3 and Supplemental Materials for details). Moreover, results also held controlling for sex (see Table S4 and Supplemental Materials for details).

Effect of SCC on helping through empathic reactions (parallel multiple mediation). To test our hypothesis that the SCC-helping relationship is mediated by empathic personal distress and empathic concern (Hypotheses 3a and 3b), we conducted a parallel multiple mediation analysis using least squares path analysis. This model was calculated using Model 4 of the PROCESS macro (version 3.2) for SPSS (Hayes, 2018). Specifically, we examined if the effect of SCC (predictor) on the amount of money donated (outcome) was mediated through feelings of empathic personal distress and/or empathic concern (separate mediators). We elected to run a parallel mediation model (over two simple mediation models) because it allows for multiple mediators to be correlated with each other (recall that personal distress and empathic concern are often correlated and were correlated in this study) to determine the unique indirect effects in the presence of the each other. A parallel mediation analysis also allows for pairwise comparisons between the strength of the mediated effects (Hayes, 2018). Indirect effects were calculated using 5000 bootstrap samples and 95% bias-corrected confidence intervals (CIs). Indirect effect estimates were considered significant if the CIs did not contain zero. (Note; we adopted the same approach to indirect effect estimates for all mediation models in Studies 2 and 3.)

As predicted, the parallel mediation analysis revealed that SCC indirectly influenced the amount of money donated through its unique effects on emotional reactions (controlling for each other). Figure 2 and Table 4 indicate the unstandardized regression coefficients for this model. Individuals with lower SCC experienced more personal distress ($a_1 = -0.22$, p = 0.006) and

higher personal distress subsequently led to less money donated to Katie ($b_1 = -1.59$, p = 0.023), controlling for feelings of empathic concern ($a_1b_1 = 0.36$, 95% CI = 0.001, 0.87; Hypothesis 3a). Moreover, individuals with lower SCC also felt less empathic concern ($a_2 = 0.24$, p = 0.001) which, in turn, led to lower donations ($b_2 = 2.08$, p = 0.01), controlling for personal distress reactions ($a_2b_2=0.49$; 95% CI: 0.087, 1.069; Hypothesis 3b). Bootstrapped confidence intervals were entirely above zero for both personal distress and empathic concern, suggesting parallel mediation of the effect of SCC on helping through these reactions. A pairwise comparison indicated that these mediators were of similar strength (indirect effect contrast = -0.01, 95% CI = -0.064, 0.040). Finally, SCC was also associated with helping independent of its effect on personal distress and empathic concern (c' = 2.38, p = 0.007).

Effect of SCC on empathic reactions through self-other merging (simple mediation). As noted, we also took this opportunity to examine the hypothesis that SCC indirectly leads to personal distress through its effect on self-other merging (Hypothesis 4). Given that the two self-other merging measures were positively correlated (r = 0.26, p < 0.001), and that we did not have specific predictions about which aspect of self-other merging would be most important for SCC, we created a composite of the two self-other merging measures by summing the z-scores of each. However, for the interested reader, we present the associations between each self-other merging measure and the other study variables in Table 3. To test our prediction, we again used Model 4 of the PROCESS macro. Specifically, SCC was entered as a predictor of personal distress reactions and self-other merging was entered as a mediator. As in the analyses above, we included empathic concern as a covariate (because it was correlated with personal distress). We also ran an identical model with empathic concern as the outcome variable and personal distress

as the covariate to examine the indirect effect of SCC on empathic concern through self-other merging.

As predicted and displayed in Figure 3, the simple mediation analysis showed that SCC indirectly influenced personal distress through self-other merging ($a_1b_1 = -0.14$, 95% CI = -0.23, -0.08). That is, lower SCC led to more self-other merging ($a_1 = -0.58$, p < 0.001) and greater merging then led to more personal distress ($b_2 = 0.24$, p < 0.001), controlling for empathic concern. SCC also influenced personal distress beyond the contribution of self-other merging and empathic concern (c' = -0.24, p < 0.001).

By contrast, there was no indirect effect of SCC on empathic concern through self-other merging, controlling for personal distress (*indirect effect estimate* = 0.01, 95% CI = -0.03, 0.04). This suggests that the observed positive correlation between self-other merging and empathic concern (r = 0.51, p < 0.01) is due to the shared variance between empathic concern and personal distress. Indeed, when self-other merging and empathic personal distress were both entered as predictors of empathic concern in a linear regression analysis, thus isolating variance that is unique to empathic concern, self-other merging was no longer associated with this empathic reaction (self-other merging: b = -0.07, t(316) = -0.09, p = 0.082; personal distress: b = 0.50, t(316) = 0.57, p < 0.001).

In sum, in Study 2, we replicate and extend our findings from Study 1 to the context of actual helping behaviour using the classic Katie Banks paradigm. Specifically, we replicate the associations between SCC and dispositional empathic personal distress and empathic concern and extend these findings by showing that low SCC is also negatively related to state personal distress, and positively related to state empathic concern, in an actual empathy-inducing situation. Perhaps more significantly, we show that low SCC individuals' empathic reactions

(higher personal distress, lower empathic concern) to another person in distress hinder their inclination to help the person in need. Finally, additional analyses from Study 2 suggest that low SCC individuals' empathic difficulties stem partly from their trouble maintaining a clear distinction between self and other. That is, without a strong sense of self to draw upon, those low in SCC are more vulnerable to incorporating the other into the self and this makes them vulnerable to experiencing the other person's distress as their own.

Study 3

In Study 2, we showed that low SCC is detrimental for helping behaviour and that empathic personal distress and empathic concern mediate this relationship. We also found that excessive self-other merging underlies the association between SCC and vulnerability to empathic personal distress. These findings, however, are correlational. Thus, in Study 3, our primary aim was to investigate the causal role of SCC in empathy and helping (Hypotheses 1a, 1b, and 2). To this end, we took advantage of the observation that SCC is susceptible to experimental manipulation (Emery, Walsh, & Slotter, 2015); we thus experimentally manipulated participants' SCC and then presented them with the same on-line Katie Banks paradigm used in Study 2. We predicted that participants with low experimentally manipulated SCC would show more empathic personal distress, less empathic concern, and would be less likely to help Katie than their high SCC counterparts. We also used this opportunity to examine the mediation findings from Study 2 in this experimental framework. We predicted that those randomly assigned to the low SCC condition would help less because they experienced higher personal distress and less empathic concern (Hypothesis 3a and 3b). Finally, consistent with Study 2, we expected that individuals in the low SCC condition would show higher self-other merging, which would account for their increased personal distress (Hypothesis 4).

Methods

Participants. Given that we observed an effect of dispositional SCC on prosocial responding in Study 2 with a sample of 319 participants, we aimed to recruit approximately three times this sample size for the current study since it involved randomly assigning participants to one of three conditions (see below). To this end, we recruited 1014 participants through CrowdFlower.com in exchange for \$2. Two-hundred twenty-eight participants had incomplete data and 128 failed the attention check. We thus conducted analyses with data from the 658 participants (362 women; 18-82 years old, mean age = 35.22 ± 12.50) with usable data. Table 1 presents the demographic characteristics of the sample.

Procedure. Procedures were identical to Study 2 with three exceptions. First, before listening to the pilot radio broadcast, participants were randomly assigned to one of three SCC manipulations (i.e., confusion, clarity, control; see below). Second, immediately after the SCC manipulation and right before the Katie Banks paradigm, participants completed the Self-Concept Clarity scale as a manipulation check, consistent with other work (Emery, Walsh, & Slotter, 2015b). Thus, in this study, this scale reflects *state* SCC rather than *trait* SCC. Finally, we did not measure self-esteem since we manipulated SCC. All other measures were the same as Study 2.

SCC Manipulation. Following Emery and colleagues (2015), participants were randomly assigned to one of three SCC conditions. In the *self-concept confusion* condition, participants generated a list of various self-descriptive aspects (i.e., personality traits, characteristics, preferences, social roles). They were then instructed to select two aspects that they believed contradict each other and to write about how they come into conflict with one another in their everyday life (e.g., "lazy" and "ambitious"). In the *self-concept clarity* condition,

participants selected two consistent self-aspects and wrote about how they complement each other in their everyday life. Participants in the *control* condition listed activities they had done during the preceding weekend and wrote about two of them. Importantly, prior research indicates that this SCC manipulation influences individuals' perceptions of the cohesiveness of their sense of self, and not the positivity with which they view themselves (Emery et al., 2015).

Results and Discussion

Manipulation check. We first performed a between-subjects ANOVA to confirm whether our experimental manipulation of SCC in fact influenced participants' SCC. Our final sample consisted of 214 participants in the confusion condition, 206 in the clarity condition, and 239 in the control condition. As predicted, we observed a significant effect of condition on SCC $(F(2, 663) = 11.75, p < 0.001, \text{ partial } \eta^2 = 0.03)$. Post-hoc Gabriel tests (due to unequal samples between conditions) showed that participants in the *confusion* condition (M = 3.12, SD = 0.82, N = 214) reported less SCC than participants in the *clarity* (M = 3.42, SD = 0.87, p < 0.01, N = 206) and *control* condition (M = 3.49, SD = 0.90, p < 0.01, N = 239). However, participants in the *clarity* condition reported the same level of SCC as those in the *control* condition (p > 0.250). These findings suggest that our manipulation effectively lowered SCC but did not bolster SCC. Notably, this is consistent with Emery et al. (2015); although these researchers effectively increased SCC using this manipulation in one of their studies (Study 2), they failed to do so in an online sample (Study 3). We thus collapsed across the *clarity* and *control* conditions for subsequent analyses (henceforth control condition). Table 3 shows the correlation coefficients between all variables ignoring condition.

Effect of SCC manipulation on empathy and helping. We then conducted independent samples t-tests to examine whether our manipulation of SCC influences people's empathic

responses to another person in distress (Hypotheses 1a and 1b), and whether SCC reduces helping behaviour (Hypothesis 2). Results showed no between condition (i.e., confusion vs. control) differences in empathic personal distress (t(656) = -0.85, p > 0.250; Mconfusion =4.02, Mcontrol = 4.13), empathic concern (t(656) = -1.31, p = 0.192; Mconfusion = 4.91, Mcontrol = 5.04) or helping (t(656) = -0.24, p > 0.250; Mconfusion =21.43, Mcontrol = 21.62). Several researchers, however, have noted that participants vary considerably in response to experimental manipulations (e.g., DeMarree, Wheeler, & Petty, 2005; Hull, Slone, Meteyer, & Matthews, 2002), and self-concept manipulations in particular (Csank & Conway, 2004), but that the experimental condition can still influence outcomes indirectly even if the direct effect is not significant (Hayes & Rockwood, 2017; Preacher & Hayes, 2008; Shrout & Bolger, 2002). That is, our manipulation may have indirectly affected empathy and helping behaviour via its effects on *state* SCC. We examined this possibility using Model 4 of the PROCESS macro. Specifically, we conducted a series of mediation analyses to examine if the SCC manipulation (predictor) affected state SCC (mediator), which in turn affected 1) empathic personal distress, 2) empathic concern and 3) helping (outcomes in separate mediation models) (see Kachanoff, Taylor, Caouette, Khullar, & Wohl, 2019, for an example of a similar data analytic approach). As in Studies 1 and 2, empathic personal distress was entered as a covariate in the model for empathic concern, and vice versa for the model for empathic personal distress.

Results from our mediation analyses (summarized in Table 5) showed that SCC condition influenced empathic reactions and helping behaviour via its effects on state SCC (personal distress: *indirect effect estimate* = 0.11, 95% CI = 0.06, 0.18; empathic concern: *indirect effect effect effect effect* estimate = -0.09, 95% CI = -0.15, -0.05; helping: *indirect effect estimate* = -0.48, 95% CI = -0.95, -0.09). That is, individuals in the confusion condition tended to experience lower SCC and

lower SCC subsequently led to more empathic personal distress and less empathic concern as well as less money donated to Katie. Of note, these effects held when sex was included in the model (see Table S5-S7 and Supplemental Material for details), indicating that the confusion condition affected empathic reactions and helping through state SCC beyond any contribution of sex. Taken together, these findings provide some support for the notion that lowering SCC increases empathic personal distress (Hypothesis 1a) and decreases empathic concern (Hypothesis 1b) as well as, perhaps most critically, reduces helping behaviour (Hypothesis 2) and argue against the alternative hypothesis that greater empathic personal distress, lower empathic concern and less helping in empathy inducing situations lower people's SCC.

Effect of SCC manipulation on helping through empathic reactions. We also aimed to investigate if our mediational findings from Study 2 replicate in Study 3. To this end, we tested a serial-parallel multiple mediation model to examine if state SCC mediates the effect of condition on helping behavior (i.e., amount of money donated) through empathic reactions. Specifically, we used the PROCESS macro to examine the simultaneous indirect effects of state SCC (first-order mediator) through both empathic personal distress and empathic concern (second-order mediators) in the relationship between condition membership (predictor) and amount of money donated (outcome). Thus, this model tested two indirect effects of interest: 1) the effect of SCC condition via state SCC and, subsequently, empathic personal distress (controlling for empathic concern; Hypothesis 3a) as well as 2) the effect of SCC condition via state SCC and, subsequently, empathic personal distress; Hypothesis 3b). The indirect effect of condition through state SCC on amount of money donated, controlling for both empathic reactions, was also included in the model. Given that condition was not related to personal distress or empathic concern, the model did not include a path between

condition and either of these mediators (note, a model including these paths did not alter the results).

Figure 4 and Table 6 present the path coefficients of the serial-parallel mediation model. Consistent with Study 2 and supporting Hypothesis 3b, results revealed a significant indirect effect of condition on amount of money donated to Katie through state SCC and, subsequently, empathic concern $(a_1d_3b_3 = -0.09, 95\%$ CI = -0.21, -0.01). That is, compared to those assigned to the control condition, individuals assigned to the confusion condition experienced lower state SCC (b = -0.35, p < 0.001) which led to less empathic concern (b = 0.13, p = 0.016) which, in turn, resulted in less money donated to Katie (b = 1.85, p < 0.001). However, in contrast to Study 2, the indirect effect through SCC and then personal distress was not significant ($a_1d_2b_2 = -0.02$, 95% CI = -0.10, 0.05). Finally, the indirect effect of SCC condition on helping through state SCC controlling for empathic personal distress and empathic concern was not significant, although the majority of the confidence interval fell below 0 ($a_1b_1 = -0.38$, 95% CI = -0.85, 0.02), suggesting that these empathic reactions fully mediated the effect of SCC on helping.

Effect of SCC manipulation on empathic reactions through self-other merging.

