

What are They Thinking? Examining Complex Links among Social Withdrawal,
Maladaptive Cognitions, and Internalizing Problems in Children and Emerging Adults

by

Laura L. Ooi

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Abstract

The aim of this doctoral dissertation was to examine a conceptual model linking social withdrawal, maladaptive cognitions, and internalizing difficulties in childhood and emerging adulthood. In Studies 1 and 2, undergraduate students (Study 1: $N = 451$, $M_{\text{age}} = 19.17$, $SD = 1.40$; Study 2: $N = 540$, $M_{\text{age}} = 19.20$, $SD = 1.49$) completed assessments of social withdrawal (shyness, unsociability, social avoidance), maladaptive cognitions (threatening and negative cognitions), and internalizing problems (social anxiety, depressive symptoms). For both samples, results from structural equation modeling suggested partial specificity in the cognitive content associated with internalizing problems. Specifically, whereas threatening cognitions were positively associated with both social anxiety and depressive symptoms, negative cognitions were only positively associated with depressive symptoms. Differences in the social, cognitive, and emotional implications of social withdrawal subtypes also emerged across studies. In Study 1, results suggested that maladaptive cognitions played a mediating role in the links between shyness (but not social avoidance) and internalizing problems. In a conceptual replication of Study 1, results from Study 2 indicated that threatening cognitions mediated the effects of both shyness and social avoidance on social anxiety and depression; however, shyness and social avoidance only displayed indirect effects on depressive symptoms via negative cognitions. The goal of Study 3 was to explore whether a similar model linking withdrawal, peer relations, social cognitions, and internalizing problems could be applied to a sample of early elementary school-aged children ($N = 408$ children, $M_{\text{age}} = 7.10$ years, $SD = .86$). During individual interviews, children completed assessments of their social cognitions (rejection sensitivity, negative

social information processing), and parents provided assessments of children's socially withdrawn behaviours, socio-emotional functioning, and peer relations. Among the results, peer problems (but not social cognitions) emerged as a significant mediator in the associations between both shyness and social avoidance and internalizing problems.

Results are discussed in the terms of the meaning, as well as the social, emotional, and cognitive implications of different subtypes of social withdrawal at different developmental periods. Future directions and potential implications for intervention and prevention development are also discussed.

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What are They Thinking? Examining Complex Links among Social Withdrawal, Maladaptive Cognitions, and Internalizing Problems in Children and Emerging Adults

From a very early age, children spend the majority of their waking time in the company of peers (Ladd & Golter, 1988; Larson & Richards, 1991). It has long been argued that peer interaction is both beneficial and necessary for healthy cognitive, social, and emotional development (e.g., Cooley, 1902; Mead, 1934; Piaget, 1932; Sullivan, 1953). Consequently, it has been suggested that children who *withdraw* themselves from the peer group may miss out on unique opportunities to develop important interpersonal and social-cognitive skills (Asendorpf, 1990). Indeed, findings from a number of studies suggest that, from early childhood through to early adulthood, socially withdrawn youth are concurrently and predictively at increased risk for a number of negative adjustment difficulties (Coplan & Ooi, 2014; Karevold, Ystrøm, Coplan, Sanson, & Mathiesen, 2012; Nelson, 2013). For example, in comparison to their more sociable counterparts, socially withdrawn youth often report higher rates of peer rejection, victimization, and lower friendship quality (Nelson, 2013; Rubin, Wojslawowicz, Rose-Krasnor, Booth-LaForce, & Burgess, 2006). Socially withdrawn children are less likely to initiate social interactions and are more frequently rebuffed by peers when they do try to meet their social goals (Chen, DeSouza, Chen, & Wang, 2006). Perhaps most importantly, socially withdrawn children are at increased risk for concurrent and subsequent internalizing difficulties (Coplan, Ooi, & Rose-Krasnor, 2015; Katz, Conway, Hammen, Brennan, & Najman, 2011), which in turn pose a greater risk for developing more serious mental health difficulties, such as anxiety and depression (Zahn-Waxler, Klimes-Dougan, & Slattery, 2000).

However, there is considerable variability in these outcomes: not all (and indeed, only a minority of) socially withdrawn children go on to develop more severe socio-emotional difficulties. Moreover, there remains considerable variability in the trajectories of socially withdrawn youth (Oh et al., 2008). In the past, inconsistencies in definitions and assessments of social withdrawal have made it difficult to compare findings across the literature (Rubin, Coplan, & Bowker, 2009). For example, many studies have defined social withdrawal as a unidimensional phenomenon (e.g., Katz et al., 2011; Kingery, Erdley, Marshall, Whitaker, & Reuter, 2010; Schneider, 1998; Wichmann, Coplan, & Daniels, 2004); however, it has long been argued that social withdrawal should be conceptualized as a multi-dimensional construct (Asendorpf, 1990).

Findings from more recent work suggest that there may indeed be a number of reasons why individuals withdraw from the peer group (Coplan, Ooi, & Nocita, 2015). Importantly, withdrawal characterized by different social motivational substrates appear to be differentially associated with socio-emotional adjustment (Coplan, Ooi, & Baldwin, 2018; Coplan, Ooi, Xiao, & Rose-Krasnor, 2018; Coplan et al., 2013; Nelson, 2013). For example, whereas *unsociability* (i.e., a non-fearful preference for solitude) appears to be a relatively benign form of withdrawal, *shyness* is associated with socio-emotional maladjustment, including heightened feelings of social anxiety. *Social avoidance* appears to be associated with the most pervasive socio-emotional difficulties, and may be uniquely linked to symptoms of depression (Coplan & Armer, 2007; Coplan, Ooi, Xiao, et al., 2018; Coplan et al., 2013). As such, it is important to identify the possible mechanisms through which subtypes of socially withdrawn youth may (or may not) develop internalizing problems.

Theories of the etiology of internalizing problems (particularly anxiety and depression) from the extant clinical literature have primarily focused on the effects of maladaptive cognitive processes (e.g., Beck, 1976; Beck & Emery, 1985; Clark & Wells, 1995; Kendall, 1985; Rapee & Heimberg, 1997). For instance, it has been well established that systematic errors in cognitions (i.e., cognitive biases) play a central role in the development and maintenance of internalizing problems (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & Ijzendoorn, 2007; Gladstone & Kaslow, 1995). As such, it is plausible to suspect that maladaptive cognitions may also help to explain the commonly observed link between social withdrawal and internalizing problems. Despite this, examination of the associations between social withdrawal and cognitions remains grossly under-explored, particularly in childhood. Notwithstanding, there is some evidence to suggest that withdrawn children are not only generally more likely to display maladaptive cognitive styles (e.g., Harrist, Zaia, Bates, Dodge, & Pettit, 1997; Weeks, Ooi, & Coplan, 2016; Wichmann et al., 2004), but some subtypes of withdrawn children may exhibit greater cognitive errors than others (Coplan et al., 2013). Thus, maladaptive cognitions may be important in clarifying the link between subtypes of social withdrawal and internalizing problems. Specifically, it may be that cognitive styles account for (i.e., mediate) the associations between subtypes of social withdrawal and internalizing problems. In this regard, maladaptive cognitions act as part of a causal pathway from some subtypes of social withdrawal to internalizing problems, such as social anxiety and depression.

Although both anxiety and depressive symptoms are highly prevalent by early adulthood (Bittner et al., 2007; Kessler, Avenevoli, & Ries Merikangas, 2001), they also

appear to display decidedly different cognitive and emotional features (Ambrose & Rholes, 1993; Schniering & Rapee, 2004). Given that subtypes of social withdrawal appear to be differentially associated with internalizing problems (Coplan, Ooi, Xiao, et al., 2018), it is possible that the specific cognitive features uniquely associated with anxiety and depression might have an impact on the proposed mediated pathway. For example, it may be that shy youth become anxious mainly due to maladaptive cognitive patterns implicated in models of anxiety (Weeks et al., 2016). In contrast, depressive-related cognitions may be an explanatory mechanism through which social avoidance leads to depression.

Thus, the primary purpose of this dissertation was to examine a conceptual model that would help account for the potentially complex inter-associations among subtypes of social withdrawal, maladaptive cognitions, and internalizing problems. The proposed conceptual model depicts a developmental progression from social withdrawal, to cognitive risks, to the emergence of internalizing difficulties. Three studies were conducted to address various research questions and gaps in the literature. In Studies 1 and 2, the direct and indirect links between subtypes of social withdrawal (i.e., shyness, unsociability, social avoidance), maladaptive cognitions (i.e., threatening and negative cognitions), and internalizing problems (i.e., social anxiety, depressive symptoms) were explored in two samples of emerging adults (i.e., undergraduate students). Since we know very little about the predictors and implications of social cognitions of younger children, the aim of Study 3 was to assess the proposed associations in a sample of early school-aged children, while incorporating an additional pertinent developmental factor (i.e., peer problems) into the model. Both developmental periods were specifically selected as they

coincide with important transition periods of social and emotional development.

In the general introduction, a theoretical framework for the research is presented. First, the concept of social withdrawal is introduced, followed by a review of the available theoretical and empirical research on the subtypes of social withdrawal. Next, the concepts of social cognitions and cognitive biases are presented, drawing upon developmental and clinical perspectives. In particular, cognitive models of social anxiety and depression are reviewed, along with theoretical and empirical evidence to support Beck's (1976) *cognitive content specificity hypothesis*, which asserts that anxiety and depression have distinct cognitive correlates. Finally, evidence linking the withdrawal, cognitive, and clinical literatures is reviewed in order to support the proposed mediated model. In Study 3, a review of the relevant social, cognitive, and emotional theories and empirical findings from the childhood literature is presented, with a focus on the role of negative peer relations. Interpretations, limitations, and future directions are reviewed following each study, with a General Discussion of the research provided at the end.

Conceptual Models of Social Withdrawal

Social withdrawal is defined as the process of removing oneself from opportunities to interact with peers (Rubin et al., 2009). Not to be confused with those who are alone because they are rejected or excluded by others (a process sometimes referred to as *active isolation*; Rubin & Asendorpf, 1993), socially withdrawn youth *choose* to be alone when in the company of potential playmates. Although initially conceptualized as a unidimensional construct, it is becoming increasingly apparent that individuals may withdraw from the peer group for a number of reasons (Coplan, Ooi, & Nocita, 2015). Accordingly, researchers have since begun to consider different factors

that may underlie children's socially withdrawn behaviours (e.g., Kim, Rapee, Oh, & Moon, 2008) from a number of different perspectives (e.g., psychopathological, developmental, biological, environmental) (Coplan & Armer, 2007). In this dissertation, motivational and temperamental models are drawn upon to describe processes underlying socially withdrawn behaviour.

Social approach-avoidance motivations. Gray (1972) proposed two general motivational systems that underlie all behaviour: (a) the behavioural activation system (BAS; see Appendix Q for Abbreviations List), which is thought to regulate appetitive motives by moving towards something desirable; and (b) the behavioural inhibition system (BIS), which is thought to regulate aversive motives by moving away from unpleasant stimuli. Drawing upon this theory, Asendorpf (1990, 1993) proposed a similar conceptual model describing different *social* motivations (and related psychosocial outcomes) for children. He proposed that distinct patterns of social behaviour can be differentiated based on two dimensions of motivational tendencies. Whereas *social approach motivations* increase the tendency to approach others due to a dispositional orientation towards potentially positive social incentives, *social avoidance motivations* decrease the tendency to approach others due to a desire to avoid negative or fearful social outcomes (Nikitin & Schoch, 2014).

From this model, Asendorpf (1990, 1993) identified four social behavioural profiles. For example, children high on approach and low on avoidance motivations were classified as *sociable*, and were postulated to be outgoing and socially competent. The remaining three profiles were classified as resulting in socially withdrawn behaviours, predominantly due to either low approach or high avoidance motivations. These

conceptual subtypes of withdrawal were labeled: *shyness*, *unsociability*, and *social avoidance*. Furthermore, Asendorpf (1990, 1993) posited that each subtype would be associated with unique social-cognitive, emotional, and behavioural patterns. This model has since been widely accepted as an underlying organizational blueprint for conceptualizing subtypes of social withdrawal, and has led to a large increase in empirical studies over the last two decades. Moreover, although originally developed as a model of childhood social behaviour, researchers have begun to apply Asendorpf's model to adolescents and emerging adults (e.g., Bowker, Stotsky, & Etkin, 2017; Bowker & Raja, 2011; Nelson, 2013; Nelson, Coyne, Howard, & Clifford., 2016). Accordingly, this has resulted in the development of several new assessment tools designed to measure subtypes of social withdrawal across childhood and into emerging adulthood in recent years (e.g., Bowker & Raja, 2011; Bowker et al., 2017; Coplan, Ooi, Xiao, et al., 2018; Coplan, Prakash, O'Neil, & Armer, 2004; Kim et al., 2008; Nelson, 2013). Nonetheless, there remains much to be understood about the predictors, correlates, and outcomes of the subtypes of social withdrawal, particularly social avoidance.

Temperament. Some researchers have conceptualized subtypes of social withdrawal as the behavioural expressions of certain temperamental dispositions (e.g., Fox, Henderson, Marshall, Nichols, & Ghera, 2005). Indeed, Asendorpf (1990, 1993) drew upon the temperament literature in describing the distinct subtypes of social withdrawal. As such, examination of the temperament literature may support and strengthen our understanding of withdrawal as a multi-dimensional construct.

Temperament has been described as encompassing individual differences in behaviour, affect, reactivity, and attention in response to unfamiliar situations (Sanson, Hemphill,

Yagmurlu, & McClowry, 2011). These emotional and behavioural tendencies can be identified in early infancy and are fairly stable across development (Fox, 2004).

Moreover, temperament has been found to play an influential role in the development of adult personality, and appears to have important implications for behavioural and emotional adjustment (Berdan, Keane, & Calkins, 2008; Brumariu & Kerns, 2013; Dougherty et al., 2011).

There is growing evidence to suggest that temperamental characteristics may serve as *biologically-based* precursors to the display of different patterns of social behaviour (Evans, Nelson, & Porter, 2012; see Sanson, Hemphill, & Smart, 2004 for a review). For example, researchers have identified the short allele serotonin transporter 5-HTTLPR as a genetic risk marker for specific temperamental dispositions in childhood (i.e., behavioural inhibition and negative emotionality) (e.g., Burkhouse, Gibb, Coles, Knopik, & McGeary, 2011). Moreover, physiological mechanisms of emotion regulation associated with temperament appear to play an important role in children's motivations to interact with or withdraw from others (Hane, Fox, Henderson, & Marshall, 2008; Henderson, Marshall, Fox, & Rubin, 2004). For instance, children's temperamental dispositions may influence the types of environments they seek, how they experience them, and how others respond to them. In turn, these behaviours may result in a transactional model wherein children interact with others in ways that perpetuate a cycle of (mal)adjustment (Spinrad et al., 2004).

Although numerous interpretations of temperament have been proposed (e.g., Kagan, Reznick, Clarke, Snidman, & Garcia-Coll, 1984; Rothbart & Derryberry, 1981; Thomas, Chess, & Birch, 1968), most models include dimensions that tap into emotion

regulation/reactivity and emotionality/affect. There are three related dimensions of temperament that appear to be particularly relevant to our understanding of children's socially withdrawn behaviours. First, behavioural inhibition (BI) refers to a heightened sensitivity (or reactivity) towards *novel* situations and stimuli (Kagan, Reznick, & Snidman, 1988). Individuals who are overly sensitive to unfamiliar circumstances may try to avoid or retreat from potentially anxiety-inducing situations. Second, negative emotionality is a temperamental (or affective) sensitivity to *negative* stimuli (Clark, Watson, & Mineka, 1994). Children who are hyper-aware of threatening or negative stimuli may experience distress, and in turn try to escape or avoid potential danger. Finally, positive affect is defined as the tendency to experience positive moods, and to seek out and enjoy rewards, particularly of the social nature (Hayden, Klein, Durbin, & Olino, 2006). As such, individuals *low* on positive affect may not be motivated to seek out potentially rewarding social interactions. Thus, it appears that these particular temperamental traits may have direct implications on an individual's motivations to approach or withdraw from the peer group.

Subtypes of Social Withdrawal

The three subtypes of social withdrawal conceptualized by Asendorpf (1990) have received varying amounts of empirical attention in the last 25 years. Of note, some researchers have included actively rejected/isolated youth as an additional subtype of socially withdrawn children (e.g., Bowker & Raja, 2011; Harrist et al., 1997; Kim et al., 2008; Nelson, 2013; Rubin & Mills, 1988). Rejected youth do tend to spend more time alone – and those who withdraw themselves from the peer group may also come to be rejected or victimized (Bernstein & Watson, 1997). Thus, the association between peer

rejection and social withdrawal is likely to be reciprocal (Rubin et al., 2009). However, as previously mentioned, children and adolescents who are alone because they are actively isolated or rejected are not socially withdrawn per se, because their solitude is driven by external sources (i.e., being rejected by peers) rather than internal sources (i.e., removing themselves from the peer group) (Asendorpf, 1993; Gazelle & Ladd, 2003). Moreover, it has been well established that there are many other groups of children who are at risk for peer rejection for several different reasons (e.g., aggression, hyperactivity) (Beran, 2008; Bernstein & Watson, 1997; Ladd, 2006). As such, although *some* children may be isolated because they engage in withdrawn behaviours, children who are isolated by peers likely form a heterogeneous group. Thus, children who spend more time alone due to isolation from their peers will not be primarily conceptualized as withdrawn. In the following sections, more detailed descriptions of the social, behavioural, and temperamental characteristics of the three distinct subtypes of social withdrawal are provided, along with a review of the existing empirical findings from childhood through to emerging adulthood.

Shyness. *Shyness* is the most often studied form of withdrawal, and can be defined as wariness in the face of social novelty, and/or feelings of unease in situations of perceived evaluation (Asendorpf, 1991; Cheek & Buss, 1981; Crozier, 1995). According to Asendorpf (1990, 1993), shy children are caught in an approach-avoidance conflict, wherein they want to play with their peers (i.e., high approach motivation) but are simultaneously inhibited by fear and anxiety (i.e., high avoidance motivation). As such, shy youth are often quiet and wary in social contexts, and rarely initiate social interactions (Burgess & Younger, 2006; Rubin et al., 2009). There is substantial

empirical evidence to support this conceptualization of shyness. For example, shy children have been observed to frequently engage in reticent behaviours (e.g., hovering/on-looking near peers without actually joining in), even among familiar peers (Coplan et al., 2004). This behaviour suggests that although they are interested in what their peers are doing, they are refraining from approaching them. Thus, although the term ‘shyness’ has frequently been used colloquially to represent inhibited behaviours in the presence of strangers (i.e., unfamiliar others), Asendorpf’s (1990) conceptualization suggests that feelings of distress or social evaluative concerns can lead to withdrawn behaviours in the presence of both unfamiliar and familiar peers (sometimes referred to as ‘*anxious-solitude*’) (Gazelle & Ladd, 2003; Gazelle & Rubin, 2010).

There is also evidence to suggest that there may be temperamental markers of shyness. For example, a temperamental trait that has been well documented as being associated with shyness is BI. As previously mentioned, BI refers to a biologically based heightened sensitivity towards novel situations (Kagan et al., 1988). Whereas BI refers to a more global fearful approach to novel situations, shyness emphasizes wariness specifically in *social* contexts. Despite being distinct constructs, there is significant empirical evidence to suggest that BI and shyness are conceptually similar (Asendorpf, 1991; Kagan et al., 1988). For example, behaviourally inhibited children have been described as being quiet, watchful, fearful, and withdrawn in the face of novelty (Kagan et al., 1984). Moreover, observations of behaviourally inhibited children indicate that they frequently engage in shy and withdrawn behaviours in unfamiliar social situations (Kagan, 1997; Kagan et al., 1984). Thus, although BI has generally been linked to social withdrawal, it has been described as involving patterns of behaviour particularly

consistent with shy approach-avoidance motivations (e.g., Coplan, DeBow, Schneider, & Graham, 2009; Hirshfeld-Becker et al., 2007).

Behaviourally inhibited children tend to display patterns of physiology similar to those involved in fear systems, such as elevated salivary cortisol (Schmidt et al., 1997) and heightened startle responses (Schmidt & Fox, 1998). There is also evidence that right frontal EEG asymmetry in early childhood may be predictive of lower emotion regulation and heart rate patterns consistent with an inhibited temperament during stressful situations (Hannesdóttir, Doxie, Bell, Ollendick, & Wolfe, 2010). Moreover, patterns of EEG activity associated with BI have been identified in shy adults (Schmidt & Fox, 1994). Taken together, it has been hypothesized that these characteristics combine to result in hyper-reactivity towards novel and stressful situations (Schmidt et al., 1997). Indeed, findings from the BI literature are largely consistent with those from the shyness research, supporting the notion that BI may be a biological precursor of shyness. For example, BI is associated with peer difficulties, such as isolation, victimization, and having fewer friends (Fox, 2004). BI has also been identified as a strong predictor of anxiety in childhood and adulthood (Clauss & Blackford, 2012).

Another temperamental trait associated with shyness is negative emotionality (or negative affectivity). There is evidence to suggest that reticent-withdrawn behaviours are positively associated with negative emotions (Coplan & Rubin, 1998). Indeed, shyness has been found to be associated with negative emotionality (e.g., Coplan, Ooi, Xiao, et al., 2018; Coplan et al., 2004; Coplan et al., 2013). Moreover, it has been argued that high avoidance-motivated individuals are susceptible to elevated levels of negative affect (Nikitin & Freund, 2008).

Correlates and outcomes. Most shy children do not display severe maladjustment; however, there is a substantial body of research that suggests that a subgroup of extremely shy children may be concurrently and predictively at risk for a number of adjustment difficulties beginning in early childhood and continuing into adulthood. For example, shy children appear to have difficulty adjusting to the school environment, perhaps due to the presence of numerous social demands (e.g., large peer group, verbal participation, group activities) (Coplan & Arbeau, 2008; Coplan, Arbeau, & Armer, 2008; Rubin et al., 2009). Moreover, there is evidence to suggest that shyness is associated with lower school liking (Coplan & Weeks, 2010) and school competence (Hughes & Coplan, 2010; Crozier, 1995).

It should come as no surprise that shy children's tendency to spend relatively less time with peers appears to have negative implications for social relationships and competence. For instance, in their study examining young withdrawn children, Coplan and colleagues (2004) reported that shy children were observed to make fewer initiations towards peers, and to engage in more reticent and parallel play (i.e., non-interactive play). Moreover, shyness was positively associated with anxious and asocial behaviours in the presence of peers, and negatively associated with prosocial behaviours.

In addition to deficits in social skills, shyness throughout childhood and adolescence is positively associated with peer rejection, exclusion, and victimization (Gazelle & Druhen, 2009; Gazelle & Ladd, 2003; Perren & Alsaker, 2006; See Study 3 for a more detailed review of the peer relations of socially withdrawn children). Although shy youth tend to have fewer friends than their comparison peers (e.g., Ladd, Kochenderfer-Ladd, Eggum, Kochel, & McConnell, 2011), there is evidence to suggest

that shy children do not differ with regards to the likelihood of having mutual friendships (Ladd & Burgess, 1999), or best friendships (Rubin et al., 2006). However, the friends of shy youth tend to be similarly withdrawn, and their relationships tend to be of poorer quality than their comparison peers (Nelson, 2013; Nelson et al., 2008; Rubin et al., 2006). Not surprisingly, shy individuals also often report greater loneliness and social dissatisfaction (Bowker & Raja, 2011; Findlay, Coplan, & Bowker, 2009; Jackson, Fritch, Nagasaka, & Gunderson, 2002).

The most prominently researched area of shyness has focused on the development of more severe socio-emotional difficulties, particularly along the internalizing dimension. Across developmental periods, shyness has consistently been found to be concurrently and predictively associated with internalizing problems, including feelings of loneliness, lower well-being, and emotion dysregulation (e.g., Bowker & Raja, 2011; Coplan et al., 2004; Findlay et al., 2009; Nelson, 2013; Nelson et al., 2008; Sette, Zava, Baumgartner, Baiocco, & Coplan, 2017). Moreover, shyness has been widely found to be a contributing factor in the subsequent development of more serious mental health difficulties, including both clinical and subclinical symptoms of social anxiety and depression (e.g., Chronis-Tuscano et al., 2009; Essex et al., 2009; Goodwin, Fergusson, & Horwood, 2004; Hirshfeld-Becker et al., 2007; Volbrecht & Goldsmith, 2010). Thus, although many socially wary children go on to be well adjusted, there appears to be at least a subset of at-risk children who display fear and wariness in social settings who may benefit from support and/or intervention in childhood. However, social fear may be only one of the reasons why children withdraw from the peer group.

Unsociability. A second subtype of withdrawal has been referred to as *unsociability* (Asendorpf, 1990), or social disinterest (Coplan et al., 2004). This form of withdrawal is characterized by a non-fearful, intrinsic motivation for spending time alone, and shares conceptual overlap with other constructs such as affinity for aloneness (Goossens, 2014), solitropic orientation (Leary, Herbst, & McCrary, 2003), and preference for solitude (Burger, 1995). Unlike shyness, unsociability is not driven by fear of social situations (Coplan, Ooi, & Baldwin, 2018), and unsociable youth may very well accept invitations from others when presented with an “attractive offer”. As such, it has been postulated that unsociable children simply tend to prefer object play over social play, particularly in early childhood (Asendorpf, 1990). Indeed, unsociable preschoolers have been observed to initiate fewer social interactions (Coplan et al., 2004) and report higher ratings of preference for solitary activities (Coplan, Ooi, Rose-Krasnor, & Nocita, 2014; Sette et al., 2017). Accordingly, unsociability is characterized by low approach and low avoidance motivations. In support of this conceptualization, Coplan and colleagues (2004) reported that both shy and unsociable children were rated as engaging in more asocial (i.e., withdrawn) behaviours; however, unlike their shy counterparts, unsociable children were not more likely to display reticent or anxious behaviours in the presence of peers. Similarly, in a recent study of 4- to 7-year-olds, Ooi, Baldwin, Coplan, and Rose-Krasnor (2018) reported that a preference for solitary activities was significantly and positively associated with asocial but not anxious behaviours with peers. Moreover, unsociability has been found to be negatively associated with BAS (i.e., approach motivations), but not BIS (i.e., avoidance motivations), in emerging adulthood (Bowker

et al., 2017), further supporting the notion that unsociable individuals neither seek nor actively avoid social interaction.

As compared to shyness, the literature examining the links between unsociability and temperament is rather limited. Notwithstanding, there is some evidence that serves to further differentiate unsociability from shyness. For example, there is preliminary evidence to suggest that unsociability is not associated (Coplan, Ooi, Xiao, et al., 2018) or negatively associated with negative emotionality in childhood (Coplan et al., 2004). Furthermore, in emerging adulthood, low sociability has been found to be unrelated to negative emotionality, and associated with low positive emotional intensity and low physiological reactivity (Eisenberg, Fabes, & Murphy, 1995).

Correlates and outcomes. Unsociable youth do not seem to exhibit high levels of distress when playing alone or with the peer group. As such, unsociability appears to be a comparatively benign form of withdrawal, and has been found to be either unrelated or negatively related to indices of internalizing problems in both adults and children (e.g., Coplan, Ooi, Xiao, et al., 2018; Coplan et al., 2004; Coplan & Weeks, 2010; Nelson, 2013; Nelson et al., 2016). For example, in one of the first studies examining differences among subtypes of withdrawn kindergarteners, Harrist et al. (1997) compared the social, emotional, and cognitive functioning of unsociable, passive-anxious (i.e., shy), isolated, and sad/depressed children. Among the results, they found that children in the unsociable group were rated by teachers as being less anxious, timid, self-isolating, and immature than to those in the shy group. Although one might have expected the unsociable group to be more likely to isolate themselves given their preference for solitude, this was not the case, perhaps reflecting the fact that unsociable children are also less likely to turn down

social invitations as compared to their shy peers.

In a more recent study exploring differences between shyness and unsociability among early elementary school-aged children (i.e., grade 2), Coplan and Weeks (2010) reported that unsociable children did not differ from their non-withdrawn comparison peers with regards to socio-emotional adjustment. For example, whereas children in the shy group were rated as having significantly greater internalizing problems, peer problems, and feelings of loneliness, those in the unsociable group did not differ significantly from their non-withdrawn peers. Moreover, unlike their shy peers, unsociable children did not report lower school liking than their comparison peers. Thus, aside from a greater tendency to spend time alone, unsociable children appear to be better adjusted than their shy peers.

Recent studies have yielded similar patterns of associations with regard to socio-emotional functioning in adolescents and adults. For example, Bowker and Raja (2011) reported that unsociability was not significantly associated with verbal reticence, sad affect, or loneliness in their sample of adolescents from India. Similarly, Barry, Nelson, and Christofferson (2013) reported that, as compared to their shy counterparts, *asocial* emerging adults (described as withdrawing for non-fearful motivations) exhibited better levels of adjustment, including higher ratings of religious faith, identity development, and indices of relationship quality. Most notably, unsociability does not appear to pose particular risk for emotional maladjustment. For example, Nelson (2013) reported that, unlike shyness and social avoidance, unsociability in emerging adulthood was not significantly associated with self-reported self-esteem, suicidal ideations, or self-regulations. Moreover, unsociability was significantly and negatively associated with fear

of negative evaluation. Together, these findings suggest that although shyness and unsociability both involve the behavioural enactment of withdrawal, these subgroups have decidedly different patterns of association with social and emotional outcomes.

Notwithstanding these findings, there is at least some evidence to suggest that unsociable youth may be at risk for some social difficulties (see Coplan, Ooi, & Baldwin, 2018 for a recent review). It has been argued that withdrawn behaviour (regardless of the underlying motivation) is perceived as non-normative (Rubin & Asendorpf, 1993), and as such, may evoke negative responses from peers. Indeed, there is growing evidence to suggest that the general tendency to withdraw from the peer group has negative implications for peer relationships (Coplan et al., 2013; Ooi et al., 2018). In support of this postulation, unsociability has been found to be associated with peer exclusion, victimization, and neglect in childhood and adolescence (Bowker & Raja, 2011; Coplan et al., 2004; Harrist et al., 1997). However, despite the heightened degree of peer rejection, it has been postulated that unsociable children may not be particularly upset by these experiences, and in turn are less affected by the negative behaviours of others (Coplan et al., 2013). Moreover, Bowker and Raja (2011) speculated that because unsociable children do not always turn down social invitations, they may receive a sufficient amount of social interaction to stave off many of the negative outcomes associated with social withdrawal.

Relatedly, Harrist et al. (1997) proposed that unsociable children may not necessarily lack the social skills required to interact with their peers in a competent manner. In support of this, Ladd and colleagues (2011) reported that unsociable children were more likely to have more stable friendships than anxious-solitary (i.e., shy) children.

Additionally, the friends of unsociable children were more accepted by peers than those of shy children. There is also growing evidence to suggest that unsociable adolescents and emerging adults may not experience significant differences in the quantity and quality of social relationships from their non-withdrawn peers (Ladd et al., 2011; Nelson, 2013). Thus, despite postulations that spending more time alone may come at a social cost (Rubin & Asendorpf, 1993), some have stressed the benefits of solitude (e.g., Larson, 1997), particularly when it is voluntary (Chua & Koestner, 2011) and reflective of non-fearful preferences (Hills & Argyle, 2000). As such, it may be that as children (and their peers) develop an appreciation for solitude, choosing to be alone may no longer be perceived as unacceptable behaviour.

Indeed, Coplan, Ooi, and Baldwin (2018) postulated that the social and emotional risks associated with unsociability may vary across developmental periods. Specifically, the authors argued that whereas unsociability may not be particularly problematic in early childhood when solitary play is relatively normative (Coplan et al., 2004), risks associated with removing oneself from the peer group may increase during later childhood and early adolescence when social expectations are heightened. However, such risks may again decrease during late adolescence and into emerging adulthood, when choosing to spend time alone may be viewed as a normative expression of autonomy and independence (Larson, 1997; Larson & Richards, 1991).

In partial support of this model, Kopala-Sibley and Klein (2017) reported that unsociability at age 3 was not associated with concurrent or subsequent internalizing (depressive symptoms, anxiety symptoms) or externalizing difficulties at ages 6 and 9 years. However, unsociability at age 6 was positively associated with symptoms of

anxiety at age 9, suggesting that unsociability in middle-to-late (but not early) childhood might carry at least some risk for maladjustment. Similarly, Wang, Rubin, Laursen, Booth-LaForce, and Rose-Krasnor (2013) reported that preference for solitude was associated with indices of maladjustment in 8th grade, but not in 12th grade, supporting previous assertions that preference for solitude may become less problematic as children move towards later adolescence and early adulthood. However, it should be noted that the measure of preference for solitude used in this study confounds unsociability and social avoidance, and as such, the results must be interpreted with caution. Nevertheless, Bowker et al. (2017) recently provided the first empirical evidence to suggest that unsociability may be associated with benefits in emerging adulthood. Specifically, the authors reported that unsociability demonstrated a significant and positive association with creativity.

Although there is growing evidence to support a model depicting developmental timing effects of unsociability (Coplan, Ooi, & Baldwin, 2018), empirical examination of this construct remains relatively limited. Moreover, it is worth noting that there is at least some evidence that calls this model into question. For example, Nelson (2013) reported that unsociability displayed a modest positive association with depression in a sample of emerging adults. Moreover, extreme group comparisons indicated that unsociable youth reported higher levels of depression (that did not differ from shy and socially avoidant peers) than comparison non-withdrawn emerging adults. In contrast, Nelson et al. (2016) reported that correlation analyses examining the associations between unsociability and depression assessed at two timepoints yielded mixed findings, including significant positive associations as well as non-significant negative associations. Thus, although the

extant literature suggests that unsociability poses less risk for socio-emotional maladjustment as compared to shyness and social avoidance, additional empirical exploration of unsociability across developmental periods is needed.

Social avoidance. Along with shyness and unsociability, Asendorpf (1990, 1993) proposed *social avoidance* as a third potential subtype of withdrawal, conceptualized as a combination of low approach and high avoidance motivations. According to this view, not only do socially avoidant children exhibit a preference for solitude, they also actively seek to avoid social interactions. However, Asendorpf (1990) said little else about what might underlie this particular motivational pattern and, as such, much less is known about social avoidance.

Several reasons for these motivations have since been proposed in the literature. For example, Bowker and Raja (2011) argued that social avoidance in adolescence may be the result of extended exposure to peer exclusion, wherein motivations to interact are diminished due to negative social experiences. Conversely, Schmidt and Fox (1999) speculated that an individual's motivations to approach others are extinguished over time due to feelings of extreme fear and anxiety. Finally, Coplan and Armer (2007) postulated that social avoidance may be an early consequence of the development of depression, which is characterized by persistent mood disturbances involving feelings of sadness and/or loss of interest or pleasure (Cicchetti & Toth, 1998). Although recent empirical examination of social avoidance has yielded at least some evidence to support each of these postulations, arguably the most convincing body of research has supported links between social avoidance and depression. For example, Harrist and colleagues (1997) identified a group of withdrawn children that was characterized by significantly higher

levels of sad/depressed affect as compared to other groups of withdrawn and comparison children. A similar group (described as *low mood*) was also identified in a sample of older adolescents (Kim et al., 2008). Although the profiles of the sad/depressed withdrawn groups in these studies were not theoretically derived from Asendorpf's (1990) model, these findings suggest that there may be a group of withdrawn children who exhibit particularly high levels of depressed affect.

Findings from the temperament literature may also provide insight into the potential links between social avoidance and depression. Similar to shyness, social avoidance appears to be associated with negative emotionality. However, there is evidence to suggest that low positive affect (which is strongly rooted in the depression literature; Clark & Watson, 1991) may also be implicated in the development of social avoidance. For instance, Nikitin and Freund (2008) postulated that those exhibiting low approach and high avoidance motivations would experience both high negative and low positive affect. Given that depressed children have been found to withdraw from the peer group more often than comparison peers (Bell-Dolan, Reaven, Peterson, 1993; Burgess & Younger, 2006), it can be postulated that low positive affect may be predictive of a particular subtype of withdrawn, depressed children. In support of this, Coplan et al. (2013) found that socially avoidant children reported significantly higher levels of depressive symptoms and lower positive affect than their non-withdrawn peers.

Additional support for these postulations comes from Clark and Watson's (1991) *tripartite model*, which suggest that, whereas both anxiety and depression share a general negative affect component, low positive affect is specific to depression, and physiological hyper-arousal is specific to anxiety. Conceptual parallels to this model can be identified

in the developmental literature (Anthony, Lonigan, Hooe, & Phillips, 2002). Specifically, whereas both shyness and social avoidance appear to be linked to negative affect, social avoidance appears to be uniquely linked to low positive affect, whereas shyness is strongly linked to BI (i.e., hyper-arousal) (Clauss & Blackford, 2012; Coplan et al., 2013).

The limited research exploring the temperamental correlates of social avoidance appears to support the proposed theories. For example, in their study examining general motivational systems (i.e., BIS/BAS), Coplan and colleagues (Coplan, Wilson, Frohlick, & Zelenski, 2006) reported that, in comparison to other withdrawn groups, children characterized by high BIS and low BAS (i.e., avoidant children) reported both the highest levels of negative affect and the lowest levels of positive affect. In a subsequent study, Coplan et al. (2013) reported that socially avoidant children reported significantly higher levels of negative affect and lower levels of positive affect than unsociable and comparison children.

A related construct that may shed some light on the temperamental origins of social avoidance is *social anhedonia*, which refers to the reduced capacity to derive pleasure from social interactions (Blanchard, Gangestad, Brown, & Horan, 2000; Troisi, Alcini, Coviello, Croce Nanni, & Siacusano, 2010). Social anhedonia has primarily been studied within a clinical context, particularly in relation to depression and schizophrenia-spectrum disorders (e.g., Blanchard et al., 2000; Blanchard, Horan, & Brown, 2001; Kwapil, 1998; Rey, Jouvent, & Dubal, 2009). However, there is emerging evidence that it may be an identifiable personality trait in non-clinical populations (e.g., Harvey, Pruessner, Czechowska, & Lepage, 2007; Troisi et al., 2010), and more specifically, it

may help identify temperament-related individual differences in social motivations and behaviours (Brown, Silvia, Myin-Germeys, & Kwapil, 2007). For example, Winch, Moberly, and Dickson (2015) found that depression was uniquely characterized by a reduced enjoyment of approach motivations in a sample of undergraduate students.

In another study, Brown and colleagues (2007) examined affect, behaviours, and thoughts in relation to social anhedonia and social anxiety in a sample of undergraduate students. Among the results, the authors reported that social anhedonia was positively associated with increased time alone, preference for solitude, and lower positive affect. In contrast, social anxiety was positively associated with negative affect, but not increased time alone. Of note, social anxiety was only positively associated with a preference to be alone during interactions with unfamiliar people. This may be indicative of their feelings of anxiety in social situations, in contrast to those with higher social anhedonia, who appear to prefer to be alone at all times. In keeping with this, Troisi et al. (2010) reported that higher levels of social anhedonia were associated with avoidant, but not anxious attachment styles in adults.

Drawing upon this literature, it has been postulated that an inability to derive pleasure from social interactions, rather than anxiety or fear, may underlie socially avoidant behaviours (Coplan, Ooi, & Nocita, 2015). In support of this, Bowker et al. (2017) recently reported that social avoidance was negatively associated with BAS (i.e., approach motivations), and positively associated with social anhedonia, after controlling for shared variance with shyness and unsociability in a sample of undergraduate students. Moreover, shyness (but not social avoidance or unsociability) was positively associated with anxiety sensitivity.

Correlates and outcomes. It has long been suggested that socially avoidant children may be at risk for the most pervasive social and emotional difficulties (Asendorpf, 1990). Yet, it is only within the last few years that researchers have begun to directly assess this particular subtype of withdrawal from a social motivational perspective (e.g., Bowker, Markovic, Cogswell, & Raja, 2012; Bowker & Raja, 2011; Bowker et al., 2017; Coplan et al., 2016; Coplan, Ooi, Xiao, et al., 2018; Coplan et al., 2013; Nelson, 2013; Nelson et al., 2016). This recent empirical interest in social avoidance has provided evidence to suggest that social avoidance may indeed carry considerable risks for maladjustment. For example, in support of postulations identifying negative peer experiences as motivating avoidant behaviour (Bowker & Raja, 2011), social avoidance has been found to be associated with social difficulties. Harrist and colleagues (1997) reported that children in the sad/depressed withdrawn group had a relatively high likelihood of rejection in kindergarten, and were disproportionately likely to experience neglect in early elementary school. Coplan et al. (2016) similarly found that socially avoidant 10- to 12-year-old Chinese children were rated by peers as higher on peer victimization and lower in peer preference than their non-withdrawn comparison peers. Similarly, in a sample of adolescents from India, Bowker and Raja (2011) reported that social avoidance uniquely predicted exclusion and loneliness, above and beyond the contributions of shyness and unsociability. Relatedly, Nelson (2013) found that socially avoidant undergraduate students reported significantly lower relationship quality with a best friend than those in the unsociable and control groups, but did not differ significantly from those in the shy group.

There is also evidence to suggest that social avoidance is associated with a wide range of internalizing difficulties. For example, Coplan, Ooi, Xiao, et al. (2018) reported that social avoidance was positively associated with negative emotionality and negatively associated with soothability in a sample of kindergarten and grade one students, suggesting that socially avoidant children may experience elevated emotion dysregulation. In another study, Coplan and colleagues (2013) found that, in comparison to shy and unsociable children, socially avoidant 9- to 12-year-olds reported the most pervasive socio-emotional difficulties, including higher levels of negative emotionality, and social anxiety. Coplan et al. (2016) similarly reported that 10-12-year old Chinese children reported the highest levels of social anxiety and loneliness as compared to their shy, unsociable, and non-withdrawn comparison peers (however, see General Discussion for a review of the role of culture on the study of social withdrawal).

The largest body of empirical evidence has served to support the notion that social avoidance may be uniquely related to depression (Coplan & Armer, 2007). For example, in a study conducted by Kim and colleagues (2008), emerging adults from Australia and Korea were asked to retrospectively report their withdrawn behaviours in high school. In both samples, *low mood* withdrawal displayed the strongest relations with later depression and impaired self-worth. Coplan and colleagues (2006) similarly reported that, as compared to shy, unsociable, and sociable children, avoidant children reported higher ratings of depressive symptoms and lower ratings of subjective well-being. Although *social* motivational systems were not directly assessed in these studies, the findings provide preliminary evidence that children who display avoidant behaviour may be at the greatest risk for psychosocial maladjustment.

Of the limited available studies directly examining social avoidance, the findings provide additional evidence to support previous postulations that social avoidance may be uniquely related to depression. For example, Coplan, Ooi, Xiao, et al. (2018) explored the direct and indirect links between subtypes of social withdrawal, peer problems, and internalizing problems in a sample of 4- to 7-year-olds. Among the results, social avoidance (but not shyness or unsociability) was uniquely and directly associated with depressive symptoms (see Study 3 for a more detailed review of this study).

Among older children and young adolescents, socially avoidant youth have also been found to report higher levels of depression as compared to their shy and unsociable peers (Coplan et al., 2013). Wang et al. (2013) reported that preference for solitude in early adolescence was associated with internalizing difficulties (i.e., anxiety/depression) and lower self-esteem, above and beyond the effects of shyness. Again, it is important to acknowledge that the authors did not distinguish between unsociability and social avoidance. However, their measure of preference for solitude was significantly associated with emotion dysregulation, which is characteristic of social avoidance but not unsociability. As such, it is plausible to suspect that this group was at least partially comprised of socially avoidant youth. Bowker and Raja (2011) similarly reported that social avoidance (but not shyness or unsociability) was positively associated with sad affect in their sample of adolescents.