Finally, we also aimed to test our self-other merging findings from Study 2. As in Study 2, the two self-other merging measures were positively correlated (r = 0.23, p < 0.001) and we thus created a composite (interested readers can examine associations between each self-other merging measure and other study variables in Table 3). Given that there were no between condition differences in self-other merging (t(656) = -0.94, p > 0.250; Mconfusion =-0.09, Mcontrol = 0.04), we conducted a serial multiple mediator analysis (Hypothesis 4) using Model 6 of the PROCESS macro for SPSS to examine if SCC condition (predictor) influenced empathic personal distress (outcome) through its effect on state SCC (first mediator) and subsequent self-

other merging (second mediator). As in Studies 1 and 2, and the analyses above, empathic concern was entered as a covariate of empathic personal distress. To confirm that self-other merging does not mediate the state SCC-empathic concern relationship, as shown in Study 2, we also ran an identical serial multiple mediator model with empathic concern as the outcome and empathic personal distress as a covariate.

As in Study 2, results showed that the indirect effect of SCC condition on empathic personal distress through state SCC and subsequent self-other merging was significant (indirect effect estimate = 0.02, 95% CI = 0.01, 0.04). That is, people in the confusion condition experienced lower state SCC (b = -0.35, p < 0.001), which in turn led to greater self-other merging (b = -0.35, p < 0.001), which then led to greater personal distress (b = 0.20, p < 0.001), controlling for empathic concern (Hypothesis 4). Echoing the findings above (i.e., effect of SCC condition on helping through empathic reactions), the indirect effect estimate = 0.09, 95% CI = 0.04, 0.14). As expected, the effects in the model that excluded state SCC were not significant (i.e., indirect effect through self-other merging: *estimate* = -0.05, 95% CI = -0.10, 0.00; direct effect of SCC condition: b = -0.08, p > 0.250). Finally, consistent with Study 2, the indirect effect of SCC condition on empathic concern through state SCC and subsequent merging was not significant (*indirect effect estimate* = 0.01, 95% CI = 0.00, 0.02).

In sum, in Study 3 we conceptually replicate our findings from Study 2 in an experimental framework. Specifically, we show that participants assigned to the self-concept confusion condition experienced lower SCC which subsequently led to more empathic personal distress and less empathic concern compared to participants whose SCC was unaltered. Moreover, we replicate our observation that reduced empathic concern hinders low SCC

people's helping behaviour. Finally, we demonstrate that the lower SCC experienced by those in the self-concept confusion condition was associated with greater self-other merging which in turn was related to higher empathic personal distress, which is also consistent with Study 2.

General Discussion

Empathy functions as a social bridge, allowing us to connect with and, critically, care for others in times of need. Although empathy rests on the shared experience between the empathizer and the empathizee, this sharing needs to be accompanied by self-other distinctionthat is, the empathizer must be able to disentangle their own emotional experience from that of the empathizee. Low self-other distinction in the context of empathy can lead to personal distress, a self-focused reaction that often results in withdrawing from the empathy-inducing situation, rather than responding with empathic concern and helping to alleviate the other's distress. Although research supports the importance of self-other distinction in empathy, to date, no work has examined the psychological factors that facilitate or hinder this self-other distinction. Here, we tested the idea that self-concept clarity (SCC), the extent to which the selfconcept is clearly, coherently, and consistently defined (Campbell, 1990; Campbell et al., 1996), is important for empathy. Without a clear and coherent sense of self to draw upon, one may be particularly vulnerable to troubles with distinguishing one's own distress from that of another person's, thus leading to less adaptive emotional responses to the other's distress and, ultimately, undermining the prosocial action that is so important for human connection.

Across three studies, involving 1429 student and community participants, we found support for our hypothesis that low SCC is associated with empathic responding. Specifically, we showed that low trait SCC individuals reported higher dispositional empathic personal distress and lower dispositional empathic concern (Studies 1-2) as well as more situationally induced empathic personal distress and less situationally induced empathic concern (Studies 2-3) when confronted with an actual person in need. Perhaps even more significantly, we found that low trait SCC was associated with less actual helping behaviour (Studies 2-3), and that this association was mediated by feelings of empathic personal distress (Study 2) and empathic concern (Studies 2-3). Thus, not only does an unclear sense of self make one vulnerable to experiencing more self-focused distress and less other-oriented concern when confronted with another's plight, these responses have real, tangible consequences for the target of empathy. Importantly, in Study 3, we replicate these findings in an experimental framework: individuals assigned to the self-concept confusion condition experienced lower SCC than those in the control condition and this lowered SCC was in turn associated with greater empathic personal distress, lower empathic concern, and less helping behaviour. As Rogers noted (1959, p. 210), taking on the experience of another "as if one were the person" is essential to empathy, but equally important is to not lose the "as-if condition". Our findings suggest that the very act of empathizing with another person leads those with a weak sense of self to lose themselves in the other's experience and, consequently, undermines mature empathic responding.

Of note, we observed that the SCC-helping relationship was mediated by both decreased empathic personal distress and increased empathic concern in Study 2. Consistent with other work (Batson et al., 1987), this observation suggests that not getting overwhelmed by the other person's suffering and caring about the other's well-being represent distinct facilitators of helping behaviour. That said, it may be that in some situations—for example, when helping is very costly—one requires more than just the absence of personal distress to motivate helping. In such situations, another motive—perhaps empathic concern or even non-empathic factors like social desirability or obligation—is needed to promote prosocial action. Consistent with this idea, research suggests that care for others' welfare is a more reliable predictor of helping behaviour than feeling the distress of others (Jordan, Amir, & Bloom, 2016). Speaking to this point, in Study 3, we replicated the mediating role of empathic concern, but not empathic personal distress, in the SCC-helping relationship; although these divergent effects could be due to methodological differences between the studies, they could reflect the superiority of empathic concern in motivating helping behavior, at least in situations when helping is costly. Future work is needed to better understand the relationship between empathic personal distress and empathic concern, and to elucidate whether low empathic personal distress as a unique driver of prosocial action.

In addition to showing that SCC is associated with empathic responding and helping behaviour, we provide initial evidence that greater self-other merging may be one mechanism underlying low SCC individuals' empathic difficulties. Prior work shows that individuals with an unclear sense of self are characterised by more malleable self-concepts (Campbell, 1990; Cuperman, Robinson, & Ickes, 2014). Consistent with this, we found that SCC was negatively associated with self-other merging in Studies 2 and 3; moreover, we found that SCC was negatively associated with the Fantasy subscale of the IRI—that is, the tendency to lose one's self in the lives and feelings of fictitious characters—in Studies 1 and 2, which also highlights low SCC people's proclivity to merge with others. Importantly, though, we extend this prior work to show that this vulnerability to merging has consequences for empathy. In both Studies 2 and 3, greater self-other merging mediated the association between low SCC and increased empathic personal distress. These findings are in line with Batson and colleagues' (Batson et al., 1987; Batson et al., 1997) research indicating the importance of self-other distinction in the context of empathy, but suggest that clarity and coherence of the self-concept is an important determinant of one's vulnerability to experiencing excessive self-other merging when empathizing with others. That is, individuals with an unclear sense of self appear to possess an highly malleable self-concept that may render them more susceptible to over-identifying with another's distress, leading them to experience it as personal distress. Of note, we did not find evidence that self-other merging mediates the association between SCC and empathic concern, in either Study 2 or 3. This suggests that merging does not contribute to low SCC individuals' reduced empathic concern and further highlights the dissociation between these two routes to empathic responding.³ To our knowledge, this is the first work to identify a psychological factor that contributes to self-other merging in the context of empathy.

Of note, although we present evidence for low self-other distinction as one mechanism underlying low SCC individual's empathic difficulties, it may not be the only mechanism. Work by Eisenberg and colleagues (Eisenberg & Fabes, 1992; Eisenberg et al., 1994) highlights the importance of emotion regulation for empathic responding in that individuals who have difficulties maintaining their emotions in a tolerable range tend to experience empathic personal distress and are less likely to experience empathic concern. Self-concept researchers have long documented the importance of the self-concept for emotion regulation (Markus & Wurf, 1987). They highlight that regulating emotions typically involves defending one's sense of self against negative emotional states. This is typically accomplished by maintaining consistency with one's previous, usually positive, views of self or enhancing the self when possible. Without a clear, consistent, and coherent sense of self to draw upon, the task of defending the self against

³ In Study 3, self-other merging was positively related to empathic concern, controlling for empathic personal distress. This finding is consistent with Cialdini et al.'s work (Cialdini et al., 1997; Maner et al., 2002) demonstrating that self-other merging is important for empathic responding as well as the observation that people empathize more with individuals that they perceive as similar to themselves (Hein, Silani, Preuschoff, Batson, & Singer, 2010; Krebs, 1975; Stürmer, Snyder, Kropp, & Siem, 2006). That said, as noted, our findings also indicate that self-other merging can lead to personal distress.

negative emotions should be particularly difficult and, in this way, make those with low SCC more prone to difficulties with emotion regulation. Consistent with this notion, individuals with lower SCC report lower trait emotional stability (Campbell, Assanand, & Paula, 2003). Accordingly, in addition to lower self-other distinction, low SCC people's empathic difficulties may also stem from troubles regulating their emotional states. Future work could investigate the role of emotion dysregulation in low SCC individuals' responses in empathy-inducing situations.

Our self-other merging findings may have important implications for empathy in contexts where the self and other are already entangled. Research shows that people readily expand their self-concept to incorporate others into the self (Aron et al., 1992). For example, Aron and colleagues observed that individuals in long-term romantic relationships took longer to respond to "me/not me" judgments when responding to traits on which their partner differed from them compared to traits where the partner was similar to them, suggesting a self-other confusion between the self and the romantic partner (Aron, Aron, Tudor, & Nelson, 1991). Similarly, Mashek et al. found that individuals mistake traits describing a romantic partner as characteristic of the self (Mashek, Aron, & Boncimino, 2003). Moreover, the mother-child relationship as well as ingroup identification are also characterized by high self-other overlap (Aron et al., 1991; Lee, Qu, & Telzer, 2017; Tropp & Wright, 2001). In the context of empathy, research shows that we are more likely to engage in self-other merging with those we are closest to (i.e., the people that are likely already incorporated into our identity; Cialdini et al., 1997). Keeping this in mind, our work suggests that empathizing with individuals that are incorporated into the self-concept may be particularly detrimental for low SCC individuals. Ironically, those low in SCC may show less care and helping toward the people they care about the most because of their proclivity to merge with close others renders them vulnerable to experiencing empathic personal distress. Given the

importance of empathy for the formation and maintenance of close relationships (Eisenberg & Miller, 1987), failing to empathize appropriately with close others is likely associated with poorer relationship outcomes. Indeed, this may be one process explaining the aforementioned link between SCC and relationship quality (Lewandowski et al., 2010).

Our findings may also have important implications for empathy in certain contexts and/or life stages in which the self-concept is less stable—for example, changing social roles (Light & Visser, 2013; Slotter & Walsh, 2017), experiencing rejection (Ayduk, Gyurak, & Luerssen, 2009), the break-up of a romantic relationship (Slotter, Gardner, & Finkel, 2010), or simply experiencing negative daily events can decrease SCC (Nezlek & Plesko, 2001). Given our findings, one might expect greater vulnerability to empathic personal distress in these kinds of situations, regardless of dispositional SCC. Future work could investigate how empathic responding fluctuates as a result of fluctuations in SCC.

This research has numerous strengths including the use of large samples (total N=1429) that included non-student adults (Studies 2 and 3); we also used well-validated measures of empathic responding and behavioral measures of helping. Notwithstanding these strengths, some limitations should be noted. In Study 3, our experimental manipulation was successful in decreasing SCC, but was not effective in increasing SCC. However, Emery and colleagues (2015; Study 3) also reported difficulties bolstering SCC using the same manipulation in an on-line sample. The ineffectiveness of the SCC confirmation manipulation may stem from the average age of our sample in Study 3, which was 35 years old. Given that people in their mid-thirties tend to have higher SCC relative to younger people (Lodi-Smith & Roberts, 2010), we may have been unable to further increase our participants' SCC. Moreover, we observed indirect effects of SCC condition via state SCC rather than direct effects of condition in Study 3; we thus
cannot make strong causal claims about the effect of SCC on empathy. That said, it is unlikely that the causal direction goes the other way given that SCC is generally conceptualized as a traitlike construct while empathy refers to a dynamic, mental/emotional state. Importantly, Study 3 replicated the majority of our findings from Study 2 and thus speaks to the robustness of the observed associations. Of note, the mediation of the SCC-helping relationship through empathic personal distress was only observed in Study 2. Future work should aim to replicate this observation.

In conclusion, this work is novel in that it highlights the importance of the self for empathy. To date, empathic responses are largely thought to be affected by other-oriented processes, such as one's capacity to take another's mental perspective, ability to recognize or simulate the emotions of others (Blair, 2005), and/or motivation to expend the personal costs required for empathic responding (Zaki, 2014). In addition to these factors, we show that a clear, coherent and stable sense of self is important for empathic responding. Here, it is interesting to note findings from developmental psychology. A critical milestone in human development occurs between 15 and 18 months when toddlers begin to recognize their own image in a mirror (Lewis & Brooks-Gunn, 1979). Importantly, coordinated empathic behaviour designed to alleviate the distress of another, rather than more rudimentary emotion contagion (i.e., personal distress), appears only after the emergence of this self-awareness (e.g., Zahn-Waxler, Radke-Yarrow, Wagner, & Chapman, 1992). Based on this, it has been argued that the development of a self-concept critically enables empathic responses (Lewis, 2002). The current investigation suggests that the self, particularly the clarity and coherence of the self-concept, continues to play an important role in empathic responding well into adulthood.

Finally, in addition to making a theoretical contribution to our understanding of empathy, our work also has applied implications. As noted, to date, empathic responding is largely viewed as dependent on other-oriented processes, and, accordingly, empathic difficulties are seen as the result of deficits in these processes. Accordingly, most empathy interventions focus almost exclusively on increasing emotion understanding and sharing (see Weisz & Zaki (2017) for a review). The current work suggests that such interventions may be futile if one lacks a clear sense of self, and that for some individuals, augmenting the strength of the self-concept may be key to unlocking the prosocial behavior that is so vital to human social relationships.

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Table 1

Demographic characteristics of Study 1-3

	St	udy 1	St	udy 2	Study 3		
Characteristic	Number	Percentage	Number	Percentage	Number	Percentage	
Gender							
Male	94	20.8	152	47.6	296	45	
Female	358	79.2	167	52.4	362	55	
Education							
< 12 years	68	15	5	1.6	5	0.8	
High school diploma or equivalent	47	10.4	72	22.6	129	19.6	
High school plus some college or professional training	187	41.3	71	22.3	174	26.4	
Bachelor's degree or 4-year college degree	80	17.7	127	39.8	229	34.8	
College degree plus some graduate school	9	2	14	4.4	44	6.7	
Graduate or professional degree	22	4.9	30	9.4	66	10	
Ethnicity							
Native American	1	0.2	7	2.2	20	3.0	
Asian or Pacific Islander	92	20.3	26	8.2	55	8.4	
African American	10	2.2	29	9.1	50	7.6	
Middle Eastern	10	2.2	5	1.6	6	0.9	
White	244	53.9	233	73	487	74.0	
Hispanic or Latin American	7	1.5	17	5.3	36	5.5	
Other	48	10.6	2	0.6	4	0.6	

Note. In Study 1, one participant did not indicate gender, another participant did not indicate their ethnicity, and we also did not collect education or ethnicity data for 40 participants.

Descriptive statistics and correlations between Interpersonal Reactivity Index subscales and self-

concept clarity.

	М	SD	а	1	2	3	4
1. Personal distress	2.25	0.84	0.79				
2. Empathic concern	3.48	0.90	0.75	0.44**			
3. Perspective-taking	3.18	0.88	0.82	0.26**	0.68**		
4. Fantasy	3.12	1.02	0.84	0.43**	0.634**	0.461**	
5. Self-concept clarity	3.16	0.85	0.89	-0.24**	0.09*	0.09	-0.10*
* <i>p</i> <0.05; ** <i>p</i> <0.001							

Descriptive statistics, alphas, and correlations between amount of money donated to Katie, state empathic concern, state personal

distress, self-other merging (SOM), and self-concept clarity for Study 2 and Study 3 (collapsed across conditions)

	Study	М	SD	а	1	2	3	4	5	6
1. Money donated	2	19.43	13.36							
-	3	21.59	12.17							
2. Empathic concern	2	4.80	1.13	0.84	0.12*					
	3	5.00	1.25	0.88	0.18***					
3. Personal distress	2	4.06	1.29	0.89	-0.08	0.53***				
	3	4.09	1.42	0.91	0.06	0.56***				
4. SOM – trait overlap	2	2.55	0.83		-0.28***	0.00	0.25***			
	3	3.92	0.81		-0.05	0.09*	0.21***			
5. SOM – IOS	2	3.69	1.75		-0.21***	0.24***	0.42***	0.26***		
	3	3.81	1.76		0.10**	0.38***	0.42***	0.23***		
6. SOM – composite	2	-0.01	1.59		-0.31***	0.51**	0.42***	0.80***	0.79***	
-	3	0	1.57		0.04	0.30***	0.40***	0.78***	0.78***	
7. Self-concept clarity	2	3.21	0.89	0.91	0.21***	0.19**	-0.15**	-0.30***	-0.15**	-0.29***
	3	3.35	0.88	0.91	0.10*	0.09*	-0.15***	-0.27***	-0.02	-0.18^{***}

*p<0.05; **p<0.01; ***p<0.001

	Outcome										
	Pe	Distress	Emp	oathic (Concern	Money Donated					
Predictor	b	t	95% CI	b	t	95% CI	b	t	95% CI		
Self-concept clarity	-0.22**	-2.77	-0.38, -0.06	0.24**	3.36	0.10, 0.38	2.38**	2.72	0.66, 4.10		
Personal Distress	_	_	_	_	_	_	-1.59*	-2.28	-2.96, -0.22		
Empathic Concern	_	_	_	—	_	_	2.08**	2.60	0.51, 3.65		
p < 0.05; ** p < 0.05)]										

Model summary for parallel multiple mediation model for self-concept clarity predicting amount of money donated to Katie in Study 2

Model summary for mediation models of the effect of self-concept clarity condition (control = 0; confusion = 1) on empathic personal

	Outcome									
	Per	sonal Distress	Emp	athic Concern	Money Donated					
Path	b	95% CI	b	95% CI	b	95% CI				
Condition \rightarrow state SCC	-0.34	-0.48, -0.20	-0.36	-0.50, -0.22	-0.35	-0.49, -0.21				
State SCC \rightarrow outcome	-0.34	-0.44, -0.24	0.26	0.16, 0.35	1.38	0.31, 2.46				
Condition \rightarrow outcome (indirect effect)	0.11	0.06, 0.18	-0.09	-0.15, -0.05	-0.48	-0.95, -0.10				
Condition \rightarrow outcome (direct effect)	-0.13	-0.32, 0.06	0.01	-0.16, 0.17	0.24	-1.78, 2.26				

distress, empathic concern, and amount of money donated to Katie in Study 3

Note: the effects of empathic personal distress in the model for empathic concern and the effects of empathic concern in the model for empathic personal distress are omitted.

Model summary for the serial multiple mediation model for self-concept clarity condition (control = 0; confusion = 1) predicting

						Outcome							
	State Self-Concept Clarity (SCC)			Pe	Personal Distress			Empathic Concern			Money Donated		
Predictor	b	t	95% CI	b	t	95% CI	b	t	95% CI	b	t	95% CI	
Condition	-0.35**	-4.82	-0.49, -0.21							0.36	0.35	-1.64, 2.35	
State SCC				-0.24**	-3.78	-0.36, -0.11	0.13*	2.41	0.02, 0.24	1.08†	1.93	-0.02, 2.18	
Personal Distress				_	_	_	_	_	_	-0.29	-0.70	-1.09, 0.52	
Empathic Concern				_	_	_	_	_	_	1.85**	4.00	0.94, 2.78	

amount of money donated to Katie in Study 3

 $\dagger = p = 0.054; * p < 0.05; ** p < 0.01$

Figures



Figure 1. Theoretical model of the relationship between self-concept clarity, empathic reactions, and helping tested in the current investigation. We hypothesize that self-concept clarity would be negatively associated with empathic personal distress (Hypothesis 1a) as well as positively associated with empathic concern (Hypothesis 1b) and helping behaviour (Hypothesis 2). Moreover, we expect that the self-concept clarity-helping relationship would be mediated by empathic personal distress (higher personal distress associated with less helping; Hypothesis 3a) and empathic concern (lower empathic concern associated with less helping; Hypothesis 3b). Finally, we theorize that low self-concept clarity would be associated with higher self-other merging which would in turn be related to increased empathic personal distress (Hypothesis 4).



Figure 2. Parallel multiple mediation model for self-concept clarity predicting amount of money donated to Katie in Study 2. Personal distress and empathic concern reactions uniquely mediate the association between self-concept clarity and amount of money donated. Paths are unstandardized coefficients. All paths are significant. (p < 0.05).



Figure 3. Simple mediation model for self-concept clarity predicting empathic personal distress in Study 2. Self-other merging mediates the effect of self-concept clarity on empathic personal distress, controlling for empathic concern. Coefficients for empathic concern are omitted and paths are unstandardized coefficients. All paths are significant. (p < 0.05).



Figure 4. Serial-parallel multiple mediation model for self-concept clarity condition (control = 0; confusion = 1) predicting amount of money donated to Katie in Study 3. Individuals in the self-concept confusion condition experienced lower state self-concept clarity which led to less empathic concern and ultimately less money donated to Katie. Paths are unstandardized coefficients. Solid paths are significant (p < 0.05), dotted path is marginally significant (p = 0.054), dashed paths are not significant.

Bridge to Article 2

Article 1 examined the role of SCC in empathic responding, a cornerstone of human social interactions. I demonstrated that low SCC individuals reported higher dispositional empathic personal distress and lower dispositional empathic concern (Study 1) as well as more situationally induced empathic personal distress and less situationally induced empathic concern (Studies 2-3) when confronted with an actual person in need. Moreover, I found that low SCC was associated with less helping behaviour (Studies 2-3), and that this association was mediated by feelings of empathic personal distress (Study 2) and empathic concern (Studies 2-3). Importantly, as I hypothesized, SCC was associated with self-other merging and, furthermore, increased self-other merging (i.e., low self-other distinction) mediated the association between low SCC and increased personal distress (Studies 2-3). These findings suggest that individuals with an unclear and incoherent sense of self have trouble distinguishing self and other representations and that this reduced self-other distinction underlies their difficulties with empathic responding.

Article 1 investigated self-other distinction using classic measures from social psychology that capture differentiation between conceptual representations between the self and other. Article 2 sought to probe more deeply the association between SCC and self-other distinction by examining if low SCC people's difficulties with self-other distinction at the conceptual level extend to difficulties with self-other distinction at the level of the bodily self. The bodily self is viewed as distinct from the self-concept and refers to the implicit, prereflective awareness of the perceptual experiences of one's body in space (Gallagher, 2000; Gallagher & Meltzoff, 1996; Haggard & Wolpert, 2005). An association between low SCC and difficulties with self-other distinction in the bodily self would suggest that an unclear sense of self is pervasive and implies confusion across different modalities of self. Of note, the bodily self comes online earlier in development than the self-concept; while research suggests that the bodily self is present from birth, the self-concept appears to emerge in the second year of life (Fonagy et al., 2002). This is consistent with the widely accepted notion that the bodily self serves as the foundation for the development of the self-concept. Keeping this in mind, an association between low SCC and difficulties with bodily self-other distinction would suggest that an unclear bodily self may be an important contributor to low SCC individuals' difficulties with self-other distinction. Indeed, given that research to date has largely focused on the importance of social interactions, such a finding would open a new research avenue for understanding sources of self-concept confusion.

To investigate whether individuals with an unclear and incoherent sense of self are characterized by difficulties with bodily self-other distinction, in Article 2, I examined if low SCC is associated with increased susceptibility to body illusions. In Study 1, participants reported on their SCC and underwent the rubber hand illusion, a paradigm in which synchronous (versus asynchronous) stimulation between a prosthetic hand and one's own hand leads one to incorporate the prosthetic hand into one's body representation (Botvinick & Cohen, 1998). As suggested by Article 1, low SCC people may be particularly prone to losing sight of the self and thus I predicted that they would show greater susceptibility to bodily self-other merging (i.e., low self-other distinction) in an inappropriate context—that is, during the asynchronous stroking condition, which typically does not elicit the rubber hand illusion. In Study 2, I aimed to conceptually replicate and extend my understanding of this effect by examining if SCC is also related to susceptibility to the body-swap illusion—the impression that another person's body is one's own (Petkova & Ehrsson, 2008).

Article 2

Self-Concept Clarity and the Bodily Self: Malleability Across Modalities*

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Abstract

The self has fascinated scholars for centuries. Although theory suggests that the selfconcept (cognitive self-understanding) and bodily self (pre-reflective awareness of one's body) are related, little work has examined this notion. To this end, in Study 1, participants reported on self-concept clarity (SCC) and completed the Rubber Hand Illusion (RHI), a paradigm in which synchronous (versus asynchronous) stimulation between a prosthetic hand and one's own hand leads one to "embody" the prosthetic hand. Whereas participants were equally susceptible to the RHI during synchronous stroking, low SCC individuals were more vulnerable to the illusion during asynchronous stroking, when the effect is unwarranted. Conceptually replicating and extending this finding, in Study 2, low SCC individuals were more susceptible to the body-swap illusion—the impression that another person's body is one's own. These findings suggest that a clear sense of self implies clarity and stability of both the self-concept and the bodily self. Keywords: self, self-concept, rubber hand illusion, multisensory integration processes

Self-Concept Clarity and the Bodily Self: Malleability Across Modalities

Where does our sense of self come from? How do we maintain a clear and stable sense of self? Beginning with William James (1890), philosophers and psychologists have defined and studied the self in different ways to understand these fundamental questions (Gallagher, 2000; Neisser, 1997). Personality and social psychologists have largely focused on the self-concept. Essentially, the self-concept—the cognitive generalization of one's self-knowledge and selfbeliefs based on past experiences—encompasses everything that an individual claims as "me" or "mine": personality attributes, values, attitudes, beliefs, preferences, goals, emotional states, social roles, and even physical appearance (Markus, 1977). Researchers conceptualizing the self in this way have shown that people are generally motivated to maintain a stable self-concept: that is, people are resistant to information that is incongruent with their self-views and often reject feedback that is inconsistent with their notion of self (Swann & Read, 1981a; 1981b). That said, it is also well-established that the self-concept is dynamic and subject to change, especially in response to changes in the social environment or social roles (Markus & Wurf, 1987). For example, research indicates that the self-concept is likely to change during life transitions, such as going to university or becoming a parent (Kling, Ryff, & Essex, 1997), or in close relationships, as people readily incorporate close others into their sense of self (e.g., Aron, Aron, Tudor, & Nelson, 1991; Mashek, Aron, & Boncimino, 2003). In the face of these changes, it is thought that the self-concept integrates new information and experiences with existing selfknowledge allowing individuals to organize the new and old together to maintain a consistent and stable sense of self (Markus, 1977).

Individuals, of course, vary in their ability to establish a consistent and stable sense of self; such variability has been conceptualized as *self-concept clarity* (SCC)—i.e., the extent to

which the self-concept is clearly and confidently defined, internally consistent, and temporally stable (Campbell et al., 1996). Over two decades of research has established the internal, external, and discriminant validity of SCC (Lodi-Smith & DeMarree, 2017). For example, individuals with lower self-reported SCC show lower levels of self-other agreement in personality ratings and lower accuracy in predicting their own behaviour, suggesting that they "know" themselves less well than do those who report higher SCC (Lewandowski & Nardone, 2012). In addition to having a less clear and confidently-defined self-concept, individuals with low SCC are characterized by a less stable and more malleable self-concept. It is thought that with no clear "self" to draw upon, these individuals are more prone to incorporating new, and potentially conflicting, information into their self-understanding. Supporting this idea, Cuperman and colleagues (2014) showed that people with a weak sense of self were more likely to accept false, generic personality descriptions as characteristic of the self, and they were more prone to temporarily taking on the personality characteristics of a stranger following a brief interaction. Similarly, Smeesters et al. (2009) found that individuals with less accessible self-knowledge (presumably related to having a weak and unclear self-concept) were more susceptible to priming effects than individuals with highly accessible self-knowledge. Taken together, these findings suggest that those with low SCC are characterized by more malleable cognitive self representations.

While personality and social psychologists have focused on the self-concept, for decades, cognitive psychologists and philosophers of mind have addressed questions about the self by studying the bodily self, also known as "bodily self-consciousness" (e.g., Lenggenhager, Tadi, Metzinger, & Blanke, 2007) and "body schema" (e.g., Gallagher & Meltzoff, 1996). The bodily self can be defined as the implicit, pre-reflective awareness of the perceptual experiences of

one's body in space (Gallagher, 2000; Gallagher & Meltzoff, 1996; Haggard & Wolpert, 2005) and is thought to rely on multisensory integration processes that are responsible for assimilating various sensory signals (e.g., visual, vestibular, auditory, tactile, proprioceptive) and resolving conflicts to generate a coherent representation of the body (Ehrsson, 2012; Kilteni, Maselli, Kording, & Slater, 2015). Of note, the bodily self is different from body image, which reflects the conscious perceptions, attitudes, and beliefs one has about one's body (Gallagher & Meltzoff, 1996). Importantly, the bodily self is thought to come online earlier in development than the self-concept. Developmental studies show that newborns less than an hour old can imitate facial gestures (e.g., Meltzoff & Moore, 1983), an ability thought to rely on the presence of a representation of one's body (Gallagher & Meltzoff, 1996). By contrast, the self-concept is thought to emerge in the second year of life (Fonagy, Gergely, Jurist, & Target, 2002). This sequential emergence of these two notions of self is in line with the long-held understanding that the bodily self serves as the foundation for the development of the self-concept. As Freud (1961, p. 26) noted, "the ego is first and foremost a bodily ego" and, similarly, as Baumeister (1992, p. 2) wrote, "everywhere in the world, self starts with body". In sum, the self-concept and bodily self represents different perspectives on the self and research to date indicates that these two notions of self rely on different psychological processes and come online at different stages during development.