Nelson (2013) examined the socio-emotional adjustment of withdrawn undergraduate students. Among the results, it was found that socially avoidant adults reported higher ratings of socio-emotional difficulties related to depression (i.e., self-harm, suicidal ideation) as compared to those in the shy, unsociable, and control groups.

Additionally, in comparison to their unsociable and control peers, socially avoidant emerging adults reported lower self-esteem and greater emotion dysregulation. However, in a subsequent study, Nelson and colleagues (2016) reported mixed findings regarding the associations between social avoidance and depression (which were each assessed at two timepoints). Specifically, social avoidance at Time 1 was positively associated with depression at Time 1, but not Time 2. Moreover, social avoidance at Time 2 was not significantly correlated with depression at Time 2. Thus, the associations between social avoidance and depression in emerging adulthood are somewhat unclear.

Notwithstanding, Ding et al. (2018) have provided perhaps the most convincing evidence to suggest that social avoidance may be uniquely related to depression. In their short-term longitudinal study of elementary and middle school-aged children in China, symptoms of depression (but not social anxiety or peer problems) at Time 1 predicted social avoidance nine months later. Although these findings may not necessarily be applicable to Western populations, they provide important insight into the role of depression in the development of social avoidance. Thus, the limited available empirical literature generally supports the notion that social avoidance may carry the greatest risk for psychosocial difficulties (particularly depression) in childhood through to emerging adulthood. However, despite recent interest in this particular subtype of withdrawal, the correlates and outcomes of social avoidance remain under-explored, particularly among early school-aged children.

In summary, both social motivation and temperament theories suggest that social withdrawal should be conceptualized as a multi-dimensional construct. Although all withdrawn children share the common behavioural tendency to remove themselves from

the peer group, the underlying reasons to withdraw (and associated emotional and behavioural outcomes) differ based on whether the desire to interact is thwarted (i.e., as it is for shy individuals), or missing altogether (i.e., as it may be for socially avoidant individuals) (Brown et al., 2007). Subtypes of withdrawal also appear to be uniquely associated with temperamental traits. More specifically, although negative emotionality seems to underlie both shyness and social avoidance, it appears that hyper-arousal is uniquely linked to shyness, whereas low positive affect may be uniquely linked to social avoidance. Conversely, unsociability does not appear to be particularly related to maladaptive temperamental traits. Given that unsociability appears to be a comparatively benign form of withdrawal, this dissertation will primarily focus on the concomitants of shyness and social avoidance. However, it is becoming increasingly apparent that it is important to account for shared variance among the subtypes of social withdrawal in order to identify their potentially unique implications (Coplan, Ooi, & Baldwin, 2018). As such, where appropriate, the correlates and outcomes of unsociability are discussed.

Finally, it is worth noting that there appear to be no gender differences with regards to the overall *prevalence* of social withdrawal in childhood (e.g., Arbeau, Coplan, & Weeks, 2010; Battaglia et al., 2004). There also do not appear to be significant gender differences within the subtypes of social withdrawal (Coplan et al., 2013; Coplan & Weeks, 2010) or in the prevalence of internalizing problems in younger children (Zahn-Waxler et al., 2000; Zahn-Waxler, Shirtcliff, & Marceau, 2008). However, there is increasing evidence to suggest that social withdrawal may be more problematic for boys than for girls (Doey, Coplan, & Kingsbury, 2014). For example, shyness and unsociability have been found to be more strongly associated with various indices of

maladjustment in boys as compared to girls (e.g., Coplan, Gavinski-Molina, Lagacé-Séguin, & Wichmann, 2001; Coplan et al., 2004; Coplan & Weeks, 2010; Stevenson-Hinde & Glover, 1996). It has been suggested that these findings reflect a lower social acceptance of socially withdrawn behaviours among boys due to the violation of stereotypical male gender roles (e.g., assertiveness, dominance; Gazelle & Ladd, 2003; Rubin & Coplan, 2004). Yet, a recent study found that shyness was more strongly associated social anxiety among girls in a sample of older children and adolescents (Tsui, Lahat, & Schmidt, 2017). As such, it is unclear whether gender plays a critical role in the links between social withdrawal and socio-emotional difficulties.

Having distinguished between social withdrawal subtypes and their differential associations with internalizing problems, attention is now turned towards understanding the mechanisms that may underlie, account for, and/or explain these associations. There has been very little previous research specifically examining the unique pathways through which different subtypes of withdrawal may (or may not - in the case of unsociability) become linked with internalizing difficulties (particularly social anxiety and depression) (e.g., Coplan, Ooi, Xiao, et al., 2018).

Anxiety and depressive disorders are among the most prevalent psychiatric disorders affecting youth (Kessler et al., 2001; Kessler et al., 2005; Rapee, Schniering, & Hudson, 2009). They have been shown to have a significant and negative impact on daily functioning, peer relationships, schooling, and quality of life (Beesdo, Knappe, & Pine, 2009; Rose, Carlson, Luebbe, & Schwartz-Mette, 2011). Moreover, anxiety and depressive disorders in childhood and adolescence are concurrently and subsequently predictive of a number of additional psychiatric diagnoses (Beesdo et al., 2007; Bittner et

al., 2007; Kessler et al., 2005; Pine, Cohen, Gurley, Brook, & Ma, 1998). Thus, there is a clear need to understand the antecedents, correlates, and outcomes of anxiety and depressive disorders. Drawing upon developmental, cognitive, and clinical models of internalizing problems, it is argued that social cognitions may help explain why some withdrawn youth experience emotional difficulties.

Conceptual Overview of Social Cognitions and Cognitive Biases

Social cognition (also referred to as *social information processing*) encompasses a number of psychological processes that enable individuals to interact with, and be part of, a social group (Frith, 2008). Representations of social situations are formed through various cognitive processes such as attention, perception, storage, retrieval, and action planning (Frith, 2008; Sherman, Judd, & Park, 1989). Not surprisingly, how children process social information has direct implications for their social behaviours, competence, and adjustment (Parker, Rubin, Erath, Wojslawowicz, & Buskirk, 2006; Sherman et al., 1989). For example, children who have positive attitudes towards social interactions may seek out social contact. In contrast, children who primarily have negative thoughts about their social surroundings may choose to avoid or withdraw from social interactions. As a result, they may miss out on unique opportunities to develop competent social skills and successful relationships that contribute to the experience of positive emotions (Asendorpf, 1990).

Indeed, children who correctly encode social cues and who interpret peer intent as friendly tend to be more socially competent, have more successful peer relations (Ogelman & Seven, 2012), and appear to be more academically well adjusted (Ziv, 2013). Conversely, children who exhibit difficulties in accurately processing social cues

appear to be at risk for emotional and behavioural maladjustment, including externalizing and internalizing difficulties (e.g., Burgess, Wojslawowicz, Rubin, Rose-Krasnor, & Booth-LaForce, 2006; Dodge et al., 2003; Luebke, Bell, Allwood, Swenson, & Early, 2010; Puliafico & Kendall, 2006; Rapee et al., 2009; Ziv & Sorongon, 2011). Indeed, the presence of systematic errors in cognitions can result in a number of maladaptive thought patterns, often referred to as *cognitive biases* or *cognitive distortions* (Muris, Rapee, Meesters, Schouten, & Geers, 2003). Thus, social cognitions play a critical role in children's social and emotional development.

In the following sections, a broad review of the cognitive research linking social withdrawal and internalizing problems is presented by drawing upon a wide variety of findings from the extant literature. More specifically, both theoretical and empirical evidence from two relevant areas of research are presented. The first has its roots in the developmental psychology research literature, and pertains to conceptual models of children's social cognitions. The second has its origins in the clinical psychology and developmental psychopathology research and focuses on cognitive-behavioural models of internalizing problems.

Developmental Models of Social Cognition

It has been established that maladaptive social cognitions can have negative implications for social behaviours, competence, and adjustment. However, *how* such maladaptive thought patterns arise is less clear. Abramson et al. (2002) proposed a cognitive vulnerability hypothesis, wherein individuals who are *predisposed* to maladaptive cognitive styles are at heightened risk for emotional disorders (Haefffel, Rozek, Hames, & Technow, 2012). Little work has explored potential risk factors or

vulnerabilities towards such cognitive biases. As such, some researchers have turned their attention towards understanding individual differences that may better help identify those at risk for maladaptive cognitions involved in the development of internalizing problems (e.g., Pérez-Edgar et al., 2010; Pérez-Edgar et al., 2011; Viana & Gratz, 2012; Weeks et al., 2016).

Dynamic systems approaches to development have suggested that temperament may play a central role in a positive feedback loop between emotions and cognitive appraisals (Lewis, 2011). This continuous feedback leads to emotional, behavioural, and cognitive patterns that are increasingly articulated and refined over time in response to the environment and experiences (Todd, Cunningham, Anderson, & Thompson, 2012). Thus, according to these views, some children may be temperamentally predisposed to maladaptive thought patterns. Indeed, there is growing conceptual and empirical evidence from the developmental literature to suggest that temperamental profiles underlying subtypes of social withdrawal may act as markers of increased risk for maladaptive social information processing (e.g., Burgess et al., 2006; Coplan et al., 2013; Harrist et al., 1997; LoBue & Pérez-Edgar, 2014; Weeks et al., 2016). As such, one of the primary goals of the current research was to explore the role of cognitions (particularly maladaptive cognitions) in the links between subtypes of social withdrawal and internalizing difficulties.

Social information processing model. Crick and Dodge (1994) described what is perhaps the most well documented and supported theoretical model of social information processing (SIP). Although this model was originally developed to describe the cognitions and behaviours of children displaying aggressive and/or externalizing

difficulties (e.g., Dodge et al., 2003; Reid, Salmon, & Lovibond, 2006), researchers have since used the SIP model to better understand the cognitive patterns of other potentially at-risk children (e.g., socially withdrawn children) (e.g., Harrist et al., 1997).

According to the SIP model, a cyclical pattern of cognitive steps occurs during social interactions, ranging from encoding of social cues, to behavioural enactment. A basic premise of this model is that each child approaches a situation with a unique combination of past experiences, memories, acquired rules, knowledge, and social schemas which influence (and are influenced by) social experiences. In Step 1, the child selects and encodes information chosen from the available sensory cues during a social interaction. In Step 2, the child interprets and makes a mental representation of those social cues. In Step 3, the child clarifies and/or selects their social goals, followed by Step 4, wherein he/she constructs or recalls possible response options. In Step 5, a decision is made about which response to make (i.e., response selection), followed by behavioural enactment in Step 6.

Although Crick and Dodge (1994) acknowledged that some biological restrictions influence how an individual processes social information, it has been argued that a major shortcoming of their model is the lack of emphasis on the role of emotions. As such, Lemerise and Arsenio (2000) proposed an integrated model of emotional and cognitive processes which posits that how a child regulates their emotional arousal impacts both cognitive processing and behavioural responses. According to this revised model, both transient (i.e., mood) and stable (i.e., temperament and emotionality) emotions can influence how social information is processed at any stage of the cycle. Moreover, emotions associated with past experiences, emotions of others, and emotion regulation

each contribute to how children experience and respond to their surroundings (see Figure 1).

Findings from the adult and child literatures support perspectives implicating temperament and emotions as integral to cognitive processes. For example, Hayden and colleagues (2006) reported that lower positive emotionality at age 3 predicted greater feelings of helplessness and decreased positive schematic processing at age 7. Similarly, both BI and anxiety sensitivity (a temperament-like trait) have been found to be associated with worry symptoms (i.e., a form of maladaptive thinking; Clark et al., 1994; Viana, Gratz, & Rabian, 2011) and attentional biases towards threat (Szpunar & Young, 2012). In another study, Grynberg, Gidron, Denollet, and Luminet (2012) examined the interpretation biases of Type D individuals, who are characterized as displaying elevated negative affectivity and social inhibition (i.e., conceptually similar to shyness) (Denollet, 2005). Results revealed that adults with Type D personality rated neutral, ambiguous situations as significantly more distressing as compared to non-Type D individuals.

Given the strong biological component involved in temperament, some researchers have turned their attention towards identifying genetic or physiological vulnerabilities for maladaptive information processing (Jetha, Zheng, Schmidt, & Segalowitz, 2012; Theall-Honey & Schmidt, 2006). For example, there is growing evidence to suggest that physiological markers associated with temperament may be linked to maladaptive thought patterns. For example, the short allele serotonin transporter 5-HTTLPR (implicated in the BI literature) appears to be associated with cognitive distortions, including selective attention of negative information (Pergamin-Hight et al., 2012) and cognitive errors in response to negative feedback (Owens et al., 2012).

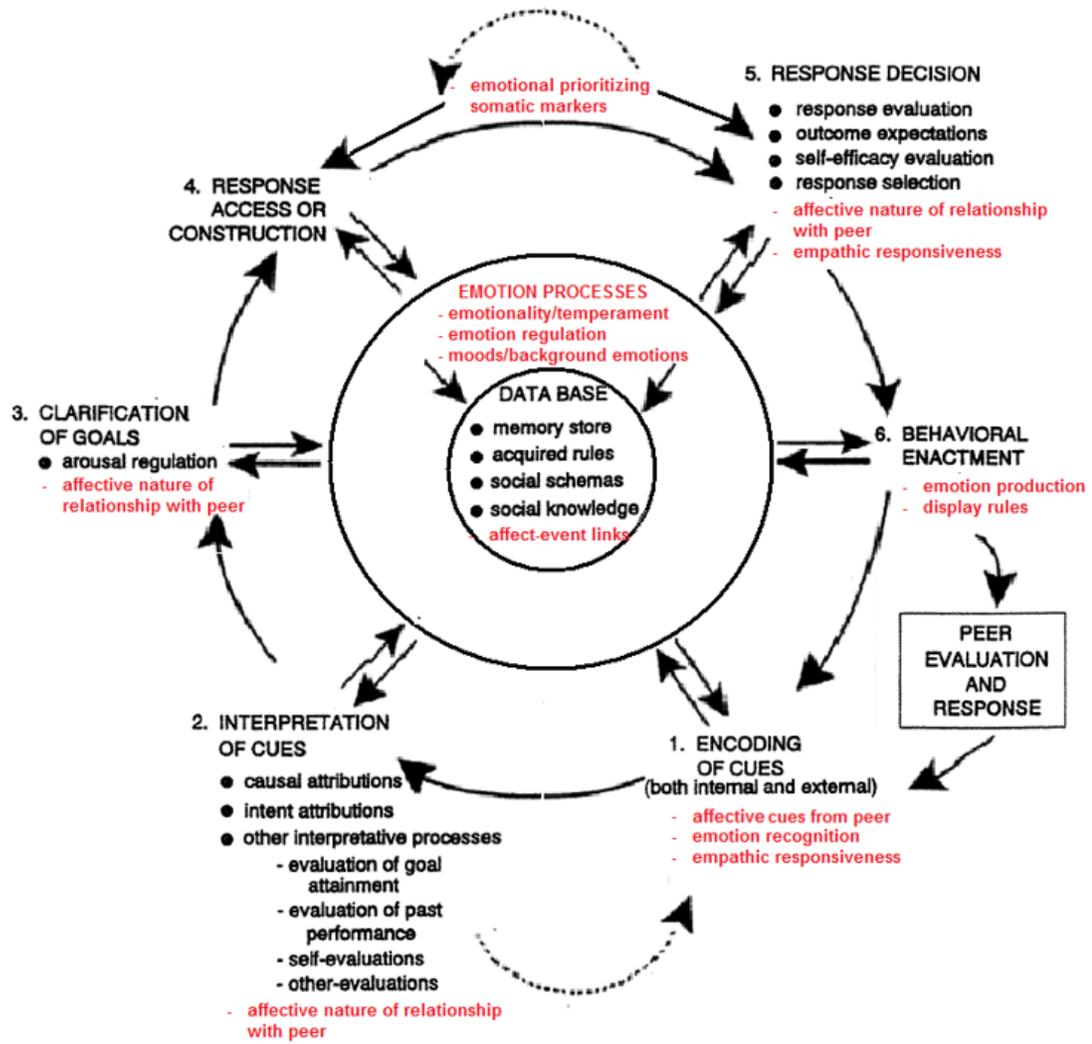


Figure 1. Lemerise and Arsenio's (2000) integrated social information processing model.

However, findings on the links between temperament and cognitive biases are not entirely consistent throughout the literature (e.g., Hayden et al., 2006). For example, two recent studies examining BI in toddlerhood found little evidence to support a direct link between BI and cognitive biases (Dodd, Hudson, Morris, & Wise, 2012; Pérez-Edgar et al., 2011). It should be noted that in both studies, children were below the age of 6 (and in some cases, as young as 3 years old) when they completed assessments of cognitive biases. It has been a point of debate as to whether children this age are capable of displaying and reporting stable patterns of cognitions (Byrne, 1996; Harter, 2003). As such, it could be postulated that the lack of significant findings was due to the participants' age. In support of this postulation, Pérez-Edgar and colleagues (2010) found that BI in toddlerhood was associated with cognitive biases in adolescence. Therefore, although cognitive biases may not be present in very young children, it may be that certain temperamental traits or profiles present early risk factors for the future development of stable maladaptive thought patterns.

Links between social withdrawal and social cognitions. Despite strong evidence linking social withdrawal and temperament, relatively little attention has been paid to understanding the cognitions of socially withdrawn youth. Only a handful of studies have linked social withdrawal to social cognitions (e.g., Burgess et al., 2006; LeMare & Rubin, 1987; Rubin, Daniels-Beirness, & Bream, 1984; Rose-Krasnor & Rubin, 1983; Rubin & Rose-Krasnor, 1983; Stewart & Rubin, 1995; Wichmann et al., 2004). However, these studies have primarily assessed shyness or social withdrawal as unidimensional constructs. For example, it has been reported that shy children and adolescents are more prone to negative self-talk (Ishiyama, 1984), negative attributional

styles (Chan & Wong, 2011; Wichmann et al., 2004), elevated expectations of the probability and costs of negative social events (Weeks et al., 2016), and biased interpretations of emotional facial expressions (Kokin, Younger, Gosselin, & Vaillancourt, 2016).

Relatedly, *rejection sensitivity* is a particular type of social-cognitive bias that appears to be implicated in the withdrawal literature (London, Downey, Bonica, & Paltin, 2007; Watson & Nesdale, 2012). Rejection sensitivity is defined as the tendency to anxiously expect, readily perceive, and overreact to social rejection (Downey, Lebolt, Rincón, & Freitas, 1998), and has been proposed to be a central cognitive component of shyness (Jackson, Towson, & Narduzzi, 1997; Stritzke, Nguyen, & Durkin, 2004). For example, Gazelle and Druhen (2009) reported that shy and anxious children were observably more upset when excluded, and reported experiencing greater feelings of rejection in anticipation of, and response to, rejection than their more social counterparts. Together, these findings suggest that at least some withdrawn youth may indeed be at risk for a wide range of maladaptive cognitive processes.

It remains unclear how social cognitions might be differentially associated with different subtypes of withdrawal. Yet, there is reason to believe that subtypes of social withdrawal may present different vulnerabilities for maladaptive social cognitions and behaviours. For example, it has been proposed that underlying approach-avoidance motivations influence the processing of social information. Whereas approach motivations have been linked to greater attention towards the processing of positive cues and signals of reward, avoidance motivations have been associated with greater attention towards, and processing of, negative cues and signals of punishment (Nikitin & Freund,

2008). Moreover, it has been proposed that attributions of social success and failure may serve as cognitive mediators in the links between social motivations and negative outcomes (see Nikitin & Schoch, 2014 for a review). In the following section, cognitive-behavioural models of internalizing problems are reviewed to extrapolate potential differences in the potentially specific cognitive vulnerabilities associated with different subtypes of social withdrawal.

Cognitive-Behavioural Models of Internalizing Problems

Identifying vulnerabilities for maladaptive cognitive processing patterns is particularly important as it has been well documented that cognitive biases contribute to the development and maintenance of internalizing disorders, such as depression and anxiety (Beck, 1976; Beck & Emery, 1985; Clark & Wells, 1995; Kendall, 1985; Muris et al., 2003; Rapee & Heimberg, 1997). In fact, cognitive models of internalizing problems have become widely accepted within the psychopathology literature (Hirsch, Meeten, Krahe, & Reeder, 2016). Moreover, components of cognitive modification are often included in clinical treatment programs (Compton et al., 2004; Koster, Fox, & MacLeod, 2009), based on the underlying premise that systematic cognitive errors in reasoning affect emotion regulation, thereby increasing vulnerability to internalizing problems (Tran, Hertel, & Joormann, 2011).

Numerous types of cognitive biases have been proposed in the literature as distinct phenomena; however, it has been theorized that all cognitive biases share a common underlying mechanism (Mathews, Mackintosh, & Fulcher, 1997). As such, cognitive models of internalizing problems share considerable overlapping features. For instance, these models emphasize consistent errors or biases in reasoning. Reasoning is a

cognitive process that involves using logic, beliefs, generating judgements, and testing hypotheses in order to reach conclusions (Kompridis, 2000). When left unchallenged, deficits in reasoning can elicit and maintain distress, and can result in maladaptive representations of both the individual and the environment (Muris, 2010; Viana & Gratz, 2012). A common feature of cognitive models of internalizing problems is that they assert that maladaptive cognitions, emotions, and behaviours make up a system of interacting processes that result in a self-perpetuating pattern (e.g., Clark & Wells, 1995; Crick & Dodge, 1994; Rapee & Heimberg, 1997). For example, a child who is nervous about presenting at show-and-tell may anxiously anticipate all possible negative outcomes. This nervous anticipation may result in performance deficits, which are then catastrophized and committed to memory. In turn, this perceived failed experience may fuel negative expectations of future social performances, and perpetuate the cycle of maladaptive thinking.

There is a substantial body of literature examining the merit of these models, with overwhelming evidence supporting a link between maladaptive cognitive styles and internalizing disorders in childhood and adolescence (e.g., Amir, Foa, & Coles, 1998; Bögels & Zigterman, 2000; Waters, Craske, Lindsey Berman, & Treanor, 2008; Waters, Henry, Mogg, Bradley, & Pine, 2010). Moreover, findings from a number of studies suggest that cognitive models can be extended to identify those at risk for subclinical (but elevated) symptoms of internalizing difficulties (e.g., Bell, Luebbe, Swenson, & Allwood, 2009; Creswell, Shildrick, & Field, 2011; Dudeney, Sharpe, & Hunt, 2015; Kaslow, Rehm, & Siegel, 1984; Marston, Hare, & Allen, 2010; Muris et al., 2003; Weeks et al., 2016). For example, Tuschen-Caffier, Köhl, and Bender (2011) examined the

occurrence of cognitive distortions and performance deficits among children with social anxiety disorder, children with elevated but subclinical social anxiety, and children without any anxiety symptoms. Analyses revealed that children in the clinical and subclinical groups both displayed more negative thinking than those in the control group, despite no differences in actual task performance. Similarly, Vassilopoulos and Banerjee (2012) examined responses to ambiguous events of subclinically anxious 11- to 12-year-olds. Among the results, social anxiety symptoms were positively associated with negative interpretations of social events and self-referent cost judgements.

Further support for cognitive models of internalizing problems has been provided by examining the effects of experimental modification of cognitive processing (e.g., Berry & Cooper, 2012; Lau, Belli, & Chopra, 2012; Mobini, Reynolds, & Mackintosh, 2013; Tran et al., 2011). Cognitive bias modification (CBM) refers to procedures designed to alter cognitive processing styles thought to contribute to internalizing disorders by training vulnerable individuals to endorse different processing styles, such as reducing negative interpretations, and/or increasing positive attributions (Hertel & Mathews, 2011; Koster et al., 2009). There is growing evidence to support the efficacy of CBM in reducing not only maladaptive cognitions, but also internalizing disorders in both adults and children (e.g., Bechor et al., 2014; Eldar et al., 2012; Heeren, Reese, McNally, & Philippot, 2012).

CBM also appears to have an impact on children with sub-threshold internalizing difficulties (Bar-Haim et al., 2007; MacLeod & Mathews, 2012). For example, in two separate studies, Vassilopoulos and colleagues (Vassilopoulos, Banerjee, & Prantzalou, 2009; Vassilopoulos & Moberly, 2013) provided evidence linking cognitive biases to

non-clinical social anxiety by manipulating cognitions using CBM techniques. In the first, Vassilopoulos et al. (2009) trained early adolescents selected for high levels of social anxiety to endorse benign interpretations of potentially threatening social scenarios. The authors reported that, in addition to decreased cognitive biases, those who received training reported significantly less anxiety about anticipated social interactions. In a subsequent study, Vassilopoulos and Moberly (2013) reported that participants who were trained to endorse negative (rather than benign) interpretations reported more negative self-imagery (i.e., nervous, anxious, embarrassed). Moreover, this effect was particularly pronounced among youth with elevated symptoms of social anxiety. Heeren, Peschard, and Philippot (2012) similarly reported that induction of attentional biases in a non-socially anxious sample resulted in increased anxiety during subsequent social rejection.

Another study examining the efficacy of CBM on reducing depressive symptoms in emerging adults found that participants who underwent training not only reported more adaptive cognitive styles, but also reported fewer depressive symptoms (Haefffel et al., 2012). However, the authors noted that negative cognitive biases began to re-emerge shortly after, which supports previous assertions that forming new cognitive patterns is difficult when competing and well-established patterns already exist (McNeil & Alibali, 2005). Nonetheless, these findings suggest that biases are not only associated with, but also contribute to, internalizing problems (Hertel & Mathews, 2011). In support of this, Miers, Blöte, Rooij, Bokhorst, and Westenberg (2013) identified three distinct developmental trajectories of non-clinical social anxiety during adolescence and early adulthood: (a) high and changing, (b) moderate and decreasing, and (c) low and

decreasing. Notably, trajectory groups differed in their cognitive patterns, with those following the high trajectory being more likely to report negative interpretations and self-focused attention (i.e., maladaptive cognitions). This suggests that cognitions may play an important role in the development of internalizing problems over time.

Notwithstanding, there are some contradictory findings in the literature that should be mentioned. Creswell, Murray, and Cooper (2014) recently examined the threat interpretations of 7- to 12-year-old children who met the diagnostic criteria for anxiety disorders. Contrary to their expectations, anxious children did not display inflated threat interpretations in comparison to their non-anxious peers. Melfsen and Florin (2002) similarly reported that socially anxious children (ages 8-12 years) did not interpret neutral or positive emotional facial expressions in a negative manner more frequently than their non-anxious peers. Finally, Schofield, Coles, and Gibb (2007) found that socially anxious undergraduate students did not display heightened sensitivity towards hypothetical negative evaluations (i.e., disgusted facial expressions). However, they did attribute a higher perceived cost of interacting with someone showing a disgusted expression, supporting the notion that socially anxious individuals place greater importance on being accepted by others (Clark & Wells, 1995). Despite considerable support for cognitive models of internalizing problems, these findings highlight the need to further explore additional factors that may account for some of the discrepancies in the literature.

In response to such inconsistencies, researchers have begun to examine the role of cognitive *content*. It has been proposed that the specific type of error or bias exhibited by an individual may reflect the dominant concerns of the associated psychological problem (Muris, 2010). It has been well established that anxious and depressed individuals display

decidedly distinct cognitive styles than their more aggressive and comparison peers (e.g., Burgess et al., 2006; Harrist et al., 1997). For example, whereas aggressive children tend to interpret others' behaviours in a hostile or aggressive manner (Orobio de Castro, Veerman, Koops, Bosch, & Monshouwer, 2002), anxious and depressed individuals tend to exhibit maladaptive cognitions in relation to themselves and their surroundings. As a result, anxious and depressive symptoms have often been examined concurrently (e.g., Côté et al., 2009; Sylvester, Hudziak, Gaffrey, Barch, & Luby, 2016), and/or have been operationalized as belonging to a non-specified category of internalizing problems, particularly among younger children (e.g., Ashford, Smit, van Lier, Cuijpers, & Koot, 2008; Prinstein, Cheah, & Guyer, 2005).

However, there is reason to believe that anxiety and depression may also have distinct cognitive correlates. According to Beck's (1976) *cognitive content specificity hypothesis* (CCSH), anxiety is thought to be associated with the selective processing of threatening information (i.e., threat and danger), whereas depression is thought to be associated with the selective processing of negative information (i.e., loss and failure). Thus, it could be argued that maladaptive cognitions associated with anxiety and depression may be better represented as two distinct (but related) categories of cognitive patterns. Indeed, cognitive models of anxiety and depression posit unique cognitive correlates underlie the development and maintenance of emotional difficulties. In the following sections, a more in-depth review of the relevant cognitive models of (social) anxiety and depression is presented, along with a review of the empirical evidence supporting the CCSH.

Cognitive models of (social) anxiety. Cognitive models of anxiety posit that biased information processing contributes to the development and maintenance of anxiety (Barlow, 1988; Beck & Emery, 1985; Kendall, 1985). Information is processed through anxious schemas, wherein potentially neutral information is perceived as threatening or dangerous. As information continues to be interpreted in a threatening manner, anxious thoughts become more automatic (Beck, Brown, Steer, Eidelson, & Riskind, 1987). As a result, anxious individuals not only disproportionately attend to information that confirms their negative expectations, but they may also miss cues that could disconfirm their biased interpretations. This, in turn, perpetuates the cycle of negative expectations and maladaptive processing of information.

There is reason to believe that these cognitive models can be applied to our understanding of the development of various anxiety disorders (Weems, Berman, Silverman, & Saavedra, 2001). For example, it has been proposed that difficulty in processing *social* cues contributes to the development and maintenance of social anxiety (Clark & Wells, 1995; LoBue & Pérez-Edgar, 2014; Rapee & Heimberg, 1997). Given the overlap between shyness and social anxiety, cognitive models of social anxiety may be particularly informative about the cognitions of shy individuals. The American Psychiatric Association (2013) defines *social anxiety disorder* (SAD, previously referred to as *social phobia*) as a pattern of excessive and persistent fear of social situations involving unfamiliar others and/or social evaluation. For socially anxious individuals, social settings evoke feelings of anxiety and distress, and can lead to anxious anticipation or avoidance of such situations.

Cognitive models suggest that socially anxious individuals seek positive approval

from others while simultaneously fearing behaving in ways that will result in a loss of status and/or worth (Clark & Wells, 1995; Philippot & Douilliez, 2005; Rapee & Heimberg, 1997). Since socially anxious individuals tend to possess lower self-confidence about their social abilities and believe that others are inherently critical, they are primed to anxiously anticipate negative outcomes during social situations. In an attempt to avoid social failure or humiliation, they continuously scan their environments for potentially threatening social cues (e.g., rejection) (Clark & Wells, 1995; Rapee & Heimberg, 1997). Additionally, their heightened sensitivity and perceived costs of negative evaluation trigger self-focused attention towards their own performance (Philippot & Douilliez, 2005; Schofield et al., 2007). Thus, a considerable amount of attentional resources is allocated towards monitoring both internal and external factors. This, in turn, reduces the amount of cognitive resources available to engage in additional tasks (Rapee & Heimberg, 1997), ultimately diminishing their ability to competently function and cognitively process information in social situations (Schultz & Heimberg, 2008).

In support of these models, Spence, Donovan, and Brechman-Toussaint (1999) reported that clinically socially anxious children (ages 7-14 years) reported lower expected performance and higher negative self-talk during social-evaluative tasks than their non-anxious peers. Socially anxious participants also rated themselves as less socially competent and less likely to receive positive evaluations from peers.

There is also growing evidence to suggest that elevated symptoms of social anxiety in community samples are associated with similar patterns of socio-cognitive functioning. For example, Blöte, Miers, Heyne, Clark, and Westenberg (2013) examined

the cognitions of a community sample of adolescents (ages 14-18 years). Participants were given a task wherein they presented a speech in front of a pre-recorded audience engaging in neutral behaviours. Consistent with Clark and Wells' (1995) model, participants with higher levels of social anxiety reported greater negative performance expectations, higher self-focused attention, and more negative perceptions of the audience.

Given the anxious expectation of negative events and/or evaluations from others, it has been proposed that threatening cognitive biases play an important role in anxiety disorders. *Threatening cognitions* (sometimes referred to as *anxiety-related biases*, or *threat perception biases*) is an umbrella term used to describe a number of cognitive patterns that involve maladaptive processing of threatening stimuli. For example, it has been well documented that anxious individuals display biases in their attention towards threat (i.e., attention bias) (e.g., Abend et al., 2017; Bar-Haim et al., 2007; Pérez-Edgar, Taber-Thomas, Auday, & Morales, 2014; Reid et al., 2006; Roy et al., 2008; Waters et al., 2010). Cognitive models of anxiety also suggest that anxious individuals tend to exaggerate or overestimate the probability and/or cost of negative events (i.e., judgement bias) (Amir et al., 1998). Thus, in addition to being hypersensitive to threatening or dangerous stimuli, anxious individuals may also catastrophize the consequences of a negative event. Indeed, there is evidence that anxious children tend to rate negative events as being both more probable and more distressing than their non-anxious peers (e.g., Schofield et al., 2007; Vassilopoulos & Banerjee, 2012; Weeks, Coplan, & Ooi, 2017).

Furthermore, it has been proposed that socially anxious individuals are also at risk

of misinterpreting neutral cues due to their belief that others are inherently critical and that their negative self-evaluations are congruent with others' perceptions (Rapee & Heimberg, 1997). As such, it has been argued that anxious individuals frequently misinterpret social cues or draw negative inferences from ambiguous social events (i.e., interpretation bias) (Clark & Wells, 1995; Muris, Merckelbach, & Damsma, 2000; Muris et al., 2003). Thus, objectively threatening stimuli need not even be present in order to perceive threat. Indeed, there is considerable evidence to support a link between anxiety and interpretation biases among samples of clinical and non-clinical children and adults. For example, when presented with ambiguous social scenarios, socially anxious individuals are more likely to interpret them in a negative or threatening manner as compared to their non-anxious counterparts (e.g., Amir et al., 1998; Creswell et al., 2011; Higa & Daleiden, 2008; Micco, Hirshfeld-Becker, Henin, & Ehrenreich-May, 2013; Vassilopoulos, 2006; Vassilopoulos & Banerjee, 2008; Weeks et al., 2017).

As previously discussed, rejection sensitivity has been proposed as another underlying mechanism in the development of maladaptive social behaviours. Increased expectations of rejection lead to heightened emotional arousal, which activates a hyper-vigilance for rejection cues and increases the likelihood of falsely perceiving rejection (Downey, Mougios, Ayduk, London, & Shoda, 2004; London et al., 2007). In this regard, rejection sensitivity may be conceptualized as containing aspects of attention, interpretation, and judgement biases specifically within the social domain. Moreover, it appears that shy children may be particularly sensitive to the effects of victimization and rejection (Gazelle & Druhen, 2009), and as such, may be at increased risk to anxiously anticipate rejection. Not surprisingly, rejection sensitivity has been linked to elevated

symptoms of social anxiety (e.g., Li, 2011) and withdrawn behaviour (London et al., 2007). Taken together, the findings suggest that elevated threat-related cognitions play an important role in the development and maintenance of clinical and subclinical symptoms of social anxiety.

Cognitive models of depression. Cognitive models have also become the dominant framework used to understand the development and maintenance of depressive symptoms and disorders (e.g., Beck, 1976; Beck et al., 1987). However, whereas threatening cognitive biases appear to play an important role in anxiety disorders, models of depression argue that *negative cognitions*, or *depression-related cognitions* (i.e., negative thoughts about oneself or one's environment) are the underlying mechanisms that promote the development of depressive symptoms (Beck, 1976). Cognitive models of depression also emphasize the processing of mood-congruent (i.e., sad) and self-referent (e.g., personal failure, loss, low self-esteem) content (Beck et al., 1987; Everaert, Podina, & Koster, 2017). Thus, cognitive models of depression focus on negatively valenced affective information about the self, rather than threatening thoughts in relation to others (Ridout, Astell, Red, Glen, & O'Carroll, 2003). Indeed, there is evidence that threatening cognitions typically associated with anxiety are not related to depression (e.g., Neshat-Doost, Moradi, Taghavi, Yule, & Dalgleish, 2000; Williams, Watts, MacLeod, & Mathews, 1997).

Beck (1967, 1976) argued that dysfunctional cognitive processes not only precede but also present a vulnerability factor for the onset and maintenance of depression. More specifically, he proposed that negative views of the self, the future, and the environment (collectively referred to as the cognitive triad) play an important role in the etiology and

perpetuation of depression. According to his model, individual experiences of loss or failure foster the development of negative schemas. Depressed individuals then filter information through a negative cognitive screen, wherein they develop maladaptive attitudes and unrealistic expectations about the self.

It has been argued that control (or lack thereof) plays a key role in the development of such negative schemas (Abramson, Seligman, & Teasdale, 1978). Rotter (1966) first described a continuum of perceived control that ranges from internal to external locus of control. Individuals with an internal locus of control believe that outcomes of an event are contingent upon their own behaviours. In contrast, individuals with an external locus of control believe that outcomes are out of their control. Drawing upon Rotter's (1966) work, Maier and Seligman (1976) hypothesized a response pattern wherein individuals who are faced with negative outcomes that they cannot influence develop an expectation that further attempts to gain control will be unsuccessful. According to their model of learned helplessness, the perception that outcomes are independent of an individual's responses leads to diminished motivation to make future attempts to gain control, ultimately fostering deficits in problem solving and elevated depressed affect.

Abramson and colleagues (1978) later proposed an expanded version of the learned helplessness model of depression. In this reformulated model, the authors highlighted the role of causal attributions for (negative) events in the development of learned helplessness. It was argued that when faced with situations in which one has no control, individuals attribute their helplessness to a cause. In addition to Rotter's (1966) causal dimension of locus of control (i.e., internal-external), Abramson and colleagues

(1978) argued that the cause of helplessness can also be attributed to factors along two more dimensions: (a) stable-unstable, and (b) global-specific. In turn, these attributions affect future expectations, behaviours, and the intensity of the negative associated outcomes. For example, it was hypothesized that non-depressed individuals attribute negative events to causes that are external (e.g., “this is someone else’s fault”), unstable (e.g., “this is a single bad event”), and specific (e.g., “this won’t affect other areas of my life”). As a result, these individuals are more motivated to actively engage in behaviours that may resolve the problem and, in turn, resist negative affect. In contrast, the authors argued that depressed individuals exhibit negative attribution biases (or negative attributional styles), which involve systematic errors in attributing causes to both one’s own and others’ behaviours. More specifically, it was argued that depressed individuals tend to interpret negative outcomes as having causes that are internal (e.g., “I am the reason that this happened”), stable (e.g., “it will always be this way”), and global (e.g., “this will affect everything I do”) (Abramson et al., 1978). Together, these maladaptive cognitions foster self-defeating coping strategies, which in turn, contribute to feelings of negative affect.

Findings from a large number of studies have lent support for these cognitive models of depression among samples of adolescents and older children (e.g., Asarnow & Bates, 1988; Gibb et al., 2006; Heimberg, Vermilyea, Dodge, Becker, & Barlow, 1987; Kaslow et al., 1984). For example, it has been well documented that youth with elevated symptoms of depression tend to exhibit more dysfunctional attributional styles for negative outcomes (Gibb et al., 2006; Heimberg et al., 1987; Prinstein et al., 2005). Depressed youth also tend to report more hopelessness and negative self-perceptions

(Asarnow & Bates, 1988), exhibit greater deficits in self-evaluation (Kaslow et al., 1984), and report more self-blaming and feelings of helplessness (Moyal, 1977). Moreover, depressed individuals have been found to endorse negative interpretations more often and faster than non-depressed individuals only when the negative stimuli are self-referent (Cowden Hindash & Rottenberg, 2017). Thus, it appears that depressed individuals are “primed” to process and retain negative thoughts about the self.

Meta-analytic reviews of the association between negative cognitive styles and depression in children and adolescents have yielded even more support for these models (Gladstone & Kaslow, 1995; Joiner & Wagner, 1995). For example, in a review of 28 studies, Gladstone and Kaslow (1995) found that elevated symptoms of depression were associated with more internal, stable, and global attributions for negative events in both clinical and non-clinical samples of children and adolescents. Additionally, there is evidence that training depressed individuals to develop more adaptive cognitive styles can lead to fewer depressive symptoms and feelings of helplessness (Haefel et al., 2012).

Empirical support for the CCSH. In the previous sections, empirical evidence was presented to independently support cognitive models of anxiety and depression. Notwithstanding, there are findings in the literature that suggest that anxious individuals exhibit maladaptive cognitions typically associated with depression, and vice versa (e.g., Eley et al., 2008; Trew & Alden, 2009; Watts & Weems, 2006). These inconsistencies in the literature have led to competing interpretations of the findings. For instance, because both anxiety and depression are linked to maladaptive cognitions and share conceptual and empirical overlap (Mathews et al., 1997), some have argued that these findings reflect a more general, common cognitive style present in both disorders (Hong, Lee,

Tsai, & Tan, 2017). Conversely, it has been argued that anxious and depressed individuals do exhibit specificity in their cognitive styles, but that non-specificity emerges as a result of construct and measurement overlap of disorders and cognitive styles (Luebbe et al., 2010). For example, Eley and colleagues (2008) indicated that some measures of depression include items that reflect worry or trait anxiety, and postulated that such measures are assessing a higher-order structure of negative affect, rather than *pure* depression. They also postulated that the content included in assessments of cognitive biases may themselves reflect non-specificity, such as including depression-relevant content in assessments of interpretation biases (which are typically implicated in the anxiety literature).

The degree of overlap between anxiety and depression has further complicated efforts to differentiate between the disorders. Indeed, it has been reported that anxiety and depression are strongly interrelated and often co-occur in clinical and non-clinical samples (e.g., Schniering & Rapee, 2004; Storch, Roberti, & Roth, 2004; Watson & Kendall, 1989; Zahn-Waxler et al., 2000; Weeks et al., 2017). For example, a meta-analysis of 21 population-based studies revealed that 10% to 69% of youth with anxiety had a comorbid depressive disorder, and 15% to 75% of depressed youth had a comorbid anxiety disorder (Angold, Costello, & Erkanli, 1999). Similarly, it has been reported that around a quarter of adolescents with SAD have a comorbid depressive disorder (Chavira, Stein, Bailey, & Stein, 2004; Essau, Conradt, & Petermann, 1999). As such, findings of non-specificity in cognitive styles among anxious and depressed individuals (e.g., Watts & Weems, 2006) may be the result of unmeasured or unaccounted-for comorbidity. In support of this assertion, Heimberg et al. (1987) found that whereas depressed

participants demonstrated negative attributional styles, anxious patients only did so if they were also depressed.

Researchers have attempted to tease apart these complex inter-associations in an effort to identify the potentially distinct cognitive correlates of anxiety and depression. Indeed, there is growing evidence that anxious and depressed adults and adolescents possess distinct cognitive features (Ambrose & Rholes, 1993; Beck et al., 1987; Heimberg et al., 1987; Lambertson & Oei, 2008; Schniering & Rapee, 2004). For example, Beck and colleagues (1987) had clinically anxious and depressed patients complete an assessment of automatic thoughts relevant for anxiety and depression. Among the results, the authors reported that anxious patients had a higher mean score on the anxious automatic thoughts subscale than depressed patients. Conversely, depressed patients had a higher mean score on the depressive automatic thoughts subscale. More recently, Lambertson and Oei (2008) sought to test Beck's (1976) CCSH by examining whether anxiety and depression could be differentiated based on cognitive patterns in a sample of adults who all met the criteria for a depressive disorder. Results revealed that only negative self-statements and thoughts predicted depression, whereas only anxious self-statements predicted anxiety.

More recently, Weeks et al. (2017) explored cognitive content specificity in a community sample of depressed and anxious adolescents. Not surprisingly, those with both elevated anxiety and depression displayed the most maladaptive cognitive thought patterns, both in terms of the number of biases present and the severity. Consistent with previous findings, they also reported that negative views and attributions were more prominent in the depressed group (as compared to the anxious and comparison groups).

However, contrary to expectations, threatening cognitions were present in both the anxious and depressed groups. The authors speculated that specificity in threatening cognitions may only emerge among those with clinical symptoms.

However, findings from a meta-analysis which included studies with both clinical and non-clinical samples provide further support for the CCSH (Hallion & Ruscio, 2011). The researchers analyzed 45 studies that assessed the effects of modifying attention and interpretation biases (i.e., threatening cognitions) on anxiety and depression. Results revealed that modification of anxiety-related biases led to a reduction in anxiety, but not depression, providing further evidence that threatening cognitive biases are uniquely implicated in anxiety. Thus, there is reason to believe that there is cognitive heterogeneity within internalizing problems.

Extending the CCSH to Models of Social Withdrawal

There is evidence to suggest that socially withdrawn children (collapsing across all subtypes) may display maladaptive cognitive patterns specifically implicated in the development of anxiety and depression. For example, it has been reported that extremely withdrawn children tend to attribute social failures to internal and self-defeating causes (Rubin & Rose-Krasnor, 1986; Wichmann et al., 2004). Moreover, when faced with social conflict, withdrawn children tend to choose avoidant strategies consistent with defeatist behaviours exhibited by depressed individuals (Wichmann et al., 2004).

However, more detailed examination of cognitive models of anxiety and depression suggests that subtypes of withdrawal may also display specificity in cognitive content which, in turn, may have implications for specificity in emotional outcomes. To begin, given its comparatively benign nature across development, unsociability would not

be expected to be significantly associated with any cognitive biases (Coplan et al., 2013; Nelson, 2013). This, in turn, might account for the lack of associations between unsociability and internalizing difficulties. However, the considerable conceptual (and methodological) overlap between shyness and social anxiety (see Rapee & Coplan, 2010), suggests that it is reasonable to suspect that threat-related cognitions may also be particularly relevant for shy individuals. Furthermore, the growing evidence to suggest that social avoidance is uniquely associated with depression suggest that negative cognitions may be associated with this form of social withdrawal.

However, the potentially unique cognitive vulnerabilities associated with different subtypes of social withdrawal remain empirically under-explored. To date, only three studies have examined cognitive processing in relation to subtypes of social withdrawal. First, Harrist and colleagues (1997) conducted a longitudinal study exploring differences in SIP patterns across groups of withdrawn and isolated children. Kindergarten children ($N = 567$) were observed during free play. Of these, 150 of them were classified as socially withdrawn and were followed over a 4-year period. Four groups of withdrawn children were then identified using cluster analysis based on teacher ratings of children's social behaviours at school (e.g., isolates self, timid, anxious, immature, sad/depressed, lacks restraint, and angry/defiant). The four subtypes were labeled *passive-anxious* (i.e., shy), *unsociable*, *sad/depressed*, and *active-isolate*.

Differences in SIP were then examined across the withdrawn clusters. As expected, children in the unsociable group displayed relatively competent social-cognitive patterns (similar to those displayed by non-withdrawn children). Conversely, children in the shy group generated and/or endorsed more passive solutions in response to

peer conflict in kindergarten, and were found to under-attribute hostility across all 4 years. Although it is unclear whether this tendency to under-attribute hostility is maladaptive, the authors argued that these findings suggest that shy children exhibit unique social-cognitive patterns. Surprisingly, the SIP patterns of the sad/depressed withdrawn group did not differ significantly from those of their non-withdrawn comparison peers. Consistent with previous assertions, the authors postulated that maladaptive cognitive patterns associated with depressed affect may not manifest until later in childhood. The authors also pointed out that the sad/depressed measure consisted of only a single teacher-rated item, and as such, may affect the interpretability of the results.

Since this was the first study to explore divergent social-cognitive patterns among subtypes of socially withdrawn children, the assessment of SIP was largely focused on previous protocols used to assess aggressive children (e.g., emphasizing hostile attributions, interpretations and responses to peer rejection). This may have limited their ability to detect more relevant cognitive differences between the groups of withdrawn children. Nonetheless, the findings of this study were the first to support the notion that subtypes of socially withdrawn children exhibit different social-cognitive patterns.

More recently, Coplan et al. (2013) examined the depressive attributional styles of shy, unsociable, and socially avoidant 9- to 12-year-olds. Using person-centered analyses, the authors reported that socially avoidant children displayed significantly greater depressive attributional styles than shy children. In turn, shy children reported significantly greater biases than unsociable and comparison non-withdrawn children, who did not differ significantly from each other.

Finally, Nelson (2013) examined fear of negative evaluation (FNE) among different subtypes of socially withdrawn emerging adults. Although not a direct assessment of social cognitions, FNE may be conceptualized as a cognitive component of social anxiety. Consistent with the conceptual literature, Nelson (2013) found that shy individuals reported significantly higher ratings of FNE than their unsociable, avoidant, and comparison counterparts. Avoidant individuals did not differ significantly in their ratings of FNE from those in the unsociable and control groups. However, unsociable individuals reported significantly lower ratings of FNE than those in the control group. Taken together, these findings provide preliminary evidence that subtypes of withdrawn youth display distinct cognitive patterns.

To date, no study has explicitly assessed the CCSH in relation to subtypes of social withdrawal, nor how such cognitive specificity may be related to different patterns of risk for emotional maladjustment. Nevertheless, Clark and Watson's (1991) *tripartite framework* provides conceptual reason to believe that social withdrawal subtypes may share affective traits commonly identified with anxiety and depression, which in turn are associated with distinct cognitive correlates. Specifically, although negative affect is thought to be a shared feature between shyness and social avoidance, it was previously argued that shyness and social avoidance might also reflect different underlying affective traits which parallel the clinical literature. For example, whereas low positive affect may be uniquely related to social avoidance (and depression), hyper-arousal may be uniquely associated with shyness (and anxiety).

In partial support of this assertion, Coplan and colleagues (2013) found that both shy and socially avoidant children reported higher levels of negative affect than

unsociable and non-withdrawn children. Moreover, socially avoidant children reported significantly lower positive affect than their unsociable and non-withdrawn peers.

Although socially avoidant and shy children's ratings of positive affect did not differ significantly from one another, shy children's ratings were somewhat higher, and did not differ significantly from their non-withdrawn peers. The authors noted that they operationalized "social avoidance" as a combination of self-reported high shyness and high unsociability, and did not directly assess children's social motivations. As such, further examination of the cognitive, temperamental, and emotional correlates of different social motivational profiles is clearly warranted. Notwithstanding, these findings provide preliminary evidence to suggest that the affective literature may bridge the gap between the clinical literature on anxiety and depression and the developmental research on social withdrawal.

For example, Jolly, Dyck, Kramer, and Wherry (1994) sought to identify differentiating features of anxiety and depression by examining affect and cognitive content in a sample of psychiatric outpatient adults. Several important findings were reported. First, consistent with the tripartite framework, it was reported that whereas negative affect was positively associated with both anxiety and depressive symptoms, low positive affect was uniquely associated with depressive symptoms. Second, whereas depressive cognitions uniquely predicted depressive symptoms, anxious cognitions did not show specificity in predicting depressive and anxiety symptoms. Third, a combination of negative affect and anxious cognitions significantly predicted anxiety symptoms, whereas a combination of negative affect, depressive cognitions, and low positive affect significantly predicted depressive symptoms. Although only partial

support for the CCSH was found, the findings support the assertion that an affective profile descriptive of social avoidance, along with depression-related cognitions, may be associated with the most pervasive socio-emotional difficulties.

More recently, Luebbe and colleagues (2010) examined the links between affect, SIP styles, and internalizing problems in a community sample of fifth- and sixth-grade students. Analyses revealed that negative interpretation styles partially mediated the relations between negative affect and both anxiety and depression. Moreover, low positive information processing partially mediated the link between low positive affect and depression, but not anxiety. Again, these findings suggest that temperamental profiles associated with distinct subtypes of social withdrawal may be associated with specific maladaptive cognitions which, in turn, predict differences in associated socio-emotional outcomes.

The Developmental Progression from Temperamental, to Cognitive Risk Factors, to Internalizing Problems: A Mediation Model

Parallel lines of research have identified both social withdrawal and maladaptive cognitions as risk factors for the emergence of internalizing problems, particularly social anxiety and depression. Moreover, theoretical and empirical evidence have linked social withdrawal to maladaptive cognitions. Despite converging evidence suggesting significant overlap between social withdrawal, cognitive distortions, and internalizing problems, very little is known about the potentially complex nature of the associations among these constructs.

It has been suggested that temperament, maladaptive cognitions, and socio-emotional maladjustment may function as part of a broader developmental network or

system (e.g., LoBue & Pérez-Edgar, 2014; Morales, Pérez-Edgar, & Buss, 2015; Pérez-Edgar et al., 2014; Puliafico & Kendall, 2006; Reeb-Sutherland et al., 2014). For example, Lonigan, Vasey, Phillips, and Hazen (2004) proposed a model that integrates temperament and cognition in the development of anxiety. According to their model, reactive and effortful temperamental processes present a developmental risk for anxiety; however, this association is partially accounted for by the failure to override reactive control of attention (i.e., maladaptive cognition). In other words, attentional bias toward threat *mediates* the link between temperamental processes and pathological anxiety.

Lonigan et al. (2004) provided evidence to support the various components of their model by drawing upon relevant empirical findings; however, they did not directly test the full model.

In fact, very little empirical work has applied this model to gain a better understanding of the development of internalizing problems. As such, the primary goal of the current research was to explore a developmental sequence by testing direct and indirect pathways linking developmental vulnerabilities to internalizing problems via cognitive biases (Lonigan et al., 2004; Viana & Gratz, 2012; Weeks et al., 2016; White, Helfinstein, & Fox, 2010). More specifically, it was proposed that social withdrawal would present developmental vulnerabilities for maladaptive cognitive styles, which in turn would contribute to the emergence of more severe internalizing difficulties (Gazelle & Rubin, 2010). Moreover, it was postulated that subtypes of social withdrawal would predict distinct maladaptive cognitive patterns which, in turn, would differentially contribute to the development of social anxiety and depression.

Empirical support. Although limited, preliminary support for the proposed mediated model comes primarily from the shyness and temperament literature. In an earlier study, Alfano, Joiner, and Perry (1994) examined the attributional styles of shy and non-shy university students. They found that shy students reported higher levels of depression and had more negative attributional styles than their non-shy counterparts. Moreover, shyness no longer predicted depression once the effect of attributional style was removed, suggesting that cognitions mediated these associations. Although these findings do not directly support the notion that shyness may present risk for threatening cognitions and anxiety, it is important to note that shared associations with social avoidance and anxiety were not accounted for in this study. Nevertheless, this study provided initial evidence to support the mediated model.

More recently, Viana and Gratz (2012) hypothesized a model wherein cognitive biases mediated the links between temperament (i.e., BI and anxiety sensitivity) and anxiety symptoms in emerging adults. Results from structural equation modeling (SEM) provided support for their hypothesized model. In a similar study, Dragan and Dragan (2014) examined the nature of the associations between temperament, anxiety, and maladaptive metacognition (i.e., the aspect of cognition responsible for processing, regulation, and organization of cognitions; Moses & Biard, 1999) in a clinical sample of anxious adults. SEM analyses supported a model in which the links between temperamental traits and anxiety were fully mediated by metacognition.

Similar support for this mediating pattern has also been found in children and adolescents (Bell et al., 2009; Broeren, Muris, Bouwmeester, van der Heijden, & Abee, 2011; Luebke et al., 2010; Weeks et al., 2016; see Study 3 for more details). Thus,

although these studies have not directly assessed the role of social withdrawal in these associations, the findings support a developmental progression from temperamental to cognitive risks culminating in the emergence of internalizing problems. Taken together, the limited research in this area supports the mediating effect of cognitive processes in the links between shyness (and/or temperamental traits associated with shyness) and internalizing difficulties. However, it remains unknown how other subtypes of social withdrawal may be differentially linked to internalizing problems via maladaptive cognitions.

Order of the mediation model. Given the proposed mediated model, a certain level of causality, or temporality, among the variables must be established (Baron & Kenny, 1986). Despite the empirical evidence presented, it is necessary to provide a reasonable rationale for the order of the model, whereby social withdrawal leads to maladaptive cognitive styles which, in turn, lead to subsequent internalizing problems.

Findings from the extant literature suggest that the three constructs of interest have different developmental origins (White et al., 2010). As such, it is reasonable to argue that certain factors may have temporal precedence over others (Viana & Gratz, 2012). To begin, it has been well established that social withdrawal is strongly linked to biologically based temperamental traits that are stable and identifiable early in life (e.g., BI, emotionality) (Fox, 2004). Indeed, subtypes of withdrawal have also been conceptualized as temperamental traits (e.g., Coplan et al., 2013), as they emerge early in life (i.e., toddlerhood, preschool) and appear to have biological origins (Kagan et al., 1988).

Whereas social withdrawal emerges in early childhood as a result of biological predispositions, it has been argued that cognitive biases and internalizing problems arise only when the necessary cognitive, social, and emotional skills have developed (Field & Lester, 2010). For example, since cognitive and neurological changes occur throughout childhood and into adolescence (Field & Lester, 2010), it has been postulated that higher-order cognitive patterns may not be stabilized in early childhood (Harter, 2003). As such, certain cognitive biases would not be expected to be present as early as temperamental predispositions. Indeed, research suggests that the capacity for biased cognitions may not be present before the age of 4 (Creswell et al. 2011; LoBue & Pérez-Edgar, 2014; Pillow & Henrichon, 1996).

Furthermore, it is well established that the prevalence of clinical diagnoses of emotional problems sharply increases during adolescence and emerging adulthood (Beesdo et al., 2007; Kessler et al., 2001; Kessler et al., 2005). Thus, although there is evidence to suggest that internalizing difficulties are present in very young children (e.g., Egger & Angold, 2006; Ooi, Nocita, Coplan, Zhu, & Rose-Krasnor, 2017), more severe internalizing problems generally do not begin to develop until later in childhood. Indeed, evidence from the experimental psychopathology literature supports the notion that cognitive biases serve as a precursor to internalizing symptoms (Mathews & MacLeod, 2005; Yiend & Mathews, 2002). Taken together, it is argued that social withdrawal emerges well before cognitive distortions, which in turn precede internalizing problems (Rapee & Heimberg, 1997; Viana & Gratz, 2012).

Viana and Gratz (2012) further provided evidence to support the order of the mediation model by testing different pathways to explain the interrelations among

temperament, cognitive biases, and anxiety. The authors first tested the hypothesized model, which modeled temperament as the predictor, anxiety as the outcome, and cognitive biases as the mediator. The authors also tested an alternative model wherein temperament predicted anxiety which, in turn, predicted cognitive biases. Comparison of the competing models revealed that the hypothesized model proved to be the best fit. Gramszlo, Geronimi, Arellano, and Woodruff-Borden (2018) similarly tested the order of effects in their study examining the links between attentional control and worry, fearful temperament, and anxiety. Results indicated that maladaptive cognitions mediated the effects of temperament on anxiety, but not the effects of anxiety on temperament. Together, these studies provide robust evidence to support the order of the proposed mediated model.

Overview of this Dissertation

To summarize, social withdrawal appears to be a multi-dimensional construct, with subtypes displaying unique patterns of associations. Whereas unsociability appears to be a relatively benign form of social withdrawal, shyness and social avoidance appear to be associated with a number of maladaptive outcomes, including social-cognitive and internalizing difficulties. Parallel streams of research have highlighted the cognitive and developmental risk factors in the emergence of internalizing difficulties. Despite theoretical and empirical support for a model linking social withdrawal to internalizing problems through social cognitions, few studies have explored such a model (Alfano et al., 1994; Weeks et al., 2016). Moreover, no study to date has examined social withdrawal as a multi-dimensional construct within this model. As such, there is clearly a need to identify potential cognitive patterns through which subtypes of social withdrawal

may be associated with internalizing problems, particularly social anxiety and depression. Even at subclinical levels, internalizing problems in childhood and adolescence are strong predictors of concurrent and subsequent socio-emotional and mental health difficulties (Ashford et al., 2008; Filho et al., 2010). If maladaptive cognitions do account for these associations, then they may be regarded as early markers of increased risk for anxiety and depression among shy and socially avoidant youth.

Three studies were conducted as part of this integrated thesis. The overarching research goal was to test a conceptual model linking subtypes of social withdrawal, social cognitions, and internalizing problems in emerging adults and early school-aged children. More specifically, a model depicting a developmental progression from social withdrawal to cognitive risks, resulting in the emergence of internalizing difficulties was tested in each study, while taking the relevant developmental considerations into account.

Studies 1 and 2 explored the potential mediating effects of maladaptive cognitions in the links between subtypes of social withdrawal and internalizing problems in two samples of undergraduate students. Moreover, the potential influence of specific cognitive content on the development of distinct internalizing problems (i.e., social anxiety and depressive symptoms) was examined. In *Study 3*, a similar conceptual model was tested to assess the nature of these associations in a younger sample (i.e., 6- to 9-year-olds). However, given the importance of peer relations in childhood (Rubin, Bukowski, & Bowker, 2015), the role of peer problems was additionally included in the conceptual model (see *Study 3* for more details). Finally, although not the primary focus of this dissertation research, past research has suggested that child gender may play a role

in some of these associations (e.g., Doey et al., 2014). As such, where appropriate, gender effects were examined.

**Study 1 – Social Withdrawal, Maladaptive Cognitions,
and Internalizing Problems in Emerging Adulthood**

Emerging adulthood represents a developmental period during which individuals are establishing autonomy, developing identity, building meaningful friendships and romantic relationships, and often living with non-family members for the first time (Layland, Hill, & Nelson, 2018; Rogers, Willoughby, & Nelson, 2016). During this time, several new social relationships need to be established (e.g., with peers, co-workers, superiors, etc.), often in unfamiliar environments (e.g., university, new job) (Nikitin & Freund, 2008). Thus, emerging adulthood represents a time when individuals are often required to learn how to navigate and manage new social situations and interactions on their own (Nelson, 2013). This developmental period also marks of time during which emerging adults experience feelings of ‘in-betweenness’ (i.e., not seeing themselves as adolescents or adults), and are faced with personal challenges, such as identity formation and focus on the self (Nelson & Padilla-Walker, 2013). Taken together, emerging adulthood presents increased opportunity for social- and self-evaluation. As such, maladaptive thoughts related to these tasks (and their associated implications for social and emotional well-being) may be particularly important to explore during emerging adulthood. Although this developmental period may be challenging for many (Nelson & Padilla-Walker, 2013), it may be a particularly difficult time for those who struggle in social situations or with negative feelings of the self. For example, shy and avoidant emerging adults appear to be at risk for lower self-esteem, internalizing problems, and lower relationship satisfaction and quality as compared to their non-withdrawn peers (Nelson, 2013; Nelson et al., 2008; Tackett, Nelson, & Busby, 2013).

Such developmental changes and transitions also happen to coincide with an increase in the occurrence of anxiety and mood disorders. For example, the typical age of onset for general and social anxiety disorders falls between adolescence and emerging adulthood (Beesdo et al., 2007; Beesdo et al., 2009; Kessler et al., 2005; Mesa, Nieves, & Beidel, 2011; Rapee et al., 2009). Depressive disorders seem to appear somewhat later and across a wider developmental period, with reports of onset ranging from late adolescence to mid-adulthood (Cicchetti & Toth, 1998; Kessler et al., 2005). Moreover, starting in adolescence and continuing into adulthood, females show a marked increase in internalizing disorders and symptoms (Saluja et al., 2004; Zahn-Waxler et al., 2000; Zahn-Waxler et al., 2008). As such, there is reason to suspect that gender may further impact upon the hypothesized relations with regards to anxiety and depression during emerging adulthood.

Elevated but subclinical symptoms of anxiety and depression appear to be associated with many of the same maladaptive concomitants of clinically diagnosed disorders and can cause significant impairment in daily functioning (Cole, Peeke, Martin, Truglio, & Seroczynski, 1998; Filho et al., 2010; Zahn-Waxler et al., 2000). Elevated symptoms of anxiety and depression appear to be extremely prevalent in community samples (Cooper, & Goodyer, 1993; Muris, Merckelbach, Mayer, & Prins, 2000), similarly peaking in mid-to-late adolescence (Van Oort, Greaves-Lord, Verhulst, Ormel, & Huizink, 2009). For example, Kessler and colleagues (2001) found that 20-50% of adolescents self-reported depressive symptoms that exceeded cut-off points for significant depression. In contrast, clinical depression based on diagnostic interviews only yielded prevalence estimates between 1-6%. The authors speculated that this

discrepancy was reflective of a substantial proportion of adolescents and emerging adults who suffer from sub-threshold depression.

There is also evidence to suggest that maladaptive cognitions may exert a stronger influence on both anxiety and depression in later adolescence (Stuijtzand, Creswell, Field, Pearcey, & Dodd, 2017). For example, Weems and colleagues (2001) examined the links between threat-related cognitive biases and anxiety in a sample of 6- to 17-year-old children and adolescents. Results indicated that threatening cognitive biases were more strongly associated with anxiety with increasing age. Similarly, Neshat-Doost et al. (Neshat-Doost, Taghavi, Moradi, Yule, & Dagleish, 1998) examined the cognitions of 10- to 17-year-old depressed and non-depressed youth, and reported that the association between depression and negative biases became stronger with age. Thus, emerging adulthood may represent a time when maladaptive cognitions are particularly harmful for emotional adjustment.

Finally, evidence of gender differences in cognitions is limited and somewhat inconsistent. Given the gender imbalance in anxious and depressive symptoms between males and females during emerging adulthood, it is plausible to suspect that females may exhibit more corresponding maladaptive cognitions. However, findings regarding gender differences in cognitive biases have not been consistent (e.g., Gluck, Lynn, Dritschel, & Brown, 2014; Marston et al., 2010; Miers, Blöte, Bögels, & Westenberg, 2008). Moreover, no research has explored gender differences in the links between subtypes of social withdrawal and social cognitions. As such, it is unknown whether subtypes of social withdrawal are differentially associated with social-cognitive patterns across genders. Nonetheless, emerging adulthood appears to be an important developmental

period during which to explore the social, cognitive and emotional risks associated with socially withdrawn behaviours.

Few studies have directly tested Beck's (1976) CCSH. Accordingly, one of the aims of Study 1 was to explore whether social anxiety and depressive symptoms were related to specific cognitive patterns. Furthermore, in addition to exploring the linear associations between the constructs of interest, more complex, conceptually derived mediating effects were explored in order to test the conceptual model. Specifically, a wide range of maladaptive cognitions and internalizing outcomes were examined in order to develop a better understanding of if and how social-cognitive patterns might account for the links between subtypes of social withdrawal and internalizing symptoms in a sample of emerging adults.

Aims and Hypotheses

Based on previous assertions that all social cognitions share an underlying mechanism (Mathews et al., 1997), it was expected that all threatening and negative cognitions would be moderately positively correlated (Beck & Perkins, 2001). However, in keeping with Beck's (1976) CCSH, it was expected that convergent cognition-symptomatology relations (i.e., threatening cognitions/social anxiety and negative cognitions/depressive symptoms) would be stronger than divergent relations (i.e., threatening cognitions/depressive symptoms and negative cognitions/social anxiety) (e.g., Beck et al., 1987; Beck & Perkins, 2001; Heimberg et al., 1987; Lambertson & Oei, 2008).

More specific associations regarding subtypes of social withdrawal were also expected. Drawing upon previous findings, unsociability was not expected to be

associated with internalizing problems or maladaptive cognitions. In contrast, both shyness and social avoidance were expected to predict both negative and threatening cognitions (Coplan et al., 2013; Gazelle & Druhen, 2009; Jackson et al., 1997), as well as both social anxiety and depressive symptoms (Coplan et al., 2013; Nelson, 2013). However, given the conceptual and empirical links between shyness and social anxiety (Rapee & Heimberg, 1997; Rapee & Spence, 2004), shyness was expected to be more strongly predictive of social anxiety symptoms (Kim et al., 2008) and threatening cognitions (Weeks et al., 2016). In contrast, given the conceptual overlap between social avoidance and depression (Coplan & Armer, 2007), social avoidance was expected to be uniquely predictive of depressive symptoms (Kim et al., 2008) and negative cognitions (Coplan et al., 2013).

More specific causal pathways linking shyness and social avoidance to specific internalizing problems were also predicted. The indirect effects of shyness and social avoidance on internalizing problems were tested using a multiple mediation model (see Figure 2), allowing for various pathways between subtypes of social withdrawal and internalizing problems via maladaptive cognitions to be explored simultaneously. Given the expected inter-correlations among the variables of interest, multiple significant pathways were expected. However, it was hypothesized that threatening cognitions would account for a greater amount of the variability in the links between shyness and social anxiety than negative cognitions. Conversely, it was hypothesized that negative cognitions would account for a greater amount of variability in the links between social avoidance and depression than threatening cognitions.

Finally, previous findings have suggested that gender might be important to

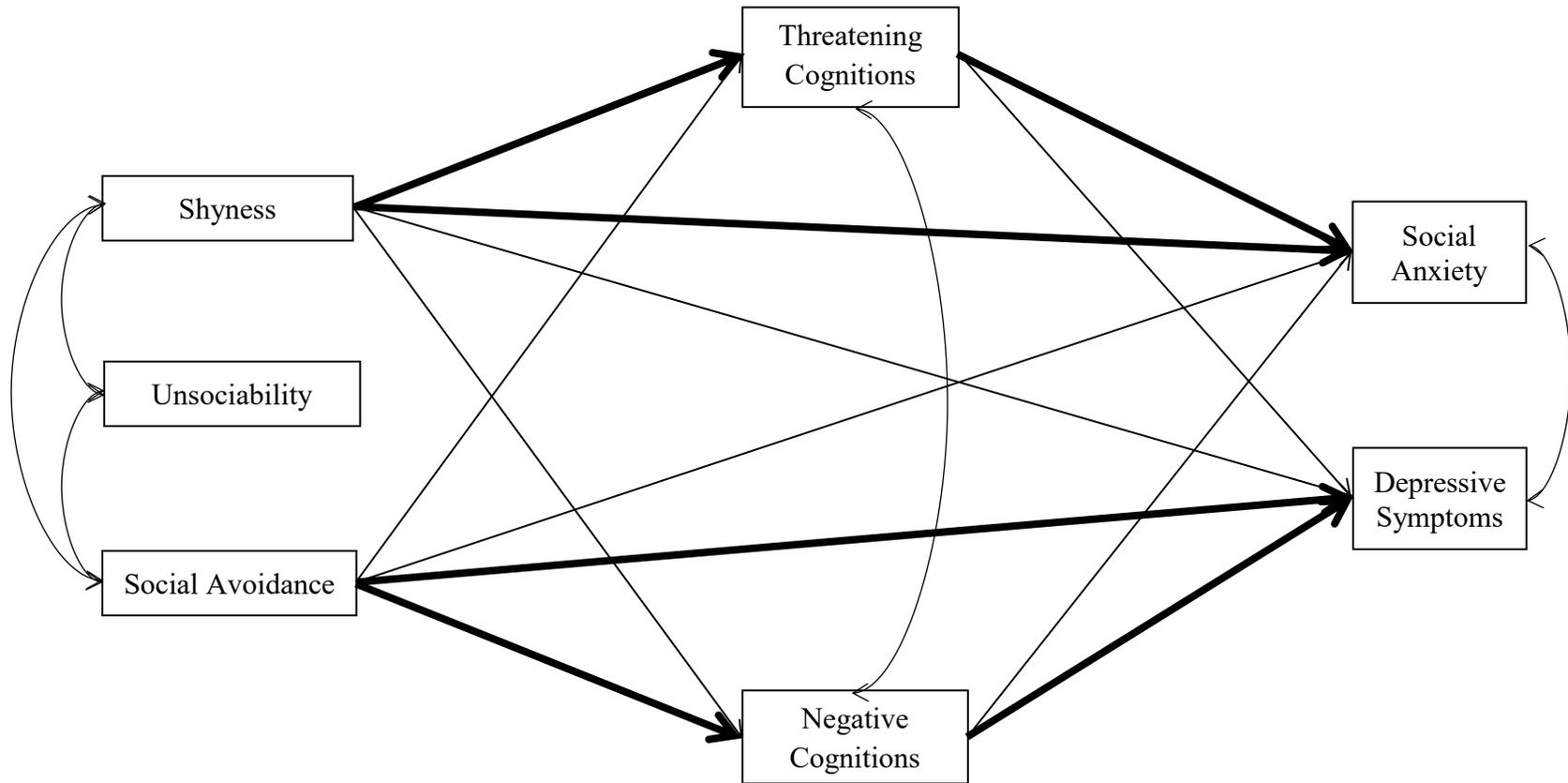


Figure 2. Conceptual multiple mediation model for subtypes of social withdrawal, maladaptive cognitions, and internalizing problems.

consider. For example, in keeping with previous research (Saluja et al., 2004; Zahn-Waxler et al., 2000; Zahn-Waxler et al., 2008), it was expected that females would display more symptoms of social anxiety and depression than males. However, due to a lack of theoretical or empirical justification, no specific hypotheses were made with regards to gender differences in the display of maladaptive cognitions. Nevertheless, potential differences in the model between males and females were explored.

Method – Study 1

Participants

Participants in Study 1 were $N = 451$ undergraduate students (278 females, 169 males) between the ages of 17 and 25 ($M_{age} = 19.17$ years, $SD = 1.40$). Upon obtaining approval from the *Carleton Psychology Research Ethics Board*, participants were recruited using the Carleton undergraduate participant pool (SONA). Participants were given 0.5% credit in a psychology course for their participation. After providing informed consent, participants completed a short demographic questionnaire (age, gender), followed by a series of self-report questionnaires online using FluidSurveys, a Canadian online survey service based in Ottawa, Ontario. After completing the study, participants were given a debriefing form explaining the purpose of the study and providing contact information for appropriate resources pertinent to the material addressed in the study.

Measures

Social withdrawal subtypes. Participants completed the Social Preference Scale for Emerging Adults (SPS-EA; Nelson, 2013; see Appendix A), a self-report assessment of multiple subtypes of social withdrawal for use with emerging adults. Using factor analysis, Nelson (2013) identified four factors, with factor loadings ranging from .41 to

.93. The first factor was labelled *shy* (6 items; $\alpha = .91$), and included items such as “I’d like to hang out with other people, but I’m sometimes nervous to”. The second factor was labelled *unsociable* (4 items; $\alpha = .62$), and included items such as “I’m just as happy to be by myself as with other people”. The third factor, *socially avoidant* (6 items; $\alpha = .82$), included items such as “I don’t really like being with other people and prefer being alone”. A fourth factor was identified as *isolated* (4 items; $\alpha = .89$), but was not considered to represent internal reasons for solitude. As such, items representing the first three factors were of particular interest. Participants were asked to rate their agreement with each item on a 5-point scale, ranging from 1 = *strongly disagree* to 5 = *strongly agree*. Items within each subscale were averaged in order to generate summary scores, with higher values indicating higher levels of withdrawn motivations. Consistent with previous findings (Nelson et al., 2016), internal consistency reliabilities were good-to-excellent in the current study for the shyness ($\alpha = .92$), unsociability ($\alpha = .80$), and social avoidance ($\alpha = .83$) subscales.

Threatening cognitions. Participants completed several assessments of threatening cognitions. First, participants completed the *Outcome Probability Questionnaire* (OPQ) and the *Outcome Cost Questionnaire* (OCQ; Uren, Szabó, & Lovibond, 2004; see Appendix B) as assessments of their tendency to anxiously expect or exaggerate the probability and cost of negative social and physical events. Previous findings have demonstrated that socially wary individuals do not show judgement biases in response to non-social or physical events (Banerjee & Henderson, 2001; LoBue & Pérez-Edgar, 2014; Micco et al., 2013; Stopa & Clark, 2000). As such, only the negative *social events* subscales of the OPQ and the OCQ were included in the current study. The

OPQ and OCQ are comprised of the same 12 items (e.g., “You will sound dumb while talking to others”, “At a party, others will notice that you are nervous”). Participants were asked to rate how likely (i.e., probable) each event was to happen to them, and how bad or distressing (i.e., costly) they would be for them if they were to occur on a 9-point Likert scale ($0 = \textit{not at all}$ to $8 = \textit{extremely}$). Summary scores were generated by averaging the items within each scale, with higher values reflecting greater probability or cost of negative events. Consistent with previous findings (Morgan et al., 2014; Uren et al., 2004; Weeks et al., 2016), high internal consistencies were found for the social subscales of both the OPQ ($\alpha = .91$) and the OCQ ($\alpha = .94$).

As an assessment of interpretation biases, participants completed the *Ambiguous Social Situation Interpretation Questionnaire* (ASSIQ; Stopa & Clark, 2000; see Appendix C). The ASSIQ is a 24-item measure designed to assess interpretations of 14 ambiguous social situations (e.g., “Some people you know are looking in your direction and talking”) and 10 non-social control situations (e.g., “You feel short of breath”). Each of the hypothetical situations was followed by three possible explanations (one negative, two benign) and participants were asked to rank-order the explanations in terms of the extent to which they would be likely to come to mind. A score of 1, 2, or 3 was assigned to each item based on how the negative interpretation was ranked. Scores for all social items were then averaged to create a total score, with higher values reflecting greater negative interpretation bias. The ASSIQ has previously been used to measure interpretation biases in clinical and community samples (Bowler et al., 2012; Saleminck, van den Hout, & Kindt, 2009; Stopa & Clark, 2000). Consistent with previous studies

(Kingsbury & Coplan, 2016), rankings of negative interpretations demonstrating good internal consistency ($\alpha = .84$) in the current study.

As an assessment of rejection sensitivity, participants completed the *Rejection Sensitivity Questionnaire* (RSQ; Downey & Feldman, 1996; see Appendix D). The RSQ consists of 18 social scenarios in which rejection is possible (e.g., “You ask someone in class if you can borrow his/her notes”, “You ask someone you don’t know well out on a date”). For each situation, respondents were asked to indicate the extent to which they feel anxious or concerned about the outcome on a 6-point scale ($1 = \textit{very unconcerned}$ to $6 = \textit{very concerned}$), with higher scores representing greater concern about possible rejection. Participants were also asked to rate the likelihood that the other person would respond in an accepting way ($1 = \textit{very unlikely}$ to $6 = \textit{very likely}$), with higher values reflecting greater expectations of acceptance. For each item, the expectancy score was reversed and multiplied by the concern score, and a mean total rejection sensitivity score was computed for all items. The RSQ has previously been used in a sample of undergraduate students, and has shown high internal reliability ($\alpha = .83$) and test-retest reliability ($r = .78$) (Downey & Feldman, 1996; Watson & Nesdale, 2012). High internal consistency was found in the current study ($\alpha = .89$).

Negative cognitions. As an assessment of the negative thoughts, participants completed the *Cognitive Triad Inventory* (CTI; Beckham, Leber, Watkins, Boyer, & Cook, 1986; see Appendix E). The CTI is a 36-item measure (including 6 filler items) designed to assess participants’ views of the *self* (CTI-S; e.g., “I can’t do anything right”), the *world* (CTI-W; e.g., “The world is a very hostile place”), and the *future* (CTI-F; e.g., “There is nothing to look forward to in the years ahead”). Although the CTI can

also be represented as a single total score, scores for the three subscales (10 items each) were computed in the current study. Respondents rated the extent to which each statement was consistent with their own view on a 7-point scale ($1 = \textit{totally agree}$ to $7 = \textit{totally disagree}$). Negatively phrased items were reverse coded, and summary scores were obtained by adding the scores within each subscale, with higher values representing more negative views. Consistent with previous findings (Beckham et al., 1986), high internal consistency was found for all three subscales ($\alpha = .82$ to $.93$) in the current study.

Social anxiety symptoms. Participants' symptoms of social anxiety were assessed using the *Social Interaction Anxiety Scale* (SIAS; see Appendix F) and its companion scale, the *Social Phobia Scale* (SPH; see Appendix G; Mattick & Clarke, 1989, 1998). Whereas the SIAS focuses on anxiety related to social interaction, the SPH is designed to assess fear of scrutiny by others (Mattick & Clarke, 1989). As such, the SIAS and the SPH are often administered together and treated as subscales of a broader assessment of social anxiety (Safren, Turk, & Heimberg, 1998). Each scale consists of 20 items. Sample items from the SIAS include "I worry about expressing myself in case I appear awkward" and "I tense up if I meet an acquaintance in the street". Sample items from the SPH include "I get tense when I speak in front of other people" and "I feel awkward and tense if I know people are watching me". For both scales, respondents were asked to indicate the degree to which they felt each statement was characteristic or true for them on a 5-point Likert scale, ranging from $0 = \textit{not at all}$ to $4 = \textit{extremely}$. Items from each scale were averaged to create summary scores, with higher values reflecting higher symptoms of social anxiety.

There is substantial support for the reliability and validity of both the SIAS and

the SPH as measures of social anxiety in clinical and community samples, including high internal consistency ($\alpha = .85$ to $.94$) and good test-retest reliability at intervals of up to 13 weeks ($r = .91$ to $.93$) (Heimberg, Mueller, Holt, Hope, & Liebowitz, 1992; Mattick & Clarke, 1998). In the current study, both the SIAS ($\alpha = .93$) and the SPH ($\alpha = .95$) demonstrated excellent internal consistency.

Depressive symptoms. The 21-item *Beck Depression Inventory* (BDI; Beck, Emery, & Greenberg, 1996; see Appendix H) was used to assess symptoms of depression. Participants were presented with questions about how they had been feeling in the last two weeks. Items covered a range of depressive symptoms, including changes in sleep, appetite, and mood, and were rated on a 4-point scale. Each item consists of a set of choices that ranged in intensity (e.g., “0 = I do not feel sad”, “1 = I feel sad,” “2 = I am sad all the time and can’t snap out of it”, or “3 = I am so sad and unhappy that I can’t stand it”). Item scores were averaged, with higher values representing greater symptoms of depression. The BDI has been found to have high internal consistency ($\alpha = .91$ to $.93$) (Beck et al., 1996; Dozois, Dobson, & Ahnberg, 1998; Osman, Barrios, Gutierrez, Williams, & Bailey, 2008) and test-retest reliability ($r = .73$ to $.96$) in clinical and non-clinical samples (Wang & Gorenstein, 2013). The BDI again demonstrated evidence of excellent internal consistency in the current study ($\alpha = .93$). Of note, the item regarding suicidal ideation was removed from the measure.

Depressive symptoms were also assessed using the *Depressive Attributions Questionnaire* (DAQ; Kleim, Gonzalo, & Ehlers, 2011; see Appendix I). The DAQ is a 16-item measure of depressive attributions. Respondents were asked to indicate the degree to which they agreed with each item on a 5-point Likert scale, ranging from 0 =

not at all to 4 = *very strongly* (e.g., “Bad things always happen to me”). Although originally developed to assess causal attributions of negative events, it has been suggested that the DAQ may serve as a screening measure for risk of depression as it has been found to be highly correlated with scores on the BDI ($r = .63$ to $.79$), and can distinguish between participants with and without concurrent major depression (Kleim et al., 2011)¹. Items were averaged to create individual scores, with higher values reflecting higher symptoms of depression. The DAQ has been found to be psychometrically sound, valid, and reliable ($\alpha = .91 - .96$) (Cruwys, South, Greenaway, & Haslam, 2015; Gonzalo, Kleim, Donaldson, Moorey, & Ehlers, 2012; Kleim et al., 2011). In the current study, the DAQ demonstrated excellent internal consistency ($\alpha = .94$).

Statistical Analysis Plan

Preliminary analyses. Data were screened for potential errors in data entry and then examined for missing values. Examination of the data for univariate and multivariate outliers was conducted, followed by testing of assumptions, multicollinearity, and normality. Finally, bivariate correlations among all study variables were conducted, and main effects of gender were tested through a series of one-way MANOVAs (with follow-up univariate analyses using Bonferroni correction, where appropriate).

Structural equation modeling. The primary analyses involved testing the hypothesized conceptual model using structural equation modeling (SEM). Kline (2016) describes SEM as a technique which allows researchers to test causal relations among variables of interest (while controlling for other potential effects), using experimental and

¹ It is worth noting that treating the DAQ as a latent indicator of negative cognitions in the SEM models did not fit the data well, further suggesting that the measure may be more appropriately utilized as an assessment of depressive symptoms.

non-experimental designs. Primary limitations to more traditional methods such as ANOVA and regression are that they: (a) can only include observed (i.e., measured) variables; and (b) assume that variables are measured without error – an assumption that is almost always violated in practice. SEM addresses these limitations by allowing for the analysis of relations between both observed and unobserved (i.e., hypothetical) latent variables (LV). Observed variables are used as indicators of an underlying latent factor, allowing for a reduction in measurement error by pooling shared error across indicators using confirmatory factor analysis (CFA) techniques (Hancock & Mueller, 2006). Moreover, remaining unique residual error for each indicator that is not explained by the LV is also represented in the model.

Indeed, SEM has been found to be a superior method for testing complex mediation effects (see Iacobucci, Saldanha, & Deng, 2007 for a full review). To begin, SEM allows for examination of data involving multiple independent, mediating, and dependent variables. Next, SEM has the ability to assess the overall fit of the model as well as individual parameters, and is more capable of handling non-normal data. Finally, the simultaneous estimation (versus estimations from a series of models) of all parameters in a model leads to smaller standard errors. Accordingly, given the aims of the current research, SEM was deemed the most appropriate approach for analyzing the data.

All analyses were conducted using Maximum Likelihood with Robust standard errors (MLR) in Mplus 7.4 (Muthén & Muthén, 1998-2015). In order to maximize the use of the dataset, Full Information Maximum Likelihood (FIML) was used to handle missing data as it ensures that cases with missing values on certain variables are not deleted from the analysis. FIML allows the likelihood function to be computed separately

for each case, based on unique combinations of missing and present values (Dong & Peng, 2013). FIML is considered to be one of two gold standard approaches for handling missing data as it leads to unbiased parameter estimates and accurate model fit statistics with efficient standard errors when using incomplete data sets, even when data are not Missing Completely at Random (MCAR) (Enders & Bandalos, 2001).

In order to address the research questions in the current study, a two-step process was followed to help diagnose model misspecification in the data (Anderson & Gerbing, 1988). First, a measurement model was constructed, and included all latent factors in the model. After establishing appropriate fit for the measurement model, structural associations were then added to the model, with alterations (i.e., model building) conducted only when theoretically and statistically supported. Unless otherwise stated, standardized parameter estimates are presented for all findings.

For all structural equation models, multiple indices were considered in evaluating *model fit*. Based on previously established guidelines, several indices were evaluated (goodness of fit criteria in parentheses) including: (a) Chi Square (χ^2 ; non-significant statistic is preferred, but often not present in large sample sizes); (b) Root Mean Square Error of Approximation (RMSEA; < .05 for good fit, < .08 for acceptable fit); (c) Standardized Root Mean Square Residual (SRMR; < .08 for good fit, < .10 for acceptable fit); and (d) Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) (both > .95 for good fit, > .90 for acceptable fit) (Hu & Bentler, 1999; Kline, 2016). In instances of model misfit, modification indices were examined while considering theory, and only theoretically meaningful modifications were made to the model.