Intriguingly, as with the self-concept, our bodily self is somewhat malleable. The most famous and well-established empirical demonstration of this malleability is the Rubber Hand Illusion (RHI; Botvinick & Cohen, 1998). In this illusion, participants are seated at a table with a life-like, prosthetic hand placed directly in front of them and with their own hand positioned on the table, next to the prosthetic hand, but hidden from view. The experimenter strokes both the visible prosthetic hand and the real hidden hand, using identical paintbrushes. Synchronous stroking between the prosthetic hand and a participant's hand causes the participant to experience the prosthetic hand as part of his or her own body (Botvinick & Cohen, 1998; Longo, Schüür, Kammers, Tsakiris, & Haggard, 2008). Interestingly, research indicates that the experience of "owning" the prosthetic changes the way participants' own real hand is experienced. During the illusion, participants report feeling as if their real hand has "disappeared" (Longo et al., 2008), suggesting that the prosthetic hand has replaced the real hand in the body representation. Several studies have demonstrated that the RHI also induces a mislocalization of one's own real hand as being closer to the prosthetic hand than it really is (Abdulkarim & Ehrsson, 2016; Botvinick & Cohen, 1998; Tsakiris & Haggard, 2005). Remarkably, the RHI also induces physiological changes indicating that participants experience their real hand differently. Bending one of the prosthetic fingers backward (Armel & Ramachandran, 2003) or stabbing a needle into it (Ehrsson et al., 2008; Petkova & Ehrsson, 2009) produces a heightened skin conductance response, indicative of autonomic reactivity, suggesting that participants are reacting as if their real hand were threatened. Taken together, psychological, behavioural and physiological evidence indicate that owning the prosthetic hand changes the way one's own real hand is experienced.

The RHI is thought to rely on the same multisensory integration processes responsible for generating the bodily self noted earlier. The illusion occurs as a result of the interaction between vision, touch, and proprioception (the sense of position of one's body parts) and the dominance of vision over proprioception. The vision of tactile stimulation on the prosthetic hand and the matching touch felt on the real hand become bound together in a single event; this then causes participants to misperceive the visible prosthetic hand as being part of their own body (Botvinick & Cohen, 1998; Tsakiris, 2010). Indeed, these multisensory integration processes are so strong and automatic that the vast majority of participants report strongly experiencing the prosthetic hand as their own (Botvinick & Cohen, 1998; Ehrsson, Spence, & Passingham, 2004; Ehrsson, Holmes, & Passingham, 2005; Lloyd, 2007). Importantly, though, *asynchronous* stroking—that is, when the prosthetic hand and the participant's own hand are stroked out of phase—typically elicits a weaker illusion or none at all since there is no sensory conflict between visual and tactile inputs to be resolved (Shimada, Fukuda, & Hiraki, 2009; Tsakiris & Haggard, 2005).

Recently, the malleability of the bodily self evidenced in the RHI has been extended to other bodily illusions using similar synchronous multisensory stimulation techniques. In the enfacement illusion, synchronous stroking between a participant's face and another person's face induces changes in self-recognition such that the other's facial features are incorporated into the participant's own facial representation (Sforza, Bufalari, Haggard, & Aglioti, 2010; Tajadura-Jiménez, Grehl, & Tsakiris, 2012). Other work suggests that this malleability can be extended from individual body parts, like the hand and face, to the entire body. For example, out-of-body experiences can be induced by having participants observe a virtual avatar in front of them, outside of their personal space (i.e., third-person perspective), as it is stroked in synchrony with their own body (Lenggenhager, Tadi, Metzinger, & Blanke, 2007; see Ehrsson, 2007 for induction of out-of-body experiences using a different method). Building on this finding, Petkova and Ehrsson (2008) were the first to induce illusory ownership over an actual person's body (i.e., not a virtual avatar): in the "body-swap" illusion, participants see another person's body from the first-person perspective via a head-mounted display and are subjected to synchronized visuo-tactile stimulation with this person. This illusion, like the RHI, induces people to experience the other person's body as if it were their own. Indeed, this illusion is so

robust that even standing across from and shaking hands with what appears to be one's own body (but is actually the other person's body) does not break the illusion (Petkova & Ehrsson, 2008).

Taken together, the psychological self-concept and bodily self offer two approaches to understanding the self. Although clearly different from one another, theory suggests that these two notions of self are related (Gallagher, 2000); to date, however, we know of only a few studies that have touched on this issue. In one study, Banakou, Groten, and Slater (2013) induced illusory body ownership of a virtual child which increased participants' endorsement of childlike, rather than adult-like, attributes. This study suggests that the content of the self-concept is reliant on owning a specific body. In another study, Bergouignan, Nyberg, and Ehrsson (2014) showed that disruption of the bodily self through the inducement of an out-of-body experience led to interference with encoding of episodic memories, a process critical for the formation and maintenance of the self-concept (Conway & Pleydell-Pearce, 2000; Schacter, Chiao, & Mitchell, 2003). Finally, Ainley, Maister, Brokfeld, Farmer, and Tsakiris (2013) showed that focusing attention on self-relevant aspects (e.g., hometown) improved awareness of internal bodily signals such as heartbeat. These studies provide initial evidence that the self-concept and bodily self are indeed related. As noted, one fundamental aspect of the self-concept is its relative clarity and stability (i.e., SCC). If the self-concept and the bodily self are related, then one would expect that malleability in the self-concept implies malleability in the bodily self. Such a finding would contribute to our understanding of the self by indicating that a clear and coherent sense of self entails clarity and coherence of both the self-concept *and* the bodily self.

To this end, we conducted two studies to test whether individuals with a less clear, coherent, and stable self-concept are characterized by a more malleable bodily self. In Study 1, participants self-reported on their SCC and then underwent the RHI in which they experienced both synchronous and asynchronous visuo-tactile stimulation with a prosthetic hand. As noted, in the synchronous condition, multisensory integration processes are sufficiently strong and automatic that most people are susceptible to experiencing the illusion (Botvinick & Cohen, 1998; Ehrsson, Spence, & Passingham, 2004; Ehrsson, Holmes, & Passingham, 2005; Lloyd, 2007). Thus, we predicted that overall participants would be more susceptible to "embodying" the prosthetic hand in the synchronous (vs. asynchronous) stroking conditions, as has been shown in prior work. However, we hypothesized that those low (vs. high) in SCC would be more susceptible to experiencing the illusion in the asynchronous stimulation condition, which typically does not elicit the illusion. Given that their sense of self is so tenuous and unclear, and that they are prone to incorporating any random, new information into their self-concept (Cuperman et al., 2014), we reasoned that individuals low in SCC would be more vulnerable to embodying the prosthetic hand even under inappropriate circumstances, when there is no sensory conflict to be resolved by multisensory integration. In Study 2, we aimed to conceptually replicate and extend our understanding of this effect by examining whether SCC is related to illusory body ownership using the body-swap illusion.

To assess malleability of the bodily self in Studies 1 and 2, we used the embodiment questionnaire (Longo et al., 2008), an instrument used to assess susceptibility to the RHI. Of note, although embodiment is often conceptualized as a unitary experience, research indicates that it can be broken down into three sub-components reflecting specific aspects of embodiment: ownership, location, and agency (Longo et al., 2008). We did not have *a priori* predictions about the relationship between SCC and these specific sub-components so we report our findings using the full scale. However, for the interested reader, we conducted exploratory analyses with these sub-components as the dependent variable to assess whether the effects we report in Studies 1

and 2 are specific to certain aspects of the illusion; results from these exploratory analyses are detailed in the Supplementary Materials.

Study 1

Methods

Participants. We recruited 80 individuals (55 women, 1 whose gender was unreported) from the McGill University community to participate. Participants ranged in age from 18-34 years (M = 23.04, SD = 3.76). The procedures were approved by the McGill University Institutional Review Board and participants were compensated with either course credit or \$10/hour.

Our sample size was determined based on prior studies that have observed individual difference effects on susceptibility to the RHI with samples of approximately 70 participants (e.g., Asai, Mao, Sugimori, & Tanno, 2011; Marotta, Tinazzi, Cavedini, Zampini, & Fiorio, 2016). We did not conduct an *a priori* power analysis; however, a post-hoc sensitivity power analysis indicated that our sample size of N=80 was sensitive to detect correlations of r=.31, representing a moderate effect (Cohen, 1988), with 80% power.

Procedure. After giving informed consent, participants completed the Self-Concept Clarity scale (Campbell et al., 1996). They were then randomly assigned to either the synchronous or asynchronous condition of the RHI (condition order was counterbalanced). After the illusion, they completed the aforementioned questionnaire developed by Longo and colleagues (2008), which quantifies the subjective experience of the RHI. Approximately 20mins later, after completing tasks unrelated to the current hypotheses, participants underwent the RHI again, with the alternate stroking style. Participants were debriefed upon completion of the study.

Tasks and measures.

Self-Concept Clarity scale (Campbell et al., 1996). This is a 12-item self-report measure of the extent to which one's self-concept is clearly and confidently defined, internally consistent, and stable. Participants indicate their agreement to each item using a five-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5). The majority of the items are reverse coded, such as "My beliefs about myself often conflict with one another" and "My beliefs about myself seem to change very frequently". After reverse coding, SCC is operationalized as the mean of all items, with higher numbers indicating greater SCC ($\omega = .91$).

Rubber Hand Illusion (RHI; Botvinick & Cohen, 1998). Participants sat in front of a table with their right hand, palm down, placed in front of them in a box frame. A realistic prosthetic hand was shown to the participants and then positioned approximately 15 cm to the left of the participant's own hand, outside of the box frame. Thus, the participant's hand was hidden from view while the prosthetic hand was visible. Given evidence that differences between the skin colour of the prosthetic hand and the participant's hand affect the strength of the RHI (Farmer, Tajadura-Jiménez, & Tsakiris, 2012; Lira et al., 2017), we followed Kalckert and Ehrsson (2012) and covered both hands with a latex glove. Once the hands were in position, the experimenter sat in front of the participant and manually stimulated the visible prosthetic hand and the participant's unseen hand using two identical paintbrushes. Participants were stimulated on their second, third, and fourth fingers (index, middle, and ring fingers) from the proximal interphalangeal joint (second knuckle) to the tip of the finger, at a rate of approximately 1 stroke per second. The prosthetic hand was stimulated in the same manner, either in synchrony or asynchrony with the stimulation of the participant's hand. In the synchronous condition, the

participant's hand and the rubber hand were stroked simultaneously in the same anatomical location with each stroke lasting approximately 1 second. In the asynchronous condition, the brush strokes on the participant's hand and prosthetic hand were temporally out of sync. Specifically, timing was delayed by approximately 500 ms such that a stroke was delivered to the real hand followed by a stroke to the prosthetic hand on the same anatomical location, but 500 ms later. In both conditions, participants were instructed to keep their own hand still and to focus on the prosthetic hand. Consistent with other work, stroking lasted for 2-mins in each condition (e.g., Asai, Mao, Sugimori, & Tanno, 2011; Maister, Sebanz, Knoblich, & Tsakiris, 2013; Tsakiris, Jiménez, & Costantini, 2011).

Embodiment of the Rubber Hand Questionnaire (Longo et al., 2008). To assess the extent to which participants incorporated the prosthetic hand into their bodily self, we used the 10-item "embodiment of rubber hand" factor identified by Longo and colleagues (2008), which was previously used to quantify the subjective experience of the RHI (Bassolino et al., 2018; Grynberg & Pollatos, 2015). Participants were asked to indicate the extent to which they agreed with each item, using a 7-point scale (1 = strongly disagree and 7 = strongly agree). Example items include: "During the experiment, there were times when it seemed like the rubber hand belonged to me" and "During the experiment, there were times when it seemed like the rubber hand was my hand" (see Table S1 for questionnaire). Consistent with other work (e.g., Tsakiris, 2010; Eshkevari, Rieger, Longo, Haggard, & Treasure, 2012), degree of embodiment was operationalized as the mean of all items (synchronous: $\omega = .95$; asynchronous: $\omega = .93$).

Results and Discussion

As noted, we hypothesized that overall participants would embody the prosthetic hand more in the synchronous (vs. asynchronous) stroking condition, but that those low (vs. high) in
SCC would also be more susceptible to embodying the prosthetic hand in the *a*synchronous stimulation condition, which typically does not elicit the illusion, because their sense of self is so tenuous and unclear.

First, to verify that we successfully induced the illusion in the synchronous stroking condition, we compared the medians on two keys items of the embodiment questionnaire (items 4 and 8, see Table S1), following Kalckert and Ehrsson (2014; also see Botvinick & Cohen, 1998; Ehrsson et al., 2004; Lloyd, 2007). Results showed that, on average, participants experienced the prosthetic hand as their own hand after synchronous stroking (median = 5) but not after asynchronous stroking (median = 2); similarly, participants attributed the touch they felt to the stroking of the prosthetic hand in the synchronous condition (median = 5) but not in the asynchronous condition (median = 2). A Wilcoxon signed rank test showed that these medians were significantly different (z = -5.91 and z = -4.96 respectively, ps < 0.001) indicating that we successfully induced the RHI in the synchronous stroking condition.

To test our main hypothesis, we conducted a marginal multilevel model analysis in SPSS (version 22), employing restricted maximum likelihood criteria. Specifically, we entered SCC (mean-centered across all participants), stimulation condition (repeated measures factor) and their interaction as predictors of embodiment. We included the interaction between SCC and condition as this enabled us to examine the effect of SCC on embodiment in the asynchronous condition while also including the synchronous condition in the model. Because our main hypothesis was about asynchronous stroking, we dummy-coded stimulation condition so that the asynchronous condition was the reference category (i.e., asynchronous = 0); thus, the intercept in the model represents the degree of embodiment for the average person in the asynchronous condition. Due to the presence of the interaction term, the coefficient for SCC in our model

represents the effect of SCC on embodiment during asynchronous stroking—the key test of our main hypothesis about SCC.