Various guidelines for *comparing* model fit have also been proposed in the

literature (Chen, 2007), depending on the nature of the comparisons. For nested models, χ^2 difference tests can be conducted to determine whether the addition or removal of structural paths significantly affect model fit. If the χ^2 difference value does not exceed the critical χ^2 value, then it can be concluded that the resulting change(s) did not significantly affect model fit (Schreiber, Nora, Stage, Barlow, & King, 2006). For non-nested models, Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) can be compared across models, with lower values preferred (Kline, 2016).

Results – Study 1

Preliminary Analyses

Missing data. For the full dataset, 5.5% of all data points were missing, with missing data rates ranging from 0.9% to 10.9% for each study variable. Little's (1988) MCAR test was not significant, $\chi^2(942) = 975.442, p = .219$, suggesting that the pattern of missingness was not systematic.

Outliers. Potential univariate outliers were identified by examining *z*-scores for values greater than 3.29 (i.e., 3 *SDs* from the mean; Tabachnick & Fidell, 2007). Eight cases were identified as potential outliers. However, the presence of outliers is expected in large datasets, and may represent legitimate cases in the population (Kline, 2016). Moreover, given that the deletion of these values did not affect the overall results, the original values were retained.

Mahalanobis distance values were then examined in order to identify potential multivariate outliers in the dataset. Mahalanobis distance values greater than the corresponding critical χ^2 value (at $p < .001$) were flagged as potential multivariate outliers. Multiple regressions with all predictor variables were run for each dependent

variable. For each dependent variable, between 2 and 4 cases raised concern as potential multivariate outliers. Alteration or removal of such cases is generally not recommended, as they may be a true representation of the phenomenon being studied and are not likely to influence results when sample sizes are large. Indeed, deleting these cases did not significantly alter the pattern of results and, as such, these cases were retained.

Multicollinearity. Given that many of the constructs of interest were expected to be highly related, multicollinearity in the dataset was examined. Tolerance values were all above the suggested cut-off value of $> .10$ (range: .23-.80), and variance inflation factor (VIF) values were well below the suggested value of < 10 (range: 1.26-4.34), indicating that there were no problems with multicollinearity in the dataset.

Testing of assumptions. Assumptions of normality, linearity, independence, and homoscedasticity were tested in the data. Examination of normal probability plots did not indicate any substantive departure from normality. Bivariate scatterplots of all predictor and outcome variables were examined to identify potential non-linear (i.e., quadratic) associations. No obvious curvature was apparent in all cases. Finally, plots of residual versus predicted values gave no major indication of heteroscedasticity, suggesting constancy of variance (i.e., homoscedasticity). As such, transformations were not deemed necessary in the current sample.

Skewness. Several variables in the dataset met the criteria for being significantly skewed (i.e., z -scores > 1.96). However, this is expected in large (i.e., > 300) samples, and it is therefore recommended to rely on histograms and absolute values of skewness, rather than relying on z -scores (Kim, 2013). Examination of histograms suggested that all continuous variables had reasonably distinct tails and, as such, would likely not be

dramatically improved by transformations. Moreover, none of the main study variables exceeded reference skew values (i.e., > 2) indicating substantial non-normality (range: .04-.81). More importantly, some degree of non-normality was expected due the nature of the constructs being explored. Accordingly, transformations of the data were not conducted as it has been argued that transforming an inherently non-normal variable to force a normal distribution may have adverse implications (Kline, 2016). Moreover, transformations would result in variables that were no longer in an easily interpretable metric (Feng et al., 2014). Instead, a more robust estimation method that does not assume normality (i.e., MLR) was used to adjust for the potential impact of skewed variables.

Descriptive statistics and bivariate correlations. Descriptive statistics and correlations for all main study variables are presented in Table 1. All main study variables (with the exception of unsociability) were significantly and positively inter-associated. Unsociability was significantly and positively associated with shyness, social avoidance and some indices of internalizing problems (social interaction anxiety, social phobia, depressive symptoms), but was not significantly related to maladaptive cognitions. Age was only significantly and positively correlated with social avoidance ($r = .12, p = .015$). Of note, controlling for age in subsequent SEM analyses did not alter the pattern of results or improve model fit, and as such, results are presented without controlling for this variable.

Gender differences. A series of MANOVAs was performed to test for gender differences in social withdrawal, cognitions, and internalizing problems. Results from the first MANOVA indicated a significant multivariate main effect of gender on social withdrawal, $F(3, 417) = 3.936, p = .009$, Wilks' $\lambda = .972, \eta^2_p = 0.028$. Follow-up

Table 1

Descriptive Statistics and Bivariate Correlations among Main Study Variables (N = 451)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Shy	-													
2. Unsoc	.29***	-												
3. Avoid	.44***	.49***	-											
4. RSQ	.56***	.06	.27***	-										
5. OPQ	.49***	.08	.24***	.50***	-									
6. OCQ	.47***	.09	.23***	.48***	.63***	-								
7. ASSIQ	.37***	.02	.20***	.51***	.48***	.44***	-							
8. CTI-S	.31***	-.03	.15**	.42***	.31***	.25***	.42***	-						
9. CTI-W	.24***	-.02	.12*	.35***	.23***	.24***	.36***	.80***	-					
10. CTI-F	.27***	-.06	.13**	.33***	.23***	.21***	.36***	.84***	.82***	-				
11. SIAS	.75***	.20***	.44***	.62***	.57***	.58***	.55***	.45***	.39***	.39***	-			
12. SPH	.55***	.11*	.28***	.56***	.47***	.51***	.51***	.43***	.37***	.40***	.78***	-		
13. DAQ	.40***	.05	.14**	.52***	.53***	.44***	.50***	.58***	.49***	.55***	.53***	.55***	-	
14. BDI	.35***	.11*	.17**	.43***	.50***	.43***	.46***	.65***	.49***	.41***	.46***	.53***	.53***	-
<i>M</i>	2.67	3.27	2.50	9.38	4.51	4.71	1.57	3.04	3.19	2.84	1.47	1.10	1.35	.71
<i>SD</i>	1.01	.86	.73	4.18	2.01	2.21	.44	1.23	.99	1.34	.78	.86	.83	.53
Min-	1.00-	1.00-	1.00-	1.17-	.00-	.00-	1.00-	1.00-	1.00-	1.00-	.00-	.00-	.00-	.00-
Max	5.00	5.00	4.67	25.00	9.00	9.00	3.00	7.00	7.00	7.00	3.45	4.00	4.00	2.40
<i>n</i>	441	442	443	402	433	437	422	417	419	420	420	410	420	409

* $p < .05$; ** $p < .01$; *** $p < .001$

Shy = Shyness; Unsoc = Unsociability; Avoid = Social Avoidance, RSQ = Rejection Sensitivity Questionnaire; OPQ = Outcome Probability Questionnaire; OCQ = Outcome Cost Questionnaire; ASSIQ = Ambiguous Social Situations Interpretation Questionnaire; CTI-S = Cognitive Triad Inventory - Self; CTI-W = Cognitive Triad Inventory - World; CTI-F = Cognitive Triad Inventory - Future; SIAS = Social Interaction Anxiety Scale; SPH = Social Phobia Scale; DAQ = Depressive Attribution Questionnaire; BDI = Beck Depression Inventory. *n* varies as a function of missing data.

univariate analyses (using Bonferroni correction) indicated a significant effect of gender for shyness ($F(1, 419) = 11.542, p = .001, n^2_p = .027$; $M_{female} = 2.81, SD = 1.04, M_{male} = 2.47, SD = .93$), but not unsociability ($F(1, 419) = 1.513, p = .156, n^2_p = .005$), or avoidance ($F(1, 419) = 1.910, p = .056, n^2_p = .009$).

A second MANOVA indicated a significant multivariate main effect of gender on cognitions, $F(7, 305) = 2.940, p = .005$, Wilks' $\lambda = .937, n^2_p = .063$. Follow-up univariate analyses indicated a significant effect on outcome probability expectations ($F(1, 311) = 10.599, p = .001, n^2_p = .033$; $M_{female} = 4.85, SD = 2.01, M_{male} = 4.08, SD = 2.02$), and outcome cost expectations ($F(1, 311) = 10.367, p = .001, n^2_p = .032$; $M_{female} = 5.04, SD = 2.23, M_{male} = 4.21, SD = 2.13$). However, males and females did not differ in their reports of rejection sensitivity ($F(1, 311) = 6.553, p = .011, n^2_p = .021$), ambiguous situations interpretations ($F(1, 311) = .710, p = .400, n^2_p = .002$), or cognitive views of the self ($F(1, 311) = .693, p = .406, n^2_p = .002$), the world ($F(1, 311) = .282, p = .596, n^2_p = .001$), or the future ($F(1, 311) = .009, p = .925, n^2_p = .000$).

A third MANOVA indicated a significant multivariate main effect of gender on internalizing problems, $F(4, 337) = 5.579, p < .001$, Wilks' $\lambda = .938, n^2_p = .062$. Follow-up univariate analyses indicated significant effects on social interaction anxiety ($F(1, 340) = 11.495, p = .001, n^2_p = .033$; $M_{female} = 1.59, SD = .80, M_{male} = 1.29, SD = .75$), social phobia ($F(1, 340) = 21.229, p < .001, n^2_p = .059$; $M_{female} = 1.25, SD = .85, M_{male} = .82, SD = .75$), depressive symptoms ($F(1, 340) = 9.978, p = .002, n^2_p = .033$; $M_{female} = .76, SD = .51, M_{male} = .58, SD = .51$), and depressive attributions ($F(1, 340) = 8.749, p = .003, n^2_p = .025$; $M_{female} = 1.43, SD = .85, M_{male} = 1.16, SD = .77$). Given the number of

differences across males and females, gender differences were explored in subsequent analyses.

Testing a Conceptual Model Linking Social Withdrawal, Cognitions, and Internalizing Problems

The next set of analyses tested the hypothesized model depicting direct and indirect associations between subtypes of social withdrawal (shyness, unsociability, social avoidance), maladaptive cognitions (threatening, negative), and internalizing problems (social anxiety, depressive symptoms). The rate of missingness for all variables included in the model was 6.0%. Results from Little's (1988) MCAR test indicated that data were again MCAR ($\chi^2(819) = 842.334, p = .278$), and as such, FIML was deemed appropriate for handling missing data.

Measurement model specification. To examine the measurement model, the proposed model was re-specified as a CFA, with only LVs and their measured indicators included. This model defines how measured variables in the SEM are related to the LVs (which were permitted to covary). Four latent variables were included in the initial model: (a) *Threatening Cognitions*, with summary scores for rejection sensitivity, outcome probability expectations, outcome cost expectations, and ambiguous situation interpretations as manifest (observed) variables; (b) *Negative Cognitions*, with summary scores for cognitive views of the self, world, and future as manifest variables; (c) *Social Anxiety*, with summary scores for social interaction anxiety and social phobia as manifest variables; and (d) *Depressive Symptoms*, with summary scores for the depressive symptoms and depressive attributions as manifest variables. This initial model showed overall acceptable fit, $AIC = 11452.992, BIC = 11613.340, \chi^2(38, N = 451) = 105.017, p$

< .001, RMSEA = .063 [90% CI = .048, .077], CFI = .971, TLI = .958, SRMR = .041.

However, the normalized χ^2 and RMSEA scores were somewhat high.

Examination of modification indices suggested the removal of outcome cost expectations (OCQ). Whereas the other indicators of threatening cognitions assessed the likelihood or probability of threatening social situations occurring, the OCQ assessed the potential costs associated with such events. Thus, it could be argued that estimated costs are less conceptually relevant in the current context. As such, removal of this latent indicator was deemed theoretically justifiable. The resulting final model demonstrated overall good fit, AIC = 9757.019, BIC = 9905.032, $\chi^2(29, N = 451) = 64.703, p = .0002$, RMSEA = .052 [.035, .069], CFI = .983, TLI = .974, SRMR = .030. Moreover, comparison of AIC and BIC values suggested that the modified measurement model was a better fit. All indicator variables significantly and positively loaded on to their respective LVs (.689 - .924, all $p < .001$). Thus, the resulting model was retained and included in the structural equation model.

Structural model specification. The structural model defines how exogenous and endogenous variables (both latent and measured) are related to each other. The following measured variables involved in the structural components of the proposed model were added to the model: (a) shyness and social avoidance as predictors; and (b) unsociability as a covariate (accounting for covariance with shyness and social avoidance). The original model demonstrated acceptable-to-good fit, $\chi^2(51, N = 451) = 133.850, p < .001$, RMSEA = .060 [.048, .073], CFI = .969, TLI = .953, SRMR = .044. However, after examining modification indices, a series of changes were made (one at a time) to the structural model, each of which was deemed to be theoretically appropriate

(see Study 1 Discussion for these justifications). The changes made involved the inclusion of three paths regressed on unsociability in the following order: (a) negative cognitions; (b) threatening cognitions; and (c) depressive symptoms. The resulting model demonstrated good fit, $\chi^2(48, N = 451) = 116.845, p < .001$, RMSEA = .056 [.043, .069], CFI = .973, TLI = .958, SRMR = .036, AIC = 11266.431, BIC = 11496.673. Results from corrected χ^2 difference tests (to account for the use of robust standard errors) indicated that each change resulted in a significantly improved model (all $\chi^2\Delta > \text{critical } \chi^2_{(.05, 1df)} = 3.841$). According to the *t*-rule, the final model was over-identified (and therefore testable), with 104 unique pieces of information (*k*) and 56 estimated parameters (*t*), resulting in 48 degrees of freedom ($df = k - t$).

Evaluation of conceptual model. All estimated direct paths are presented in Figure 3. Consistent with hypotheses, shyness was significantly and positively associated with threatening cognitions, negative cognitions, and social anxiety (all $p < .001$). In contrast, unsociability was significantly and negatively associated with threatening ($p = .007$) and negative cognitions ($p = .002$). Finally, contrary to expectations, social avoidance was largely unassociated with cognitions and internalizing problems. Specifically, social avoidance only displayed a significant positive association with social anxiety ($p = .011$); however, associations with threatening cognitions ($p = .059$), and negative cognitions ($p = .077$) approached significance.

Somewhat surprisingly, shyness was significantly and *negatively* associated with depressive symptoms ($p = .006$), and a *negative* association between social avoidance and depressive symptoms approached significance ($p = .059$). In contrast, unsociability was significantly and positively associated with depressive symptoms ($p = .002$). Thus,

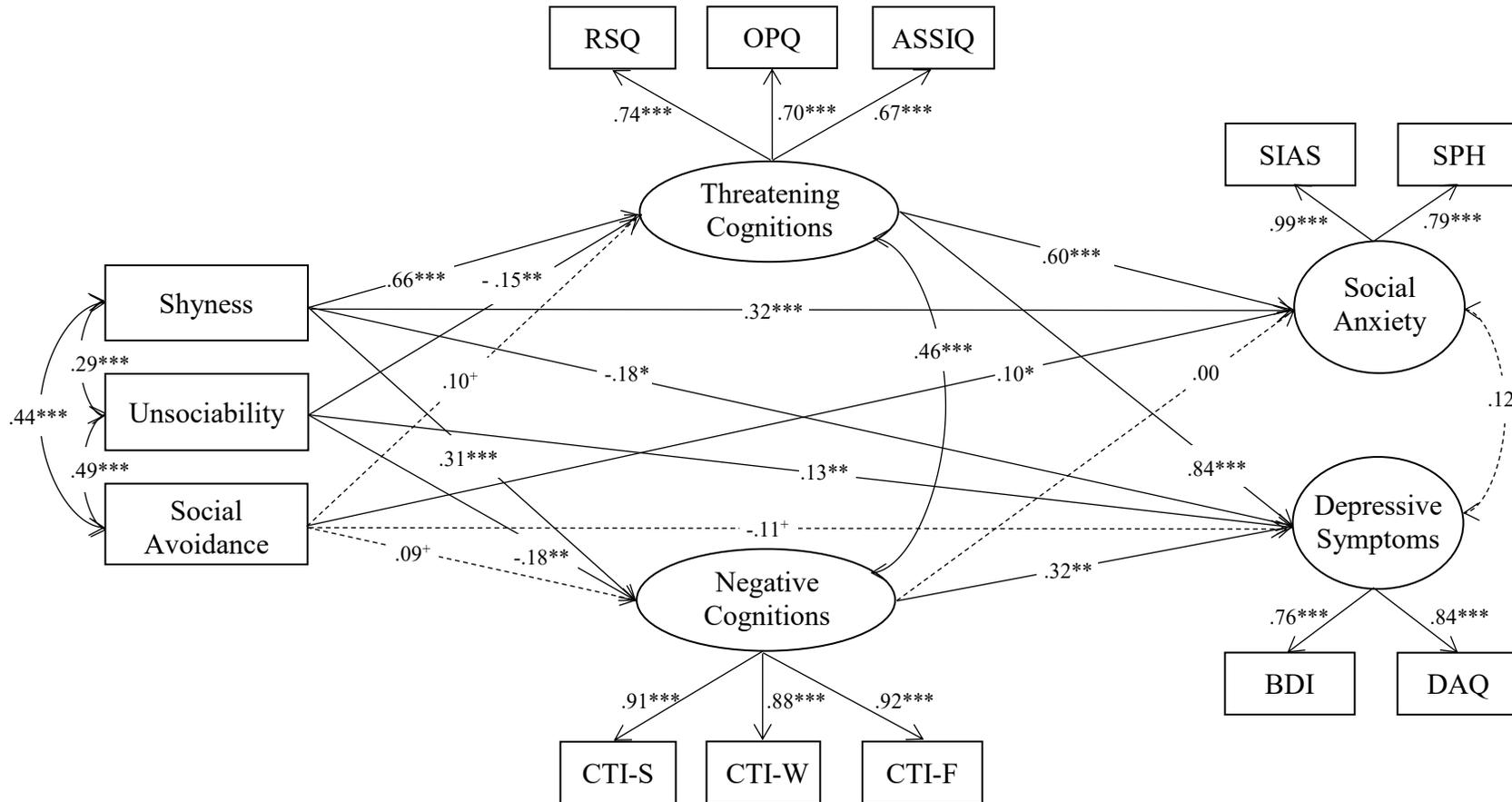


Figure 3. Structural equation model ($N = 451$) depicting all (standardized) estimated direct relations between subtypes of social withdrawal, cognitive biases, and internalizing problems. RSQ = Rejection Sensitivity Questionnaire; OPQ = Outcome Probability Questionnaire; ASSIQ = Ambiguous Social Situations Interpretation Questionnaire; CTI-S = Cognitive Triad Inventory - Self; CTI-W = Cognitive Triad Inventory - World; CTI-F = Cognitive Triad Inventory - Future; SIAS = Social Interaction Anxiety Scale; SPH = Social Phobia Scale; BDI = Beck Depression Inventory; DAQ = Depressive Attributions Questionnaire. Indirect effects, error terms, intercepts, variances, and scaling are not presented for ease of presentation. Solid lines indicate significant pathways, broken lines indicate non-significant associations. * $p < .05$; ** $p < .01$; *** $p < .001$; + $p < .08$.

findings pertaining to the cognitive and emotional correlates of subtypes of withdrawal were somewhat mixed. Finally, threatening cognitions were significantly and positively associated with social anxiety and depressive symptoms (both $p < .001$). In contrast, negative cognitions were significantly and positively associated with depressive symptoms ($p < .001$), but not social anxiety ($p = .976$). These findings partially support Beck's (1976) CCSH, suggesting that anxiety and depressive symptoms are associated with distinct cognitive patterns.

Indirect effects were also estimated to examine the potential mediating effects of threatening and negative cognitions in the relations between subtypes of social withdrawal and internalizing problems (see Table 2). Results indicated that shyness was indirectly and positively associated with social anxiety via threatening, but not negative cognitions. Unsociability was indirectly and *negatively* associated with social anxiety via threatening cognitions, but not negative cognitions. Finally, social avoidance was not indirectly associated with social anxiety via threatening (although this effect approached significance) or negative cognitions.

With regards to depressive symptoms, shyness demonstrated indirect positive effects through both threatening and negative cognitions. Unsociability was indirectly and *negatively* associated with depressive symptoms through threatening and negative cognitions. Finally, contrary to expectations, there were no significant indirect effects of social avoidance on depressive symptoms via threatening or negative cognitions independently; however, the sum of both cognitions together (i.e., multiple mediation) accounted for significant variation in the association between social avoidance and depressive symptoms.

Table 2

Summary of the Indirect Effects of Social Withdrawal Subtypes on Internalizing Problems through Threatening and Negative Cognitions

Indirect Path	β	<i>SE</i>	<i>p</i>
Shy → Threat & Neg → Soc Anx	.397	.054	< .001
Shy → Threat → Soc Anx	.398	.059	< .001
Shy → Neg → Soc Anx	.000	.013	.976
Unsoc → Threat & Neg → Soc Anx	-.092	.034	.006
Unsoc → Threat → Soc Anx	-.092	.034	.007
Unsoc → Neg → Soc Anx	.000	.007	.976
Avoid → Threat & Neg → Soc Anx	.064	.034	.063
Avoid → Threat → Soc Anx	.064	.034	.062
Avoid → Neg → Soc Anx	.000	.004	.976
Shy → Threat & Neg → Dep	.654	.077	< .001
Shy → Threat → Dep	.556	.088	< .001
Shy → Neg → Dep	.098	.029	.001
Unsoc → Threat & Neg → Dep	-.184	.058	.001
Unsoc → Threat → Dep	-.129	.050	.010
Unsoc → Neg → Dep	-.056	.023	.018
Avoid → Threat & Neg → Dep	.118	.054	.029
Avoid → Threat → Dep	.089	.049	.070
Avoid → Neg → Dep	.029	.019	.117

Significant indirect effects are in bold.

Shy = Shyness; Unsoc = Unsociability; Avoid = Social Avoidance; Threat = Threatening Cognitions; Neg = Negative Cognitions; Soc Anx = Social Anxiety; Dep = Depressive Symptoms

In summary, the indirect findings were largely consistent with expectations, with the exception of those pertaining to social avoidance. Overall, whereas shyness demonstrated significant and positive indirect effects on internalizing problems via maladaptive (particularly threatening) cognitions, unsociability demonstrated negative indirect effects on internalizing problems. In contrast, social avoidance was generally not indirectly associated with internalizing problems.

Post hoc exploratory analyses. Given the somewhat unexpected pattern of associations, particularly with regards to the associations between subtypes of social withdrawal and depressive symptoms, additional post hoc analyses were conducted (on an exploratory basis) to further tease apart the findings. A series of sensitivity analyses (path analyses, SEM) was conducted to explore the nature of associations when various constructs were (or were not) controlled for in the model. Relevant results are summarized in Table 3. Among the results, shyness was significantly and positively associated with depressive symptoms when cognitions were excluded from the model, both when other subtypes of withdrawal were (Model G) and were not (Model A) controlled for. However, once cognitions were included as mediators (Model B), shyness became significantly and *negatively* associated with depressive symptoms. Although unsociability was significantly and positively associated with depressive symptoms when all other variables were excluded (Model C), this association was no longer significant after the inclusion of cognitions (Model D), or after accounting for shared associations with shyness and social avoidance (Model G). Finally, social avoidance was significantly and positively associated with depressive symptoms when cognitions and other subtypes of withdrawal were not taken into account (Model E); however, this association was no

Table 3

Standardized Path Coefficients for Post Hoc Analyses Assessing Direct Paths between Subtypes of Social Withdrawal, Cognitions, and Internalizing Problems

Model	Variables in Model	Direct Path	β (SE)	<i>p</i>
A	IV: Shy	Shy → Soc Anx	.760 (.021)	< .001
	M: None	Shy → Dep	.456 (.054)	< .001
	DV: Soc Anx, Dep ¹			
B	IV: Shy	Shy → Soc Anx	.349 (.059)	< .001
	M: Threat, Neg ¹	Shy → Dep	-.176 (.082)	.031
	DV: Soc Anx, Dep	Shy → Threat	.669 (.038)	< .001
		Shy → Neg	.300 (.050)	< .001
C	IV: Unsoc	Unsoc → Dep	.110 (.055)	.044
	M: None DV: Dep			
D	IV: Unsoc	Unsoc → Dep	-.003 (.044)	.946
	M: Threat, Neg ¹	Unsoc → Threat	.146 (.055)	.008
	DV: Soc Anx, Dep	Unsoc → Neg	-.046 (.053)	.381
E	IV: Avoid	Avoid → Soc Anx	.426 (.044)	< .001
	M: None	Avoid → Dep	.200 (.051)	< .001
	DV: Soc Anx, Dep ¹			
F	IV: Avoid	Avoid → Soc Anx	.158 (.049)	.001
	M: Threat, Neg ¹	Avoid → Dep	-.087 (.047)	.065
	DV: Soc Anx, Dep	Avoid → Threat	.328 (.049)	< .001
		Avoid → Neg	.142 (.049)	.004
G	IV: Shy, Unsoc, Avoid ¹	Shy → Soc Anx	.706 (.029)	< .001
	M: None	Shy → Dep	.457 (.059)	< .001
	DV: Soc Anx, Dep ¹	Unsoc → Dep	.001 (.061)	.986
		Avoid → Soc Anx	.116 (.036)	.001
		Avoid → Dep	-.003 (.056)	.951

¹ = significant covariance among variables at $p < .01$.

IV = Independent Variable; M = Mediating Variable; DV = Dependent Variable; Shy = Shyness; Unsoc = Unsociability; Avoid = Social Avoidance; Threat = Threatening Cognitions (latent variable); Neg = Negative Cognitions (latent variable); Soc Anx = Social Anxiety (latent variable); Dep = Depressive Symptoms (latent variable).

Note: Across all Models (A-G), the pattern of associations between cognitions and internalizing problems was largely consistent with the original full model. For ease of presentation, these results are excluded, but are available upon request.

longer significant once cognitions (Model F) and other subtypes of social withdrawal (Model G) were taken into account.

Taken together, these results suggest that maladaptive cognitions account for considerable variance in the associations between subtypes of withdrawal and internalizing problems. Specifically of interest, associations between all three types of withdrawal and depressive symptoms either became non-significant (unsociability, social avoidance) or negatively associated (shyness) after taking cognitions into account. Additionally, these findings also suggest that shared variance across subtypes of social withdrawal might help explain the somewhat unexpected patterns of associations between subtypes of withdrawal and depressive symptoms.

Gender differences. Finally, multi-group analysis was conducted in order to evaluate potential gender differences in the model. A *configural* model was initially specified (in which no constraints were applied across groups) and demonstrated acceptable-to-good fit, $\chi^2(59, n = 447) = 109.420, p = .0001, RMSEA = .062 [.043, .080], CFI = .976, TLI = .963, SRMR = .045, AIC = 9666.899, BIC = 9958.180$. Accordingly, a series of model constraints were applied in successive models to examine potential decreases in fit resulting from measurement non-invariance. Following guidelines established by Chen (2007), *metric* invariance (indicating that factor loadings are roughly equal across groups) can be established if differences between models with and without constrained factor loadings are: $\Delta CFI < .010, \Delta RMSEA < .015, \text{ and } \Delta SRMR < .030$. *Scalar* invariance (indicating that factor means are roughly equal across groups and can be reliably compared) is established if differences between models with group-specific or common intercepts are: $\Delta CFI < .010, \Delta RMSEA < .015, \text{ and } \Delta SRMR < .010$.

Evidence for metric invariance was found ($\Delta\text{CFI} = .009$, $\Delta\text{RMSEA} = .014$, and $\Delta\text{SRMR} = .007$). As additional evidence, the AIC and BIC values were lower in the constrained (vs. non-constrained) model. Thus, the number of factors, and pattern of factor loadings, can be regarded as equivalent across groups. Scalar invariance was also established ($\Delta\text{CFI} = .007$, $\Delta\text{RMSEA} = .006$, and $\Delta\text{SRMR} = .005$). The AIC and BIC values supported this finding, as the AIC was only slightly higher, and the BIC was even lower when comparing the constrained to the unconstrained model. Because scalar invariance was established, we could proceed to explore potential differences in the structural components of the model across groups (i.e., structural invariance).

A series of Wald χ^2 tests of parameter equalities (using Benjamini-Hochberg correction, critical p values ranging from .003 to .050; Benjamini & Hochberg, 1995) was conducted to determine whether constraining paths to be equal across groups significantly reduced the model fit as compared to allowing parameters to be freely estimated for males and females (Liao, 2004). One at a time, each of the estimated paths was constrained to be equal across groups (while allowing all other paths to be freely estimated) to individually test for gender differences in each path. Results from all 15 Wald tests were not significant (χ^2 s ($df = 1$) = .033-4.122, $ps = .030$ -.927), indicating that there were no significant gender differences in the model.

Discussion – Study 1

To date, there has been very limited empirical comparison of the cognitive, social, and emotional correlates of subtypes of social withdrawal in emerging adulthood (Bowker et al., 2017; Barry et al., 2013; Nelson, 2013; Nelson et al., 2016). Drawing upon developmental, clinical, and cognitive perspectives, Study 1 was the first to explore

the potential different patterns of associations between subtypes of social withdrawal (shyness, unsociability, social avoidance), maladaptive cognitions (threatening, negative), and internalizing problems (social anxiety, depressive symptoms) in a sample of emerging adults.

Among the results, shyness, social avoidance, maladaptive cognitions, and internalizing problems were all positively inter-correlated. In contrast, unsociability was not significantly related to cognitive biases, but was positively correlated with some indices of emotional difficulties. Results from SEM analyses indicated that threatening and negative cognitions were differentially associated with internalizing problems after taking shared variance into account. Furthermore, subtypes of social withdrawal demonstrated distinct patterns of direct and indirect associations with both maladaptive cognitions and internalizing problems. Specifically, whereas unsociability was negatively associated with maladaptive cognitions, shyness was positively associated with maladaptive cognitions which, in turn, were associated with internalizing problems. However, contrary to expectations, social avoidance was not significantly associated with maladaptive cognitions, and only displayed a modest direct association with social anxiety. Thus, evidence supporting the main hypotheses was mixed. In the sections that follow, the main findings from Study 1 are briefly discussed. Given the methodological and empirical similarities across Studies 1 and 2, additional integrated discussions of the interpretations, limitations, and implications are presented in Study 2 and the General Discussion.

Cognitive Content Specificity

Consistent with cognitive models of anxiety and depression (Beck & Emery, 1985; Kendall, 1985; Rapee & Heimberg, 1997), correlation analyses indicated that indices of maladaptive cognitions and internalizing problems were all significantly and positively inter-correlated. These findings add to the growing literature suggesting that maladaptive cognitions play a role in the development of social anxiety and depressive symptoms, even in non-clinical samples (e.g., Marston et al., 2010; Weeks et al., 2017).

This broad pattern of inter-associations is in keeping with previous assertions that threatening and negative cognitions share both conceptual and methodological overlap (Hong et al., 2017; Mathews et al., 1997). As a result, previous researchers have often grouped maladaptive cognitions into a broad category that included indices of both threatening and negative cognitions (Watts & Weems, 2006), or have failed to control for shared variance between types of cognitions (Eley et al., 2008). Accordingly, previously reported results that suggest non-specificity in cognitive styles among anxious and depressed individuals (e.g., Trew & Alden, 2009) may be attributable to unmeasured or unaccounted for covariance. As such, one of the aims of Study 1 was to directly test the *cognitive content specificity hypothesis* (CCSH; Beck, 1976) by exploring the potential unique emotional correlates of different types of cognitions, while accounting for potential shared variance.

Results from SEM analyses indicated the potential presence of specificity in these associations. Specifically, whereas negative cognitions (i.e., negative thoughts about the self, the world, and the future) were only significantly and positively associated with depressive symptoms, threatening cognitions (i.e., judgement biases, interpretation

biases, and rejection sensitivity) were significantly and positively associated with both social anxiety and depressive symptoms. Moreover, threatening cognitions displayed a somewhat stronger association with depressive symptoms than social anxiety. Although these findings should be considered as preliminary in nature, they could be interpreted as initial empirical support for non-specificity in threatening cognitions. In support of this notion, Weeks et al. (2017) explored cognitive content specificity in a community sample of depressed and anxious adolescents and found that negative views and attributions were greater in the depressed group (as compared to the anxious and comparison groups). In contrast, threatening cognitions were present in both the anxious and depressed groups. Jolly (1993) reported a similar pattern of specificity for negative cognitions, and non-specificity for threatening cognitions in relation to symptoms of anxiety and depression in young adolescents.

This supports previous speculation that specificity in the implications of threatening cognitions may only become pronounced among those with extreme or clinical symptoms (Weeks et al., 2017). Alternatively, there are some parallels that can be drawn to Clark and Watson's (1991) tripartite model to help interpret these findings. For example, it could be argued that, similar to negative affect, threatening cognitions may act as a non-differentiating correlate of both anxiety and depression, whereas negative cognitions (i.e., sad, self-referent thoughts related to low positive affect) may be uniquely related to depression. Regardless, the current findings provide partial support for the CCSH (Beck, 1976), suggesting that social anxiety and depression may have (at least some) distinct cognitive correlates (see Study 2 and General Discussion for more on this topic).

Links among Subtypes of Social Withdrawal, Maladaptive Cognitions, and Internalizing Problems

After accounting for shared variance among shyness, unsociability, and social avoidance, results from SEM analyses indicated that each subtype displayed a distinct pattern of associations with cognitions and internalizing problems. Although there were some main effects of gender, no gender differences emerged in the associations among the constructs of interest (see Study 2 and General Discussion for more detailed discussions about gender). Accordingly, the findings pertaining to each subtype of withdrawal for the full sample are discussed in greater detail in the following sections.

Unsociability. Although not originally hypothesized in the conceptual model (since it was not expected to be associated with measures of biased cognitions or internalizing problems), modification indices suggested the inclusion of estimated pathways between unsociability and threatening cognitions, negative cognitions, and depressive symptoms. These additions were deemed theoretically justifiable for a number of reasons. To begin, the inclusion of estimated paths between unsociability and maladaptive cognitions were in keeping with expectations that unsociable youth would display relatively competent socio-cognitive skills (Coplan et al., 2013; Harrist et al., 1997). Indeed, unsociability was *negatively* associated with both threatening and negative cognitions. Moreover, these findings are consistent with results from Nelson (2013), who reported that unsociable emerging adults had significantly *lower* ratings of maladaptive cognitions (i.e., fear of negative evaluation) than their shy and non-withdrawn counterparts.

Somewhat unexpectedly, unsociability remained significantly (albeit modestly) associated with depressive symptoms, even after controlling for other subtypes of social withdrawal and measures of biased cognitions. The limited existing empirical research on the emotional correlates of unsociability in emerging adulthood has been somewhat mixed (Nelson, 2013; Nelson et al., 2016). This particular finding from the present study suggests that unsociability may pose at least some potential risk for internalizing difficulties. However, unsociability was also indirectly and *negatively* associated with internalizing problems via maladaptive cognitions. Taken together, these findings suggest that a lack of maladaptive cognitions may serve to protect unsociable youth from feelings of social anxiety and depression. The results from Study 1 add to our understanding of why unsociability may indeed represent a relatively benign form of withdrawal, at least in emerging adulthood (see Coplan, Ooi, & Baldwin, 2018 for a recent review).

Shyness. Shyness was positively and directly associated with social anxiety, which supports a growing body of research indicating that this particular subtype of social withdrawal serves as a robust risk factor for social anxiety (Chronis-Tuscano et al., 2009; Clauss & Blackford, 2012; Weeks et al., 2016). As expected, results also indicated that shyness was positively associated with threatening and negative cognitions. These findings are consistent with previous child and adolescent studies (Coplan et al., 2013; Gazelle & Druhen, 2009; Jackson et al., 1997; LoBue & Pérez-Edgar, 2014; Weeks et al., 2016), and add to the limited findings among emerging adults (Alfano et al., 1994; Nelson, 2013). Moreover, shyness was more strongly associated with threatening cognitions than negative cognitions, and threatening (but not negative) cognitions partially accounted for the associations between shyness and social anxiety. Taken

together, these findings support the hypothesis that shy emerging adults might be particularly prone to anticipating threatening social situations, such as rejection and heightened expectations of negative social events which, in turn, contribute to feelings of social anxiety. In contrast, negative feelings about themselves, their future, and their surroundings do not seem to influence feelings of social anxiety.

Consistent with previous findings (Nelson, 2013; Nelson et al., 2016), shyness initially displayed a positive association with depressive symptoms (i.e., in correlation analyses). However, this association was reduced (and became negative) after taking maladaptive cognitions into account (i.e., in SEM analyses). Indeed, both threatening and negative cognitions mediated the associations between shyness and depressive symptoms. These findings are consistent with previous studies demonstrating that maladaptive attributional styles fully mediate the association between shyness and depression (Alfano et al., 1994). Moreover, these findings highlight the importance of taking potential intermediary factors into account when examining socially withdrawn individuals' emotional adjustment (Barstead et al., 2017; Coplan, Ooi, & Baldwin, 2018).

It was somewhat surprising that the direct effect of shyness on depressive symptoms became *negative* after accounting for cognitions. This association was relatively small in magnitude and could be suggesting that threatening and negative cognitions are acting here as suppressor variables (MacKinnon, Krull, & Lockwood, 2000). Nevertheless, the current results suggest that shyness may not be uniquely and *positively* associated with depressive symptoms. This is consistent with previous findings indicating a non-significant relation between shyness and depression (Kim et al., 2008), particularly after taking other confounding or mediating variables into account (Alfano et

al., 1994; Coplan, Ooi, Xiao, et al., 2018). In the General Discussion, a more detailed discussion of the results pertaining to shyness is presented, with a novel perspective on the potential emotional implications of shyness.

Social avoidance. Perhaps of greatest interest in Study 1 are the findings pertaining to social avoidance. Overall, bivariate correlations and sensitivity analyses demonstrated positive associations between social avoidance and indices of internalizing problems. Although few studies have directly explored these associations, these findings are generally consistent with those previously reported in samples of children (Coplan, Ooi, Xiao, et al., 2018; Coplan et al., 2013), adolescents (Bowker & Raja, 2011), and emerging adults (Nelson, 2013; Nelson et al., 2016). A particularly novel contribution to the literature is the pattern of positive inter-associations between social avoidance and maladaptive cognitions, suggesting that socially avoidant individuals may be at risk for a wide range of maladaptive thought processes.

However, contrary to expectations, results from SEM analyses indicated that social avoidance was only positively (and modestly) associated with social anxiety, but not cognitions or depressive symptoms after accounting for shared variance with shyness and unsociability. There was also no indirect effect of social avoidance on social anxiety, supporting the hypothesis that social avoidance would not be strongly associated with social anxiety via maladaptive cognitions. Interestingly, although neither threatening nor negative cognitions served as individual mediators, there was evidence to support a multiple mediated pathway in the association between social avoidance and depressive symptoms. In other words, the collective tendency to engage in threatening and negative cognitions accounted for a positive association between social avoidance and depressive

symptoms. Taken together, these findings provide preliminary evidence to support the proposed mediated model, and furthermore, suggest that social avoidance may be associated with depressive symptoms (but not social anxiety) via maladaptive cognitions (see Study 2 for a review of the implications of these findings).

Notwithstanding these findings, the overall pattern of results related to social avoidance was not consistent with hypotheses. It could be that social avoidance in emerging adulthood is simply not strongly related to maladaptive cognitions or depressive symptoms. Indeed, the existing literature uniquely linking social avoidance to cognitions and depression has been somewhat mixed (Coplan et al., 2013; Nelson, 2013; Nelson et al., 2016). However, the disparity in the pattern of associations between the correlation and SEM analyses highlights the potential importance of accounting for confounding variables and shared variance. For example, significant inter-correlations among these constructs were reduced to non-significant associations after taking common associations with shyness and unsociability into account. Moreover, social avoidance displayed moderate-to-high inter-correlations with both shyness and unsociability. As such, it may be that social avoidance is not sufficiently differentiated from other subtypes of withdrawal (from a conceptual and/or methodological standpoint) in order to capture potential unique variance in maladaptive cognitions or depressive symptoms. Indeed, empirical exploration of social avoidance is still in its infancy, and it remains unclear as to whether social avoidance represents a truly distinct form of withdrawal. For example, it has previously been suggested that social avoidance may represent an extreme form of shyness (Schmidt & Fox, 1999).

It is also plausible that this pattern of results may be at least partially attributable to other methodological issues. Nelson (2013) provided initial support for the factor structure, psychometric properties, internal consistency, and validity of the *Social Preference Scale for Emerging Adults*. However, it is worth noting that the subscale used to assess social avoidance was comprised primarily (i.e., five out of six items) of reverse-scored items assessing sociability. Indeed, Nelson (2013) identified this as a potential limitation of the measure and suggested that the items may not have been directly assessing high avoidance/low approach motivations. Coplan, Ooi, and Baldwin (2018) similarly argued that assessments of 'low sociability' may not sufficiently differentiate between motivations underlying preferences for solitude. It has also previously been demonstrated that the use of reverse-scored items in questionnaires can introduce multiple forms of method bias (Weijters, Baumgartner, & Schillewaert, 2013), lower internal consistency, and distort factor structure by clustering items based on methodological similarities rather than content (Carlson et al., 2011; Marsh, 1986). As such, it is possible that these methodological effects impacted the findings. Accordingly, the aim of Study 2 was to address these potential methodological limitations.

Study 2 – A Conceptual Replication

Given that Study 1 was the first to examine the role of cognitions in the relations between subtypes of social withdrawal and emotional adjustment in emerging adults, replication of the results is needed to further increase the validity of the findings. However, certain methodological limitations in the measurement of social avoidance in Study 1 may have influenced the findings. Accordingly, the goal of Study 2 was to re-assess the conceptual model using another recently revised measure of subtypes of social withdrawal for use with emerging adults (Bowker et al., 2017). Re-assessing these associations using a new measure of social withdrawal subtypes in a separate sample (i.e., conducting a *conceptual replication*; Brandt et al., 2014) will: (a) allow for the removal of potential limitations or confounds in Study 1; and (b) increase the generalizability of the proposed psychological processes (Bonnett, 2012; Schmidt, 2009). Hypotheses were identical to those presented in Study 1 (refer to Figure 2).

Method – Study 2

Participants

Participants in Study 2 were $N = 540$ undergraduate students (284 females, 250 males) between the ages of 17 and 25 ($M_{age} = 19.20$ years, $SD = 1.49$). All procedures were identical to those presented in Study 1, with the exception of the measure used to assess subtypes of social withdrawal.

Measures

Social withdrawal subtypes. Participants completed the recently adapted *Social Preference Scale-Revised* (SPS-R; Bowker et al., 2017; Bowker & Raja, 2011; see Appendix J) to assess of the different subtypes of social withdrawal. Originally

developed to assess social withdrawal and isolation in adolescence, the SPS-R was recently used with a sample of emerging adults and demonstrated acceptable-to-good internal consistency ($\alpha = .70$ to $.87$) and psychometric properties (Bowker et al., 2017). Of particular interest in the current study were the subscales assessing *shyness* (5 items; e.g., “I’d like to hang out with others, but I’m sometimes nervous to”), *unsociability* (3 items; e.g., “I don’t really mind spending time alone”), and *social avoidance* (6 items; e.g., “I try to avoid spending time with other people”). In the current study, the shyness ($\alpha = .87$) and social avoidance ($\alpha = .86$) subscales demonstrated good internal consistency. Somewhat surprisingly, the unsociability subscale demonstrated unacceptable internal consistency ($\alpha = .40$). As such, the unsociability subscale was excluded from subsequent analyses (see Results and Discussion sections for more details).