Results showed a significant effect of stimulation condition, b = 1.25, t(78) = 7.94, p < 100.001, 95% CI [0.93, 1.56], indicating that participants were more likely to embody the prosthetic hand in the synchronous (vs. asynchronous) stimulation condition, consistent with prior research (Botvinick & Cohen, 1998; Ehrsson, Spence, & Passingham, 2004; Ehrsson, Holmes, & Passingham, 2005; Lloyd, 2007). Critically, as predicted, results revealed a significant effect of SCC, b = -0.34, t(78) = -2.32, p = .023, 95% CI [-0.64, -0.05], indicating that people with an unclear and unstable sense of self were more likely to embody the prosthetic in the asynchronous stroking condition, when the effect is unwarranted. Finally, results showed no significant interaction between SCC and condition (b = 0.21, t(78) = 1.25, p = .214, 95% CI [-0.13, 0.55]). Although we had no predictions about the interaction, this result suggests that the association between SCC and embodiment was similar in the two conditions. For the sake of completeness, we examined the effect of SCC in the synchronous condition; the direction of the effect was the same as in the asynchronous condition, with those lower in SCC being more likely to embody the prosthetic hand, but the effect of SCC on embodiment in the synchronous condition was not significant (b = -0.13, t(78) = -0.65, p = .52, 95% CI [-0.52, 0.27]). We suspect that this null effect is likely because of the robustness of the RHI. That is, during synchronous stroking, most people—both those low and high in SCC—experience a strong RHI. Results are summarized in Table 1 and depicted in Figure 1.

Study 2

In Study 1, we showed that low SCC is associated with greater susceptibility to the RHI when there is no sensory conflict between visual and tactile inputs to be resolved, suggesting that

individuals who have an unclear sense of self also have a more malleable bodily self. The RHI, however, involves experiencing illusory ownership over a single body part (i.e., a hand) and hence assesses malleability of body-part ownership, rather than malleability of whole-body ownership. Given that the bodily self is experienced as a single, coherent whole-body representation, rather than the sum of multiple representations of separate body parts (Metzinger, 2004), assessing susceptibility to whole-body ownership would more completely capture malleability of the bodily self. To address this, in Study 2, we sought to conceptually replicate and extend our findings by testing if low SCC people are also more vulnerable to the body-swap illusion, that is, the impression that one possesses another person's entire body (Petkova & Ehrsson, 2008). To this end, we took advantage of a study investigating whether experiencing the body-swap illusion with a different race target reduces prejudice (Thériault et al., in preparation). Specifically, participants in the body-swap condition were outfitted with a virtualreality head-mounted display, which gave them a first-person perspective from the body of another person—an important determinant of body ownership (Ehrsson, 2007). The body-swap illusion was elicited by instructing participants to execute a series of movements in synchrony with the other person. Based on our findings in Study 1, we predicted that those low in SCC would be more susceptible to the body-swap illusion.

Methods

Participants. As noted, for Study 2, we drew upon a larger study examining the effects of different perspective-taking manipulations on racism toward Black individuals (Thériault et al., in preparation; also see https://osf.io/cws8g/). Specifically, we analyzed data from the 34 participants randomly assigned to the body-swap condition. There were 25 women and nine men; participants ranged in age from 18-31 years old (M = 22.26, SD = 3.35). Of note, although the

larger study analyzed only non-Black participants, two participants in the body–swap condition were Black; because we did not have specific predictions about race, we elected to include these participants (although the pattern of results reported below does not change if these participants are excluded). The procedures were approved by the Integrated Health and Social Services University Network for West-Central Montreal Institutional Review Board and participants were compensated \$20.

Because we drew upon an existing dataset we could not base our sample size on our effect of interest; however, results from a post-hoc sensitivity power analysis indicate that this sample size was sensitive to detect correlations of r=.45 with 80% power. Given that this correlation represents a moderate to large effect (Cohen, 1988), this estimate suggests that our study was well-powered to test the association between SCC and susceptibility to the body-swap illusion.

Procedure. The experimenter first met participants and a gender-matched Black confederate at the building lobby and guided them to the testing location. Participants were informed that they would be participating in a study examining the influence of immersive virtual technology and embodiment on social cognition (i.e., they were not explicitly told that they would be seeing the confederate's perspective through a headset). After giving their informed consent, participants and the confederate were instructed to sit on one of two chairs and to put on the virtual reality headset (see below for details). Through the headset, participants received visual input from a camera attached to the head of the confederate (and vice versa for the confederate). That is, looking down at their hands or at the mirror in front of them, participants would see the hands or the reflection of the confederate, rather than their own hands or reflection (see Figure 2). Once the participant and the confederate were wearing the virtual

reality headsets, the experimenter read a script giving them instructions to execute a series of movements in order to begin the body-swap induction. Importantly, participants were told that they had been randomly assigned to the "follower" role while the confederate had been assigned to the "leader" role (in fact, participants were always assigned to the "follower" role). The leader's role was to follow the experimenter's instructions, and the follower's role was to synchronize their movements as much as possible with those of the leader. In this way, participants saw the confederate executing movements from a first-hand perspective via the headset as they themselves executed the same movements. After approximately 5 minutes, participants were instructed to close their eyes so that the curtains hiding the mirrors could be removed. Once the curtains were removed, participants opened their eyes and were instructed: "For the next minute, look at yourself in the mirror in front of you". This was done to strengthen the illusion that the confederate's body belonged to the participant (Preston, Kuper-Smith, & Ehrsson, 2015). The experimenter then continued with the movement instructions. The bodyswapping induction lasted approximately 10 minutes. After this induction, participants completed a self-report measure of embodiment, various tasks and measures unrelated to the current investigation, as well as the Self-Concept Clarity scale ($\omega = .93$) used in Study 1. Finally, participants were partially debriefed and compensated for their time, and then fully debriefed at a later time.

Experimental setup. Participants sat on a chair facing a large partition that separated the testing area, approximately 125 cm from the partition. In a parallel setup, the confederate sat on the other side of the partition such that the participant and the confederate could not see each other. Directly in front of the participant and the confederate, against the partition, was a large mirror (74 cm \times 165 cm) covered by a black curtain. The experimenter stood to the right of the

participant (left of the confederate) as they delivered the instructions through a headset microphone. A speaker to the left of the participant also transmitted the voice of the experimenter so that the instructions appeared to come from both sides of the participant. This was important to maintain the illusion of body-swapping; otherwise, the participant would see the experimenter on their left during the illusion but hear their voice from the right.

Materials and measures.

Virtual reality headset. We used the Oculus Rift Development Kit 2 head-mounted display. Two small screens are located inside, with resolutions of 960×1080 pixels per eye and a refresh rate of 75 frames per second, resulting in horizontal and vertical fields of view of approximately 100° of visual angle. To allow participants to see the person's visual perspective, we attached a modified PlayStation 3 camera to the Oculus Rift device using a custom 3D printed structure. The software used to generate the body-swap illusion is called *The Machine to Be Another*, developed by the international and interdisciplinary collective *BeAnotherLab* (Bertrand, Gonzalez-Franco, Cherene, & Pointeau, 2014)¹.

Body-Swap Embodiment Questionnaire ($\omega = .91$). To assess the degree to which participants experienced the body-swap illusion, we adapted the Longo et al. (2008) embodiment questionnaire used in Study 1. Specifically, using an 8-point scale, participants indicated their level of agreement with 10 items assessing the extent to which they experienced the confederate's body as their own (0 = I do not agree at all and 7 = I agree completely). Sample items include: "It seemed like the body I saw belonged to me" and "It seemed like the body I saw was my body" (see Table S2 for questionnaire). The strength of the body-swap illusion was

¹ This software is publicly available at: https://github.com/BeAnotherLab/The-Machine-to-be-Another.

operationalized as the mean of all items relating to embodiment, with higher scores indicating a stronger illusion that the confederate's body belonged to the participant.

Results and Discussion

To test the hypothesis that those low in SCC are more vulnerable to the body-swap illusion, we conducted a linear regression in R version 3.5.1 with SCC predicting embodiment as assessed by our body-swap embodiment questionnaire. As predicted, and conceptually replicating findings from Study 1, SCC was negatively associated with the strength of the body-swap illusion (b = -0.48, t(32) = -2.98, p = .006; 95% CI [-0.81, -0.15]). That is, as shown in Figure 3, individuals with an unclear sense of self reported experiencing the body-swap illusion more strongly than those with a more clear sense of self.

General Discussion

In the present studies, we examined the relationship between the self-concept, the cognitive representation of everything that can be described as "me" or "mine" (Markus, 1977), and the bodily self, the implicit, pre-reflective awareness of the perceptual experiences of one's body in space (Gallagher, 2000; Gallagher & Meltzoff, 1996; Haggard & Wolpert, 2005). Specifically, we investigated whether clarity and stability in the self-concept is associated with clarity and stability in the bodily self. In Study 1, we used the RHI paradigm to assess whether lower SCC individuals are more vulnerable to misperceiving sensory cues and incorporating that irrelevant information into their bodily self. As predicted, those low (vs. high) in SCC reported more embodiment of the prosthetic hand during asynchronous stroking—that is, the control condition which typically does not give rise to the illusion because there is less sensory conflict between what is "me" and "not me". We suspect that low SCC individuals have such a tenuous and fragile sense of self that they incorporate the prosthetic hand into their own body

representation even in this inappropriate context when sensory signals do not warrant it. Interestingly, a similar finding—susceptibility to the RHI under asynchronous stimulation—was observed in patients with schizophrenia (Thakkar, Nichols, McIntosh, & Park, 2011), a disorder characterized by disturbances in self-processing including self-concept confusion (for review, see Cicero, 2017). In Study 2, we conceptually replicate this effect by demonstrating that low SCC individuals are also more susceptible to the body-swap illusion—i.e., experiencing another person's body as their own. This observation is notable given that the confederate in the bodyswap illusion was of a different race than almost all participants, a factor known to reliably decrease the strength of bodily illusions (Farmer et al., 2012; Lira et al., 2017). Taken together, our results show that a weak and unclear sense of self is associated with an excessively malleable bodily self. While previous work has observed an association between SCC and body image (i.e., lower SCC is related to greater body dissatisfaction; for review, see Vartanian & Hayward, 2017), to our knowledge, this is the first evidence linking SCC to the bodily self.

Our findings are correlational and an important question for future work is to test the causal relations between SCC and body malleability. Consistent with the notion that the self "starts with the body" (Baumeister, 1992), it is possible that our bodily self contributes to the clarity of our self-concept in a bottom-up fashion. Having a more malleable representation of one's own body may predispose one to question one's psychological experience, which could ultimately lead to an unclear self-concept. In fact, as noted, developmentally, the bodily self comes online prior to the development of the self-concept or identity: infants exhibit evidence of bodily awareness as manifested by, for example, recognizing themselves in a mirror (Amsterdam, 1972; Lewis & Brooks-Gunn, 1979) before the development of a self-concept or personal identity (Damon & Hart, 1982; Stipek, Gralinski, & Kopp, 1990). Alternatively, having

a weak and unclear sense of self may make people more susceptible to alterations in their bodily representations. This notion is consistent with findings showing that increasing awareness of the self-concept translates to improved awareness of internal bodily signals such as heartbeat (Ainley, Maister, Brokfeld, Farmer, & Tsakiris; 2013). To examine if SCC plays a causal role in affecting our bodily self, researchers could experimentally manipulate SCC (e.g., Emery, Walsh, & Slotter, 2015) before exposing participants to a bodily illusion. A third possibility is that rather than being unidirectional, the self-concept and bodily self may interact in a dynamic reciprocal fashion to form a clear and coherent sense of self (Brandon, 2016). For example, low SCC individuals' proclivity to incorporate inappropriate and unwarranted bodily information into the self may lead to a vicious cycle by which self-concept confusion is maintained, or even exacerbated. Future research is needed to elucidate the precise nature of the relationship between SCC and body malleability.

Our research may have important implications for interpersonal processes. Social interaction requires processing information about the other person's internal state—their thoughts, feelings, motivations, attitudes. Interestingly, compelling evidence shows that processing others' internal states activates the same neural representations as when the self experiences these internal states (Bernhardt & Singer, 2012; Gallagher et al., 2000). Such "mirroring" can result in potential conflicts between representations of the other and the self, and thus successful social interaction requires self-other distinction: the ability to differentiate between one's own experiences and the experiences of the other (see Guzman, Bird, Banissy, & Catmur, 2016 and Steinbeis, 2016 for reviews). For example, the control of our automatic tendency to imitate others requires the ability to distinguish between one's own motor plan and that of the other (Wang & Hamilton, 2012). Perspective-taking requires appreciating differences

between one's own mental state and that of the other to avoid simply attributing one's own perspective to the other person, especially when the other's perspective conflicts with one's own (Santiesteban et al., 2012). Finally, when empathizing with another, the degree of differentiation between the self and other may lead to qualitatively different empathic reactions. As Batson (1987) argued, failing to maintain adequate boundaries between one's own emotions and those of another person can result in empathic personal distress, a self-oriented, aversive response that often detracts from helping the person in need (Batson, 1987). By contrast, empathic concern, an other-oriented response that induces a desire to alleviate the other's suffering, is associated with greater self-other distinction (Batson et al., 1997). Low SCC individuals' difficulties with bodily self-other distinction (i.e., excessively malleable bodily self) may predispose them to troubles with social processes such as the ones described above. Future work could investigate this idea.

This research may also have implications for understanding clinical conditions marked by difficulties with self-representations. In particular, our findings suggest that disorders characterized by disturbances in one aspect of the self may also be characterized by disturbances in other aspects of the self. As noted, individuals with schizophrenia, like those with low SCC, are more susceptible to the RHI during asynchronous stroking (Thakkar et al., 2011); interestingly, schizophrenia has been shown to be related to low SCC (Cicero, 2017). Together, these findings suggest that people with schizophrenia are characterized by a lack of stability in both the self-concept and bodily self. Beyond schizophrenia, one defining feature of borderline personality disorder (BPD) is "markedly and persistently unstable self-image or sense of self" (American Psychiatric Association, 2013); our findings suggest that these patients may also experience unstable bodily representations. Indeed, an unclear bodily self may explain why BPD patients tend to experience depersonalization (Brodsky, Cloitre, & Dulit, 1995), a feeling of

separation between oneself and one's body. Bodily malleability could also explain BPD individuals' tendency to excessively merge with others (Beeney, Hallquist, Ellison, & Levy, 2016). Moving away from disorders of the self-concept, a condition known to be associated with disturbances in the bodily self is mirror-touch synesthesia: when observing another person being touched, mirror-touch synesthetes experience tactile stimulation on the congruent part of their own body, suggesting that their bodily representations are highly malleable (Banissy & Ward, 2007). If bodily malleability is related to an unclear and unstable cognitive self, mirror-touch synesthetes should also be vulnerable to self-concept confusion. Interestingly, anecdotal evidence suggests that mirror-touch synesthetes also have a tenuous self-concept; as one woman with this condition described, "I spent my life losing myself in other people, on whims, just gone" and "I just have no idea who I am" (Spiegel & Miller, 2015). Her comments resonate with research indicating that individuals low in SCC search for external sources of self-definition (Campbell, 1990). Given research showing that higher SCC is associated with better relationships (e.g., Lewandowski, Nardone, & Raines, 2009) and well-being (Campbell et al., 1996; Treadgold, 1999), our findings imply that mirror-touch synesthetes may be prone to relationship difficulties and lower well-being. Future work should examine if people with one kind of self disturbance-either in the self-concept or the bodily self-also experience disturbances in the other aspects of the self.

A few limitations should be noted. Because the body-swap illusion is a resource-intensive procedure, we drew upon a larger study using this paradigm to test our hypothesis that SCC is associated with this bodily illusion; consequently, we could not base our sample size on the effect we were interested in investigating. That said, the purpose of Study 2 was to conceptually replicate the findings from Study 1, and to test whether the SCC–body malleability association extends to the entire body. Moreover, a post-hoc sensitivity analysis indicated that our sample size was sensitive to detecting the observed moderate- to large-sized effect of SCC in this study. Nonetheless, future work should replicate the association between SCC and susceptibility to the body-swap illusion in a larger sample to ascertain the robustness of the effect. We also did not have an explicit asynchronous movement condition in Study 2. However, two features of the body-swap paradigm we used likely attenuated the sensory conflict in the body-swap illusion. First, although the participants and confederate were instructed to move in synchrony in the body-swap paradigm, this was difficult to achieve in practice. As a result, the movements between participants and the confederate were likely somewhat asynchronous, similar to the asynchronous stimulation condition in the RHI paradigm. Second, with the exception of two participants, the participant and confederate were of different races, a factor known to attenuate degree of embodiment (Farmer et al., 2012; Lira et al., 2017). Again, though, future work should examine the specificity of the relationship between SCC and susceptibility to body-swapping by including a condition where participants are explicitly instructed to move out of synchrony with the confederate.

In conclusion, few topics are as central to human existence as the self. Questions like "Where does our sense of self come from?" and "How do we maintain a clear, stable, unitary sense of self?" have fascinated psychologists and philosophers for centuries. To answer these fundamental questions, some researchers have focused on the self-concept while others have examined the bodily self. Although traditionally investigated separately, both theory and some evidence suggest that these two notions of self are interrelated (Ainley et al., 2013; Banakou et al., 2013; Gallagher, 2000). We add to this literature by demonstrating that low clarity, coherence and stability of the self-concept is associated with susceptibility to bodily illusions. This finding implies that a clear and coherent sense of self entails clarity and coherence in both the psychological and bodily notion of self, suggesting that these notions may represent two sides of the same self.

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Tables

Table 1

Results of multilevel model analysis predicting embodiment of the prosthetic hand.

Predictor	b	95% Confidence Interval	<i>t</i> (78)
Intercept	2.59***	2.33, 2.86	19.50
Stimulation condition	1.25***	0.93, 1.56	7.94
SCC	-0.34*	-0.64, -0.05	-2.32
$SCC \times Stimulation Condition$	0.21	-0.13, 0.55	1.25

*p<.05; ***p<.001

Figures



Figure 1. The relationship between self-concept clarity and embodiment. Self-concept clarity significantly predicts embodiment of the prosthetic hand in the asynchronous stimulation condition. Shaded areas represent 95% confidence bands.



Figure 2. Experimental setup with large partition separating confederate and participant. Left: Confederate looking down at her hands. Middle: Participant point of view (through the virtualreality headset), seeing the confederate's hands and image reflection, instead of her own. Right: Participant looking down at her hands.



Figure 3. The relationship between self-concept clarity and embodiment in the body-swap illusion. Self-concept clarity significantly predicts embodiment of the other person's body. Shaded area represents 95% confidence band.

General Discussion

Our sense of self is intimately intertwined with the social world around us. From the moment we are born, we rely on social interactions to form a self-concept (Baldwin, 1897; Cooley, 1902; Mead, 1934). Self-concept clarity, the extent to which the self-concept is clear, consistent, and coherently defined (Campbell et al., 1996), is one important aspect of the selfconcept. Extensive research has documented the contribution of social processes to creating and maintaining a clear and coherent sense of self (see Introduction for review). Importantly, this link appears to be bi-directional as some work suggests that SCC also plays a positive role in a variety of social phenomena, including forming and maintaining romantic relationships (McIntyre, Mattingly, & Lewandowski, 2017), cooperation during conflicts (Bechtoldt et al., 2010), and fostering supportive friendships (Becht et al., 2017). Conversely, low SCC appears to be detrimental for interpersonal interactions with low SCC being associated with, for example, aggression (Stucke & Sporer, 2002), tendency to make upward social comparisons (Butzer & Kuiper, 2006), and lower relationship satisfaction (Lewandowski et al., 2010). Although research has consistently shown that SCC positively contributes to social process, the reasons why this association exists remain poorly understood. In other words, the literature has yet to answer the question: what are the mechanisms underlying SCC's beneficial effect on social processes?

The present research offers an answer to this question by suggesting that self-other distinction, the ability to distinguish between one's own experience and another person's experience, is one such possible mechanism. I investigated this idea in the context of empathy because of its fundamental role in social functioning. Importantly, although empathy entails a shared emotional experience between the empathizer and the target of empathy, this sharing needs to be accompanied by self-other distinction—that is, the empathizer must be able to

recognize the target as the source of one's own emotional experience (Batson et al., 1997; Bird & Viding, 2014; Decety & Jackson, 2004; Lamm, Bukowski, & Silani, 2016). Lack of self-other distinction in the context of empathy can lead to personal distress, a self-focused, aversive reaction that often results in withdrawing from the empathy-inducing situation, rather than responding with empathic concern, an other-oriented response of care (Batson, Fultz, & Schoenrade, 1987). Given empathy's centrality to our everyday social interactions and its reliance on self-other distinction, empathy served as an ideal context to test my hypothesis that self-other distinction underlies the positive link between SCC and a variety of social phenomena.

In Article 1, I first provide evidence that SCC is important for empathic responding. I show that low SCC individuals reported higher dispositional empathic personal distress and lower dispositional empathic concern (Study 1) as well as more situationally induced empathic personal distress and less situationally induced empathic concern (Studies 2-3) when confronted with an actual person in need. Perhaps even more significantly, I found that low SCC was associated with less helping behaviour (Studies 2-3), and that this association was mediated by feelings of empathic personal distress (Study 2) and empathic concern (Studies 2-3). Thus, not only does an unclear sense of self make one vulnerable to more maladaptive emotional responses to another's distress, these maladaptive responses have real, tangible consequences for the target of empathy. Importantly, in Study 3, I replicate these findings in an experimental framework: individuals assigned to the self-concept confusion condition experienced lower SCC than those in the control condition and this lowered SCC was in turn associated with greater empathic personal distress, lower empathic concern, and less helping behaviour. These findings suggest that the very act of empathizing with another person leads those with a weak sense of self to lose

themselves in the other's experience and, consequently, undermines mature empathic responding.

In addition to showing that SCC affects empathic responding and helping behaviour, in Article 1, I provide evidence that low self-other distinction¹ is indeed one mechanism underlying low SCC individuals' empathic difficulties. Specifically, I demonstrate that low SCC was associated with less self-other distinction as indicated by these individuals' greater overlap in trait descriptions of themselves and the target of empathy as well as higher ratings on the Inclusion of the Other in the Self scale (Studies 2 and 3). Importantly, in both Studies 2 (correlational) and 3 (experimental), lower self-other distinction mediated the association between low SCC and increased empathic personal distress. These findings are in line with prior work indicating the importance of self-other distinction in the context of empathy (Batson et al., 1987; Batson et al., 1997; Bird & Viding, 2014; de Vignemont & Singer, 2006; Decety & Jackson, 2004; Lamm, Bukowski, & Silani, 2016), but suggest that clarity and coherence of the self-concept is an important determinant of one's vulnerability to experiencing low self-other distinction when empathizing with others. Overall, these findings suggest that self-other distinction is a mechanism underlying the association between a clear and coherent self-concept and empathic responding.

Finally, in Article 2, I probed the association between SCC and self-other distinction more deeply by demonstrating that low SCC individuals' difficulties with self-other distinction at the conceptual level extend to difficulties with self-other distinction at level of the bodily self, the implicit, pre-reflective awareness of the perceptual experiences of one's body in space

¹ In Article 1, I discuss my findings in terms of "high self-other merging" rather than "low self-other distinction". These terms can be used interchangeably because self-other merging and self-other distinction represent opposite notions on a continuum. Accordingly, both these terms are used in the remainder of the General Discussion.

(Gallagher, 2000; Gallagher & Meltzoff, 1996; Haggard & Wolpert, 2005). Specifically, I show that an unclear sense of self is associated with greater susceptibility to bodily illusions, an index of the clarity in boundaries between one's body and the outside world. In Study 1, participants underwent the rubber hand illusion (Botvinick & Cohen, 1998), a paradigm in which synchronous (versus asynchronous) stimulation between a prosthetic hand and one's own hand leads one to experience the prosthetic hand as if it were one's own. Whereas participants were equally susceptible to the RHI during synchronous stroking, low SCC individuals were more vulnerable to the illusion during asynchronous stroking, when the effect is unwarranted. This finding suggests that low SCC individuals have such a tenuous and fragile sense of self that they incorporate the prosthetic hand into their own body representation even in this inappropriate context when sensory signals do not warrant it. Study 2 conceptually replicates this effect by demonstrating that low SCC individuals are also more susceptible to the body-swap illusion (Petkova & Ehrsson, 2008), a paradigm in which another person's body is experienced as one's own. These findings demonstrate that low SCC individuals' difficulties with self-other distinction in the conceptual domain extend to difficulties with self-other distinction at the level of the bodily self. Thus, these results suggest that an unclear sense of self is pervasive because it implies lack of clarity in both the self-concept and the bodily self, two distinct modalities of self. Moreover, given that the bodily self is thought to emerge earlier in development than the selfconcept and is widely understood to serve as the foundation of the self-concept (Fonagy et al., 2002), these findings suggest that an unclear bodily self may be a possible source of self-concept confusion and difficulties with self-other distinction. Research to date has largely focus on the importance of social interactions for the formation of a clear self-concept; thus, the suggestion that the bodily self could also play a role represents a new avenue of research.

Taken together, these findings are the first to demonstrate a positive link between SCC and empathy and, conversely, that low SCC has detrimental consequences for empathic responding. Moreover, the SCC-empathy association appears to be underpinned by low selfother distinction. Finally, these findings demonstrate that low SCC people also have difficulties with self-other distinction at the level of the bodily self, thus suggesting, for the first time, that an unclear sense of self is indicative of pervasive self-confusion across different self modalities (i.e., both the self-concept and the bodily self). Moreover, these latter findings open a new avenue of research by pointing to unclear bodily experiences as a possible source of self-concept confusion and difficulties with distinguishing between the self and others. These findings represent an original contribution to research examining the self-concept and have a range of implications. In the next section, I discuss these implications and provide suggestions for future investigation.

General Implications and Future Directions

Understanding positive association between SCC and social processes. Although previous work has shown that SCC plays a positive role in a variety of social domains, little work has been devoted to understanding why this association exists. That is, what are the mechanisms responsible for the positive link between SCC and social cognition and behaviour? By showing that SCC is associated with self-other distinction (at both a conceptual and body level) and that self-other distinction mediates the relationship between SCC and empathy, this program of research offers one answer this question. Specifically, given that much of social cognition and behaviour relies on some degree of self-other distinction (Guzman, Bird, Banissy, & Catmur, 2016; Steinbeis, 2016), this research suggests that self-other distinction may be one possible mechanism underlying the positive link between SCC and social processes more generally. For example, insufficient self-other distinction may mediate the association observed between low SCC and tendency to conform to others perceptions (Rahimi & Strube, 2007). Specifically, lacking a clear and coherent sense of self may render low SCC individuals prone to trouble disentangling their own ideas and points of view from those of other people thus resulting in them adapting their perspective to be in line with that of others. Similarly, self-other distinction may also mediate the relationship between SCC and cooperative problem-solving (Bechtoldt et al., 2010). This idea is in line with work showing that individuals with higher emotional intelligence, an umbrella construct referring to various emotional competencies including self-other distinction, used more collaborative problem-solving strategies during a team cognitive task (Jordan & Troth, 2004).

The notion that self-other distinction may underlie the effect of SCC on social cognition and behaviour may be particularly relevant to romantic relationships. As detailed in the Introduction, the majority of research investigating the role of SCC in interpersonal processes has focused on romantic relationships and the literature consistently shows that higher SCC is associated with better relationship functioning (see McIntyre et al., 2017 for review). While Lewandowski et al., (2010) provided evidence for self-esteem as a mediator of this association, self-other distinction could also be at play. People readily expand their self-concept to incorporate romantic partners into the self (Aron, Aron, Tudor, & Nelson, 1991; Aron et al., 1992). Although higher levels of "merging" with a romantic partner (i.e., greater incorporation of the partner into the self) have been associated with greater relationship satisfaction and lower rates of breakup over time (Tsapelas, Aron, & Orbuch, 2009), work also shows that too much merging and not enough self-other distinction may be problematic. Specifically, excessive merging at the expense of self-other distinction may pose a threat to personal identity and therefore cause a person to desire less closeness with their partner. Discrepancies in desired and actual closeness with a partner have been shown to be associated with conflict, lower levels of relationship satisfaction and commitment, and increased chance of break-up (Frost & Forrester, 2013; Mashek, Sherman, & Aron, 2004). In demonstrating that low SCC is associated with difficulties with self-other distinction, the present investigation suggests that low SCC individuals may "over-merge" with romantic partners, exacerbating their already fragile sense of self, and consequently negatively impact relationships. By contrast, higher SCC people may be able to balance merging and distinction in a relationship thus enabling better relationship functioning.

Interestingly, Emery, Walsh, and Slotter (2015) showed that low SCC individuals were actually *less* interested in expanding their self-concept to incorporate a potential romantic partner. This suggests that people with an unclear sense of self may be aware, at some level, that adding more attributes to their self-concept may increase their confusion about the self and thus they attempt to avoid it. However, since the Emery et al., (2015) study was conducted with single participants in a relationship initiation context, it is unclear how SCC influences merging in the context of an ongoing relationship. Thus, without a clear and coherent self to draw upon, it is possible that low SCC people inevitably merge excessively with their partner despite knowing that doing so may be detrimental to the self and ultimately the relationship. Future research could examine the effect of SCC on merging/distinction in romantic relationships and investigate self-other distinction as a mechanism underlying the SCC-relationship functioning link.