Maladaptive cognitions and internalizing symptoms. All remaining measures reported in Study 1 were included in the current study. Good-to-excellent internal consistency was again evidenced for all measures: OPQ ($\alpha = .91$), OCQ ($\alpha = .93$), ASSIQ ($\alpha = .85$), RSQ ($\alpha = .87$), CTI-S ($\alpha = .88$), CTI-W ($\alpha = .81$), CTI-F ($\alpha = .93$), SIAS ($\alpha = .94$), SPH ($\alpha = .95$), BDI ($\alpha = .94$), and DAQ ($\alpha = .93$).

Statistical Analysis Plan

All planned statistical analyses are identical to those presented in Study 1.

Results – Study 2

Preliminary Analyses

Missing data. For the full dataset, 6.3% of all data were missing, with missing data rates ranging from .9% to 12.8% for each study variable. Little’s (1988) MCAR test indicated that the data were MCAR, $\chi^2(1057) = 1067.116, p = .408$.

Outliers. In the current sample, a total of 25 cases were identified as potential univariate outliers (i.e., > 3 *SDs* above the mean; Tabachnik & Fidell, 2007). As in Study 1, the original values were retained given the expected presence of outliers in large datasets and the overall small percentage of cases identified. The data were then screened for potential multivariate outliers. For each dependent variable, between 3 and 6 cases raised concern (based on Mahalanobis distance values). Again, given that such cases may be true representations of the phenomenon being studied, and that a small proportion of cases is not likely to influence results with a large sample size, the cases were not altered or removed.

Multicollinearity. Tolerance values were all above the suggested cut-off value of $> .10$ (range: .27-.88), and VIF values were well below the suggested value of < 10 (range: 1.14-3.77), both indicating that there were no problems with multicollinearity in the data.

Testing of assumptions. Assumptions of normality, linearity, independence, and homoscedasticity were tested in the data. Consistent with Study 1, examination of normal probability plots did not indicate any substantive departure from normality. Bivariate scatterplots of all predictor and outcome variables did not indicate any obvious curvature (i.e., non-linear associations). Finally, plots of residual versus predicted values gave no major indication of heteroscedasticity.

Skewness. As in Study 1, several variables in the dataset met the criteria for being significantly skewed (i.e., *z*-scores > 1.96). However, examination of histograms indicated that the variables had reasonably distinct tails. Absolute skew values also did not exceed cut-offs for non-normality (range: .22-1.41; Kim, 2013). Therefore,

transformations of the data were not deemed necessary or appropriate. Accordingly, MLR was again implemented in order to adjust for the potential impact of skewed variables.

Descriptive statistics and bivariate correlations. Descriptive statistics and correlations for all study variables are presented in Table 4. Consistent with Study 1, all study variables were significantly and positively inter-associated. Age was significantly and negatively correlated with outcome probability expectations ($r = -.15, p = .001$), outcome cost expectations ($r = -.10, p = .040$), and depressive attributions ($r = -.10, p = .031$) and, as such, was controlled for in subsequent analyses. As in Study 1, controlling for age in SEM analyses did not alter the pattern of results or improve model fit, and as such, results are reported without controlling for age.

Gender differences. Results from a series of one-way MANOVAs identified a small number of gender differences in social withdrawal, cognitions, and internalizing problems. The first MANOVA indicated that males and females did not differ significantly on social withdrawal, $F(2, 517) = 1.520, p = .220$, Wilks' $\lambda = .994, n^2_p = .006$. A second MANOVA indicated a significant multivariate main effect of gender on cognitions, $F(7, 356) = 2.271, p = .028$, Wilks' $\lambda = .957, n^2_p = .043$. However, follow-up analyses (using Bonferroni correction) did not indicate significant univariate effects of gender for rejection sensitivity ($F(1, 362) = .040, p = .842, n^2_p = .000$), outcome probability expectations ($F(1, 362) = 2.683, p = .102, n^2_p = .007$), outcome cost expectations ($F(1, 362) = 6.689, p = .010, n^2_p = .018$), ambiguous situations interpretations ($F(1, 362) = .106, p = .745, n^2_p = .000$), or cognitive views of the self ($F(1, 362) = .035, p = .853, n^2_p = .000$), the world ($F(1, 362) = 2.795, p = .095, n^2_p = .008$), or

Table 4

Descriptive Statistics and Bivariate Correlations among Main Study Variables (N = 540)

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Shy	-												
2. Avoid	.36***	-											
3. RSQ	.49***	.25***	-										
4. OPQ	.52***	.21***	.49***	-									
5. OCQ	.50***	.20***	.47***	.62***	-								
6. ASSIQ	.37***	.27***	.52***	.44***	.37***	-							
7. CTI-S	.32***	.28***	.48***	.40***	.30***	.48***	-						
8. CTI-W	.27***	.26***	.39***	.30***	.23***	.39***	.78***	-					
9. CTI-F	.21***	.27***	.40***	.27***	.21***	.36***	.80***	.77***	-				
10. SIAS	.72***	.38***	.61***	.63***	.62***	.50***	.44***	.36***	.34***	-			
11. SPH	.55***	.34***	.51***	.53***	.53***	.44***	.41***	.37***	.32***	.79***	-		
12. DAQ	.44***	.38***	.55***	.51***	.46***	.49***	.61***	.51***	.53***	.60***	.56***	-	
13. BDI	.32***	.27***	.44***	.39***	.33***	.47***	.61***	.46***	.51***	.52***	.55***	.65***	-
<i>M</i>	2.40	2.27	9.86	4.75	4.80	1.57	2.97	3.07	2.60	1.55	1.12	1.42	.59
<i>SD</i>	1.03	.80	4.10	2.05	2.21	.44	1.19	.95	1.28	.83	.85	.83	.53
Min-	1.00-	1.00-	1.61-	.00-	.00-	1.00-	1.00-	1.00-	1.00-	.00-	.00-	.00-	.00-
Max	5.00	5.00	26.78	9.00	9.00	3.00	6.90	7.00	7.00	3.95	4.00	3.88	2.80
<i>n</i>	535	530	471	518	518	507	504	496	505	484	482	499	486

*** $p < .001$

Shy = Shyness; Avoid = Social Avoidance, RSQ = Rejection Sensitivity Questionnaire; OPQ = Outcome Probability Questionnaire; OCQ = Outcome Cost Questionnaire; ASSIQ = Ambiguous Social Situations Interpretation Questionnaire; CTI-S = Cognitive Triad Inventory - Self; CTI-W = Cognitive Triad Inventory - World; CTI-F = Cognitive Triad Inventory - Future; SIAS = Social Interaction Anxiety Scale; SPH = Social Phobia Scale; DAQ = Depressive Attribution Questionnaire; BDI = Beck Depression Inventory. *n* varies as a function of missing data.

the future ($F(1, 362) = 2.672, p = .103, n^2_p = .007$).

A third MANOVA indicated a significant multivariate main effect of gender on internalizing problems, $F(4, 376) = 4.954, p = .001$, Wilks' $\lambda = .950, n^2_p = .050$. Follow-up univariate analyses indicated significant effects on social interaction anxiety ($F(1, 379) = 11.024, p = .001, n^2_p = .028$; $M_{female} = 1.69, SD = .86, M_{male} = 1.41, SD = .77$), and social phobia ($F(1, 379) = 17.986, p < .001, n^2_p = .045$; $M_{female} = 1.27, SD = .89, M_{male} = .91, SD = .72$), but not depressive symptoms ($F(1, 379) = 1.562, p = .212, n^2_p = .004$), or depressive attributions ($F(1, 379) = 2.075, p = .151, n^2_p = .005$). Accordingly, gender differences were again explored in subsequent analyses.

Testing a Conceptual Model Linking Social Withdrawal, Cognitions, and

Internalizing Problems

The direct and indirect associations between subtypes of social withdrawal (shyness, social avoidance), maladaptive cognitions (threatening, negative), and internalizing problems (social anxiety, depressive symptoms) were examined using SEM. The rate of missingness for all variables included in the model was 6.2%. Data were again MCAR ($\chi^2(1057) = 1067.116, p = .408$).

Measurement model specification. In order to test whether the findings from Study 1 could be replicated, the same four latent variables (and observed indicators) were included in the initial measurement model: (a) *Threatening Cognitions*, with summary scores for rejection sensitivity, outcome probability expectations, outcome cost expectations, and ambiguous situation interpretations as observed variables; (b) *Negative Cognitions*, with summary scores for negative views of the self, world, and future as observed variables; (c) *Social Anxiety*, with summary scores for social interaction anxiety

and social phobia as observed variables; and (d) *Depressive Symptoms*, with summary scores for the depressive symptoms and depressive attributions as observed variables.

This initial model again showed acceptable fit, $AIC = 13633.661$, $BIC = 13801.032$, $\chi^2(38, N = 540) = 155.897$, $p < .001$, $RMSEA = .076$ [90% CI = .064, .088], $CFI = .956$, $TLI = .936$, $SRMR = .047$.

As in Study 1, modification indices suggested the removal of outcome cost expectations (OCQ). The resulting final model demonstrated overall good fit, $AIC = 11600.537$, $BIC = 11755.033$, $\chi^2(29, N = 540) = 95.881$, $p < .001$, $RMSEA = .065$ [.051, .080], $CFI = .972$, $TLI = .956$, $SRMR = .034$. Moreover, comparison of AIC and BIC values supported the modified measurement model as a better fit. All indicator variables significantly and positively loaded on to their respective latent variables (.648-.930, all $p < .001$). Thus, the measurement model replicated the structure found in Study 1, suggesting that the measured variables were related to the LVs in a similar manner across samples.

Structural model specification. Shyness and social avoidance were added to the model as measured predictor variables. The original model demonstrated overall acceptable-to-good fit, $\chi^2(41, N = 540) = 125.354$, $p < .001$, $RMSEA = .062$ [.050, .074], $CFI = .969$, $TLI = .951$, $SRMR = .035$. Modification indices did not suggest any theoretically justifiable changes to the structural model, and as such the model was retained². According to the *t*-rule, the final model was over-identified, with 90 unique

² Despite the low internal consistency coefficient, consistent with the extant literature, scores on the unsociability subscale were significantly and positively associated with both shyness ($r = .22$, $p < .001$) and social avoidance ($r = .36$, $p < .001$), suggesting that it may still be a valid assessment of the construct. Given the importance of accounting for shared variance among subtypes of social withdrawal, a similar model that included unsociability as a covariate was also tested and yielded the same pattern of results. As such, the results are presented *without* unsociability as a covariate.

pieces of information (k) and 49 estimated parameters (t), resulting in 41 degrees of freedom.

Evaluation of conceptual model. All estimated direct paths are presented in Figure 4. Consistent with Study 1, threatening cognitions were significantly and positively associated with social anxiety and depressive symptoms (both $p < .001$). Negative cognitions were significantly and positively associated with depressive symptoms ($p < .001$), but significantly and *negatively* associated with social anxiety ($p = .020$). Shyness was again significantly and positively associated with threatening cognitions ($p < .001$), negative cognitions ($p < .001$), and social anxiety ($p = .010$). As in Study 1, shyness was negatively associated with depressive symptoms; however, this association only approached significance ($p = .062$). Of note, contrary to findings in Study 1, associations with social avoidance in Study 2 demonstrated a pattern of results largely consistent with hypotheses. Specifically, social avoidance was significantly and positively associated with social anxiety ($p = .010$), depressive symptoms ($p = .002$), threatening cognitions ($p = .025$), and negative cognitions ($p < .001$).

Indirect effects were also estimated to examine the potential mediating effects of threatening and negative cognitions in the relations between subtypes of social withdrawal and internalizing problems (see Table 5). Results indicated that shyness and social avoidance were each indirectly associated with social anxiety via threatening cognitions. However, in contrast, shyness evidenced a *negative* indirect effect on social anxiety via negative cognitions. A similar pattern emerged for social avoidance; however, this effect only approached significance. Both shyness and social avoidance were indirectly and positively associated with depressive symptoms via threatening and

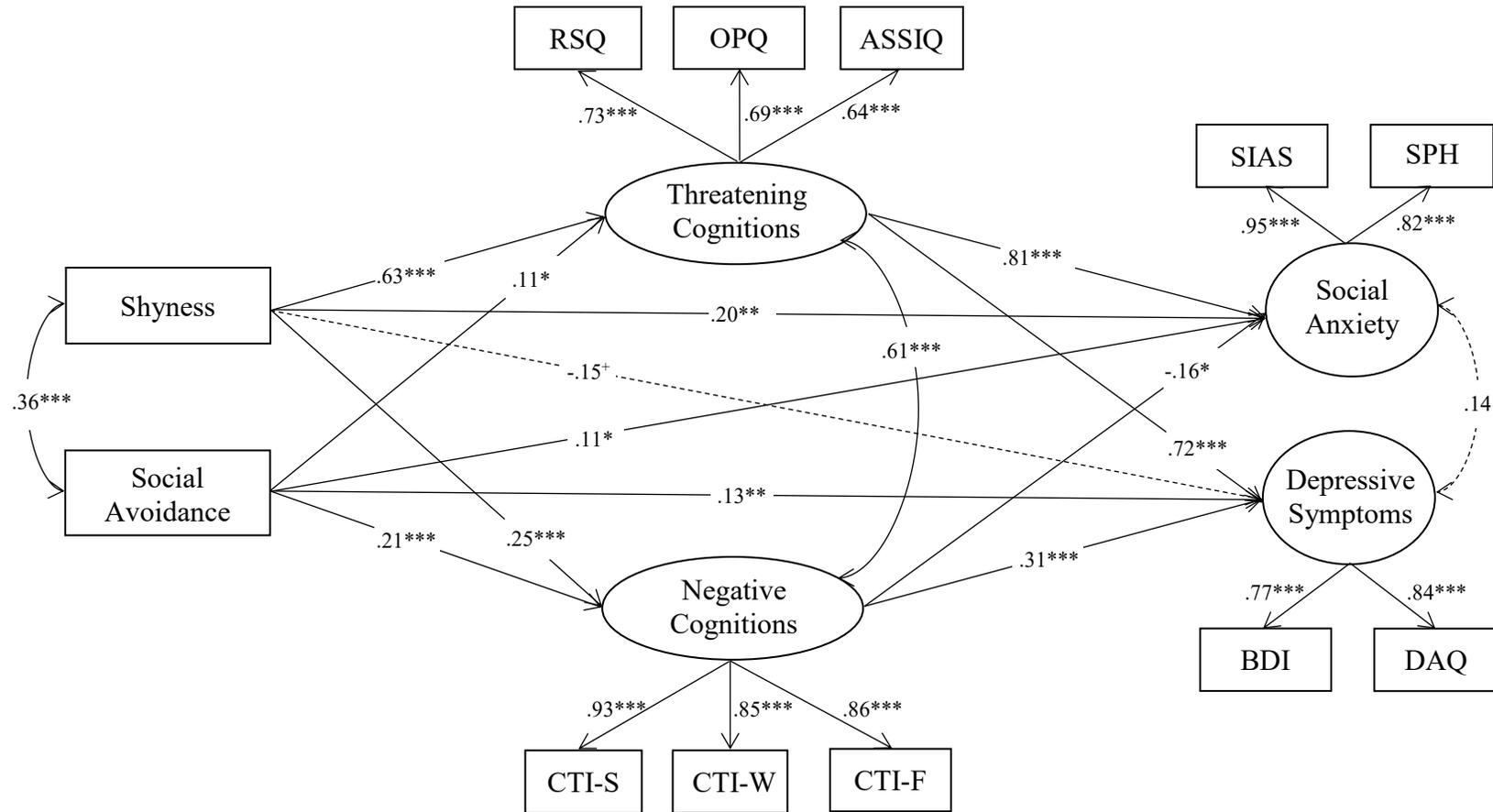


Figure 4. Structural equation model ($N = 540$) depicting all (standardized) estimated direct relations between subtypes of social withdrawal, cognitive biases, and internalizing problems. RSQ = Rejection Sensitivity Questionnaire; OPQ = Outcome Probability Questionnaire; ASSIQ = Ambiguous Social Situations Interpretation Questionnaire; CTI-S = Cognitive Triad Inventory - Self; CTI-W = Cognitive Triad Inventory - World; CTI-F = Cognitive Triad Inventory - Future; SIAS = Social Interaction Anxiety Scale; SPH = Social Phobia Scale; BDI = Beck Depression Inventory; DAQ = Depressive Attributions Questionnaire. Indirect effects, error terms, intercepts, variances, and scaling are not presented for ease of presentation. Solid lines indicate significant pathways, broken lines indicate non-significant associations. * $p < .05$; ** $p < .01$; *** $p < .001$; ⁺ $p < .10$.

Table 5

Summary of the Indirect Effects of Social Withdrawal Subtypes on Internalizing Problems through Threatening and Negative Cognitions

Indirect Path	β	<i>SE</i>	<i>p</i>
Shy → Threat & Neg → Soc Anx	.476	.065	< .001
Shy → Threat → Soc Anx	.514	.076	< .001
Shy → Neg → Soc Anx	-.038	.019	.043
Avoid → Threat & Neg → Soc Anx	.058	.038	.127
Avoid → Threat → Soc Anx	.090	.042	.030
Avoid → Neg → Soc Anx	-.032	.017	.052
Shy → Threat & Neg → Dep	.535	.073	< .001
Shy → Threat → Dep	.458	.086	< .001
Shy → Neg → Dep	.076	.028	.006
Avoid → Threat & Neg → Dep	.144	.046	.002
Avoid → Threat → Dep	.081	.037	.031
Avoid → Neg → Dep	.064	.024	.007

Significant indirect effects are in bold.

Shy = Shyness; Avoid = Social Avoidance; Threat = Threatening Cognitions; Neg = Negative Cognitions; Soc Anx = Social Anxiety; Dep = Depressive Symptoms

negative cognitions. Thus, the current findings largely supported the proposed hypotheses, with both direct and indirect associations among subtypes of social withdrawal, cognitions, and internalizing problems.

Post hoc analyses. Additional post hoc sensitivity analyses (path analyses, SEM) were conducted to further tease apart these associations, using different combinations of study variables. Relevant results are summarized in Table 6. Of note, shyness (Model A) and social avoidance (Model C) were each significantly and positively associated with social anxiety and depressive symptoms when cognitions were excluded from analyses, even after controlling for shared variance between subtypes of social withdrawal (Model E). However, when cognitions were included as mediators, shyness (Model B) was no longer significantly associated with depressive symptoms, and the strength of the association between social avoidance (Model D) and depressive symptoms was reduced. Together (and consistent with Study 1), these findings suggest that maladaptive cognitions account for the associations between social withdrawal and depressive symptoms. In contrast, shyness and social avoidance remained significantly associated with social anxiety, even after taking common associations into account.

Gender differences. Multi-group analysis was conducted in order to evaluate potential gender differences in the model. The *configural* model (with no constraints applied across groups) demonstrated good fit, $\chi^2(58, n = 534) = 111.530, p < .001$, RMSEA = .059 [.042, .075], CFI = .977, TLI = .965, SRMR = .035, AIC = 11445.039, BIC = 11753.227. Evidence was also found for *metric* (Δ CFI = .005, Δ RMSEA = .002, and Δ SRMR = .019, AIC = 11453.299, BIC = 11727.244), and *scalar* invariance (Δ CFI = .006, Δ RMSEA = .004, and Δ SRMR = .004, AIC = 11464.341,

Table 6

Standardized Path Coefficients for Post Hoc Analyses Assessing Direct Paths between Subtypes of Social Withdrawal, Cognitions, and Internalizing Problems

Model	Variables in Model	Direct Path	β (SE)	<i>p</i>
A	IV: Shy	Shy → Soc Anx	.731 (.025)	< .001
	M: None	Shy → Dep	.484 (.043)	< .001
	DV: Soc Anx, Dep ¹			
B	IV: Shy	Shy → Soc Anx	.230 (.069)	.001
	M: Threat, Neg ¹	Shy → Dep	-.108 (.077)	.158
	DV: Soc Anx, Dep	Shy → Threat	.672 (.035)	< .001
		Shy → Neg	.320 (.051)	< .001
C	IV: Avoid	Avoid → Soc Anx	.412 (.043)	< .001
	M: None	Avoid → Dep	.411 (.043)	< .001
	DV: Soc Anx, Dep ¹			
D	IV: Avoid	Avoid → Soc Anx	.141 (.045)	.002
	M: Threat, Neg ¹	Avoid → Dep	.103 (.040)	.009
	DV: Soc Anx, Dep	Avoid → Threat	.341 (.053)	< .001
		Avoid → Neg	.294 (.046)	< .001
E	IV: Shy, Avoid ¹	Shy → Soc Anx	.670 (.030)	< .001
	M: None	Shy → Dep	.271 (.048)	< .001
	DV: Soc Anx, Dep ¹	Avoid → Soc Anx	.167 (.036)	< .001
		Avoid → Dep	.386 (.047)	< .001

¹ = significant covariance among variables at $p < .001$.

IV = Independent Variable; M = Mediating Variable; DV = Dependent Variable; Shy = Shyness; Avoid = Social Avoidance; Threat = Threatening Cognitions (latent variable); Neg = Negative Cognitions (latent variable); Soc Anx = Social Anxiety (latent variable); Dep = Depressive Symptoms (latent variable).

Note: Across all Models (A-E), the pattern of associations between cognitions and internalizing problems was largely consistent with the original full model. For ease of presentation, these results are excluded, but are available upon request.

BIC = 11721.165) (Chen, 2007). Results from all 12 Wald χ^2 tests (using Benjamini-Hochberg correction, critical p values = .004 to .05; Benjamini & Hochberg, 1995) were not significant (χ^2 s ($df=1$) = .007-2.745, ps = .098-.931), indicating that there were no significant gender differences in the model.

Discussion – Study 2

The aim of Study 2 was to re-assess the conceptual model presented in Study 1 using a recently revised measure of social withdrawal subtypes. Consistent with Study 1, shyness, social avoidance, maladaptive cognitions, and internalizing problems were all positively inter-correlated. Results from SEM analyses generally replicated the pattern of direct and indirect associations between shyness, maladaptive cognitions, and internalizing problems. However, contrary to Study 1, social avoidance demonstrated direct and indirect associations with maladaptive cognitions and internalizing problems. Again, some evidence of cognitive content specificity also emerged in these associations. Findings are discussed in detail in the sections that follow, along with an integrative discussion of the meaning and implications of the findings from Studies 1 and 2.

Cognitive Content Specificity

Threatening cognitions were again positively associated with both social anxiety and depressive symptoms (more strongly with the former than the latter). This finding was somewhat different from the pattern displayed in Study 1, where threatening cognitions were (unexpectedly) more strongly associated with depressive symptoms than social anxiety. Negative cognitions were again positively associated with depressive symptoms, and negatively associated with social anxiety. Although this negative association was somewhat unexpected, these findings are generally consistent with the

findings from Study 1, suggesting that different types of maladaptive cognitions may pose differential risk for emotional adjustment.

Collectively, the current research makes several important contributions to the literature. To begin, these findings support well established cognitive models of internalizing problems (Beck, 1976; Beck et al., 1987; Clark & Wells, 1995; Rapee & Heimberg, 1997) by demonstrating that a broad range of maladaptive cognitions are not only identifiable, but may also display specificity in their implications among non-clinical samples of emerging adults. Specifically, the current findings contribute to the growing evidence to suggest a pattern of *specificity* for negative (but not threatening) cognitions (Jolly, 1993; Weeks et al., 2017). The current research is also in keeping with previous findings indicating specificity in the course of social anxiety, but not depression (Pine et al., 1998). Thus, in addition to highlighting the importance of accounting for potential shared variance in these associations, the current findings add to our understanding of the unique and overlapping features among emotional symptoms (Löwe et al., 2008) and maladaptive cognitions (Mathews et al., 1997). These findings have important theoretical and practical implications for our understanding of the emotional risks associated with maladaptive cognitive patterns (see General Discussion).

Links among Subtypes of Social Withdrawal, Maladaptive Cognitions, and Internalizing Problems

SEM analyses indicated that shyness and social avoidance displayed somewhat distinct patterns of associations with cognitions and internalizing problems. The findings of Study 2 are compared and contrasted with those from Study 1 in the sections that follow.

Shyness. Despite the use of a different measure, the overall pattern of results pertaining to shyness replicated those from Study 1, further supporting the validity of the findings. Specifically, shyness demonstrated positive associations with both types of cognitions, although the strength of the association was stronger with threatening cognitions than negative cognitions. This is consistent with the few existing studies demonstrating that shy emerging adults may be prone to maladaptive (particularly threat-related) cognitions (Alfano et al., 1994; Nelson, 2013). Moreover, results again indicated that heightened expectations and anticipation of threatening social events served as a significant explanatory variable linking shyness and social anxiety. Thus, shy individuals may anxiously anticipate negative social events, which in turn may contribute to and/or perpetuate their feelings of social anxiety (Weeks et al., 2016).

In contrast, shyness was *negatively* and indirectly associated with social anxiety via negative cognitions. This appeared to be primarily accounted for by the negative association between negative cognitions and social anxiety. Nevertheless, this suggests that negative views about the self, the future, and the world do not account for the positive links between shyness and social anxiety. These findings are consistent with the CCSH, suggesting that only threatening cognitive patterns may pose increased risk for social anxiety among shy individuals. Thus, although these findings add to the growing body of literature indicating that shy individuals often experience concurrent internalizing difficulties (Barry et al., 2013; Nelson, 2013; Nelson et al., 2008), they also help to clarify why some may not go on to experience feelings of social anxiety (Tang et al., 2017).

Evidence supporting mediated pathways (via threatening and negative cognitions) from shyness to depressive symptoms was also replicated in Study 2. This further supports the notion that maladaptive cognitions mediate the associations between temperamental vulnerabilities and emotional problems (Broeren et al., 2011; Viana & Gratz, 2012; Viana, Kiel, Alfano, Dixon, & Palmer, 2017). Thus, shy individuals' hyperarousal during social situations may evoke heightened expectations of threat and negative thinking which, in turn, may lead to and/or perpetuate feelings of social anxiety and depression (Gazelle & Rubin, 2010; Lonigan et al., 2004).

As in Study 1, shyness displayed a negative direct association with depressive symptoms after taking common associations into account; however, this association did not reach significance, further suggesting that the unexpected negative associations across samples may be anomalous and mainly indicative of full mediation effects. In any event, the current findings suggest that shyness may not pose a direct risk for feelings of depression. This has important theoretical implications for our understanding of the risks associated with shyness. It has been widely reported that shyness is a risk factor for concurrent and subsequent depression (Nelson, 2013; Nelson et al., 2016; Goodwin et al., 2004). However, few studies have accounted for common associations with other relevant variables or explored the mechanisms underlying the links between shyness and socio-emotional adjustment (e.g., Bowker et al., 2012; Coplan, Ooi, Xiao, et al., 2018). Consistent with findings reported by Coplan, Ooi, Xiao, et al. (2018), shyness did not demonstrate a positive and direct association with depressive symptoms after taking shared variance with social avoidance and mediating factors into account. Thus, the current findings suggest that we may need to reconsider our understanding of the direct

implications of shyness as being a broad risk factor for internalizing problems (see General Discussion for a more in-depth review of this topic).

Results from Studies 1 and 2 also suggest that the CCSH may be extended to models of social withdrawal, as shyness was differentially associated with internalizing problems depending on the type of cognitions. Of particular note, the indirect effects of shyness on both social anxiety and depressive symptoms were stronger via threatening cognitions than via negative cognitions in both samples. This suggests that a considerable portion of the variance in these associations was accounted for by the strong associations between shyness and cognitions, despite robust empirical evidence linking cognitions to internalizing problems (Bar-Haim et al., 2007; Everaert et al., 2017; Stuijzand et al., 2017). Together, these findings suggest that shyness may indeed serve as a considerable risk factor for maladaptive cognitive patterns and provide preliminary evidence to suggest that shyness may be useful as an early marker for cognitive risk. Nevertheless, additional exploration of shy individuals' specific cognitive patterns is needed in order to gain a better understanding of the potential implications of shyness for cognitive and emotional adjustment.

Social avoidance. Some similarities in the correlates of social avoidance emerged across Studies 1 and 2. For instance, social avoidance was again significantly correlated with all indices of maladaptive cognitions and internalizing problems in Study 2, further suggesting that socially avoidant individuals may be at risk for cognitive and emotional difficulties. Results from SEM analyses indicated that social avoidance was again modestly and positively associated with social anxiety, even after controlling for shyness, cognitions, and depressive symptoms. However, several novel findings also emerged

from the SEM analyses. Contrary to findings in Study 1 (but consistent with expectations), social avoidance was positively and directly associated with depressive symptoms. Thus, unlike shyness which only remained positively associated with social anxiety in the SEM analyses, social avoidance was positively and directly associated with both social anxiety and depressive symptoms. This is consistent with previous results suggesting that social avoidance might be associated with the most pervasive pattern of maladjustment (Coplan et al., 2013), and adds to the growing evidence to suggest that we need to pay more attention to individuals who actively avoid social interactions.

Social avoidance was also positively associated with both threatening and negative cognitions. However, the magnitude of the association with negative cognitions was stronger than that with threatening cognitions, providing additional evidence to support the extension of the CCSH to models of social withdrawal. Moreover, results revealed that maladaptive thought processes accounted for the links between social avoidance and depressive symptoms. Even after accounting for the effects of maladaptive cognitions, social avoidance remained significantly associated with depressive symptoms, suggesting only partial mediation effects. These findings are in keeping with previous conceptualizations of social avoidance as an early manifestation of *depression* (Coplan & Armer, 2007; Coplan, Ooi, & Nocita, 2015). The indirect effect was (unexpectedly) somewhat larger for threatening cognitions; however, this appeared to be primarily accounted for by the relatively strong associations between cognitions and depressive symptoms as compared to those between social avoidance and cognitions.

In contrast, social avoidance demonstrated a *negative* indirect effect (which only approached significance) on social anxiety through negative cognitions, and only

threatening cognitions served as an explanatory variable positively linking social avoidance and *social anxiety* (which appeared to be primarily accounted for by the strong links between threatening cognitions and social anxiety). Thus, whereas one indirect pathway to social anxiety (via threatening cognitions) emerged, three pathways from social avoidance to depressive symptoms were identified – one direct, and two indirect via threatening and negative cognitions. These findings not only help to explain why social avoidance might be associated with a wide range of emotional difficulties (i.e., multiple pathways to maladjustment), but also add to the growing evidence specifically linking social avoidance to depression (Coplan, Ooi, Xiao, et al., 2018; Coplan et al., 2013; Ding et al., 2018). This is particularly important, as it is becoming increasingly apparent that socially avoidant youth may have different emotional substrates than those of their shy and unsociable counterparts and may require unique assistance (see below for more details about the implications of these findings).

Notwithstanding, it is important to acknowledge that the results regarding social avoidance were inconsistent across Studies 1 and 2, and as such, the current findings must be interpreted with caution. It could be argued that the SPS-R (Bowker & Raja, 2011; Bowker et al., 2017) used in Study 2 was better able to capture unique variance across subtypes of social withdrawal than the SPS-EA (Nelson, 2013), which was used in Study 1, allowing for the true associations among the constructs of interest to be identified. Nevertheless, replication of these findings is necessary in order to determine whether the current findings reflect a true phenomenon or a methodological artefact.

Relatedly, we cannot discount the possibility that the exclusion of unsociability from the model freed up variance to be explained by social avoidance. This is a clear

limitation of the study, particularly given that it has been demonstrated that it is important to account for shared variance among subtypes of social withdrawal. As previously noted, the inclusion of unsociability in the analyses did not alter the overall pattern of results, suggesting that the findings pertaining to social avoidance may not have been a function of statistical artefact.

More importantly, the problems surrounding the assessment of social withdrawal subtypes in Studies 1 and 2 perhaps point toward larger issues in literature with regards to the conceptualization and measurement of these constructs, particularly in emerging adulthood. For example, several terms have been used in the literature to describe concepts similar to unsociability, including affinity for aloneness (Goossens, 2014), preference for solitude (Burger, 1995), asocial behaviour (e.g., Barry et al., 2013), and solitropic orientation (Leary et al., 2003). As such, slight differences in the operationalization and measurement of these constructs may have contributed to variances in the results across studies (Coplan, Ooi, & Nocita, 2015; Coplan, Ooi, & Baldwin, 2018). Although the SPS-EA (Nelson, 2013) and the SPS-R (Bowker et al., 2017) were both conceptually derived from Asendorpf's (1990) social approach-avoidance motivation model to specifically assess emerging adults' social preferences, the findings from Studies 1 and 2 highlight the fact that there is still much work to be done to establish a clear conceptual understanding of social avoidance and unsociability in order to develop sound measurement tools (Nelson, 2013).

Gender Effects

Several main effects of gender emerged in the constructs of interest. Previous research has indicated that, starting in adolescence and into emerging adulthood, females

display more internalizing symptoms and disorders (Saluja et al., 2004; Zahn-Waxler et al., 2000; Zahn-Waxler et al., 2008). Findings from the current research are consistent with these findings, as females reported greater symptoms of social anxiety in both samples, and greater symptoms of depression in Study 1. Overall, no significant gender differences in negative cognitions emerged, suggesting that males and females do not differ in their views about the self, the world, and the future. However, there was some preliminary evidence to suggest that females may be more likely to engage in threatening cognitions in Study 1. This is consistent with previous findings indicating that cognitive biases are more pronounced among adolescent females (Gluck et al., 2014; Miers et al., 2008). However, this finding was not replicated in Study 2, and therefore it is not clear whether males and females do in fact differ in their threatening cognitions. More importantly, no significant gender differences emerged in any of the hypothesized associations in both studies, suggesting that the nature of these associations do not differ for males and females (see General Discussion for a more in-depth review of gender effects).

Social Withdrawal in Emerging Adults: Implications, Limitations, and Future Directions

Studies 1 and 2 are the first to empirically explore a conceptual model depicting a progression from subtypes of social withdrawal, to maladaptive cognitions, to internalizing problems in emerging adulthood. The pair of studies addresses several gaps in the literature by providing a more nuanced understanding of different cognitive risks that may (or may not) contribute to the development of specific internalizing difficulties among socially withdrawn emerging adults. A particularly novel contribution of the

current research is the identification of specificity in the cognitive and emotional correlates of shyness and social avoidance. These findings serve to inform practitioners and researchers about potential implications for theory and intervention efforts, with some limitations and future directions to keep in mind.

Implications. Taken together, the results from Studies 1 and 2 do not bode well for shy and socially avoidant emerging adults. For example, it has been well documented that maladaptive cognitions and internalizing problems (in and of themselves) pose considerable risk for more serious psychiatric disorders (Bar-Haim et al., 2007; Beesdo et al., 2007; Zahn-Waxler et al., 2000), as well as impairment across several other domains, including lower social support and peer acceptance (Ciarrochi, Heaven, & Supavadeeprasit, 2008; Greco & Morris, 2005), social skills deficits (Miers et al., 2013), and lower academic (Owens, Stevenson, Hadwin, & Nortgate, 2012) and workplace performance (Martin, Blum, Beach, & Roman, 1996; Lerner & Henke, 2008). Thus, in addition to the other challenges commonly present during this developmental stage (e.g., identity formation, romantic relationships, living alone, new school and work environments; Nelson & Padilla-Walker, 2013; Nikitin & Freund, 2008), the current findings add to the growing evidence to suggest that emerging adulthood may be a particularly challenging time for shy and socially avoidant youth (Nelson, 2013; Nelson et al., 2008; Tackett et al., 2013).

Relatedly, this raises the question of what social withdrawal actually represents in the context of early adulthood. Much of the social withdrawal literature has focused on the meaning and implications of this behaviour (and its underlying motivations) in childhood and adolescence (e.g., Coplan, Ooi, Xiao, et al., 2018; Coplan et al., 2013;

Kopala-Sibley & Klein, 2014), when peer relations are thought to be particularly influential and impactful (Rubin et al., 2015). As such, excessive time spent alone is assumed to be (at least somewhat) costly (Coplan, Ooi, & Baldwin, 2018). Yet, social dynamics in emerging adulthood differ drastically from childhood (particularly in the university context). For example, whereas young children are rarely left alone (i.e., often with caregivers, family, or peers), university students are faced with a more complex social context. On the one hand, they are afforded much more independence and, in turn, opportunities for solitude. For some, this increased time alone may be a welcomed opportunity for relaxation, restoration, and identity formation (Larson, 1997; Nguyen, Ryan, & Deci, 2018), whereas for others, separation from an established network of peers and family may be challenging and lead to feelings of loneliness (Nikitin & Freund, 2008). On the other hand, emerging adulthood is fraught with new contexts and situations that often require interaction with others (e.g., co-workers, classmates, roommates, romantic partners; Nelson, 2013). Sociable emerging adults might flourish in these contexts, whereas those who are more anxious or prefer solitude might find this experience challenging (Nikitin & Freund, 2008). Together, these features make emerging adulthood a unique context within which to examine the meaning, conceptualization, and implications of social withdrawal.

Nevertheless, it is becoming increasingly apparent that we need to, at the very least, acknowledge that there are some individuals who withdraw from the peer group for reasons other than social fear (i.e., shyness) or non-fearful preferences for solitude (i.e., unsociability). The extant withdrawal literature has largely assumed that youth remove themselves from social interactions because they are either anxious or introverted (e.g.,

Coplan et al., 2004; Barry et al., 2013). However, Studies 1 and 2 add to the small (but growing) body of work demonstrating that social avoidance is a distinct subtype of social withdrawal, with a unique set of social and emotional implications (Bowker et al., 2017; Coplan, Ooi, Xiao, et al., 2018; Coplan et al., 2013; Nelson, 2013; Nelson et al., 2016).

More importantly, it was demonstrated that maladaptive cognitions might help explain why some shy and socially avoidant emerging adults experience feelings of social anxiety and/or depression. By identifying somewhat unique pathways whereby shyness and social avoidance differentially lead to emotional difficulties, we gain a more nuanced understanding of the cognitive and emotional risks associated with different subtypes of social withdrawal. For example, Study 2 showed that negative cognitions were only important intermediary factors linking both shyness and social avoidance to depressive symptoms (and not social anxiety). This is not surprising as it suggests that such negative thoughts might foster lower self-esteem and increased self-blame (i.e., symptoms integral to depression; Cicchetti & Toth, 1998), but not necessarily invoke feelings of fear or anxiety in social situations. As such, it is apparent that identifying the nature of socially withdrawn youth's underlying thought patterns may be important for understanding the emotional risks associated with shy and socially avoidant motivations in emerging adulthood.

There are also practical implications that follow from the current research, particularly pertaining to intervention and prevention efforts for reducing internalizing difficulties among emerging adults. Traditional intervention programs for socially withdrawn youth have emphasized increased social exposure and social skills training (e.g., communicating, initiating interactions) (Chronis-Tuscano et al., 2015; Coplan,

Schneider, Ooi, & Hipson, 2018). In the clinical domain, interventionists have traditionally relied on cognitive behavioural therapy (CBT), interpersonal therapy (which aims to enhance social relationships), and pharmacotherapy to treat depression and social anxiety (Cuijpers et al., 2013). Although such programs have been found to be effective in reducing symptoms and preventing the subsequent onset of clinical disorders in subclinical populations (Butler, Chapman, Forman, & Beck, 2006; Cuijpers et al., 2011; Cuijpers, van Straten, Andersson, & van Oppen, 2008), they can also carry physiological, financial, and/or logistical disadvantages which pose barriers to seeking treatment. For instance, CBT is time-consuming, costly, and can only be administered by trained professionals (Haefel et al., 2011). Relatedly, some individuals avoid seeking treatment due to fears of side effects from pharmacotherapy (van Schaik et al., 2004), or pessimism regarding the efficacy of such treatments (Hunt & Eisenberg, 2010; Sareen et al., 2007).

Cognitive bias modification (CBM) is a strategy aimed at correcting patterns of cognitively biased thinking (primarily among anxious and depressed individuals) by having participants attend to neutral (or positive) rather than threatening or negative stimuli (typically using a computer task, such as a modified dot-probe paradigm) (Hertel & Mathews, 2011; Koster et al., 2009). One advantage of CBM is that it can be administered at home, making it more convenient and cost-effective. More importantly, it can bypass issues of patient unwillingness which can arise in response to undesirable elements of more traditional therapies, such as exposure therapy, which is a critical component of CBT (Beard, 2011).

There is growing evidence to suggest that modifying cognitions may be a promising approach for reducing internalizing difficulties (Hallion & Ruscio, 2011;

Kuckertz & Amir, 2015; Lang, Blackwell, Harmer, Davison, & Holmes, 2012). For instance, Haeffel et al. (2011) reported that undergraduate students who underwent CBM not only displayed more adaptive cognitive styles, but also reported fewer depressive symptoms. Lau et al. (2012) similarly reported that CBM training reduced symptoms of anxiety in a sample of adolescents. Moreover, Sportel, de Hullu, de Jong, and Nauta (2013) reported that, compared to participants in the CBT group, participants in the CBM group demonstrated greater improvements with regards to threat-related associations, and an equal rate of decline in social anxiety symptoms over time in a sample of adolescents.

Thus, CBM appears to offer an alternative intervention strategy with effect sizes comparable to existing treatments (Beard, 2011). Importantly, CBM is accessible to and beneficial for those without clinical diagnosis. Indeed, there is also evidence to suggest that CBM might act as a protective tool for youth who are temperamentally at-risk for anxiety (Liu, Taber-Thomas, Fu, & Pérez-Edgar, 2018). Thus, specifically targeting cognitive biases could potentially ‘disrupt’ the pathway from social withdrawal to internalizing problems. This is a particularly important implication, as shy and socially avoidant youth may not typically seek clinical treatment (such as CBT or medication), despite evidence to suggest that they are at increased risk for maladaptive cognitions and internalizing problems (Bowker & Raja, 2011; Coplan et al., 2013; Nelson, 2013). Modifying their cognitions prior to the onset of more serious clinical disorders may prove to be critical in ameliorating socially withdrawn youth’s emotional adjustment.

In particular, the current findings suggest that tailoring CBM programs to meet the specific needs of shy and socially avoidant youth may be important for effecting meaningful change. For example, it could be speculated that whereas shy individuals at

risk for social anxiety may particularly benefit from modification of threat-related thoughts, interventions aimed at improving negative thoughts about the self may be of no particular benefit. Similarly, socially avoidant youth may achieve greater gains through the modification of negative, self-referent views. Alternatively, for shy youth who are showing particular signs of depression and/or socially avoidant youth who are showing risk for social anxiety, targeting both threatening and negative cognitions may lead to more successful outcomes.

Limitations and future directions. Despite addressing important gaps in the literature, the findings must be interpreted within the context of a number of limitations. To begin, it is possible that associations were heightened among variables due to several potential sources of shared method variance. For instance, the strength of the associations may have been influenced by potential (conceptual and methodological) overlap among the constructs of interest. For instance, definitions of social anxiety and depression often include cognitive elements (Beck, 1976; Clark & Wells, 1995; Rapee & Heimberg, 1997) and, indeed, one measure of depressive symptoms used in the current research was originally developed to assess attributions. Similarly, some have argued that shyness and social anxiety may represent two points on a continuum (Rapee & Heimberg, 1997; Rapee & Spence, 2004). However, there is growing evidence and consensus that shyness and social anxiety represent distinct constructs (Clauss & Blackford, 2012; Rapee & Coplan, 2010). Given the study aims and postulations, a certain degree of overlap was expected in the constructs of interest. However, correlations demonstrated moderate effect sizes, suggesting that these were all indeed related (but distinct) constructs. In both samples, evidence was also found to support the same measurement model, suggesting

that the conceptualization of each latent variable was justifiable and robust. Finally, no issues of multicollinearity emerged, again suggesting that each of the constructs was distinct from other study variables.