Potential benefits of low SCC. By showing that SCC is associated with self-other distinction, the present work allows nuanced predictions to be made about how SCC will relate to various social processes. Although many social processes rely on having a relatively clear distinction between the self and other person, other processes are less dependent on self-other

distinction and instead are more reliant on a merging between the self and other. For example, behavioural mimicry, which is an important facilitator of smooth and harmonious social interactions (Chartrand & Bargh, 1999), relies on the convergence between the self and other. Evidence for this convergence comes from neuroimaging studies indicating that observation of facial expressions, postures, and actions automatically activates similar neural circuits to those involved in the direct experience or execution of these expressions, postures and actions (Blakemore & Decety, 2001, Carr, Iacoboni, Dubeau, Mazziotta, & Lenzi, 2003). In addition to this overlap between self and other on a brain level, other work shows that mimicry is associated with a conceptual blurring between the self-concept and concept of the other (Cooke, Bazzini, Curtin, & Emery, 2018; Galinsky, Ku, & Wang, 2005). Beyond its importance for mimicry, selfother merging is also important for inhibiting prejudice and stereotyping (Galinsky et al., 2005). For instance, increased overlap in the cognitive representations between the self and other decreases stereotyping (Galinsky & Moskowitz, 2000). Interestingly, research shows that inducing ownership over an outgroup body via body illusions (such as the paradigms used in Article 2) leads to reductions in implicit biases against that outgroup, suggesting that, like mimicry, prevention of prejudice is facilitated by self-other merging at a body level (Maister, Slater, Sanchez-Vives, & Tsakiris, 2015).

By showing that low SCC is associated with low self-other distinction, at both a conceptual and body level, our work suggests that SCC will have different effects on social processes depending on their relative reliance on self-other distinction versus merging. Specifically, while lower SCC may be detrimental for processes that depend more on self-other-distinction, such as empathy, lower SCC may facilitate processes that rely on self-other merging, such as behavioural mimicry and inhibition of prejudice and stereotyping.
beneficial effect of low SCC on social functioning would be noteworthy given that the vast majority of research has demonstrated a negative association between low SCC and social behaviour. Future work could investigate this intriguing hypothesis.

Links with developmental psychology. The findings from the present investigation are consistent with developmental psychology literature suggesting that differentiating the self and other and the formation of a clear sense of self are closely linked in development. According to developmental psychologists, individuals go through a process of separation-individuation. This process occurs in two phases, first in infancy (Mahler, Pine, & Bergman, 1975) and then in adolescence (Blos, 1979), with individuals progressing from a high level of fusion and/or dependence on caregivers to increasingly developmentally appropriate autonomy and independence. In infancy, individuals move from experiencing the self as united with the mother to recognizing the mother as a separate person with her own thoughts and feelings (Mahler et al., 1975). In adolescence, recognition of the self as independent from caregivers critically enables individuals to take on the tasks of self-definition and the construction of a unique self-concept.

Although the present work implies that low SCC hinders self-other distinction in adulthood, the developmental literature on separation-individuation suggests that difficulties with self-other distinction precede and lead to an unclear sense of self. This hypothesis is also consistent with literature on the bodily self. As noted above, the bodily self is widely understood to serve as the foundation for the development of the self-concept. Supporting this idea, the bodily self is thought to be present from birth while the self-concept appears to emerge in the second year of life (Fonagy et al., 2002). Given that the bodily self is fundamentally about distinguishing between "me" and "the outside world", its emergence before the self-concept implies that poor self-other distinction at the bodily level precedes and may contribute to an unclear sense of self. Future work could investigate if developmental difficulties with differentiating the self from the other contribute to low SCC. It is also possible that, rather than being a unidirectional relationship, SCC and self-other distinction may interact in a dynamic reciprocal fashion. For example, insufficient self-other distinction in development may lead to low SCC, which then in turn contributes to difficulties with self-other distinction in interactions with others thus maintaining, or even exacerbating, self-concept confusion. Future research is needed to elucidate the nature of the relationship between SCC and self-other distinction in adulthood.

Keeping the separation-individuation literature in mind, the present investigation may have important implications for the parent-child relationship. An individual's ability to achieve mature separation-individuation largely depends on caregivers' responses and ability to navigate a child's needs for dependence and autonomy (Mahler et al., 1975). Whereas the development of a clear sense of self requires adaptive parenting characterized by a balance between protectiveness and "letting go", an impoverished sense of self arises when the parent is unable to let go of excessive need for the child and relies on the child to provide him or her with nurturance, support, and comforting (Zeanah & Klitzke, 1991). At its extreme, this excessive need for the child can result in enmeshment: a lack of recognition of the differentiation between the child and caregiver that results in heightened dependence and constrains the child's independence and exploration outside the family (Barber & Buehler, 1996; Kerig, 2005; Minuchin, 1974). By definition, enmeshment prevents adolescents from mastering important developmental tasks such as increased autonomy from parents (Allen & Land, 1999) and developing an individual identity (Erikson, 1950). By showing that low SCC is associated with difficulties with self-other distinction, the present work suggests that parents with low SCC may

be particularly prone to creating an enmeshed dynamic with their children. Moreover, this process may explain the intergenerational transmission of SCC (Crocetti, Rubini, et al., 2016). That is, parents with an unclear sense of self may be more likely to merge excessively and become enmeshed with their children which may ultimately undermine the child's development of a separate, clear and stable sense of self. Some evidence for the idea that lack of boundaries between the parent and child contributes to low adolescent SCC comes from research showing that over-protective parenting, often a characteristic of enmeshment, is associated with low adolescent self-understanding (Perry et al., 2008). Future work could investigate whether low SCC parents are indeed more prone to creating enmeshment and whether this negatively influences their children's SCC.

Implications for clinical research. The present investigation also has implications for understanding the social difficulties observed in clinical conditions marked by disorders of self. Specifically, this work suggests that people with self-disturbances have trouble with interpersonal processes because of their difficulties with self-other distinction, either at the psychological level and/or more basic bodily level. Consistent with this idea and my findings in Article 1, patients with schizophrenia and borderline personality disorder, both characterized by difficulties in establishing a stable sense of self (American Psychiatric Association, 2013; Parnas & Henriksen, 2014), have been shown to experience others' distress as personal distress (Guttman & Laporte, 2000; Montag, Heinz, Kunz, & Gallinat, 2007), suggesting that they do in fact have difficulties with differentiating the self from the other and that this undermines key social processes like empathy. Moreover, in a review of schizophrenia research, van der Weiden and colleagues (2015) also argued that difficulties in distinguishing between one's own thoughts, emotions, and behaviours from those of others is an important factor in explaining impaired social functioning in schizophrenia patients. Beyond schizophrenia and borderline personality disorder, autism has also been linked with an atypical sense of self, both at the level of the self-concept and the bodily self (Lyons & Fitzgerald, 2013). Given that individuals with autism have also been shown to have impaired self-other differentiation (Lyons & Fitzgerald, 2013), the present investigation suggests that self-other confusion may underlie these individuals well-documented social difficulties, including impairments in empathic responding (Harmsen, 2019).

Limitations and Future Directions

A few limitations of the present work are worth noting. First, I assessed SCC using the same measure (i.e., the Self-Concept Clarity Scale) across all five studies. In addition to the Self-Concept Clarity Scale (Campbell et al., 1996), Campbell's seminal work (1990) showed that SCC can be measured indirectly using a variety of methods. These methods have since been used by other researchers to index SCC. For example, higher SCC is reflected in more extreme ratings of oneself on trait measures (Landau et al., 2009) as well as greater reported certainty in self-conceptions (Hamid & Cheng, 1995). Higher SCC has also been indexed by lower reaction times when deciding if a trait is self-descriptive or not (Boucher, 2011). Because this program of research relied exclusively on the Self-Concept Clarity Scale, it is possible that the reported associations are specific to this measure rather than reflecting associations with the construct of SCC more generally. That said, I relied on the Self-Concept Clarity Scale because it is considered the gold standard and represents the only direct measure of SCC. Nevertheless, future work could replicate the present findings using different measures of SCC to ascertain the robustness of the observed associations.

In addition, the majority of the present work is correlational and thus conclusions about the causal role of SCC in self-other distinction processes and empathy cannot be made. That said, Study 3 in Article 1 was experimental. That study showed that people primed with selfconcept confusion experienced lowered SCC which led to decreased self-other distinction, which in turn led to increased personal distress when confronted with someone in distress. However, a caveat of that study is that the experimental manipulation did not directly affect self-other distinction. Rather, the experimental manipulation affected *state* SCC and participants who experienced lower state SCC indicated lower self-other distinction. It is possible that the manipulation we used was subtle and may not have been robust enough to completely over-ride participants' habitual manner of relating to another person especially since this was an on-line study. Thus, other work should replicate the present findings using more robust experimental manipulations to ascertain that SCC plays a causal role in self-other distinction and downstream social processes.

Finally, although my samples were fairly large and diverse (not just university students) the studies in the present investigation are limited in that they focused on North American participants, thus it is unknown whether the findings hold in other cultures. In fact, it is possible that culture moderates the association between SCC and self-other distinction. The individual self tends to drive behaviour in individualistic cultures, so SCC may be central in determining self-other distinction in social processes. Conversely, SCC may not affect self-other distinction in collectivistic cultures, where connection to others is emphasized. Individuals in collectivistic cultures tend to include other people in their self-concepts and define the self in relation to others (e.g., student, mother, friend; Markus & Kitayama, 1991). Thus, these individuals likely "merge" with others regardless of their level of SCC. Studying the role of culture in how SCC affects self-other distinction for future research.

Final Conclusions

Although research indicates that SCC plays a role in promoting social processes, the mechanisms responsible for this positive association remain poorly understood. The present research addresses this gap by suggesting that self-other distinction is one such possible mechanism. Specifically, the current findings are the first to show that an unclear sense of self is associated with empathic difficulties and that this association is mediated by decreased self-other distinction. Low SCC people appear to also be characterized by more malleable bodily representations, an observation that highlights the pervasiveness of an unclear sense of self across modalities (i.e., self-concept and bodily self). Moreover, this finding opens a new avenue of research by pointing to an unclear bodily self as a potential source of self-concept confusion and difficulties with self-other distinction. Taken together, the present research addresses a significant gap in the SCC literature and generates important directions for future work.

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Appendix A:

Supplemental Material for Article 1

The primary statistical analyses and results supporting our theoretical model about the role of SCC in empathic responding are reported in the main text. In this Supplemental Material document, we provide additional statistical analyses and results for the interested reader. Specifically, as noted in the main text, SCC is often correlated with self-esteem (Campbell et al., 1996). To address the specificity of the effects of SCC, we re-ran the analyses in Studies 1 and 2, including self-esteem, as measured with the Rosenberg Self Esteem Scale (Rosenberg, 1965), as a covariate (Note: self-esteem was not measured in Study 3 because we experimentally manipulated SCC). Moreover, research also indicates that there can be sex differences in empathic responding (see Christov-Moore et al. (2014) for review) so we re-ran our analyses from Studies 1, 2 and 3, controlling for sex. A complete description of the analyses with these additional covariates are reported below for the interested reader.

Study 1

Analyses controlling for self-esteem. To examine the specificity of SCC in predicting dispositional empathic reactions, we conducted a series of linear regression analyses. We ran separate analyses for dispositional empathic personal distress and dispositional empathic concern with SCC and self-esteem both entered as predictors. Following our main analyses, personal distress was entered as a covariate in the analysis for empathic concern and vice versa. As indicated in Table S1, SCC remained a significant predictor of dispositional empathic personal distress and dispositional empathic concern, controlling for self-esteem.

Analyses controlling for sex. To ascertain that the association between SCC and empathy is not due to sex differences in empathic responding, we ran identical analyses to those controlling for self-esteem except with sex (0 = female, 1 = male) included as a covariate instead of self-esteem. As shown in Table S2, SCC continued to significantly predict dispositional personal distress and dispositional empathic concern when sex was included as covariate.

Study 2

Analyses controlling for self-esteem. To examine the specificity of SCC in predicting state empathic reactions and helping behavior, we conducted a series of linear regression analyses identical to those in Study 1 except with state empathic personal distress, state empathic concern, and amount of money donated to Katie as our outcome variables. Consistent with findings in Study 1, Table S3 shows that SCC continued to predict state personal distress, state empathic concern, and helping behavior when self-esteem was included as a covariate.

Taken together, the results from Study 1 and Study 2 suggest that SCC is associated with empathic reactions and helping beyond any contribution of positive self-evaluations.

Analyses controlling for sex. We ran identical analyses to those controlling for selfesteem except with sex (0 = female, 1 = male) included as a covariate instead of self-esteem. As shown in Table S4, consistent with Study 1, SCC continued to significantly predict state personal distress, state empathic concern, and helping when sex was included as covariate.

Study 3

Analyses controlling for sex. To ascertain that the effect of SCC on empathy and helping is not due to sex differences in empathic responding, we conducted a series of mediation analyses using Model 4 of the PROCESS macro for SPSS. Specifically, the SCC manipulation (control condition = 0, confusion condition = 1) was entered as the predictor, state SCC was the mediator, sex was entered as a covariate, and 1) empathic personal distress, 2) empathic concern and 3) helping were entered as outcomes in separate mediation models. Moreover, empathic

personal distress was entered as a covariate in the model for empathic concern, and vice versa for the model for empathic personal distress.

As depicted in Tables S5-S7, results from our mediation analyses showed that the SCC manipulation indirectly affected empathic personal distress (indirect effect estimate = 0.11, 95% CI = 0.06, 0.18), empathic concern (indirect effect estimate = -0.09, 95% CI = -0.15, -0.05), and helping behaviour (indirect effect estimate = -0.42, 95% CI = -0.92, -0.03), controlling for sex. That is, individuals in the confusion condition tended to experience lower SCC and lower SCC was subsequently associated with more empathic personal distress, less empathic concern, and less helping, beyond any effect of sex.

Taken together, the results of Study 1, 2, and 3 suggest that SCC plays an important role in empathic responding beyond any contribution of sex differences.