The strength of the associations may have also been influenced by the fact that all constructs were assessed via self-report. Given the internal nature of social withdrawal motivations, cognitions, and emotional difficulties, it is important to directly ask the participants about their thoughts and feelings. Nevertheless, it will be important to replicate the current findings using additional methodologies and/or informants. For example, future studies should aim to replicate the current findings while including standardized or clinical assessments of social anxiety and depression, which may reduce response bias. Similarly, alternative assessments of cognitions could be implemented in future studies. Although a strength of the current research was the inclusion of a number of different cognitive biases, many of these involved asking participants to report how they *thought* they would react to hypothetical situations. Including more direct and objective assessment of cognitions (e.g., dot-probe tasks) may help to further clarify the role of cognitive patterns in socially withdrawn individuals' emotional adjustment. Moreover, inclusion of additional maladaptive cognitions would allow us to understand the potential influence of a broader range of cognitive patterns (see General Discussion for a more detailed discussion on this topic).

Although an important strength of the current research involved the inclusion of a number of potentially confounding factors, in many cases, the results indicated that cognitions only partially mediated the associations between subtypes of social withdrawal and internalizing problems. Thus, the findings only provide a piece of the puzzle with

regards to understanding how shyness and social avoidance can lead to feelings of social anxiety and depression. Accordingly, additional mediating or moderating factors may also underlie the links between social withdrawal, cognitions, and internalizing difficulties.

For instance, given the importance of establishing and maintaining intimate relationships in emerging adulthood (Nikitin & Freund, 2008), it could be important to study the potential role of romantic relationships in these associations among emerging adults. For example, Downey, Freitas, Michaelis, and Khouri (1998) reported that individuals with high rejection sensitivity were more likely to elicit rejection from their dating partners. Thus, it is plausible to suspect that this may perpetuate expectations of rejection and, in turn, exacerbate the negative implications of maladaptive cognitions on internalizing problems. Similarly, in childhood, negative peer experiences have been linked to social withdrawal (Bowker & Raja, 2011; Coplan, Ooi, Xiao, et al., 2018; Coplan et al., 2013; Gazelle & Ladd, 2006), maladaptive cognitions (Gibb, Schofield, & Coles, 2009; London et al., 2007), and internalizing problems (Dempsey & Storch, 2008; Gladstone, Parker, & Malhi, 2006). Therefore, it could be postulated that socially withdrawn children's heightened negative peer experiences may lead them to anxiously expect future negative events and experience negative thoughts about the self which, in turn, may lead to increased feelings of social anxiety and depression (Prinstein et al., 2005) (see Study 3 for a more detailed review of this literature).

Finally, it is important to acknowledge that the results from Studies 1 and 2 cannot be generalized to the broader emerging adulthood population, as both samples were drawn from a specific sub-population (i.e., primarily 1st- and 2nd-year undergraduate

university students). University students possess unique characteristics that may have influenced the results. For instance, they represent a homogeneous group that has chosen to seek higher education and have taken (at least one) psychology course. These traits alone may influence their prior understanding and knowledge of some of the underlying psychological processes that were assessed in Studies 1 and 2. At the same time, as compared to non-students, many students may be experiencing unique stresses related to attending university, including academic and financial pressures, living alone or with non-family members for the first time, and establishing new relationships in a new environment (Nikitin & Freund, 2008). It is also possible that many extremely shy and socially avoidant individuals may even choose *not* to attend university, suggesting that the current samples may not even include participants of most interest to the current research. Accordingly, additional research using a more representative sample of the emerging adulthood population is required.

Perhaps more importantly, the current findings cannot be generalized to other developmental periods (e.g., childhood, adolescence), when additional or alternative developmental processes (at the individual and contextual level) might be influencing the nature of these associations. Exploration of these associations in childhood (while taking the appropriate developmental factors into consideration) is particularly necessary in order to identify potential critical periods for prevention and intervention that might help interrupt or prevent the onset of subsequent internalizing difficulties.

Study 3 – The Social, Cognitive, and Emotional Correlates of Social Withdrawal Subtypes in Childhood

There is growing evidence to suggest that subtypes of social withdrawal are associated with different patterns of socio-emotional adjustment in childhood (Coplan, Ooi, Xiao, et al., 2018; Coplan et al., 2004; Coplan et al., 2013; Coplan & Weeks, 2010; Sette et al., 2017). However, very little is known about the potential underlying mechanisms that account for these associations, particularly with regard to social avoidance. Having established some evidence to suggest that subtypes of social withdrawal may display specific direct and indirect effects on internalizing problems via maladaptive cognitions in emerging adulthood, attention is now turned towards exploring these associations in middle childhood, a developmental period that has been particularly neglected in the withdrawal literature (Coplan & Weeks, 2010).

Entry to elementary school represents a time during which children are establishing social-cognitive patterns and behavioural reputations within a peer group that they may be with for several years (Mayeux & Cillissen, 2003). As such, the interpretations of, and responses to, social situations may be particularly important to examine during this time. Indeed, maladaptive cognitive processes have been found to be associated with emotional difficulties from a very early age (Abend et al., 2017), suggesting that cognitive models can be applied to children (van Niekerk et al., 2017). Moreover, there is at least some evidence to suggest that emotional difficulties may display cognitive content specificity in childhood (Ambrose & Rholes, 1993; Dagleish et al., 2003; Lau & Waters, 2017; Schniering & Rapee, 2004; Stuijzand et al., 2017). However, peer relations also appear to be highly influential during this developmental

stage (Rubin et al., 2015), with evidence to suggest that negative peer experiences may contribute to the development of maladaptive cognitions (London et al., 2007) and internalizing problems (Reijntjes, Kamphuis, Prinzie, & Telch, 2010). Yet, the social experiences and cognitions of young (particularly socially withdrawn) children remain relatively under-explored. As such, the purpose of Study 3 was to explore the social, cognitive, and emotional correlates of social withdrawal in a sample of early school-aged children.

Social Withdrawal and Socio-Emotional Adjustment in Early School-Aged Children

Upon entry into elementary school, children spend the majority of their waking time with peers (Larson & Richards, 1991). Although solitary play is relatively normative in early childhood (Coplan et al., 2004; Rubin, 1982), expectations for social interaction appear to steadily increase over the course of childhood and into adolescence (Coplan, Ooi, & Baldwin, 2018). Thus, choosing to withdraw from the peer group may become increasingly problematic as children enter their school-aged years. Surprisingly, very few studies have explored the correlates and implications of social withdrawal in middle childhood. In the only study to explore subtypes of social withdrawal in early school-aged children, Coplan and Weeks (2010) reported that shy 6- to 8-year-olds evidenced more internalizing problems, peer difficulties, and loneliness as compared to their unsociable and non-withdrawn peers. Similar patterns of associations have also been reported for slightly younger (Coplan, Ooi, Xiao, et al., 2018; Coplan et al., 2004; Sette et al., 2017) and older children (Coplan et al., 2013).

To date, there has been no empirical work specifically examining social avoidance in middle childhood. Accordingly, it is not known whether this particular

subtype of social withdrawal might be associated with social or behavioural difficulties. The extant withdrawal literature suggests that social avoidance might not be related to externalizing behaviours (e.g., Coplan et al., 2013). However, socially avoidant children might be particularly unlikely to engage in prosocial behaviours due to their low motivations to initiate social interactions (Asendorpf, 1990). There is also reason to suspect that social avoidance may pose risk for emotional maladjustment in middle childhood. For example, social avoidance has been found to be associated with internalizing difficulties in early (Coplan, Ooi, Xiao, et al., 2018) and late childhood (Coplan et al., 2013). Moreover, there is at least some evidence to suggest that shyness and social avoidance may demonstrate somewhat unique patterns of associations with emotional adjustment in childhood (Coplan et al., 2013; Ding et al., 2018). For example, Coplan, Ooi, Xiao, et al. (2018) reported that, whereas shyness displayed a direct effect on social anxiety, social avoidance demonstrated a direct effect on depressive symptoms (even after accounting for common associations and mediating effects) in their sample of young children. These findings further support the notion that specificity in the associations between subtypes of social withdrawal and indices of internalizing difficulties may be present in early childhood. Nevertheless, there remains much to be understood about the potential mechanisms underlying these associations.

A Multiple Mediation Model Linking Social Withdrawal, Maladaptive Cognitions, Peer Problems, and Internalizing Difficulties

Multiple factors have been identified in the literature as posing potential risk for internalizing difficulties in childhood (Clauss & Blackford, 2012; Crick & Dodge, 1994; Gladstone et al., 2006). Drawing upon the extant developmental literature, a review of the

potential mediating effects underlying the links between subtypes of social withdrawal and internalizing problems is presented in the sections that follow, with a particular focus on social cognitions and negative peer relations.

Social cognitions. Although limited, the empirical literature suggests that young withdrawn children display maladaptive cognitive processes. For example, LoBue and Pérez-Edgar (2014) compared the threat perceptions of 4- to 7-year-old high-shy and low-shy children. In addition to elevated internalizing problems, those in the high-shy group demonstrated greater biases in the processing of social threat (i.e., angry faces) than those in the low-shy group. Despite evidence to suggest that young children engage in maladaptive cognitions (Dodd et al., 2012; LoBue & DeLoache, 2008; LoBue & Pérez-Edgar, 2014), few studies have attempted to explore the role of social cognitions in the development of internalizing problems among at-risk children. Nonetheless, recent findings from the temperament literature (i.e., affect, BI) lend support for the need to consider the role of social cognitions in the development of internalizing problems among withdrawn youth.

For example, Bell and colleagues (2009) assessed the links between SIP and internalizing problems in community samples of elementary school-aged children (3rd-6th grades). Participants completed a newly developed comprehensive assessment of the various stages of Crick and Dodge's (1994) SIP model. Exploratory factor analyses suggested that a two-factor solution best fit the data, with subscales labelled: (a) negative information processing style, and (b) positive information processing style. Analyses revealed that internalizing problems were related to negative information processing styles, supporting an integration of SIP models into our understanding of the

development of internalizing problems. Luebke et al. (2010) then examined whether SIP styles added unique variance over and above trait affect in predicting internalizing problems. Among the results, it was reported that SIP partially mediated the links between affect and internalizing symptoms. Hong et al. (2017) similarly reported that negative affectivity at age 7 predicted cognitive vulnerabilities which, in turn, were positively related to internalizing symptoms.

In another study, Broeren et al. (2011) examined the role of repetitive worry and rumination in the vulnerability for emotional problems in a sample of 8- to 13-year-olds. Children completed self-reported assessments of: (a) neuroticism and BI as indicators of personality/temperamental vulnerabilities; (b) rumination and worry as manifestations of maladaptive cognitions; and (c) anxiety, depression, and sleep difficulties as indices of emotional problems. Among the results, rumination and worry partially mediated the links between temperamental vulnerabilities and emotional problems. White et al. (2017) similarly examined the relations between BI in toddlerhood, and both attention biases and anxiety at ages 5 and 7. Among the results, BI predicted anxiety at age 7 years among children who displayed attention biases towards threat at age 7 (but not age 5), suggesting that age may be an important factor in our understanding of the implications of maladaptive cognitions. Relatedly, Gramszlo et al. (2018) tested a model linking fearful temperament, maladaptive cognitions (i.e., attentional control and worry), and anxiety in a sample of 7- to 12-year-olds. Results supported a serially mediated relation between temperament and anxiety, with worry mediating the relation between attentional control and anxiety. Furthermore, the authors found evidence to support the directionality of effects by also testing two reversed mediational models.

Two recent studies provide the most direct evidence to suggest that maladaptive cognitions might account for the links between social withdrawal and internalizing difficulties. In the first, Weeks et al. (2016) examined the links between shyness, threatening cognitions, and social anxiety in a sample of 10- to 14-year-olds. Results indicated that judgement biases mediated the relations between shyness and social anxiety. Vassilopoulos, Brouzos, Moberly, and Spyropoulou (2017) similarly reported that maladaptive cognitive processes (i.e., negative social attitudes) mediated the relations between shyness and social anxiety in their sample of preadolescents.

Thus, consistent with the adult literature (e.g., Studies 1 and 2; Viana & Gratz, 2012), the limited findings from the developmental literature suggest that maladaptive cognitions may similarly function as an explanatory factor in the relations between social withdrawal and internalizing problems in childhood and adolescence. However, no study to date has compared the potential differing cognitive risks associated with different subtypes of social withdrawal. Coplan et al. (2013) reported that shy and socially avoidant children displayed more negative attributional styles as compared to their unsociable and non-withdrawn peers, suggesting that socially withdrawn children may indeed display differential risk for maladaptive cognitive patterns.

Notwithstanding, findings from another study perhaps call the proposed model into question. Dodd and colleagues (2012) conducted a longitudinal study that explored the associations among BI, interpretation biases, and clinical anxiety in 3- to 4-year-old children. The authors reported that those who met the criteria for anxiety at baseline were more likely to display cognitive biases. Interestingly, the authors found little evidence to support an association between BI and cognitive biases, which suggest that perhaps BI

and biased cognitions make independent contributions to the development of anxiety. Thus, it could be that social withdrawal, cognitions, and internalizing difficulties are not interrelated in early childhood. However, given the lack of empirical research in middle childhood, it is unclear whether cognitions account for the links between social withdrawal and internalizing difficulties during this developmental period. Accordingly, one of the aims of Study 3 was to explore these associations in a sample of early school-aged children.

It is important to note that the inconsistencies in the literature across ages may suggest that development plays a role in these associations (Stuijzand et al., 2017). As such, it may not be appropriate to apply cognitive models derived from the adult empirical literature to children – at least not without considering additional relevant developmental factors. For example, it has been well established that peer relations exert considerable influence on children’s social, emotional, and cognitive development (Rubin et al., 2015). As such, negative peer experiences may also contribute to our understanding of the risks for internalizing problems in childhood. Accordingly, a review of the relevant literature linking peer relations to social withdrawal, cognitions, and internalizing problems is presented in the following sections.

Negative peer relations. Multiple streams of evidence point towards peer relations as an important factor to consider within the context of the current research. For instance, there is evidence to suggest that temperamentally at-risk youth (e.g., socially withdrawn children) may be particularly prone to negative peer experiences (Coplan & Ooi, 2014; Nelson, Rubin, & Fox, 2005). It has been suggested that socially withdrawn children may exhibit traits that make them appear to be *easy targets* for victimization

(e.g., submissive, quiet, anxious) (Beran, 2008; Bernstein & Watson, 1997; Carney & Merrell, 2001; Troy & Sroufe, 1987). It has also been argued that withdrawn behaviour may evoke negative peer responses because it is perceived as non-normative and, therefore, less acceptable by peers (Rubin & Asendorpf, 1993). In turn, such negative responses from peers may contribute to concurrent and subsequent feelings of anxiety and depression (Carney & Merrell, 2001; Dempsey & Storch, 2008; Gladstone et al., 2006; Juvonen, Graham & Schuster, 2003; Perren & Alsaker, 2009; Rubin et al., 2015; see Coplan & Ooi, 2013). Indeed, Boivin and Hymel (1997) found that victimization mediated the links between withdrawal and feelings of loneliness in a sample of 8- to 10-year-olds. As such, negative peer experiences in childhood may (at least partially) help to explain why socially withdrawn youth are at increased risk for heightened internalizing difficulties.

Only two studies to date have directly compared the social and emotional correlates of shyness, unsociability, and social avoidance in childhood, both of which highlight the role of peer problems. In the first, Coplan and colleagues (2013) tested a conceptual model linking social approach and avoidance motivations, withdrawn behaviours, and peer difficulties in a sample of 9- to 12-year-old children. Among the findings, withdrawn behaviours accounted for the links between both shyness and preference for solitude and peer problems. These findings suggest that peers may indeed respond negatively to children who are shy and prefer solitude as a result of their propensity to spend more time alone. Person-centred analyses also revealed differences in the socio-emotional adjustment of shy, unsociable, and socially avoidant children. Specifically, socially avoidant children exhibited the most pervasive pattern of socio-

emotional maladjustment, with higher levels of social anxiety and depressive symptoms than their shy, unsociable, and non-withdrawn peers.

Coplan, Ooi, Xiao, et al. (2018) followed up on this study by exploring the associations between subtypes of social withdrawal, peer problems, and internalizing difficulties in a sample of kindergarten and grade 1 students. Among the results, unsociability was not significantly associated with peer difficulties or indices of socio-emotional maladjustment after taking common associations into account. This suggests that even young children may be able to recognize differences in their peers' motivations to spend time alone and, as such, may not respond as negatively to unsociable behaviours. In contrast, shyness and social avoidance were positively associated with peer problems and internalizing difficulties (i.e., social anxiety, depressive symptoms). Moreover, peer problems partially accounted for (i.e., mediated) the links between both shyness and social avoidance and internalizing problems. Relatedly, Sette et al. (2017) recently reported that low peer acceptance exacerbated the links between shyness and preference for solitary play, as well as the links between unsociability and externalizing problems in preschool-aged children. Taken together, these findings suggest that negative peer relations play a critical role in the links between social withdrawal and socio-emotional adjustment.

Peer problems and social cognitions. There is also conceptual and empirical evidence to suggest that peer problems may foster maladaptive cognitive patterns. The SIP model implies that past experiences influence the development of cognitive styles (Crick & Dodge, 1994). Consequently, frequent exposure to negative peer experiences might encourage the development of a cognitive schema wherein children come to expect

negative interactions in the future (London et al., 2007) or think negatively about themselves. Indeed, Graham and Juvonen (2001) reported that victimized youth tended to blame themselves for peer relationship difficulties. Such feelings of self-blame can, in turn, lead to a variety of negative feelings, such as depression and low self-esteem (Rubin et al., 2009).

Few studies have directly examined the links between negative peer experiences in childhood and social cognitions (e.g., Camodeca, Goossens, Schuengel, Meerum Terwogt, 2003; Gibb et al., 2009; London et al., 2007; Rosen, Milich, & Harris, 2007; Vosk, Forehand, & Figueroa, 1983). Frequent exposure to negative peer experiences in childhood has been found to be associated with poorer social interpretation abilities, including lower scores on emotion identification tasks during social interactions (Vosk et al., 1983), greater attention and interpretation biases (Gibb et al., 2009), and ‘pre-emptive’ processing of threatening stimuli (Rosen et al., 2007). Moreover, there is evidence to suggest that maladaptive cognitions may exacerbate the impact of negative social interactions (Zadro, Boland, & Richardson, 2006).

Indeed, there is preliminary evidence to suggest that peer experiences and maladaptive cognitions may function collectively to contribute to the development of internalizing problems. For instance, Prinstein and colleagues found that negative peer experiences predicted depressive symptoms when combined with maladaptive cognitions (e.g., negative attributional styles) in 5- to 6-year-old children (Prinstein et al., 2005) and adolescents (Prinstein & Wargo Aikins, 2003). Ladd and Troop-Gordon (2003) similarly found that the relation between peer difficulties and internalizing problems was partially mediated by negative self- and peer beliefs in their longitudinal study of children from

the ages of 5 to 10 years old. Rubin and colleagues (Rubin et al., 2009) further speculated that socially withdrawn children who were chronically rejected and victimized would develop a maladaptive pattern of thinking (e.g., negative attributions, self-blame). In support of this notion, Rubin and Rose-Krasnor (1986) found that withdrawn children blamed their social failures on personal characteristics, rather than external circumstances. Taken all together, the extant literature suggests that negative peer experiences and maladaptive cognitions may function as part of a broader developmental system linking social withdrawal to internalizing difficulties in childhood.

Developmental Considerations

The early school years may represent an important time for children's social and emotional adjustment, as they are learning to navigate more frequent and complex social interactions (van Lier & Deater-Deckard, 2016). The transition to school may be particularly challenging for some socially withdrawn youth (Coplan & Arbeau, 2008; Henderson & Fox, 1998), as the increasing social demands may intensify negative feelings and social fears (Evans, 2001). As such, middle childhood represents an important developmental period during which to investigate the social and cognitive factors that may contribute to the development of socio-emotional difficulties.

It remains unknown whether maladaptive cognitions impact upon the associations between social withdrawal and internalizing problems in middle childhood. The lack of empirical research during this developmental period may be attributable to a number of factors. For example, there has been some debate in the past regarding whether younger children: (a) have the maturity required to establish stable cognitive biases (Harter, 2003); and (b) are able to reliably and validly report their internal states (Byrne, 1996).

However, recent findings suggest that young children not only have predictable thought patterns, but are also capable of expressing their internal cognitions and self-perceptions (Harter & Pike, 1984; Measelle, John, Ablow, Cowan, & Cowan, 2005) with the use of certain methodological protocols (e.g., simplified response formats, use of one-on-one interviews, visual aids). Indeed, with the recent development of a number of new and/or adapted age-appropriate measures of social cognitions (e.g., Bell et al., 2009; Creswell et al., 2011; LoBue & Pérez-Edgar, 2014; Susa, Pitică, & Benga, 2008; Ziv & Sorongon, 2011), there has also been growing evidence supporting the presence of stable cognitions in younger children.

Another barrier to the empirical examination of the proposed research involves previous reluctance towards assessing internalizing problems in younger children. It has been well documented that the primary period of onset for emotional and mood disorders occurs in adolescence (Beesdo et al., 2007; Kessler et al., 2005), and that clinical diagnoses of internalizing disorders are rare in younger children (Egger & Angold, 2006; Domènech-Llaberia et al., 2009). However, there is now considerable evidence indicating that elevated symptoms of internalizing problems can be detected in very young children (e.g., Côté et al., 2009; Edwards, Rapee, & Kennedy, 2010; Ooi et al., 2017; Rapee, Kennedy, Ingram, Edwards, & Sweeney, 2005; Spence, Rapee, McDonald, & Ingram, 2001; Zhu et al., 2017). Given that symptoms of internalizing difficulties in childhood are one of the strongest predictors of future mental health problems in adolescence and adulthood (Beesdo et al., 2009; Bittner et al., 2007; Goodwin et al., 2004; Weems, 2008), it is particularly important to identify early risk factors.

Aims and Hypotheses

Given the overall lack of empirical examination of social withdrawal (particularly social avoidance) in middle childhood, the preliminary aim of Study 3 was to explore some of the social, emotional, and cognitive correlates (i.e., internalizing problems, peer problems, prosocial behaviours, conduct problems, maladaptive cognitions) of subtypes of social withdrawal in early school-aged children.

Converging lines of research suggest that both peer difficulties and maladaptive cognitions mediate the relations between social withdrawal and internalizing problems in childhood. Drawing upon previous models of social withdrawal (Coplan, Ooi, Xiao, et al., 2018; Coplan et al., 2013) and cognitive-behavioural models of internalizing problems (Beck, 1976; Muris et al., 2003; Rapee & Heimberg, 1997), the primary aim of Study 3 was to explore a conceptual model depicting a serial mediation effect, wherein socially withdrawn behaviours lead to peer difficulties which, in turn, promote maladaptive cognitions and internalizing difficulties (see Figure 5). The current study addresses several gaps in the literature, as relatively little is known about the nature of these associations in middle childhood. Moreover, the current study is the first to explore the concomitants of social avoidance in early school-aged children.

Consistent with previous findings in samples of younger (Coplan, Ooi, Xiao, et al., 2018; Coplan et al., 2004) and older children (Coplan et al., 2013), all three subtypes of social withdrawal were hypothesized to be associated with peer problems. In turn, peer problems were expected to be positively associated with maladaptive cognitions, as well as indices of internalizing problems (i.e., social anxiety, depressive symptoms). Additionally, shyness and social avoidance (but not unsociability) were expected to be

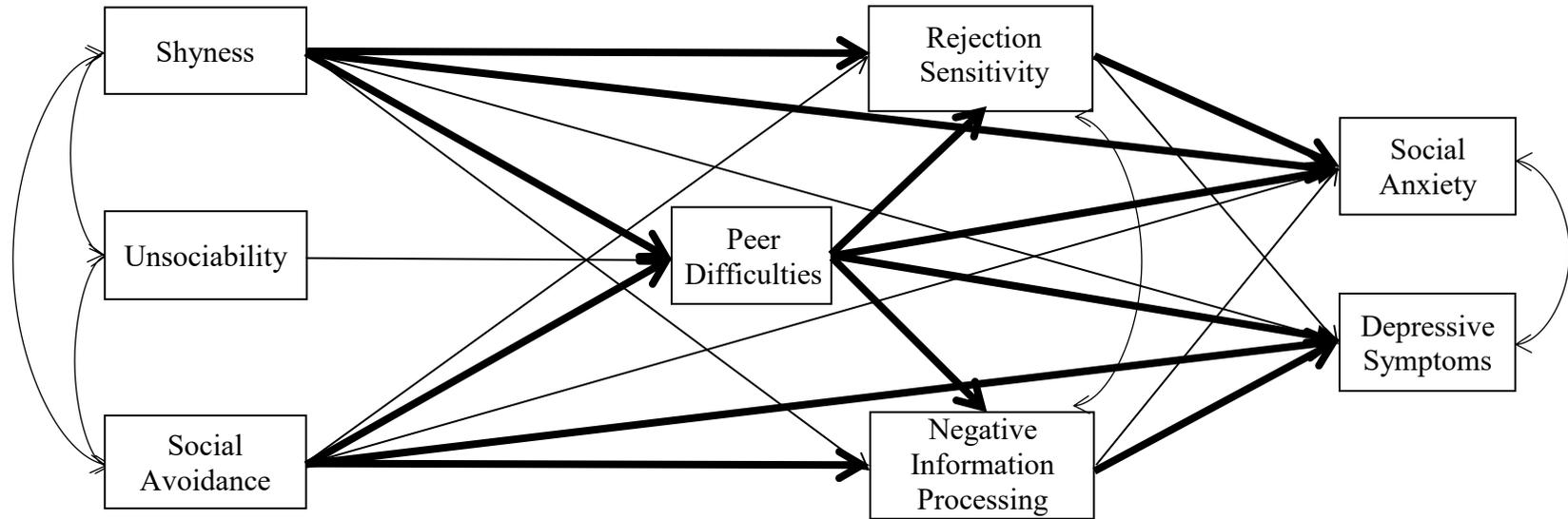


Figure 5. Conceptual serial mediation model for subtypes of social withdrawal, peer problems, maladaptive cognitions, and internalizing problems.

directly associated with internalizing problems and maladaptive cognitions.

In terms of more complex associations, it was hypothesized that peer problems and maladaptive cognitions would each *mediate* the associations between subtypes of social withdrawal and internalizing problems. Moreover, a serial mediation effect was expected, wherein social withdrawal would lead to peer problems, which would then predict maladaptive cognitions which, in turn, would predict internalizing problems.

Based on previous evidence suggesting that subtypes of social withdrawal may display unique associations with maladaptive cognitions (Coplan et al., 2013) and different types of internalizing problems (Coplan, Ooi, Xiao, et al., 2018), it was further hypothesized that shyness and social avoidance would display distinct patterns of cognitive and emotional adjustment. Specifically, it was expected that shyness would be uniquely related to threatening cognitions (i.e., rejection sensitivity) and social anxiety, whereas social avoidance would be uniquely related to negative cognitions (i.e., negative social information processing) and depressive symptoms.

Finally, consistent with previous findings, it was speculated that all types of socially withdrawn boys would experience greater socio-emotional difficulties than socially withdrawn girls (e.g., Doey et al., 2014; Stevenson-Hinde & Glover, 1996). However, findings regarding gender differences in cognitive styles are limited and inconsistent in childhood (Gluck et al., 2014; Miers et al., 2008; Musun-Miller, 1993; Walker, Irving, & Berthelsen, 2002). Given the limited available evidence, no specific hypotheses were made regarding gender differences in the display of maladaptive cognitions among subtypes of withdrawn children.

Method – Study 3

Participants

Participants for Study 3 were $N = 408$ children (221 girls, 187 boys) in grades 1 ($n = 150$), 2 ($n = 122$), and 3 ($n = 135$). Participants ranged in age from 6 to 9 years old ($M_{age} = 7.10$ years, $SD = .86$), and were recruited from elementary schools in the Upper Canada District School Board, located in the Eastern Ontario region (e.g., Brockville, Carleton Place)³.

Procedure

Upon obtaining approval from the *Carleton Psychology Research Ethics Board*, and the *Upper Canada District School Board Research Steering Committee*, principals of elementary schools were contacted in order to recruit participants. Parents of children who met the age inclusion criteria were provided with information letters and consent forms explaining details of the study, each participant's expected role, and contact information. Parents who gave consent were asked to provide demographic information and contact information. At a later date, parents were invited (via email) to complete a set of questionnaires (which included assessments of their children's social withdrawal and socio-emotional adjustment) online using FluidSurveys.

Participating children completed assessments during individual interviews, which took place in a room located at their school with a trained research assistant. Before beginning the task, children were read a letter of assent explaining what would be happening, what was expected of them, and asking them if they were willing to

³ Data for Study 3 were collected as part of a larger study conducted by Dr. Robert J. Coplan (Carleton University) and Dr. Linda Rose-Krasnor (Brock University); however, ideas regarding the conceptualization, design, and methodology of the study were contributed as part of this dissertation.

participate. Upon receiving verbal assent, instructions for each measure were read aloud to the child. Children completed assessments of maladaptive cognitions and loneliness. Upon completion of the interview, the research assistant read a debriefing letter aloud to each child. Additionally, parents of participants were given a debriefing letter, which included contact information for appropriate resources pertinent to the material addressed in the study.

Measures

Demographic information. Parents were asked to provide basic demographic information about their child(ren) (e.g., gender, age).

Social withdrawal subtypes. Parents completed the *Child Social Preference Scale-3* (CSPS-3; Coplan, Ooi, Xiao, et al., 2018; see Appendix K), a recently adapted measure designed to assess subtypes of social withdrawal in childhood. The original CSPS (Coplan et al., 2004) was developed to assess shyness and unsociability in early childhood, drawing upon previous conceptualizations of the constructs (i.e., Asendorpf, 1990; Asendorpf, 1991; Buss & Plomin, 1984; Cheek & Buss, 1981), and has been widely used (Arbeau et al., 2010; Coplan et al., 2008; Coplan & Armer, 2005; Coplan et al., 2014; Coplan & Weeks, 2010). Parents are asked to respond to the question “How much is your child like that?” along a 5-point scale for each item, ranging from *1 = not at all*, to *5 = a lot*. Items within each subscale are then averaged in order to generate summary scores, with higher values indicating higher levels of withdrawn motivations.

Recently, Coplan, Ooi, Xiao, et al. (2018) revised the CSPS to include items assessing social avoidance and reported on the factor structure and psychometric properties of the CSPS-3 for use with a sample of 4- to 7-year-olds. Results from

exploratory factor analyses supported a three-factor solution, which accounted for 56.28% of the variance. Moderate to high factor loadings were reported for the 7-item *shyness* subscale (.64 to .83; e.g., “My child seems to want to play with others but is sometimes nervous to”), the 4-item *unsociability* subscale (.56 to .81; e.g., “My child often seems content to play alone”), and the 4-item *social avoidance* subscale (.57 to .73; e.g., “my child actively avoids playing with other children”). Coplan, Ooi, Xiao, et al. (2018) also reported strong evidence of construct validity for all three subscales based on associations with parent-rated child temperament (i.e., negative emotionality, soothability), parent-rated peer interactions outside of school, and teacher-rated withdrawn behaviours at school. Acceptable-to-high internal consistencies were reported for all three subscales ($\alpha = .70$ to $.87$). Using a slightly older sample, similar coefficients were found for the shyness ($\alpha = .86$), unsociability ($\alpha = .77$), and social avoidance ($\alpha = .58$) subscales in the current study.

Socio-emotional functioning. Children self-reported their feelings of loneliness using the *Loneliness and Social Dissatisfaction Questionnaire for Young Children* (LSDQ-Y; Cassidy & Asher, 1992; see Appendix L). The *pure loneliness* scale of the LSDQ-Y (Ladd & Troop-Gordon, 2003) includes 4 items (plus 4 filler items) aimed at tapping into affective experiences at school (e.g., “Do you feel left out of things at school?”). Children were asked to respond on a 3-point Likert scale (2 = *yes*, 1 = *sometimes*, or 0 = *no*). Responses were averaged, with higher scores reflecting greater feelings of loneliness. The loneliness subscale has been used in several studies with elementary school-aged children and has demonstrated good psychometric properties, including good reliability coefficients ($\alpha = .75$ to $.82$) (Kochenderfer & Ladd, 1997; Ladd

& Coleman, 1997; Ladd, Kochenderfer, & Coleman, 1996) and good test-retest reliability (Terrell-Deutsch, 1999). In the current study, the LSDQ-Y demonstrated good internal consistency ($\alpha = .80$).

As an assessment of social and emotional functioning, parents completed the *Strengths and Difficulties Questionnaire* (SDQ; Goodman, 1997; see Appendix M). The SDQ was designed as a screening measure of the behavioural strengths and difficulties of children ages 4-16 years. Teacher-, parent-, and self-report versions of the SDQ have been used extensively in the literature (e.g., Goodman & Scott, 1999; Hawes & Dadds, 2004; Van Roy, Veenstra, & Clench-Aas, 2008). In the current study, parents rated each item on a 3-point scale based on how true they believed each item to be for their child (“0 = not true,” “1 = somewhat true,” or “2 = certainly true”). Of particular importance for the current study were the *peer problems* (5 items; e.g., “Picked on or bullied by other children”), *conduct problems* (5 items; e.g., “Often fights with other children or bullies them”), and *prosocial behaviours* subscales (5 items; e.g., “Helpful if someone is hurt, upset or feeling ill”). Summary scores were generated by averaging the items within subscales, with higher values indicating greater difficulties (or strengths, in the case of prosocial behaviours). The conduct problems ($\alpha = .63$) and prosocial behaviours subscales ($\alpha = .73$) demonstrated acceptable internal consistency. Although the internal consistency of the peer problems subscale was somewhat low in the current study ($\alpha = .51$), this is consistent with the extant literature which has yielded similar values ($\alpha = .30$ to $.76$). Despite this, the peer problems subscale has previously demonstrated acceptable test-retest reliability ($r = .66$), and the SDQ has been shown to perform well as a

screening instrument for behavioural difficulties in younger children (Stone, Otten, Engels, Vermulst, & Janssens, 2010).

Also of interest in the current study was a single item from the SDQ (item 13: “Often unhappy, depressed or tearful”) representing symptoms of depression. Although the SDQ includes an *emotional problems* subscale, it has been suggested that it is more representative of a broader range of difficulties (e.g., anxiety, fear, nervousness). In contrast, the single item has been found to be more strongly related to previously established correlates of depressive symptoms (e.g., risk for self-harm) than the remaining items in the emotional symptoms subscale (Lundh, Wangby-Lundh, & Bjärehed, 2011). Thus, although a single item is admittedly not ideal, it was deemed to be a more appropriate measure of depressive symptoms in the current study. Indeed, this particular item has previously been used as an index of parent-rated depressive symptoms (Classi, Milton, Ward, Sarsour, & Johnston, 2012). More importantly, the same item was used as an index of depression in the only existing study exploring the links between subtypes of social withdrawal and depression in early childhood (Coplan, Ooi, Xiao, et al., 2018).

Parents completed the 6-item *social phobia* subscale from the *Spence Child Anxiety Scale* (SCAS-P; Spence, 1997; see Appendix N) as an assessment of social anxiety. Items included “My child worries what other people think of him/her” and “My child feels afraid when (s)he has to talk in front of the class”. Respondents were asked to rate how representative each statement was of their child on a 4-point scale (0 = *Never* to 3 = *Always*). Item scores were averaged, with higher values representing greater symptoms of social anxiety. In addition to evidence of good convergent and divergent

validity, high internal reliability coefficients have been reported for the social phobia subscale (corrected Spearman Brown coefficients, $\alpha = .90$ to $.92$) in clinical and normal control groups (Nauta et al., 2004). In the current study, internal consistency was somewhat lower, but still acceptable ($\alpha = .76$).

Social cognitions and information processing. Given the social nature of social withdrawal, it was expected that deficits in processing information within a *social* context would be particularly salient (LoBue & Pérez-Edgar, 2014). As such, two measures assessing cognitions within a social context were administered during individual child interviews. First, as an assessment of threatening cognitions, children completed a shortened 6-item version of the *Children's Rejection Sensitivity Questionnaire* (CRSQ; Downey, Lebolt, et al., 1998; see Appendix O). Similar to the adult version (i.e., RSQ; Downey & Feldman, 1996) used in Studies 1 and 2, the CRSQ is designed to assess participants' anxious and angry expectations of rejection. Children were presented with a series of hypothetical scenarios depicting situations where there was a possibility of rejection. After each scenario, participants rated how "nervous" (i.e., anxious) and how "mad" (i.e., angry) they would feel in each situation. Following Nesdale et al. (Nesdale, Zimmer-Gembeck, & Roxburgh, 2014), a 3-point (rather than 6-point) scale was used given the age of the participants ($1 = \text{Not nervous/mad at all}$, $2 = \text{Sort of nervous/mad}$, or $3 = \text{Very, very nervous/mad}$). Participants were also asked to rate their rejection expectations for each situation ($1 = \text{Yes}$, $2 = \text{Maybe}$, or $3 = \text{No}$). Of particular interest in the current study were the anxious expectations of rejection. Accordingly, expected likelihood of rejection responses were multiplied by the degree of anxiety reported for each item, with higher scores indicating greater rejection sensitivity.

The original 12-item CRSQ anxious expectations of rejection subscale has been shown to have good factor structure, acceptable internal consistency ($\alpha = .79$) and good test-retest reliability over a 4-week interval ($r = .82$) (Downey, Lebolt, et al., 1998; London et al., 2007). Several studies assessing rejection sensitivity among children and adolescents have reported similar internal reliability coefficients using a reduced set of 6 items (e.g., Bowker, Thomas, Norman, & Spencer, 2011; Croft & Zimmer-Gembeck, 2014; Nesdale et al., 2014; Wang, McDonald, Rubin, & Laursen, 2012). Moreover, although the CRSQ was originally developed for use with older children, it has previously been used with children as young as 6 years old (Nesdale et al., 2014). In the current study, the items in the anxious expectations subscale of the CRSQ demonstrated acceptable internal consistency ($\alpha = .68$).

Finally, as an assessment of negative cognitions, children completed items from the *Children's Evaluation of Everyday Social Encounters Questionnaire* (ChEESE-Q; Bell et al., 2009; see Appendix P). The ChEESE-Q is a multi-stage vignette-based measure of children's SIP styles. Children were presented with hypothetical ambiguous social situations and were then asked to respond to questions assessing several stages of Crick and Dodge's (1994) SIP model, including intent and causal attributions, goals, and responses. Although not a direct assessment of children's negative cognitions, it does encompass a number of relevant content, including negative attributions (i.e., negative thoughts about the self and others). Given that SIP patterns appear to be important predictors of maladjustment among younger children (Luebke et al., 2010), this method was deemed the most appropriate for the purposes of the current study.

The ChEESE-Q was originally designed for use with older children (i.e., grades 3 and up) (Bell et al., 2009); however, it has previously been used with children as young as 7 years old (Baker & Hudson, 2014). In the current study, two of the original six vignettes were selected based on age-appropriate content. After presenting each ambiguous scenario, an open-ended question was first used to orient the participant to the scenario, followed by a series of questions each rated on a 5-point scale, ranging from 1 = *definitely not/not at all* to 5 = *definitely/very much*. Of particular interest in the current study were items representing negative information processing (N-SIP), which included assessments of negative causal and intent attributions, avoidant and distress expression goals, and passive, active, and negative responses. Responses for each SIP stage were averaged across scenarios, with higher scores reflecting greater negative processing patterns. Consistent with previous findings (Bell et al., 2009), items in the N-SIP evidenced good internal consistency ($\alpha = .80$). Of note, a single-item version of this measure has previously been used with younger children and yielded similar reliability coefficients (Baker & Hudson, 2014).

Statistical Analysis Plan

All planned statistical analyses are consistent with those presented in Study 1.

Results – Study 3

Preliminary Analyses

Missing data. For the full dataset, 17.8% of all data were missing (ranging from 2.9% to 58.8% for each study variable). Little's (1988) MCAR test was significant, $\chi^2(596) = 747.970, p < .001$, suggesting that the data were not MCAR; however, the

pattern of missingness did not appear to be accounted for by the variables in the study (i.e., data appeared to be missing at random).

Outliers. A total of 25 cases were identified as potential outliers (i.e., $> 3 SDs$ above the mean; Tabachnik & Fidell, 2007) in the current sample. The original values were retained due to overall small percentage of cases identified, and the potential that the outliers represented legitimate cases in the population (Kline, 2016). The data were then screened for potential multivariate outliers. For each dependent variable, between 3 and 4 cases raised concern as potential multivariate outliers (i.e., Mahalanobis distance values $>$ than critical χ^2 value at $p < .001$). Again, given the small number and that such cases may be true representations of the phenomenon being studied, they were not altered or removed.

Multicollinearity. Tolerance values were all above the suggested cut-off value of $> .10$ (range: .40-.97), and VIF values were well below the suggested value of < 10 (range: 1.03-2.14), indicating that there were no problems of multicollinearity in the data.

Testing of assumptions. Assumptions of normality, linearity, independence, and homoscedasticity were tested in the data. Normal probability plots did not indicate any substantive departure from normality. Bivariate scatterplots of all predictor and outcome variables did not indicate any obvious curvature (i.e., non-linear associations). Finally, plots of residual versus predicted values gave no major indication of heteroscedasticity.

Skewness. Several variables in the dataset met the criterion for being significantly skewed (i.e., z -scores > 1.96). However, examination of histograms suggested that all continuous variables had reasonably distinct tails. Moreover, only one of the main study variables exceeded the suggested reference absolute skew value of 2 (social avoidance =

2.08) indicating potentially substantial non-normality (Kim, 2013). The remaining variables were below the suggested cut-off (range: .25-1.88). Given that some degree of skewness was expected due to the nature of the constructs being explored, transformations of the data were not conducted. However, MLR was implemented in order to adjust for the potential impact of skewed variables.

Descriptive statistics and bivariate correlations. Descriptive statistics and correlations for all main study variables are presented in Table 7. Among the results, all three subtypes of withdrawal were significantly and positively correlated with peer problems, and not significantly related to conduct problems. Social avoidance was significantly and negatively associated with prosocial behaviours (and the association with shyness approached significance), and all three subtypes were (somewhat surprisingly) not significantly related to loneliness. However, shyness (but not unsociability or social avoidance) was significantly and positively correlated with social anxiety and depressive symptoms. Contrary to expectations, bivariate correlations indicated that subtypes of social withdrawal were not significantly associated with maladaptive cognitions (rejection sensitivity, negative information processing).

Surprisingly, rejection sensitivity and negative information processing were negatively correlated. Additionally, negative information processing was not significantly related to social anxiety or depressive symptoms but was positively correlated with feelings of loneliness. Rejection sensitivity was significantly and positively associated with depressive symptoms and loneliness (and the association with social anxiety approached significance).

Of note, age was only significantly and negatively correlated with negative

Table 7

Descriptive Statistics and Bivariate Correlations among Main Study Variables (N = 408)

	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	-											
2. Shyness ^P	.02	-										
3. Unsociability ^P	.03	.12 ⁺	-									
4. Social Avoidance ^P	.04	.45***	.28***	-								
5. Rejection Sensitivity ^C	.07	.07	.09	.06	-							
6. Negative Information Processing ^C	-.32***	-.03	.01	.01	-.18**	-						
7. Social Anxiety ^P	.01	.33***	.01	.12	.15 ⁺	.02	-					
8. Depressive Symptoms ^P	-.04	.19*	-.01	.13	.16*	.04	.24**	-				
9. Loneliness ^C	-.10*	.00	.06	-.02	.36***	.34***	.18*	.25**	-			
10. Conduct Problems ^P	-.02	.07	-.18	.09	-.15 ⁺	.03	.14	.27***	.18*	-		
11. Prosocial Behaviours ^P	-.01	-.15 ⁺	.02	-.32***	.17*	.01	-.10	-.05	.01	-.50***	-	
12. Peer Difficulties ^P	-.03	.33***	.19*	.36***	-.03	.02	.15 ⁺	.38***	.18*	.37***	-.34***	-
<i>M</i>	7.10	2.02	2.58	1.42	3.91	1.99	1.55	.25	1.50	.30	1.66	.26
<i>SD</i>	.86	.78	.80	.56	1.28	.61	.42	.52	.53	.31	.35	.29
Min-	6-9	1.00-	1.00-	1.00-	1.00-	1.00-	1.00-	.00-	1.00-	.00-	.40-	.00-
Max	years	4.43	4.50	4.75	9.00	4.47	2.83	2.00	3.00	2.00	2.00	1.20
<i>n</i>	408	274	276	278	391	378	168	172	394	170	172	170

* $p < .05$; ** $p < .01$; *** $p < .001$; ⁺ $p < .06$ ^C = Child Self-Report; ^P = Parent Rating*n* varies as a function of missing data.

information processing ($r = -.32, p < .001$) and loneliness ($r = -.10, p = .046$).

Controlling for age in subsequent SEM analyses did not alter the pattern of results or improve model fit, and as such, results are presented again without controlling for age.

Gender differences. A series of MANOVAs was performed to test for gender differences in social withdrawal, social adjustment, cognitions, and internalizing problems. Results from the first MANOVA indicated a significant multivariate main effect of gender on social withdrawal, $F(3, 264) = 3.595, p = .014$, Wilks' $\lambda = .961, n^2_p = .039$. Follow-up univariate analyses (using Bonferroni correction) indicated a significant effect on shyness ($F(1, 266) = 6.227, p = .013, n^2_p = .023$; $M_{girls} = 2.11, SD = .78, M_{boys} = 1.88, SD = .76$), but not unsociability ($F(1, 266) = .877, p = .350, n^2_p = .003$), or avoidance ($F(1, 266) = .408, p = .523, n^2_p = .002$).

A second MANOVA indicated a significant multivariate main effect of gender on social adjustment, $F(4, 160) = 7.771, p < .001$, Wilks' $\lambda = .837, n^2_p = .163$. Follow-up univariate analyses indicated a significant effect of gender on prosocial behaviours ($F(1, 163) = 16.861, p < .001, n^2_p = .094$; $M_{girls} = 1.75, SD = .32, M_{boys} = 1.54, SD = .35$), and loneliness ($F(1, 163) = 6.486, p = .012, n^2_p = .038$; $M_{girls} = 1.54, SD = .54, M_{boys} = 1.34, SD = .43$), but not peer ($F(1, 163) = .444, p = .506, n^2_p = .003$), or conduct problems ($F(1, 163) = .042, p = .837, n^2_p = .000$).

A third MANOVA indicated a significant multivariate main effect of gender on maladaptive cognitions, $F(2, 371) = 4.027, p = .019$, Wilks' $\lambda = .979, n^2_p = .021$. Follow-up univariate analyses indicated a significant effect on rejection sensitivity ($F(1, 372) = 6.380, p = .012, n^2_p = .017$; $M_{girls} = 4.05, SD = 1.28, M_{boys} = 3.72, SD = 1.27$), but not negative information processing ($F(1, 372) = .659, p = .417, n^2_p = .002$).

Finally, a fourth MANOVA indicated a significant effect of gender on internalizing problems, $F(2, 165) = 4.060, p = .019$, Wilks' $\lambda = .953, n^2_p = .047$. Follow-up univariate analyses indicated a significant effect of gender on depressive symptoms ($F(1, 166) = 8.149, p = .005, n^2_p = .047$; $M_{girls} = .34, SD = .60, M_{boys} = .12, SD = .33$), but not social anxiety ($F(1, 166) = .656, p = .419, n^2_p = .004$).

Testing a Serial Mediation Model Linking Social Withdrawal, Peer Problems, Maladaptive Cognitions, and Internalizing Difficulties

The aim of the next set of analyses was to replicate and expand previous models linking subtypes of social withdrawal (shyness, unsociability, social avoidance) and internalizing problems (social anxiety, depressive symptoms) by exploring the potential mediating effects of both peer difficulties and maladaptive cognitions (rejection sensitivity, negative information processing). The rate of missingness for all variables included in the model was 15.4%. Results from Little's (1988) MCAR test indicated that data were again not MCAR ($\chi^2(486) = 649.027, p < .001$). Accordingly, FIML was used to handle missing data (Enders & Bandalos, 2001).

Measurement model specification. To examine the measurement model, the model was specified as a CFA with only LVs and their measured indicators included. Two LVs were included in the initial model: (a) *Rejection Sensitivity*, with computed anxious expectation scores for each of the 6 social scenarios from the CRSQ as manifest variables; and (b) *Negative Information Processing*, with mean scores (averaged across two social scenarios) representing a range of negative information processing patterns from the ChEESE-Q (e.g., negative causal attributions, intent attributions, responses, goals) as manifest variables. The model showed overall good fit, AIC = 17398.796, BIC

= 17569.997, $\chi^2(76, n = 396) = 124.420, p < .001$, RMSEA = .040 [90% CI = .027, .053], CFI = .951, TLI = .941, SRMR = .062. All indicator variables significantly and positively loaded on to their respective LVs (.24 - .78, all $p < .001$), and as such, the model was retained and included in the structural equation model.

Structural model specification. The following measured variables involved in the structural components of the proposed model were added to the multiple mediation model: (a) shyness and social avoidance were included as predictors; (b) peer problems were included as a mediator; (c) social anxiety and depressive symptoms (assessed as a single item) were included as outcome variables; and (d) unsociability was included as a covariate (accounting for covariance with shyness and social avoidance). The model demonstrated overall acceptable-to-good fit, $\chi^2(152, n = 403) = 244.574, p < .001$, RMSEA = .039 [.030, .048], CFI = .921, TLI = .903, SRMR = .059. Modification indices did not suggest any theoretically justifiable changes to the structural model, and as such the model was retained. According to the *t*-rule, the final model was over-identified (and therefore testable), with 230 unique pieces of information (*k*) and 78 estimated parameters (*t*), resulting in 152 degrees of freedom.

Evaluation of conceptual model. All estimated direct paths are presented in Figure 6. Among the results, shyness and social avoidance (but not unsociability) were significantly and positively associated with peer problems (both $p < .01$) which, in turn, were significantly and positively associated with depressive symptoms ($p < .001$) but not social anxiety ($p = .415$). Shyness ($p < .001$), but not social avoidance ($p = .590$), was significantly and positively associated with social anxiety. However, neither shyness ($p = .327$) nor social avoidance ($p = .575$) displayed a direct effect on depressive symptoms.

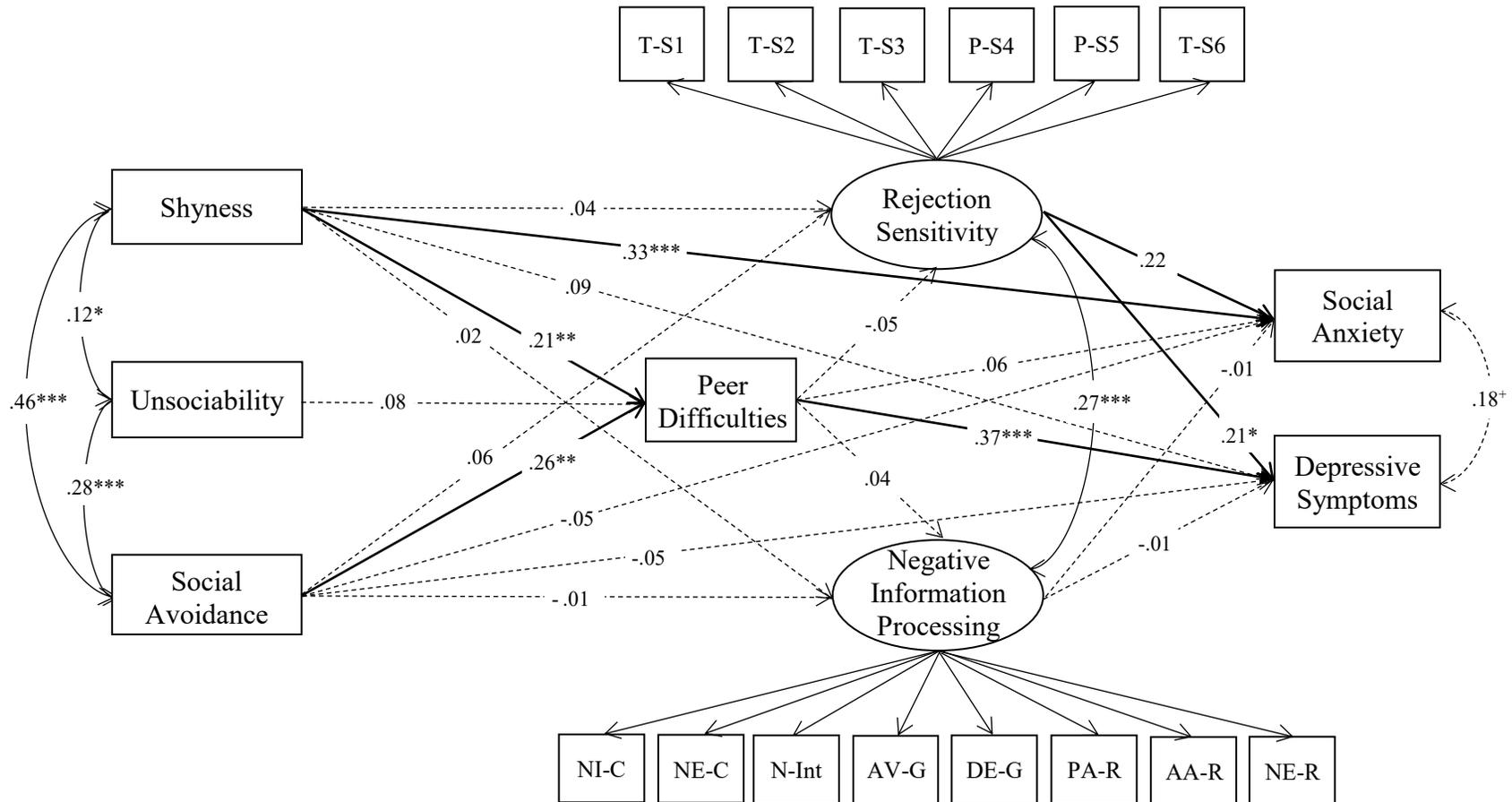


Figure 6. Structural equation model ($n = 403$) depicting standardized estimated direct relations between subtypes of social withdrawal, peer problems, maladaptive cognitions, and internalizing problems. T = Teacher-related scenario (computed rejection sensitivity score); P = Peer-related scenario (computed rejection sensitivity score); S = Scenario; NI-C = Negative internal causal attributions; NE-C = Negative external causal attributions; N-Int = Negative intent attributions; AV-G = Avoidant goals; DE-G = Distress expression goals; PA-R = Passive avoidant responses; AA-R = Active avoidant responses; NE-R = Negative responses. Factor loadings, error terms, intercepts, variances, and scaling are not presented for ease of presentation. Solid lines indicate significant paths, broken lines indicate non-significant estimated paths. * $p < .05$; ** $p < .01$; *** $p < .001$.

Also contrary to expectations, shyness, social avoidance, and peer problems were not significantly associated with rejection sensitivity ($p = .545-.694$) or negative information processing ($p = .688-.926$). Finally, consistent with cognitive models of internalizing problems, rejection sensitivity was significantly and positively associated with social anxiety ($p = .037$) and depressive symptoms ($p = .023$). However, negative information processing was not significantly associated with social anxiety ($p = .816$) or depressive symptoms ($p = .904$).

Given the lack of significant effects linking subtypes of social withdrawal and peer problems with cognitions, single and sequential indirect effects involving cognitions were not explored. However, indirect effects examining the potential mediating effects of peer problems in the relations between subtypes of social withdrawal and internalizing problems were estimated. Results indicated that both shyness ($\beta = .077, SE = .038, p = .043$) and social avoidance ($\beta = .099, SE = .045, p = .029$) were indirectly associated with depressive symptoms via peer problems. However, both shyness ($\beta = .013, SE = .017, p = .426$) and social avoidance ($\beta = .017, SE = .022, p = .442$) were not indirectly associated with social anxiety via peer problems. Of note, analyzing separate mediation models for peer difficulties and maladaptive cognitions did not alter the findings (i.e., shyness and social avoidance remained positively associated with peer problems, but not maladaptive cognitions).

In summary, the current findings do not support the hypothesized associations between social withdrawal, peer problems, and maladaptive cognitions. However, the pattern of findings provides evidence to suggest that social avoidance may indeed be associated (albeit indirectly) with depressive symptoms, but not social anxiety. In

contrast, as has been demonstrated in previous research, shyness may be uniquely and directly associated with social anxiety (but not depressive symptoms), even after taking peer problems into account.

Gender differences. Multi-group analysis was conducted in order to evaluate potential gender differences in the model. A *configural* model was initially specified (in which no constraints were applied across groups) and demonstrated good fit, $\chi^2(152, n = 396) = 186.253, p = .031$, RMSEA = .034 [.011, .049], CFI = .964, TLI = .957, SRMR = .068, AIC = 17430.834, BIC = 17773.235. Evidence was found for *metric* ($\Delta\text{CFI} = .006$, $\Delta\text{RMSEA} = .004$, and $\Delta\text{SRMR} = .007$, AIC = 17415.713, BIC = 17706.356), and *scalar invariance* ($\Delta\text{CFI} = .001$, $\Delta\text{RMSEA} = .001$, and $\Delta\text{SRMR} = .002$, AIC = 17405.942, BIC = 17652.790) (Chen, 2007). Results from all 19 Wald χ^2 tests (using Benjamini-Hochberg correction, critical p values = .0026 to .05; Benjamini & Hochberg, 1995) were not significant (χ^2 s ($df = 1$) = .005-.4.669, p s = .031-.943), indicating that there were no significant gender differences in the model.

Discussion – Study 3

The main purpose of Study 3 was to explore a conceptual model linking social withdrawal, peer problems, maladaptive cognitions, and internalizing problems in childhood. Drawing upon previous models of social withdrawal, social information processing, and internalizing difficulties, it was postulated that subtypes of social withdrawal would be differentially associated with patterns of peer problems, maladaptive cognitions (i.e., rejection sensitivity, negative information processing), and emotional problems (i.e., social anxiety, depressive symptoms).

Among the results, it was found that peer problems *mediated* the effects of shyness and social avoidance on depressive symptoms (but not social anxiety). Contrary to expectations, subtypes of social withdrawal and peer problems were both not significantly associated with indices of maladaptive social cognitions. However, rejection sensitivity (but not negative information processing) was positively associated with both symptoms of social anxiety and depression. Thus, evidence supporting the main hypotheses was limited. Main findings, implications, and future directions for the study of children's social cognitions are discussed in the sections that follow.

Socio-Emotional Correlates of Social Withdrawal Subtypes

Previous research related to social withdrawal subtypes in childhood has focused predominantly on preschool- and kindergarten-aged children (e.g., Coplan, Ooi, Xiao, et al., 2018; Coplan et al., 2004). Accordingly, one aim of Study 3 was to address a gap in the literature by exploring some of the social and behavioural concomitants of social withdrawal subtypes in a sample of early school-aged children. In keeping with the extant social withdrawal literature (Coplan et al., 2013; Kopala-Sibley & Klein, 2017), all three subtypes of withdrawal were positively correlated with peer difficulties. This suggests that, by early elementary school years, socially withdrawn behaviour (regardless of the underlying motivational and emotional substrates) may evoke negative responses from peers. Although it has been well documented that peers respond negatively towards aggressive children from a very young age (Ladd & Burgess, 1999), it is worth noting that aggression does not seem to be a confounding variable in this case, as all three subtypes of withdrawal were not significantly correlated with externalizing difficulties.

Thus, it is becoming increasingly apparent that peers perceive withdrawn behaviours as atypical and, as a result, respond negatively towards children who remove themselves from the peer group (Rubin & Asendorpf, 1993). Even children who display a non-fearful preference for solitary activities (and may be content playing alone) may continue to be at risk for negative peer experiences due to their tendency to spend more time alone (Ooi et al., 2018). This is particularly concerning as it has been postulated that rising expectations regarding social interactions and peer pressure may render withdrawn behaviour increasingly problematic in later childhood and adolescence (Coplan, Ooi, & Baldwin, 2018; Rubin & Asendorpf, 1993).

Notwithstanding, unsociability (as expected) was not significantly associated with prosocial behaviours or internalizing difficulties. This is consistent with previous findings suggesting that (with the exception of peer difficulties) unsociability does not pose substantial concurrent risk for maladjustment in younger children (Coplan, Ooi, & Baldwin, 2018; Coplan & Weeks, 2010; Kopala-Sibley & Klein, 2017). In contrast parent-rated social avoidance was significantly and negatively associated with prosocial behaviours. Thus, consistent with Asendorpf's (1990) model of social approach-avoidance motivations, children with low approach and high avoidance motivations (i.e., socially avoidant children) seem to be less likely to engage in behaviours involved in initiating social interactions (e.g., offering to help others, sharing).

It has previously been reported that shyness is associated with internalizing difficulties in childhood (Coplan, Ooi, Xiao, et al., 2018; Coplan et al., 2004; Coplan et al., 2013; Coplan & Weeks, 2010; Kopala-Sibley & Klein, 2017). Findings support the literature by demonstrating positive correlations between shyness and both social anxiety

and depressive symptoms. Somewhat surprisingly, shyness was not correlated with child-rated feelings of loneliness. It could be that younger shy children do not feel particularly lonely in the school context. Indeed, although shy children tend to have fewer friends (Ladd et al., 2011), they also tend to be just as likely as their non-withdrawn peers to have a mutual friend or best friend (Ladd & Burgess, 1999; Rubin et al., 2006). It could be that having at least one friend may stave off feelings of loneliness among young shy children. Also surprisingly, social avoidance was not significantly correlated with feelings of loneliness or internalizing problems. These findings are inconsistent with previous findings which have suggested that social avoidance is associated with a wide range of socio-emotional difficulties (Bowker & Raja, 2011; Coplan, Ooi, Xiao, et al., 2018; Coplan et al., 2013). It could be speculated that socially avoidant children do not feel lonely because they actually prefer to be alone, reflecting their low approach and high avoidance motivations.

Notwithstanding, results from SEM analyses provided a somewhat more nuanced examination of the direct and indirect effects of social withdrawal on peer and internalizing difficulties. To begin, only shyness demonstrated a direct effect on social anxiety, which is in keeping with the well documented associations between shyness and social anxiety in childhood (Chronis-Tuscano et al., 2009; Clauss & Blackford, 2012). Also consistent with findings among younger children (Coplan, Ooi, Xiao, et al., 2018), shyness and social avoidance (but not unsociability) were positively associated with peer difficulties after taking shared variance into account. In keeping with previous literature linking negative peer experiences with internalizing problems in childhood (Reijntjes et al., 2010), peer difficulties were positively associated with depressive symptoms.

However, contrary to findings reported by Coplan et al. (2018), peer problems were not associated with social anxiety.

Although it has been well documented that shy youth are at increased risk for social anxiety, the implications of social avoidance in childhood are relatively unknown. As this is the first study to examine the social and emotional correlates of social avoidance in middle childhood, these findings make important contributions to our understanding of social avoidance in middle childhood. To begin, Study 3 provides partial support to suggest that social avoidance demonstrates a certain degree of specificity in relation to emotional adjustment, even in childhood. Specifically, whereas shyness was associated with social anxiety (directly) and depressive symptoms (indirectly), social avoidance only displayed an indirect association with depressive symptoms. This adds to the growing evidence to suggest that social avoidance does not simply reflect extreme feelings of social fear (Schmidt & Fox, 1999), but instead may present a unique risk for feelings of depression (Coplan, Ooi, Xiao, et al., 2018; Coplan et al., 2013). Moreover, whereas this subtype of social withdrawal does not appear to have *direct* implications for internalizing difficulties (i.e., loneliness, social anxiety, or depressive symptoms) in early school-aged children, the findings suggest a potential cascade effect, wherein avoidance leads to negative peer responses which, in turn, may contribute to feelings of sadness. This is contrasted with the findings from Study 2, where social avoidance was directly and indirectly associated with depressive symptoms. It could be that the direct and indirect implications of social avoidance evolve over time. Relatedly, the factors implicated in the development of depression may also vary across developmental periods (see General Discussion for more details).

Elementary school-aged children spend the majority of their time with peers (Larson & Richards, 1991). In the early school years, children are often establishing behavioural reputations within a peer group (Mayeux & Cillisen, 2003), making this a critical time for establishing social skills and relationships (van Lier & Deater-Deckard, 2016). Children who frequently withdraw from the peer group may miss out on important social and developmental opportunities (Asendorpf, 1990). Accordingly, withdrawing from the peer group in middle childhood may have detrimental and long-lasting implications for social and emotional functioning. Study 3 offers preliminary evidence to suggest that social avoidance is indeed a distinct subtype of withdrawal in childhood, and provides a first step towards understanding the potentially unique social and emotional implications of different subtypes of social withdrawal in middle childhood.

Maladaptive Cognitions in Childhood

The results pertaining to maladaptive cognitions were the most surprising, as they were largely unrelated to other study variables. Nevertheless, these findings provide important insight into our understanding of the role of maladaptive cognitions in middle childhood, as well as point towards alternative possible sources of risk for maladjustment.

Social withdrawal and cognitions. Contrary to expectations, all three subtypes of social withdrawal were *not* significantly associated with rejection sensitivity or negative information processing. This is inconsistent with the limited existing literature demonstrating that (at least some types of) socially withdrawn youth engage in maladaptive cognitive processes (Coplan et al., 2013; Harrist et al., 1997; LoBue & Pérez-Edgar, 2014; Wichmann et al., 2004). Although the current findings may be attributable to methodological issues (see below for a more detailed review on this

subject), it could also be postulated that temperamental risk factors such as social withdrawal may not serve as *concurrent* markers for maladaptive cognitions. Indeed, two studies reported little evidence directly linking temperamental risks to cognitive biases in very young children (Dodd et al., 2012; Pérez-Edgar et al., 2011). However, this does not preclude the possibility that social withdrawal in childhood might confer *subsequent* risk for maladaptive cognitions. Although this has not been directly empirically evaluated, the BI literature (which shares conceptual overlap with shyness) provides some evidence to support this idea. Specifically, whereas previous studies have found that BI in toddlerhood is not associated with attention biases at ages 5 and 7 (White et al., 2017), it has been found to be associated with maladaptive processing patterns in later childhood (Nozadi, White, Degnan, & Fox, 2018) and adolescence (Pérez-Edgar et al., 2010). Accordingly, longitudinal research is needed in order to assess the potential long-term cognitive implications of social withdrawal in childhood.

Alternatively, it could be speculated that social withdrawal does not directly (or indirectly) predict maladaptive cognitive processes in childhood, but instead *interacts* with cognitions to predict outcomes. For example, Pérez-Edgar and colleagues (2010, 2011) have reported that BI in toddlerhood interacts with attention biases to predict subsequent socially withdrawn behaviour and have further argued that attention biases may moderate the link between early temperament and later anxiety (Pérez-Edgar et al., 2014). In this regard, maladaptive cognitive processes may serve to exacerbate (rather than explain) the links between withdrawal and emotional difficulties.

However, it is also possible that the maladaptive cognitions assessed in the current study were not particularly relevant to social withdrawal in younger children.

Indeed, Harrist et al. (1997) found very few differences in the SIP patterns of withdrawn and non-withdrawn kindergarteners. As such, other types of maladaptive cognitions may be more appropriate for this age group (see General Discussion for more details about the importance of capturing additional or alternative cognitive processes in childhood).

Peer problems and cognitions. In addition to tracking the potential longitudinal relations between social withdrawal and maladaptive cognitions, future research should also include potential intermediary factors (e.g., peer relations) that might help explain this developmental progression. Indeed, SIP models postulate that individuals develop cognitive styles at least partially based on past experiences (Crick & Dodge, 1994). Accordingly, it was hypothesized that negative peer experiences would result in heightened anticipation of future negative outcomes. Although there is evidence to support this postulation among older children (Crick & Ladd, 1993; London et al., 2007; Rosen et al., 2007), no study to date has explored these associations in younger children. Contrary to expectations, no evidence was found to support an association between peer difficulties and maladaptive cognitions. Accordingly, given the overall lack of associations with maladaptive cognitions, findings did not support the hypothesized serial mediation wherein peer difficulties would lead to maladaptive cognitions which, in turn, would lead to internalizing difficulties.

In addition to the previously mentioned possibility that other maladaptive cognitions may be more relevant in childhood, there are other potential reasons why the hypotheses were not supported. For example, it could be that maladaptive cognitions develop independently of negative peer experiences in childhood. In this regard, it could be argued that peer experiences do not directly influence the development of the specific

maladaptive cognitions assessed in the current study, but instead, independently (but simultaneously) contribute to internalizing problems. Alternatively, given the age of the sample, it may be that: (a) children have not yet been exposed to extreme or persistent peer difficulties; and/or (b) such experiences have not yet had the opportunity to effect stable change in children's cognitions. Therefore, it is plausible that elevated peer problems in childhood may lead to the development of subsequent maladaptive cognitions. No studies to date have directly explored these longitudinal associations; however, Ladd and Troop-Gordon (2003) reported that peer difficulties (rejection, friendlessness, victimization) in grades 1 and 3 negatively predicted perceived social and self-acceptance (which can be construed as a maladaptive thought process) in grade 4. Accordingly, additional research exploring the developmental progression of maladaptive cognitions in childhood is needed in order to disentangle the true nature of these associations.

Cognitions and internalizing problems. Notwithstanding the lack of associations between cognitions, peer difficulties, and social withdrawal, some evidence to support cognitive models of internalizing problems was found. Specifically, rejection sensitivity (i.e., an index of threatening cognitions) was significantly and positively associated with both social anxiety and depressive symptoms. Thus, even in early school-aged children, the tendency to anxiously expect social rejection seems to have implications for feelings of fear and anxiety in social situations as well as feelings of sadness. This adds to the growing body of evidence indicating that heightened expectations of rejection are associated with socio-emotional maladjustment (Chango, Boykin McElhaney, Allen, Schad, & Marston, 2012; London et al., 2007; Marston et al.,

2010; Sandstrom, Cillessen, & Eisenhower, 2003), and extends the findings to a somewhat younger age group. This is particularly interesting given that peer difficulties did not predict social anxiety. In other words, expected (but not actual) peer difficulties seem to affect children's feelings about social interactions, underscoring the meaningfulness of cognitions in children's emotional adjustment.

However, contrary to expectations (and Studies 1 and 2), negative information processing was not associated with internalizing problems. This is directly in contrast with previous studies using the same measure of negative information processing which indicated positive associations with both social anxiety and depressive symptoms in samples of older children and adolescents (Bell et al., 2009; Luebke et al., 2010). However, a recent study (Ewing et al., 2016) found that 5- to 9-year-old children at risk for anxiety disorders (i.e., children who had anxious parents) and children of non-anxious parents did not differ in their display of maladaptive cognitions. Taken together with the limited empirical literature, the current findings raise additional questions regarding the potential implications of negative information processing in middle childhood.

Indeed, there may be multiple reasons why significant associations were not found between negative information processing and internalizing difficulties. One possible interpretation is that (unlike threatening cognitions) negative thought patterns do not manifest until later in childhood (Harrist et al., 1997), or that they do not contribute to feelings of social anxiety and depressive symptoms in younger children. Yet, among samples of older children, negative thought patterns have been found to be associated with clinical and subclinical internalizing problems (Tuschen-Caffier et al., 2011; Vassilopoulos & Banerjee, 2012). Thus, it could be argued that whereas threatening

cognitions may pose a risk for concurrent emotional difficulties, specific connections between depressive-related thought patterns and internalizing difficulties do not develop until later in childhood. This is in keeping with previous work demonstrating that symptoms of anxiety tend to precede symptoms of depression in childhood (Cole et al., 1998).

A second possibility is that negative cognitions exert less of an influence on children's socio-emotional adjustment as compared to other developmentally relevant factors (see General Discussion for a more in-depth review of this topic). Indeed, results from Study 3 indicated that negative peer experiences were the only mediating factor in the links between social withdrawal and internalizing difficulties. However, several additional unexamined factors have also been identified as adding explanatory value in the links between social withdrawal and internalizing difficulties in childhood (e.g., gender, maternal characteristics, parenting styles, parent and peer support, negative life experiences) (Barstead et al., 2017; Coplan et al., 2008; Doey et al., 2014; Kopala-Sibley & Klein, 2017; Zarra-Nezhad et al., 2014). Therefore, it could be that other factors are more pertinent to our understanding of young children's emotional adjustment than cognitions.

Finally, it is possible that negative information processing patterns *do* influence young, socially withdrawn children's emotional adjustment, but that methodological issues did not allow for an accurate assessment of these relations. For example, in the current study, a somewhat different approach was used to assess negative information processing using the ChEESE-Q than has previously been reported (Baker & Hudson, 2014; Luebke et al., 2010). Although the measure was originally developed for older

children and was comprised of 6 vignettes, Baker and Hudson (2014) used a single vignette to assess the information processing patterns of 7- to 12-year-olds. In an effort to reduce the limitations of using responses to a single vignette without substantially increasing participant burden, two vignettes were assessed in the current sample. Nevertheless, it is possible that the exclusion of additional vignettes might have influenced the validity of the measure. Additionally, this measure was used with a slightly younger sample of children and may have been more challenging for younger children to complete. From a conceptual standpoint, this also calls into question whether young children are indeed capable of reliably reporting stable patterns of cognitions (Byrne, 1996; Harter, 2003).

Similarly, a reduced set of 6 scenarios (versus 12 scenarios in the original measure) using a shortened response scale (3-point versus 6-point) was used to assess rejection sensitivity (CRSQ). Although this methodology has previously been employed with younger children (e.g., Bowker et al., 2011; Croft & Zimmer-Gembeck, 2014; Nesdale et al., 2014; Wang et al., 2012), the internal consistency was somewhat lower than has previously been reported. Accordingly, additional efforts to support the psychometric properties and validity of the CRSQ and ChEESE-Q, along with the development of new cognitive assessment tools and protocols for use with younger children are needed. Only following this can researchers really begin to empirically examine the antecedents and consequences of maladaptive cognitions during this developmental period (London et al., 2007).

Gender Effects

Finally, although it has previously been suggested that socially withdrawn boys

may experience greater social and emotional difficulties as compared to girls (Doey et al., 2014), the limited existing findings regarding this postulation have been somewhat mixed, with the strongest evidence appearing to be in the form of negative peer responses towards male shyness (Coplan, Ooi, Xiao, et al., 2018; Coplan et al., 2004; Coplan et al., 2013; Coplan & Weeks, 2010). In the current sample, no gender differences emerged in the hypothesized associations, suggesting that social withdrawal in this younger sample may be similarly related to social, emotional, and cognitive adjustment for boys and girls. It is also plausible to suspect that gender differences may emerge later in childhood, when withdrawal from the peer group may come to be viewed as progressively problematic (Coplan et al., 2013) due to related increases in expectations for social interaction (Coplan, Ooi, & Rose-Krasnor, 2015; see General Discussion for a broad discussion of gender effects).

Implications, Limitations, and Future Directions

Study 3 makes an important contribution to the literature by replicating previous findings regarding the social and emotional concomitants of social withdrawal and extending current understanding of social avoidance to a never before examined age group. Moreover, by exploring the cognitive patterns of young children, Study 3 takes a novel approach to our understanding of social withdrawal. Although findings shed light on potential implications for practice and future research, some caveats should also be considered in the interpretations of the findings.

To begin, it is again possible that the pattern of results was influenced by shared method variance. Specifically, the majority of the significant associations in the model emerged among parent-rated variables (i.e., social withdrawal, peer problems,

internalizing difficulties). One exception to this was that rejection sensitivity (which was assessed via child self-report) displayed the expected pattern of associations with parent-rated internalizing difficulties, providing some evidence of cross-informant validity for the current findings. Notwithstanding, future studies should continue to explore these associations using a variety of methodological protocols (e.g., direct observations), and additional informants (e.g., teachers, peers).

Study 3 was also hampered by some additional methodological limitations. To begin, the use of a single item to assess depressive symptoms was not ideal; however, this methodology has previously been used to assess symptoms of depression among withdrawn youth in early childhood (Harrist et al., 1997). Moreover, this particular item has previously been used as an index of parent-rated depressive symptoms (Classi et al., 2012) and, importantly, replicates the only existing empirical study exploring the emotional correlates of subtypes of social withdrawal in younger children (Coplan, Ooi, Xiao, et al., 2018). Nevertheless, future studies should seek to explore the socio-emotional implications of social withdrawal using a wider range of psychometrically supported assessments of internalizing difficulties (e.g., the *Child Depression Inventory*; Kovacs, 1992). Relatedly, unlike the emerging adult samples, single assessments of each type of cognition (rejection sensitivity, negative information processing) were used in Study 3. As such, future research should consider additional cognitive processes (e.g., attention biases) that might influence socio-emotional adjustment in childhood (see General Discussion for a more in-depth review of this topic).

Finally, the lower internal consistency of the social avoidance scale was somewhat concerning in the current sample (and was notably lower than has previously

been reported; Coplan, Ooi, Xiao, et al., 2018). It could be that this affected the current findings by reducing the opportunity to capture potentially significant effects. Given that this was only the second study to use the CSPS-3, researchers should continue to seek evidence to support the psychometric properties of this measure.

One final important takeaway from Study 3 is that peer problems, but not cognitive patterns, contribute to the links between social withdrawal and emotional adjustment in childhood. A practical implication of this finding is that, unlike for adolescents and adults who may benefit from CBM, social skills training may indeed be a more appropriate preventative approach for at-risk (e.g., shy and socially avoidant) youth. In early childhood, there is greater neuroplasticity and capacity to learn new skills, making early identification and prevention efforts particularly effective in prompting long-term change (Hirshfeld-Becker & Biederman, 2002; Luby, 2013; Rapee et al., 2005). Thus, understanding the underlying temperamental and motivational substrates of withdrawn behaviour early in life may be critical for implementing appropriate strategies, potentially preventing or interrupting pathways leading to subsequent internalizing problems (Hong et al., 2017).

General Discussion

The primary aim of this dissertation was to explore the associations between social withdrawal, maladaptive cognitions, and internalizing problems. Drawing upon developmentally appropriate models of social withdrawal, complex patterns of associations were examined in samples of emerging adults and early school-aged children. Although some similarities emerged across all three studies, each study also yielded unique findings. When taken together, results from these three studies offer novel insights into the nature of associations among the constructs of interest across two developmental periods. In the sections that follow, an integrative perspective of the current findings is discussed within the context of the extant literature, along with a review of the broader implications, limitations, and future directions for this area of research.

Cognitive Content Specificity

According to the CCSH, anxiety and depression display distinct cognitive correlates. Specifically, whereas anxiety is thought to be associated with selective processing of threatening information, depression is postulated to be more closely related to the processing of negative information (Beck, 1976). Although findings from the current program of research did support the notion that threatening and negative cognitions pose differential risk for internalizing difficulties, the nature of these associations was somewhat different than expected. In all three samples, threatening cognitions were significantly and positively associated with both social anxiety and depressive symptoms. In contrast, negative cognitions exhibited a more specified risk for depressive symptoms in the emerging adult samples. Together, these findings add to the

existing research among adults and adolescents (Jolly, 1993; Jolly et al., 1994; Trew & Alden, 2009; Weeks et al., 2017), suggesting that whereas threatening cognitions may be associated with a broad (i.e., non-specific) risk for internalizing difficulties in childhood and emerging adulthood, the tendency to process negative information may be uniquely related to depressive symptoms (at least among emerging adults).

These findings have important implications for our understanding of the emotional risks associated with maladaptive cognitive patterns. It may indeed be the case that specificity in threatening cognitions only emerges among those with extreme or clinical symptoms (Weeks et al., 2017). However, there is reason to doubt this postulation. Specifically, Beck and Perkins (2001) conducted a meta-analysis including clinical and non-clinical samples to evaluate evidence for the CCSH. Among the results, depressive and anxious cognitions shared variance with both depressive and anxious symptoms (reflecting overlapping features); however, evidence to support specificity for depressive cognitions and non-specificity for anxious cognitions was also found. Thus, this pattern does not appear to be a function of clinical status or symptom severity.

As previously discussed, an alternative interpretation may be that (somewhat contrary to the CCSH) threatening cognitions serve as a general marker for maladjustment, slightly akin to Clark and Watson's (1991) postulations regarding negative affectivity as a broad risk for internalizing disorders. On the opposite side of the coin, the results also suggest that social anxiety symptoms, but not depressive symptoms, display cognitive specificity. This is in keeping with previous findings indicating general specificity in the course of social anxiety, but not depression (Pine et al., 1998). In other words, it could be speculated that whereas specific cognitions representing fear may only

contribute to the development of anxiety, *any* type of maladaptive cognitive process may confer risk for negative feelings about the self.

It is also worth noting that anxiety disorders have been typically found to emerge before depressive disorders (Cole et al., 1998). As such, it is also possible that more complex multi-step processes are taking place, whereby: (a) threatening cognitions lead to social anxiety which, in turn, leads to depressive symptoms; and/or (b) social anxiety leads to threatening cognitions which, in turn, lead to depressive symptoms. In support of these postulations, Price et al. (2016) recently explored the longitudinal implications of attentional biases in a sample of anxious youth. Results indicated that attention biases (i.e., threat avoidance) predicted greater depression scores two years later, over and above baseline and post-treatment symptoms. The authors argued that maladaptive processing in the context of anxiety may be a gateway to depression over time. Applying these findings to the current context, it could be speculated that a more complex, sequential process accounts for the wide range of implications associated with threatening cognitions. Similarly, it could be that negative cognitions do not present an equivalent progressive pattern of risk (i.e., from negative cognitions, to depressive symptoms, and then to anxiety), given the developmental sequence of anxiety to depression.

In any case, the current findings highlight the importance of carrying out direct comparisons between types of cognitions rather than drawing conclusions based on findings across studies (Dagleish et al., 2003). More importantly, these findings have important practical implications that follow. Specifically, contrary to previous findings indicating that only anxious individuals benefit from the modification of threat-related cognitions (Hallion & Ruscio, 2011), the findings from all three studies suggest that

emerging adults and children with depressive symptoms may also benefit from such modification techniques. In contrast, socially anxious youth may *not* benefit from practices aimed at improving negative views about the self, the world, or the future.

It might also be beneficial to focus on modifying threatening cognitions as a first line of action, given their wide range of negative implications, as well as the inconsistent evidence to support the presence/influence of negative cognitions in childhood. For example, it has been suggested that threatening cognitions may precede (and contribute to the development of) negative cognitions (Everaert, Tierens, Uzieblo, & Koster, 2013). Thus, threatening cognitions may demonstrate temporal precedence over negative cognitions. Indeed, negative information processing was not associated with internalizing problems in the sample of children in Study 3. This disparity in findings across developmental periods may be attributable to a number of factors. For example, it could be postulated that negative cognitions only exert concurrent risk for depressive symptoms later on in life, or that the early appearance of negative cognitions pose subsequent risk for maladjustment (Pérez-Edgar et al., 2011). Relatedly, it is important to acknowledge that the current findings cannot speak to the potential specificity of the emotional risks associated with different types of cognitions at other developmental periods (e.g., later childhood, adolescence) (see a later section for more discussion of the role of development/age).

Social Withdrawal: Cognitive and Emotional Correlates

Drawing upon Gray's (1972) motivational systems model, Asendorpf (1990, 1993) postulated four different behavioural profiles based on different combinations of social approach and avoidance motivations: sociable, shy, unsociable, and socially

avoidant children. Asendorpf (1990, 1993) also speculated that each behavioural profile would be associated with a unique pattern of socio-cognitive, emotional, and behavioural patterns. There is now a substantial body of empirical work supporting Asendorpf's (1990) assertions regarding shyness and (to a lesser extent) unsociability. Indeed, there is considerable empirical evidence demonstrating that shy children, adolescents, and emerging adults display decidedly different adjustment profiles as compared to their unsociable counterparts, at least among samples selected from Western populations (e.g., Bowker et al., 2017; Coplan, Ooi, Xiao, et al., 2018; Coplan et al., 2004; Coplan et al., 2013; Coplan & Weeks, 2010; Kopala-Sibley & Klein, 2017; Nelson, 2013; Nelson et al., 2016). However, much less is known about social avoidance. Moreover, very little is understood about the potential unique socio-cognitive patterns of shy, unsociable, and socially avoidant youth. Accordingly, the current research addresses several important gaps in the literature by providing novel insight into some of the social, cognitive, and emotional correlates of shy, unsociable, and socially avoidant youth.

Unsociability. As discussed in Study 2, there continue to be issues with how unsociability is conceptualized, operationalized, and measured across studies and developmental periods. This, in turn, has likely had an impact on the existing findings, as well as our understanding of the meaning and implications of unsociability (Coplan, Ooi, & Baldwin, 2018). Notwithstanding, the findings pertaining to unsociability from Studies 1 and 3 were generally consistent with expectations and Asendorpf's (1990) longstanding suggestion that unsociability represents a comparatively benign form of social withdrawal. For example, unsociability was (overall) not significantly related with indices of internalizing difficulties or maladaptive cognitions, especially after taking

shared variance with shyness and social avoidance into account. However, researchers continue to argue that spending time alone (for any reason) may still come at a cost. This is based on the notion that individuals who spend too much time in solitude may miss out on important opportunities and benefits afforded by social interactions (Rubin et al., 2009).

More recently, Coplan, Ooi, and Baldwin (2018) proposed a more nuanced perspective by positing that unsociability may be more (or less) adaptive at different developmental stages. Based on this theoretical model, the risks associated with unsociable behaviour may depend on a number of developmental factors. For example, in early childhood, solitary play is quite common and may serve adaptive functions (Coplan & Ooi, 2014; Katz & Buchholz, 1999). As such, playing alone may actually fit the demands of the social environment quite well. However, expectations for social interaction progressively increase throughout childhood and into adolescence. Indeed, older children have been observed to spend the majority of their free time with peers at school (i.e., recess, lunch) (Coplan, Ooi, & Rose-Krasnor, 2015). Accordingly, choosing to remove oneself from the peer group during this time may become increasingly problematic (Rubin & Asendorpf, 1993). As adolescents move into emerging adulthood and are granted greater independence and autonomy, they are presented with increasing opportunities for solitude. During this period, time spent alone not only becomes more frequent (Larson & Richards, 1991), but also more functional (e.g., respite from social pressures, individuation and identity formation, leisure pursuits; Bowker et al., 2017; Goossens & Marcoen, 1999; Larson, 1990; Larson, 1997; Nelson et al., 2016) and enjoyable (Cramer & Lake, 1998). The latter appears to be particularly true when

individuals actively choose to be alone (Nguyen et al., 2018). Not surprisingly, such changes appear to coincide with increases in positive attitudes towards solitude (Danneel, Maes, Vanhalst, Bijttebier, & Goossens, 2017; Larson, 1997; Marcoen & Goossens, 1993).