Results of linear regression analyses with SCC predicting dispositional empathic personal distress and dispositional empathic concern, controlling for self-esteem, in Study 1

	Outcome								
	Personal Distress			Em	pathic Co	oncern			
Predictor	b	t	95% CI	b	t	95% CI			
Self-concept clarity	-0.29***	-6.39	-0.38, -0.20	0.16**	3.12	0.06, 0.26			
Self-esteem	0.03	0.45	-0.09, 0.15	0.16*	2.45	0.03, 0.30			
Empathic Concern	0.43***	11.17	0.36, 0.51	-	-	-			
Personal Distress	-	-	-	0.50***	11.17	0.42, 0.59			

* p < 0.05; ** p < 0.01; *** p < 0.001; - indicates that variable was not included as a predictor in

the analysis

Results of linear regression analyses with SCC predicting dispositional empathic personal distress and dispositional empathic concern, controlling for sex, in Study 1

		Outcome						
	Pe	rsonal D	istress	Em	pathic C	oncern		
Predictor	b	t	95% CI	b	t	95% CI		
Self-concept clarity	-0.28***	-6.91	-0.36, -0.20	0.22***	5.00	0.14, 0.31		
Sex	-0.12	-1.40	-0.29, 0.05	-0.24**	-2.65	-0.42, -0.06		
Empathic Concern	0.42***	10.93	0.35, 0.50	-	-	-		
Personal Distress	-	-	-	0.50***	10.93	0.41, 0.59		

** p < 0.01; *** p < 0.001; - indicates that variable was not included as a predictor in the

analysis

Results of linear regression analyses with SCC predicting state empathic personal distress, state empathic concern, and amount of

	Outcome									
	Pe	rsonal D	istress	En	pathic Co	oncern	Money Donated			
Predictor	b	t	95% CI	b	t	95% CI	b	t	95% CI	
Self-concept clarity	-0.41***	-4.93	-0.57, - 0.24	0.26***	3.56	0.12, 0.40	2.51*	2.45	0.49, 4.53	
Self-esteem	0.07	0.56	-0.17, 0.30	0.21*	2.07	0.01, 0.41	1.69	1.16	-1.17, 4.55	
Empathic Concern	0.66***	12.31	0.55, 0.76	-	-	-	-	-	-	
Personal Distress	-	-	-	0.49***	12.31	0.42, 0.57	-	-	-	

money donated to Katie, controlling for self-esteem, in Study 2

* p < 0.05; *** p < 0.001; - indicates that variable was not included as a predictor in the analysis

Results of linear regression analyses with SCC predicting state empathic personal distress, state empathic concern, amount of money donated to Katie, controlling for sex, in Study 2

	Outcome									
	Personal Distress			Empathic Concern			Donations			
Predictor	b	t	95% CI	b	t	95% CI	b	t	95% CI	
Self-concept clarity	-0.36***	-5.32	-0.49, -0.23	0.32***	5.56	0.21, 0.44	2.88**	3.48	1.25, 4.51	
Sex	0.32**	2.74	-0.56, -0.09	-0.34**	-3.38	0.14, 0.55	-4.11**	-2.80	1.22, 6.99	
Empathic Concern	0.68***	12.96	0.58, 0.78	-	-	-	-	-	-	
Personal Distress	-	-	-	0.51***	12.96	0.43, 0.59	-	-	-	

** p < 0.01; *** p < 0.001; - indicates that variable was not included as a predictor in the analysis

Results of mediation model with SCC predicting state personal distress, controlling for sex, in

Study 3.

	Dependent Variable								
	Self-	Concep	t Clarity	Personal Distress					
Predictor	b	t	95% CI	b	t	95% CI			
Confusion Condition	-0.34***	-4.70	-0.48, -0.20	-0.13	-1.33	-0.32, 0.06			
State SCC	-	-	-	-0.33***	-6.34	-0.43, -0.23			
Sex	-0.12	-1.75	-0.25, 0.01	0.23*	2.54	0.05, 0.41			
Empathic Concern	0.05*	1.97	0.00, 0.11	0.67***	18.66	0.60, 0.74			

* p < 0.05; *** p < 0.001; - indicates that variable was not included as a predictor in the analysis

Results of mediation model with SCC predicting state empathic concern, controlling for sex, in Study 3.

	Dependent Variable									
	Self-	Concept	t Clarity	Emp	oathic C	oncern				
Predictor	b	t	95% CI	b	t	95% CI				
Confusion Condition	-0.35***	-4.98	-0.49, -0.21	0.01	0.08	-0.16, 0.17				
State SCC	-	-	-	0.24***	5.27	0.15, 0.33				
Sex	-0.13 [†]	-1.96	-0.26, 0.00	-0.32***	-4.08	-0.47, -0.17				
Personal Distress	-0.09***	-3.98	-0.14, -0.05	0.52***	18.66	0.46, 0.57				

 $\overline{+ p = 0.05}$; *** p < 0.001; - indicates that variable was not included as a predictor in the analysis

Results of mediation model with SCC predicting the amount of money donated to help Katie, controlling for sex, in Study 3.

	Dependent Variable								
	Self-	Concept	t Clarity	Mo	oney Do	onated			
Predictor	b	t	95% CI	b	t	95% CI			
Confusion Condition	-0.34***	-4.79	-0.49, -0.20	0.25	0.25	-1.74, 2.25			
State SCC	-	-	-	1.22*	2.25	0.15, 2.29			
Sex	-0.14*	-2.02	-0.27, 0.00	-3.55***	-3.76	-5.41, -1.70			

 $\overline{p < 0.05}$; *** p < 0.001; - indicates that variable was not included as a predictor in the analysis

Appendix B:

Supplemental Material for Article 2

Specificity of SCC and Embodiment Effect

Study 1

As indicated in the main text, we used the 10-item "embodiment of rubber hand" factor identified by Longo and colleagues (2008) to quantify the subjective experience of the RHI. Although these items loaded onto one factor, a secondary analysis conducted by Longo et al. (2008) showed that these items can also be broken down into three sub-components. Specifically, five items refer to ownership, the feeling that one owns the prosthetic hand (Table S1, items 1-5; e.g., "During the experiment, there were times when it seemed like the rubber hand belonged to me."), three items refer to location, the feeling that the real hand and prosthetic hand were in the same location (Table S1, items 6-8; e.g. "During the experiment, there were times when it seemed like my hand was in the location where the rubber hand was."), and two items refer to agency, the feeling that one can control the prosthetic hand (Table S1, items 9-10; e.g. "During the experiment, there were times when it seemed like I could have moved the rubber hand if I had wanted.)

Given that we observed that low SCC individuals were more susceptible to the RHI in the asynchronous condition, we conducted additional exploratory analyses to investigate the specificity of this effect. In other words, is SCC related to particular aspects of the embodiment experience and not others? We were particularly interested in the ownership and agency components since a sense of body ownership, the sense that my body belong to "me", and a sense of agency, the sense of authorship of a movement or action, are considered two fundamental characteristics of the bodily self (Gallagher, 2000; Tsakiris, Schütz-Bosbach, &

Gallagher, 2007). To examine this question, we calculated the mean of items for each of the three sub-components of embodiment in the asynchronous condition and then correlated these scores with SCC.

Results are presented in Table S3. SCC was significantly negatively associated with ownership and marginally associated with location. However, SCC was not related to feelings of agency. These results suggest that the association between SCC and embodiment of the prosthetic hand in the asynchronous condition was primarily driven by feelings of ownership over the prosthetic hand.

Study 2

As noted in the main text, we adapted the 10 items that loaded onto Longo et al.'s (2008) "embodiment" factor to assess the degree to which participants experienced the body-swap illusion. Consistent with Study 1, we calculated ownership (mean of items 1-5 in Table S2), location (mean of items 6-8 in Table S2), and agency (mean of items 9-10 in Table S2) scores to examine if SCC was associated with a particular aspect of embodiment in the body-swap illusion.

Of note, although the embodiment factor was the focus of the present investigation, in Study 2 participants also completed adapted versions the other questionnaire factors identified by Longo and colleagues (2008) that assess different aspects of the illusion experience. Specifically, the "loss of own body" component reflects feelings of loss of agency over one's own body (items 11-15 in Table S2, e.g., "It seemed like my body had disappeared"), the "movement" component assesses feelings of the two bodies moving towards each other (items 16-18 in Table S2, e.g., "It seemed like the body I saw was moving towards my body"), and, finally the "affect" component measures the extent to which the experience of the body-swap illusion was enjoyable and interesting (items 19-21 in Table S2, e.g., "I found that experience interesting"). The mean of items for each component served as the index for that aspect of the illusion. We conducted additional exploratory correlation analyses to examine if, in addition to embodiment, SCC was associated with other aspects of the body-swap experience.

Results of the correlation analyses are presented in Table S4. Consistent with Study 1, SCC was significantly negatively related to the ownership aspect of embodiment indicating that low SCC individuals had a stronger impression that the confederate's body belonged to them. SCC was also significantly negatively related to agency suggesting that people with low SCC were more likely to feel as though they had control over the confederate's body. Although body ownership is necessary for feelings of agency (there can be no authorship of movement without owning a body), research also shows that feelings of agency enhance feelings of ownership (Tsakiris et al., 2007). This latter observation may account for the stronger association between SCC and body ownership in Study 2 (b = -0.34) compared to Study 1 (b = -0.48). Taken together, these results suggest that low SCC individuals have more malleable body ownership and agency, two fundamental aspects of the bodily self (Gallagher, 2000).

Interestingly, SCC was also related to the loss of own body component. This suggests that, in addition to being more susceptible to experiencing changes in feelings about the confederate's body (i.e., body ownership and agency aspects), low SCC individuals were also more prone to changes in feelings about their own body. In fact, this result suggests that, for low SCC people, the confederate's body did not simply become incorporated into their own body, but instead displaced their own body in some sense. Finally, SCC was associated with movement scores suggesting that individuals with a less clear sense of self are more likely to perceive the two bodies as moving towards each other. This is consistent with the observation that individuals
that experience a stronger subjective embodiment of the prosthetic hand in the RHI also experience a "proprioceptive drift"—participants tend to misperceive the felt location of their own hand toward the prosthetic hand (Longo et al., 2008).

Discussion

In sum, our results suggest that the association between SCC and embodiment is driven by body ownership and, in Study 2, agency. In Study 1, we observed that low SCC individuals were more susceptible to feelings of ownership over the prosthetic hand following asynchronous stroking. In Study 2, this effect was conceptually replicated with low SCC people being more susceptible to feelings of ownership over the confederate's body. In addition, low SCC was also associated with increased feelings of agency during the body-swap illusion. These findings imply that a more flexible sense of body ownership and sense of agency, two critical aspects structuring the bodily self (Gallagher, 2000), underpin low SCC people's more malleable bodily self.

Of note, although low SCC individuals were more likely to experience feelings of agency in the body-swap illusion in Study 2, in Study 1, there was no association between SCC and agency over the prosthetic hand in the asynchronous condition. This pattern of results makes sense given the paradigms of these two bodily illusions and the underlying processes thought to give rise to the sense of body ownership versus the sense of agency. As explained in the main text, multisensory integration processes are sufficient to induce a sense of body ownership (Ehrsson, 2012; Kilteni, Maselli, Kording, & Slater, 2015); however, the sense of agency is dependent on a match between the expected sensory consequences of an action and the actual sensory consequences of an action (Frith, Blakemore, & Wolpert, 2000) and/or a match between the intention to act and the perception of action goals (Wegner, Sparrow, & Winerman, 2004). In other words, feelings of agency rely on action whereas feelings of body ownership do not. Thus, in Study 1, it follows that SCC was unrelated to feelings of control over the prosthetic hand given that the participant's hand and the prosthetic hand remained immobile. By contrast, in Study 2, because the body-swap illusion relies, at least in part, on the matching of movements between the participant and confederate, it is not surprising that SCC was associated with perceptions of control over the confederate's body (i.e., sense of agency). Moreover, these results are consistent with work showing that the sense of body ownership and the sense of agency are dissociable aspects of the bodily self (Kalckert & Ehrsson, 2012).

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Descriptive statistics for Rubber Hand Illusion Embodiment Questionnaire items.

	Synchronous			Asynchronous		
Item ("It seemed like")	Median	Mean	SD	Median	Mean	SD
1. I was looking directly at my own hand, rather than at a rubber hand. (O)	5	3.79	2.28	2	2.73	1.89
2. The rubber hand was part of my body.(O)	5	4.04	2.07	2	2.61	1.58
3. the rubber hand belonged to me. (O)	5	3.99	1.99	2	2.49	1.58
4. the rubber hand was my hand. (O)	5	4.10	2.14	2	2.43	1.68
5. the rubber hand began to resemble my real hand. (O)	5	4.68	1.84	3	3.25	1.75
6. my hand was in the location where the rubber hand was. (L)	4	3.81	1.96	2	2.85	1.67
7. the rubber hand was in the location where my hand was. (L)	3	3.39	1.98	2	2.50	1.53
8. the touch I felt was caused by the paintbrush touching the rubber hand (L).	5	4.15	2.08	2	2.64	1.79
9. I could have moved the rubber hand if I had wanted. (A)	3	3.19	1.93	2	2.28	1.53
10. I was in control of the rubber hand.	3	2.93	1.84	2	1.98	1.21

Note: O = Ownership item; L = Location item; A = Agency item

Descriptive statistics for Body-Swap Embodiment Questionnaire items.

Item ("It seemed like")	Longo et al. (2008) Dimension	Median	Mean	SD
1. I was looking directly at my own body, rather than at someone else's body.	Embodiment (Ownership)	5	4.09	1.71
2. The body I saw began to resemble my real body.	Embodiment (Ownership)	5	4.41	1.67
3. The body I saw belonged to me.	Embodiment (Ownership)	5	4.21	1.49
4. The body I saw was my body.	Embodiment (Ownership)	4	4.06	1.52
5. The body parts I saw were part of my body.	Embodiment (Ownership)	5	4.94	1.28
6. My body was in the location where the body I saw was.	Embodiment (Location)	5	4.85	1.74
7. The body I saw was in the location where my body was.	Embodiment (Location)	5	5.00	1.71
8. The touch I felt was caused by the objects touching the body I saw.	Embodiment (Location)	5	4.32	1.65
9. I could have moved the body I saw if I had wanted.	Embodiment (Agency)	4	3.77	1.62
10. I was in control of the body I saw.	Embodiment (Agency)	3	3.27	1.56
11. I was unable to move my body.	Loss of own hand	2.5	2.34	1.93
12. I could have moved my body if I had wanted.	Loss of own hand	5	4.94	1.43
13. I couldn't really tell where my body was.	Loss of own hand	4	3.65	2.12
14. My body had disappeared.	Loss of own hand	2	2.74	2.18
15. My body was out of my control.	Loss of own hand	3	2.77	1.99
16. My body was moving towards the body I saw.	Movement	3	2.85	1.79
17. The body I saw was moving towards my body.	Movement	3	2.74	1.69
18. I had two bodies.	Movement	1.5	2.32	2.21
19. I found that experience enjoyable.	Affect	6	5.41	1.31
20. I found that experience interesting.	Affect	7	6.53	0.75
21. The touch of the objects in my hands was pleasant.	Affect	5	5.12	1.27

Scale psychometrics and correlation analyses between self-concept clarity and embodiment sub-

Subscale	ω	r	р
embodiment	0.93	24	0.023
ownership	0.94	28	0.013
location	0.77	22	0.055
agency	0.78	10	0.401

components in the asynchronous condition of the rubber hand illusion in Study 1.

Scale psychometrics and correlation analyses between self-concept clarity and each Body-Swap

Subscale	ω	r	p-value
embodiment	0.91	472	0.005
ownership	0.96	436	0.010
location	0.99	192	0.275
agency	0.98	460	0.006
loss	0.95	534	0.001
movement	0.99	496	0.003
affect	0.94	260	0.138

Embodiment Questionnaire subscale in Study 2.