Taken together, Coplan, Ooi, and Baldwin (2018) postulated that unsociability becomes increasingly maladaptive from early childhood to early adolescence and then reverses course, becoming increasingly adaptive into emerging adulthood. In support of this model, unsociability did not appear to present considerable risk for maladjustment in the sample of emerging adults (Study 1) and younger children (Study 3). Nevertheless, longitudinal examination of the implications of unsociability over time is needed to directly test this model.

Shyness. In contrast to unsociability, the current findings add to the well-documented literature indicating that shyness poses risk for concurrent social anxiety, even after taking other factors into account. Although previous research has suggested that shyness poses risk for concurrent feelings of depression (Coplan et al., 2013; Nelson, 2013), no evidence to support a direct positive effect of shyness on depressive symptoms was found. In fact, in Studies 1 and 2, shyness actually evidenced a *negative* association with depressive symptoms after accounting for common associations with other variables. However, shyness was positively associated with depressive symptoms via maladaptive cognitions (Studies 1 and 2) and peer difficulties (Study 3). Most studies that have examined the links between shyness and depression have not controlled for social avoidance in these associations. As such, it is possible that the previously observed link between shyness and depression may have been due to shared variance. Indeed, Coplan,

Ooi, Xiao, et al. (2018) recently reported that, after controlling for common associations with social avoidance and unsociability, shyness was not directly related to depressive symptoms in young children.

Taken together, the current findings shed a more nuanced light on the nature of the associations between shyness and depression, and highlight the importance of taking additional contributing (i.e., moderating and mediating) factors into account when evaluating the socio-emotional implications of shyness (Barstead et al., 2017; Bowker et al., 2012; Bowker & Raja, 2011; Etkin, Bowker, & Scalco, 2016). More importantly, these findings hint at the idea that we may need to reconsider previous conceptualizations of shyness (and social withdrawal in general) as a broad risk factor for a wide variety of internalizing difficulties, including depression (Rubin et al., 2009). The lack of direct effects on depressive symptoms further supports evidence to suggest that, indeed, not *all* shy youth are at risk for or experience emotional difficulties (Tang et al., 2017). As such, it could be that the disruptions in the pathways from shyness to depression prevent the subsequent onset of emotional difficulties.

Social avoidance. Over the last two decades, there has been increasing recognition that children may withdraw from the peer group for multiple reasons. Much of the existing literature has focused on comparing the implications of fearful (i.e., shy) versus non-fearful (i.e., unsociable) motivations to spend more time alone (e.g., Barry et al., 2013; Coplan et al., 2004; Coplan & Weeks, 2010; Kopala-Sibley & Klein, 2017). Although distinguishing between shy and unsociable motivations has proven to be important for our understanding of the implications associated with socially withdrawn behaviour, findings from a handful of recent empirical studies (e.g., Bowker & Raja,

2011; Bowker et al., 2017; Coplan, Ooi, Xiao, et al., 2018; Coplan et al., 2013; Nelson, 2013; Nelson et al., 2016) suggest that some youth (i.e., socially avoidant) may withdraw from social situations for reasons other than fear or a preference for solitary activities. Indeed, Asendorpf (1993) originally conceptualized a third type of withdrawal as reflective of internalizing problems, expressed through “low self-esteem, loneliness, or depression” (p. 1069).

Yet, to date, no study has: (a) empirically explored social avoidance in early school-aged children; or (b) conducted an in-depth examination of the socio-cognitive correlates of social avoidance. Although the limited existing research on social avoidance has largely supported Asendorpf’s (1990, 1993) original postulations that this subtype of withdrawal would carry the most substantive risk for maladjustment (Bowker et al., 2017; Coplan, Ooi, Xiao, et al., 2018; Coplan et al., 2013; Nelson, 2013), findings from the current program of research suggest a somewhat less consistent pattern. Specifically, in Studies 1 and 3, shyness demonstrated a broader pattern of maladjustment than social avoidance (after accounting for common associations between both subtypes of withdrawal). However, both of these studies were hampered by potential methodological issues which may have influenced the findings. In contrast, results from SEM analyses in Study 2 suggested that social avoidance conferred the greatest risk, as it was directly and indirectly associated with all indices of cognitive and emotional maladjustment. Most importantly, findings from all three samples provided evidence to suggest that socially avoidant youth may display a unique (albeit sometimes indirect) risk for depressive symptoms. This is consistent with previous assertions suggesting that social avoidance

may represent an early consequence of the development of depression (Coplan & Armer, 2007).

Thus, it is becoming increasingly apparent that social withdrawal encompasses a heterogeneous group, including some who withdraw potentially due to feelings of sadness and depression. These findings have important implications for our understanding and conceptualization of social avoidance in middle childhood and emerging adulthood. Specifically, unlike shyness, social avoidance may develop from an inability to gain pleasure or enjoyment from social interactions (i.e., social anhedonia; Coplan, Ooi, & Nocita, 2015), a symptom commonly linked to low positive affect and depression (Blanchard et al., 2001; Brown et al., 2007). Notwithstanding, evidence supporting alternative theories of social avoidance cannot be discounted. For instance, it has previously been suggested that extended exposure to peer exclusion (Bowker & Raja, 2011), or extreme feelings of fear and anxiety (Schmidt & Fox, 1999) may extinguish motivations to approach social situations, resulting in avoidant behaviour. Indeed, social avoidance demonstrated positive associations with both social anxiety (Studies 1 and 2) and peer problems (Study 3).

Thus, although the current research provides an important step towards our understanding of social avoidance, the inconsistencies in the pattern of findings across samples, and the evidence to support multiple etiological underpinnings, highlight the fact that empirical examination of this construct remains in its infancy. Indeed, there remains considerable work to be done in order to improve our approach towards both the conceptualization and measurement of social avoidance (Coplan, Ooi, & Nocita, 2015), as well as unsociability (Coplan, Ooi, & Baldwin, 2018). Importantly, additional research

across all developmental periods is required to not only gain a broad understanding of the predictors and consequences of social withdrawal, but to also determine whether all subtypes of social withdrawal (and their concomitants) *vary* across developmental periods.

Internalizing Problems: Contributing Factors Across Developmental Periods

In the emerging adult samples, evidence was found to support the mediating effects of maladaptive cognitions in the links between subtypes of social withdrawal and internalizing problems. In contrast, peer difficulties emerged as the sole mediator linking both shyness and social avoidance to depressive symptoms in a sample of school-age children. Although caution must be exercised in making direct comparisons across these studies due to differences in methodologies and assessments, there are a number of potentially important takeaways from the current research.

From a broad perspective, these discrepant findings support the notion that internalizing problems display a pattern of *equifinality*, with multiple pathways leading to the same outcome. Indeed, multiple factors in the current research (e.g., social withdrawal, cognitions, peer experiences) were associated with internalizing problems. Moreover, the extant literature has identified a wide variety of additional factors related to internalizing problems and overall mental health, including (but not limited to) emotion regulation strategies (Schäfer, Naumann, Holmes, Tuschen-Caffier, & Samson, 2017), parenting practices (Rapee, 1997), physical health and screen time (Gunnell et al., 2016), family history (Ashford et al., 2008), socio-economic status (Gilman, Kawachi, Fitzmaurice, & Buka, 2002), and low birth weight (Van Lieshout, Boyle, Saigal, Morrison, & Schmidt, 2015).

However, from a more specific developmental perspective, these findings may also indicate that the risks for internalizing difficulties display *developmental timing effects*. Although research supports a certain degree of continuity in anxiety and depression from childhood to adulthood, this idea suggests that there is potential heterogeneity in the etiology and course of internalizing problems across developmental periods. This, in turn, can pose problems for the application of theory, research, and treatment (Kaufman, Martin, King, & Charney, 2001; Jaffee et al., 2002). Indeed, previous research has identified differences in the risk factors, symptomatology, and trajectories of early versus late onset internalizing problems (Dekker et al., 2007; Hoehn-Saric, Hazlett, & McLeod, 1993; Korten, Comijs, Lamers, & Penninx, 2012).

For example, the *adolescent* and *adult* literatures have largely emphasized cognitive (Beck, 1976; Clark & Wells, 1995) and environmental factors (e.g., peer experiences, life events; Pine, Cohen, Johnson, & Brook, 2002) in the development of internalizing problems. However, it has been argued that stable cognitive patterns cannot be established until the necessary cognitive, social, and emotional skills have developed (Field & Lester, 2010). Accordingly, some of the underlying premises of cognitive models of internalizing problems may not be suitable for application to younger children. Instead, the extant *early childhood* literature has identified biological or trait-like predispositions (e.g., temperament), genetics (e.g., parent with an internalizing disorder, parent high on neuroticism), and early socialization experiences (e.g., parental modeling, negative life events) as primary risk factors for internalizing difficulties (Bögels & Brechman-Toussaint, 2006; Clauss & Blackford, 2012; Najman et al., 2005; Ooi et al., 2017; Warren, Schmitz, & Emde, 1999; Wichstrøm, Belsky, & Berg-Nielson, 2013).

Thus, whereas biological predispositions may present early risk for internalizing problems in early childhood, additional environmental factors and cognitive maturity may introduce new sources of risk over time (Gregory et al., 2007). For instance, it has been reported that although heritable factors play a role in the development of information processing biases, environmental factors and experiences account for nearly two-thirds of the variance (Eley & Zavos, 2010). Taken together, these findings suggest that the etiology and risk factors for internalizing problems may differ across developmental stages (Field & Lester, 2010). More importantly, this highlights the potential pitfalls of applying adult theories of internalizing problems downward to children as it assumes that the phenomena are continuous across development (Essau & Petermann, 1999). Accordingly, it is important to consider factors that might affect our understanding of internalizing problems at different developmental stages.

However, it is worth noting that in each of the three studies, participant age demonstrated limited significant associations with other study variables. Moreover, the inclusion of age as a covariate did not alter any of the patterns of results, suggesting that *within* these two developmental periods, age may not significantly impact upon the associations. However, there is evidence from the existing literature to suggest that age (*across* developmental stages) may be important to consider within the current context, particularly pertaining to the associations between maladaptive cognitions and emotional adjustment (Dudeney et al., 2015; Field & Lester, 2010; Neshat-Doost et al., 1998; Weems et al., 2001). For example, findings from a recent meta-analysis indicated that the positive association between anxiety and interpretation biases in samples of children and adolescents was strengthened with increasing age (Stuijzand et al., 2017). As such, the

influence of development on cognitive biases (and its associated implications) clearly requires further attention (Field & Lester, 2010), either through the use of longitudinal designs, or (at minimum) exploration of the potential moderating effects of age at different developmental stages. Moreover, future studies should seek to determine when patterns of specificity in the emotional consequences of different types of cognitions emerge throughout development.

Gender Effects

Overall, very few significant effects of gender were observed across the three studies. However, a few noteworthy patterns of gender *main effects* did emerge. For example, with regards to internalizing problems, females tended to display higher social anxiety (Studies 1 & 2), depression (Studies 1 & 3), and loneliness (Study 3). Males and females did not differ in all three studies with regards to negative cognitions; however, there was some evidence (from Studies 1 & 3) to suggest that females may be more likely to engage in threatening cognitions than males. This is potentially of interest, as it was also shown that threatening cognitions had broader negative implications for emotional adjustment. In concert with previous indications that females tend to report higher levels of anxiety and depressive symptoms than males (Saluja et al., 2004; Zahn-Waxler et al., 2000; Zahn-Waxler et al., 2008), it is plausible to suspect that their tendency to engage in threatening cognitions might help explain the gender disparity in emotional disorders.

Notwithstanding, no gender differences were found in the *associations* among the study variables across all three studies. For example, the emotional risks associated with maladaptive cognitions did not appear to differ for males and females. Moreover, despite previous evidence to suggest that gender may impact upon the associations between

social withdrawal and outcomes (e.g., Kopala-Sibley & Klein, 2017), the current research suggests that socially withdrawn males and females may be similarly be at risk for social, cognitive, and emotional maladjustment. It has previously been argued that socially withdrawn males may be at greater risk for maladjustment because others view the behaviour as a violation of stereotypical male gender roles of assertiveness and dominance (Doey et al., 2014). One speculative possibility as to why this assertion was not supported is that, as society moves towards greater standards of gender equality, the differences in expected gender roles may be diminishing, ultimately reducing the impact of gender effects on withdrawn youth's social experiences. Alternatively, it could also be that withdrawn behaviour is perceived as *so* atypical and unacceptable that peers respond to such behaviour negatively, regardless of the underlying motivations or who is engaging in the behaviour. In turn, such negative responses may pose similar risk for social, emotional, and cognitive maladjustment for withdrawn males and females. Indeed, Stevenson-Hinde and Glover (1996) postulated that gender differences may be more pronounced among *medium-shy* children as compared to *extremely shy* children, who are all experiencing difficulties (i.e., overriding gender effects).

Another possible explanation for the lack of gender differences could be that the social, cognitive, and emotional risks associated with social withdrawal subtypes reflect vulnerabilities related to the underlying biological and/or temperamental characteristics of the behaviour (and are not a function of social responses to the behaviour). Thus, biological and temperamental predispositions (e.g., approach-avoidance motivations, negative affect, low positive affect, hyper-arousal) might account for the links between social withdrawal subtypes and adjustment outcomes, irrespective of gender. In this

regard, we would not expect gender differences to emerge in the associations between subtypes of social withdrawal and adjustment outcomes. Nevertheless, it is also possible that gender-related differences in the implications of socially withdrawn behaviours vary across development (Coplan, Ooi, & Baldwin, 2018). For example, as expectations for social interactions and the influence of peer pressure increase throughout childhood and into adolescence, gender effects may become more pronounced. Clearly, additional research is needed (across developmental stages) in order to gain a better understanding of the role of gender in these associations.

General Limitations and Future Directions

The current program of research addresses a number of important gaps in the literature by exploring the social, cognitive, and emotional correlates of social withdrawal in two developmental periods. Nevertheless, there are a number of limitations that must be acknowledged, with an eye towards future directions.

Drawing upon the theoretical and empirical literature, subtypes of social withdrawal were treated as predictor variables, cognitions as mediators, and internalizing problems as outcomes (Lonigan et al., 2004; Viana & Gratz, 2012; Weeks et al., 2016). However, the data from all three samples were cross-sectional and, as such, it is not possible to make any firm conclusions regarding the direction of effects. Given that cross-sectional mediation models can result in several equally acceptable interpretations (Roe, 2011), alternative interpretations of the data must be considered. To begin, internalizing problems and/or maladaptive cognitions may promote socially withdrawn behaviour (Cole, Zapp, Fetting, & Pérez-Edgar, 2016; London et al., 2007; Zimmer-Gembeck, Nesdale, Webb, Khatibi, & Downey, 2016). For example, Ding et al. (2018)

recently reported that depression predicted significant change in social avoidance nine months later (but not vice versa) in their sample of Chinese children, suggesting that social avoidance may also *arise* from depression.

Similarly, it could be that maladaptive cognitions develop in response to heightened feelings of social anxiety and depression (e.g., Creswell & O'Connor, 2010; Nolen-Hoeksema, Girgul, & Seligman, 1992) or, as cognitive models suggest, that cognitions and internalizing problems exert reciprocal or cyclical relations that serve to maintain maladaptive functioning (Clark & Wells, 1995; Crick & Dodge, 1994; Rapee & Heimberg, 1997). It is similarly plausible to suspect that reciprocal effects with peer difficulties are at play in childhood. For example, it has previously been argued that negative peer experiences *reinforce* withdrawn behaviours (Bowker & Raja, 2011; Gazelle & Ladd, 2003), and serve as both antecedents and consequences of internalizing problems (Reijntjes et al., 2010).

The cross-sectional nature of the data also limits the ability to draw any conclusions regarding the temporality of these associations. For instance, inferences regarding a developmental progression from social withdrawal, to cognitive risks, to internalizing problems *over time* (i.e., from childhood to emerging adulthood) cannot be made based on the current data. At best, the findings inform us about how these concurrent associations might vary at different stages of development. Again, within each study, controlling for age did not alter the pattern of results. However, exploration of these associations at additional developmental periods is required to fully understand potential developmental effects. For example, investigating these associations in late

childhood/early adolescence is needed in order to bridge the gaps in the current research⁴. Empirical exploration during this developmental period is particularly critical for numerous reasons. To begin, it has been argued that the consequences of social withdrawal peak during this time, when social expectations and peer pressure are particularly high (Coplan, Ooi, & Baldwin, 2018; Pérez-Edgar & Fox, 2005; Rubin et al., 2009). Moreover, anxiety and depressive symptoms are among the most commonly reported difficulties during late childhood and early adolescence. For example, SAD is the most common anxiety disorder among 8- to 12-year-olds (Spence, 1997). Rates of depression similarly begin to increase by adolescence, with prevalence estimates in mid-late adolescence being comparable to those found in adults (Zahn-Waxler et al., 2000). Thus, early adolescence represents a time of rapid increases in the prevalence and severity of internalizing disorders.

The data also do not tell us how these associations might evolve or stay the same over time *within an individual*. Previous research has identified different trajectories of social withdrawal (e.g., increasing, decreasing, stable) which, in turn, appear to be associated with distinct social and emotional adjustment outcomes (Karevold et al., 2012; Oh et al., 2008; Schmidt et al., 2017; Tang et al., 2017). As such, individuals may display differential risk for maladjustment across developmental stages. Thus, although previous research supports the hypothesized order of effects (e.g., Viana & Gratz, 2012), multiple

⁴ A study exploring the associations between subtypes of social withdrawal, maladaptive cognitions, and internalizing problems in older children and early adolescents was initially planned as part of this dissertation. Recruitment efforts took place from April 2015 to January 2018, with 8 applications submitted to five different schoolboards in Ontario and Alberta, Canada. Fourteen private schools in the Ottawa area were also contacted. Unfortunately, due to issues with gaining access to schoolboards and recruiting sufficient participants, it was not possible to collect this data as part of this doctoral dissertation.

assessments over a long period of time are necessary to appropriately assess the temporal and developmental nature of these associations.

Another potential limitation of the current research is that all measures of cognitions employed indirect methodologies. Specifically, participants were asked to report how they thought they would react to or interpret hypothetical situations. This may have introduced potential for response bias, as this strategy can often evoke more effortful, conscious responses, and participants may engage in mental strategies to reduce the report of unwanted cognitions (Wenzlaff & Bates, 1998). Yet, processing of social cues and self-referent information can often happen more instantaneously and subconsciously (Teachman, Joormann, Steinman, & Gotlib, 2012). Accordingly, such responses to hypothetical events might have limited ecological validity. Indeed, although both automatic and explicit negative cognitive processes have been found to be associated with internalizing difficulties (Romero, Sanchez, & Vazquez, 2014), there is evidence to suggest that methodological factors can influence conclusions regarding cognitive biases (Everaert et al., 2017; Morales, Taber-Thomas, & Pérez-Edgar, 2017). Thus, future studies should also include more direct assessments of cognitive processes. For instance, capturing more automatic processes such as attention biases through the use of eye-tracking or dot-probe paradigms would provide more direct and objective assessments of cognitive patterns.

This might be particularly beneficial for understanding cognitive patterns among younger children, who are more likely to engage in lower-effort cognitive processes (Gramszlo et al., 2018). Whereas higher-level cognitions, such as interpretation and judgement biases, may not appear until later in childhood (Field & Lester, 2010), more

automatic processes such as attention biases have been identified within the first year of life (LoBue, Buss, Taber-Thomas, & Pérez-Edgar, 2017; Peltola et al., 2009).

Representing the first step of the SIP model, it has been argued that attention biases act as *gate keepers* for what and how subsequent information is processed (Crick & Dodge, 1994). Over time, preferentially attending to threatening stimuli may train attentional filters to seek out and identify threat which may elicit a cascade of effects on subsequent higher-order information processing (White, Helfinstein, Reeb-Sutherland, Degnan, & Fox, 2009). As such, attention biases represent an integral component in understanding the development of cognitive patterns and subsequent negative outcomes, particularly in early childhood. Indeed, whereas the evidence linking higher-order cognitions to anxiety in early childhood has been mixed (Dodd et al., 2012; J. Ooi, Dodd, & Walsh, 2015), early appearing attention biases have been found to be robustly associated with subsequent adjustment difficulties (Pérez-Edgar et al., 2011). Moreover, children high on BI have been shown to be at increased risk for attention biases and subsequent internalizing difficulties (Chronis-Tuscano et al., 2009; Pérez-Edgar et al., 2010). As such, assessing developmentally-appropriate cognitions may be important for accurately identifying the nature of the associations between maladaptive cognitive processing and internalizing difficulties in early childhood.

It will be important for future studies to capture these processes in order to gain a more global understanding of the cognitive mechanisms underlying emotional maladjustment, particularly among temperamentally at-risk youth. However, the central scientific premise of the cognition literature is focused on understanding social behaviour *in context* (Crick & Dodge, 1994). Therefore, we especially need methodologies that can

more closely capture these experiences *in vivo*. For example, mobile eye-tracking paradigms would allow for real-time monitoring during social interactions. This methodology would allow researchers to assess the potential cognitive risks associated with maladaptive cognitions without compromising ecological validity (Risko, Laidlaw, Freeth, Foulsham, & Kingstone, 2012).

Finally, although it is important to consider the immediate social context, it is also important to acknowledge the broader sociocultural context. It is becoming increasingly evident that the meaning and implications of social withdrawal differ across cultures (e.g., Chen, 2010; Chen, 2015). Whereas most of the existing literature has relied on findings from Western countries, there is growing interest in understanding cultural differences in social behaviours (and their associated implications) (e.g., Bowker, Ojo, & Bowker, 2016; Kim et al., 2008; Liu et al., 2015; Liu et al., 2014; Nelson, Hart, Yang, Wu, & Jin, 2012; Nelson, Lee, & Duan, 2015).

For example, whereas unsociability appears to be relatively benign (as compared to shyness and social avoidance) in samples of Western youth (Bowker et al., 2017; Coplan, Ooi, Xiao, et al., 2018; Coplan et al., 2013; Coplan & Weeks, 2010; Nelson, 2013; Nelson et al., 2016), it has been found to be associated with internalizing problems, peer difficulties, and poorer academic functioning among Chinese youth (Chen, Wang, & Cao, 2011; Coplan et al., 2016; Liu et al., 2015; Liu et al., 2017; Liu et al., 2014). It has been argued that these differences are accounted for by socio-cultural influences.

Whereas autonomous expression is valued in Western cultures, interdependence and social affiliation are highly valued in collectivistic societies such as China (Chen, 2010). Thus, choosing to remove oneself from the group (for any reason) may be viewed as

going against the collective, and may elicit negative responses from others. As such, future studies should seek to explore the cognitive and emotional correlates of social withdrawal in non-Western cultures in order to determine whether the current findings are invariant across cultures.

Additional Strengths, Contributions, and Concluding Remarks

Despite some limitations, the current research also featured a number of strengths. To begin, all three studies included large sample sizes, which maximized statistical power and mitigated the influence of missing data and outliers (Dong & Peng, 2013; Wolf, Harrington, Clark, & Miller, 2013). Importantly, the large sample sizes permitted the use of more complex statistical analyses which allowed for multiple associations to be examined and compared simultaneously (Kline, 2016). Indeed, the statistical techniques (i.e., SEM) used in the current study have rarely been implemented in this particular area of research, despite having several advantages over more commonly used methods (e.g., linear regression) (Iacobucci et al., 2007).

Several important contributions to the literature were also made. To begin, the current research adds to the extremely limited body of research examining the concomitants of social withdrawal during childhood and emerging adulthood. In particular, Study 3 was the first to empirically explore social avoidance in middle childhood, addressing a clear gap in the withdrawal literature. Next, by examining the socio-cognitive correlates of withdrawn youth, the current research explored an area that is grossly lacking in empirical attention. Indeed, authors of a recent meta-analysis examining the associations between interpretation biases and anxiety in children and adolescents highlighted the lack of available data for children between the ages of 6 and 8

years (Stuijzand et al., 2017).

The current research was also the first to examine the relations between subtypes of social withdrawal, maladaptive cognitions, and internalizing problems. Findings from Studies 1 and 2 suggest that shyness and social avoidance are associated with an overall pattern of maladaptive cognitive processes in emerging adulthood. More importantly, these studies were the first to provide evidence of potential differences in the pathways linking subtypes of social withdrawal and emotional adjustment. Examining these complex patterns of associations while accounting for common associations allowed for a more nuanced understanding of specific (and non-specific) social and cognitive risks associated with emotional adjustment.

Finally, examination at two different developmental periods provided unique insight into potential developmental differences in these associations. Specifically, contrary to the findings among emerging adults, peer problems (and not cognitions) accounted for the links between both shyness and social avoidance and internalizing problems. Taken together, these findings provide preliminary evidence to suggest that risks for internalizing difficulties may vary across developmental periods.

Notwithstanding these contributions, it is clear that there remains considerable work to be done in order to obtain a clear understanding of the potential risk and protective factors for emotional adjustment among socially withdrawn youth. The current research provides the groundwork for future examination of the social, cognitive, and emotional implications of social withdrawal across developmental stages.

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Appendix A

Social Preference Scale for Emerging Adults

(SPS-EA; Nelson, 2013)

Strongly disagree ← → Strongly agree
 1 2 3 4 5

-
1. I tend to be shy. (S)
 2. I'd like to hang out with other people, but I'm sometimes nervous to. (S)
 3. Although I desire to talk to and be with other people, I feel nervous about interacting with them. (S)
 4. I feel tense in social situations. (S)
 5. Sometimes I turn down chances to hang out with other people because I feel too shy. (S)
 6. I feel nervous at parties and other social settings. (U)
 7. I'm just as happy to be by myself as with other people. (U)
 8. I don't really mind spending time alone. (U)
 9. I don't have a strong need to be with other people. (U)
 10. I like spending time alone more than I like spending time with other people. (U)
 11. I like to be with people. (*reversed*) (SA)
 12. I am the happiest when I am hanging out with other people. (*reversed*) (SA)
 13. When given the choice, I prefer to do something with others than to be alone. (*reversed*) (SA)
 14. I welcome the opportunity to mix socially with people. (*reversed*) (SA)
 15. I prefer working with others rather than alone. (*reversed*) (SA)
 16. I don't really like being with other people and prefer being alone. (SA)
 17. I want to hang out with others but often they don't want to be with me. (I)
 18. Sometimes people don't want me to hang out with them. (I)
 19. I wish I could spend more time with other people, but they won't let me. (I)
 20. I'd like to hang out with other people, but I'm often excluded. (I)

(S) = shyness item; (U) = unsociability item; (SA) = social avoidance item; (I) = isolation item

Appendix B

The Outcome Probability Questionnaire (OPQ) and
the Outcome Cost Questionnaire (OCQ) Social Events Subscale

(Uren et al., 2004)

OPQ Instructions: Please rate how likely it is that you think each situation will happen to you in the next year.

OCQ Instructions: Please rate how bad or distressing each of these situations would be if they happened to you.

Not at all										Extremely
0	1	2	3	4	5	6	7	8	9	

- 1) You will feel embarrassed by something you did
- 2) You will sound dumb while talking to others
- 3) You will feel flustered in front of others
- 4) People will think you are boring
- 5) At a party, others will notice that you are nervous
- 6) During a job interview or evaluation, you will freeze
- 7) While you are talking with several people, one of them will leave
- 8) You will be ignored by someone you know
- 9) You will do something foolish in public
- 10) You will fail to accomplish an important goal
- 11) You will fail to cope in your day-to-day living
- 12) You will be unexpectedly called in to see your supervisor at work

Appendix C

Ambiguous Social Situations Interpretation Questionnaire

(ASSIQ; Stopa & Clark, 2000)

Following are some descriptions of situations in which it is not quite clear what is happening. After each situation, you will see three possible explanations for the situation. Arrange these in the order in which they would be most likely to come to your mind if you found yourself in a similar situation. The explanation that you would consider most likely to be true should come first, and the one that you would consider least likely to be true should come third. Do not think too long before deciding. We want your first impressions, and do not worry if none of them fits with what you actually would think.

- 1. You have a sudden pain in your stomach. Why?**
 - a. You have appendicitis or an ulcer
 - b. You have indigestion
 - c. You are hungry
- 2. You ask a friend to go out for a meal with you in a few days' time and they refuse. Why?**
 - a. They are trying to save money
 - b. They don't want to spend the evening with you
 - c. They've already arranged to do something else
- 3. You have been eating normally but have recently lost some weight. Why?**
 - a. You have cancer
 - b. It's a normal fluctuation
 - c. You have been rushing about more than usual
- 4. You go into a shop and the assistant ignores you. Why?**
 - a. They are bored with their job, and behave rudely
 - b. They are concentrating on something else
 - c. You are not important enough for them to bother with
- 5. You notice that your heart is pounding, you feel breathless, dizzy, and unreal. Why?**
 - a. You have been exerting yourself and are overtired
 - b. Something you ate disagreed with you
 - c. You are dangerously ill
- 6. Not long after starting a new job, your boss asks to see you. Why?**
 - a. He wants to make sure you have settled in alright
 - b. You haven't been doing the job properly
 - c. He is going to tell you how well you've been doing
- 7. A letter marked "URGENT" arrives. What is in the letter?**
 - a. It is junk mail designed to attract your attention
 - b. You forgot to pay a bill
 - c. News that someone you know has died or is seriously ill

8. A friend overhears your telephone conversation and starts to smile. Why?

- a. You said something funny
- b. You're making a fool of yourself
- c. They're remembering a joke

9. You wake up with a start in the middle of the night, thinking you heard a noise, but all is quiet. What woke you up?

- a. You were woken by a dream
- b. A burglar broke into your house
- c. A door or window rattled in the wind

10. You have visitors over for a meal and they leave sooner than you expected. Why?

- a. They did not wish to outstay their welcome
- b. They had another pressing engagement
- c. They were bored and did not enjoy the visit

11. You are having a conversation with some friends. You say something and there is a long pause. Why?

- a. You said something foolish
- b. They are thinking about what you said
- c. There was nothing more to say

12. A member of your family is late arriving home. Why?

- a. They have had a serious accident on their way home
- b. They met a friend and are talking with them
- c. It took longer than usual to get home

13. You are in the middle of answering a question at an interview. The interviewers suddenly interrupt and ask you another question. Why?

- a. They were satisfied with your answer and wanted to move on to another question
- b. They are bad interviewers
- c. They thought that you were talking rubbish.

14. Your chest feels uncomfortable and tight. Why?

- a. You have indigestion
- b. You have a sore muscle
- c. Something is wrong with your heart

15. You join a group of colleagues for lunch at work. As you sit down, two people in the group get up to leave without saying anything. Why?

- a. They have got some work to finish
- b. They don't much like you
- c. They have to go run an errand

16. A stranger approaches you in the street. Why?

- a. He's lost and wants directions
- b. You have done something wrong and are about to be told off
- c. He wants to ask some questions for a survey

17. You feel short of breath. Why?

- a. You are developing flu
- b. You are about to suffocate
- c. You are physically out of shape

- 18. You are talking to an acquaintance who briefly looks out the window. Why?**
- Something outside has caught their attention
 - They are bored with you
 - They are tired and can't concentrate
- 19. Some people you know are looking in your direction and talking. Why?**
- They are criticizing you
 - They are being friendly and want you to join them
 - They just happen to be looking your way
- 20. You feel lightheaded and weak. Why?**
- You are about to faint
 - You need to get something to eat
 - You didn't get enough sleep last night
- 21. You've made tentative plans to go to the movies with a friend and they tell you that they can't go. Why?**
- They don't feel well
 - You've done something to offend them
 - They've arranged something else by mistake and are too embarrassed to tell you.
- 22. You are talking to someone at a party. They excuse themselves to go get a drink and then start talking to someone else. Why?**
- They are just being sociable
 - You are boring them
 - They saw someone they haven't seen for a long time
- 23. You suddenly feel confused and are having difficulty thinking straight. Why?**
- You are going out of your mind
 - You are coming down with a cold
 - You've been working too hard and need a rest
- 24. You walk past a group of tourists and they start laughing. Why?**
- Their guide said something amusing
 - You look odd
 - They're enjoying their holiday

Appendix E

The Cognitive Triad Inventory

(CTI; Beckham et al., 1986)

Totally agree						Totally disagree
1	2	3	4	5	6	7

1. I do well at many different things
2. Work is no fun
3. Most people are friendly and helpful
4. Nothing is likely to work out for me
5. I am a failure
6. I like to think about the good things that lie ahead for me
7. I do my work well
8. The people I know help me when I need it
9. I think that things will be going very well for me a few years from now
10. I have messed up almost all the important relationships I have ever had
11. The future holds a lot of excitement for me
12. My daily activities are fun and rewarding
13. I can't do anything right
14. People like me
15. There is nothing left in my life to look forward to
16. My current problems or concerns will always be there in one way or another
17. I am as adequate as other people I know
18. The world is a very hostile place
19. There is no reason for me to be hopeful about my future
20. The important people in my life are helpful and supportive
21. I hate myself
22. I will solve my problems
23. Bad things happen to me a lot
24. I have a spouse or friend who is nice and helpful to me
25. I can do a lot of things well
26. My future is simply too awful to think about
27. My family doesn't care what happens to me
28. Things will work out for me in the future
29. I am guilty of many things
30. No matter what I do, other people make it hard for me to get what I need
31. I am a worthwhile human being
32. There is nothing to look forward to in the years ahead
33. I like myself
34. I am faced with many difficulties
35. I have serious flaws in my character
36. I expect to be content and satisfied as the years go by

Appendix F

Social Interaction Anxiety Scale (SIAS)

(Mattick & Clarke, 1989, 1998)

For each item, please select the number to indicate the degree to which you feel the statement is characteristic or true for you. The rating scale is as follows:

0 = Not at all characteristic or true of me, **1 = Slightly** characteristic or true of me, **2 = Moderately** characteristic or true of me, **3 = Very** characteristic or true of me, **4 = Extremely** characteristic or true of me

1. I get nervous if I have to speak with someone in authority (teacher, boss, etc.).
2. I have difficulty making eye contact with others.
3. I become tense if I have to talk about myself or my feelings.
4. I find it difficult to mix comfortably with the people I work with.
5. I find it easy to make friends my own age.
6. I tense up if I meet an acquaintance in the street.
7. When mixing socially, I am uncomfortable.
8. I feel tense if I am alone with just one other person.
9. I am at ease meeting people at parties, etc.
10. I have difficulty talking with other people.
11. I find it easy to think of things to talk about
12. I worry about expressing myself in case I appear awkward.
13. I find it difficult to disagree with another's point of view.
14. I have difficulty talking to attractive persons of the opposite sex.
15. I find myself worrying that I won't know what to say in social situations.
16. I am nervous mixing with people I don't know well.
17. I feel I'll say something embarrassing when talking.
18. When mixing in a group, I find myself worrying I will be ignored.
19. I am tense mixing in a group.
20. I am unsure whether to greet someone I know slightly.

Appendix G

The Social Phobia Scale (SPH)

(Mattick & Clarke, 1998)

For each item, please select the number to indicate the degree to which you feel the statement is characteristic or true for you. The rating scale is as follows:

0 = Not at all characteristic or true of me, **1 = Slightly** characteristic or true of me, **2 = Moderately** characteristic or true of me, **3 = Very** characteristic or true of me, **4 = Extremely** characteristic or true of me

1. I become anxious if I have to write in front of other people
2. I become self-conscious when using public toilets
3. I can suddenly become aware of my own voice and of others listening to me
4. I get nervous that people are staring at me as I walk down the street
5. I fear I may blush when I am with others
6. I feel self-conscious if I have to enter a room where others are already seated
7. I worry about shaking or trembling when I'm watched by other people
8. I would get tense if I had to sit facing other people on a bus or a train
9. I get panicky that others might see me to be faint, sick or ill
10. I would find it difficult to drink something if in a group of people
11. It would make me feel self-conscious to eat in front of a stranger at a restaurant
12. I am worried people will think my behaviour odd
13. I would get tense if I had to carry a tray across a crowded cafeteria
14. I worry I'll lose control of myself in front of other people
15. I worry I might do something to attract the attention of others
16. When in an elevator I am tense if people look at me
17. I can feel conspicuous standing in a queue
18. I get tense when I speak in front of other people
19. I worry my head will shake or nod in front of others
20. I feel awkward and tense if I know people are watching me

Appendix H

The Beck Depression Inventory

(BDI; Beck et al., 1996)

This survey consists of 20 groups of statements. Pick one statement from each group that best describes the way you have been feeling during the past two weeks, including today.

Item 1

- 0 I do not feel sad.
- 1 I feel sad much of the time.
- 2 I am sad all the time.
- 3 I am so sad and unhappy that I can't stand it.

Item 2

- 0 I am not discouraged about my future.
- 1 I feel more discouraged about my future than I used to be.
- 2 I do not expect things to work out for me.
- 3 I feel my future is hopeless and will only get worse.

Item 3

- 0 I do not feel like a failure.
- 1 I have failed more than I should have.
- 2 As I look back, I see a lot of failures.
- 3 I feel I am a total failure as a person.

Item 4

- 0 I get as much pleasure as I ever did from the things I enjoy.
- 1 I don't enjoy things as much as I used to.
- 2 I get very little pleasure from the things I used to enjoy.
- 3 I can't get any pleasure from the things I used to enjoy.

Item 5

- 0 I don't feel particularly guilty
- 1 I feel guilty over many things I have done or should have done.
- 2 I feel quite guilty most of the time.
- 3 I feel guilty all of the time.

Item 6

- 0 I don't feel I am being punished.
- 1 I feel I may be punished.
- 2 I expect to be punished.
- 3 I feel I am being punished.

Item 7

- 0 I feel the same about myself as ever.
- 1 I have lost confidence in myself.
- 2 I am disappointed in myself.
- 3 I dislike myself.

Item 8

- 0 I don't criticize or blame myself more than usual.
- 1 I am more critical of myself than I used to be.
- 2 I criticize myself for all of my faults.
- 3 I blame myself for everything bad that happens.

Item 9

- 0 I don't cry any more than I used to.
- 1 I cry more now than I used to.
- 2 I cry over every little thing.
- 3 I feel like crying but I can't.

Item 10

- 0 I am no more restless or wound up than usual.
- 1 I feel more restless or wound up than usual.
- 2 I am so restless or agitated that it's hard to stay still.
- 3 I am so restless or agitated that I have to keep moving or doing something.

Item 11

- 0 I have not lost interest in other people or activities.
- 1 I am less interested in other people or things than before.
- 2 I have lost most of my interest in other people or things.
- 3 It's hard to get interested in anything.

Item 12

- 0 I make decisions about as well as ever.
- 1 I find it more difficult to make decisions than usual.
- 2 I have much greater difficulty in making decisions than I used to.
- 3 I have trouble making any decisions.

Item 13

- 0 I do not feel I am worthless.
- 1 I don't consider myself as worthwhile and useful as I used to.
- 2 I feel more worthless as compared to other people.
- 3 I feel utterly worthless.

Item 14

- 0 I have as much energy as ever.
- 1 I have less energy than I used to have.
- 2 I don't have enough energy to do very much.
- 3 I don't have enough energy to do anything.

Item 15

- 0 I have not experienced any change in my sleeping pattern.
- 1a I sleep somewhat more than usual.
- 1b I sleep somewhat less than usual.
- 2a I sleep a lot more than usual.
- 2b I sleep a lot less than usual.
- 3a I sleep most of the day.
- 3b I wake up 1-2 hours early and can't get back to sleep.

Item 16

- 0 I am no more irritable than usual.
- 1 I am more irritable than usual.
- 2 I am much more irritable than usual.
- 3 I am irritable all of the time.

Item 17

- 0 I have not experienced any change in my appetite.
- 1a My appetite is somewhat less than usual.
- 1b My appetite is somewhat greater than usual.
- 2a My appetite is much less than before.
- 2b My appetite is much greater than usual.
- 3a I have no appetite at all.
- 3b I crave food all the time.

Item 18

- 0 I can concentrate as well as ever.
- 1 I can't concentrate as well as usual.
- 2 It's hard to keep my mind on anything for very long.
- 3 I find I can't concentrate on anything.

Item 19

- 0 I am no more tired or fatigued than usual.
- 1 I get more tired or fatigued more easily than usual.
- 2 I am too tired or fatigued to do a lot of the things I used to do.
- 3 I am too tired or fatigued to do most of the things I used to do.

Item 20

- 0 I have not noticed any recent change in my interest in sex.
- 1 I am less interested in sex than I used to be.
- 2 I have almost no interest in sex.
- 3 I have lost interest in sex completely.

Appendix I

Depressive Attributions Questionnaire

(DAQ; Kleim et al., 2011)

Below is a list of statements dealing with how you generally feel about yourself and things that happen to you. Please select the appropriate number to indicate how much you agree with each statement.

	0 not at all	1 a little	2 some- what	3 strongly	4 very strongly
1. When bad things happen, I think it is my fault.	0	1	2	3	4
2. I feel helpless when bad things happen.	0	1	2	3	4
3. When things do not go well, I get easily discouraged.	0	1	2	3	4
4. When things go well, I think it is just due to good luck.	0	1	2	3	4
5. When something I do goes wrong, I think it is because I am incapable.	0	1	2	3	4
6. When something good happens, I think it will not last long.	0	1	2	3	4
7. When something bad happens, I think there is little I can do to make things better.	0	1	2	3	4
8. When something good happens to me, I think this was because of other people or the circumstances rather than me.	0	1	2	3	4
9. Bad things always happen to me.	0	1	2	3	4
10. When bad things happen, I rely on other people to sort things out.	0	1	2	3	4
11. When bad things happen to me, I am sure it will happen again.	0	1	2	3	4
12. When bad things happen to me, I think my life will never get better.	0	1	2	3	4
13. When something bad happens, I think of the problems this will cause in all areas of my life.	0	1	2	3	4
14. Bad things happen in all areas of my life.	0	1	2	3	4
15. When bad things happen to me, I can't see anything positive in my life.	0	1	2	3	4
16. When bad things happen, nothing seems to be in place any more.	0	1	2	3	4

Appendix J

Social Preference Scale-Revised

(SPS-R; Bowker & Raja, 2011; Bowker et al., 2017)

How much are you like that?

<u>Not at All</u>	←	→	<u>A Lot</u>
1	2	3	4
		5	

-
1. I don't really mind spending time alone. (U)
 2. I'd like to hangout with others, but I'm sometimes nervous to. (S)
 3. I don't really like being with others and prefer being alone. (SA)
 4. I don't have a strong preference for being alone or with others. (U)
 5. I'd like to hang out with others, but I'm often excluded. (I)
 6. I am the happiest when I am hanging out with others. (*reversed*) (SA)
 7. Sometimes I turn down chances to hang out with others because I feel too shy. (S)
 8. I want to spend time with others but often they don't want to be with me. (I)
 9. I don't have a strong need to be with others. (U)
 10. When given the choice, I always choose to spend time alone because I don't like being with others. (SA)
 11. Sometimes others don't want me to hang out with them. (I)
 12. I'd like to ask others to hang out, but I often feel too nervous or afraid to do so. (S)
 13. When given the choice, I prefer to hang out with others than to spend time alone. (*reversed*) (SA)
 14. I try to avoid spending time with other people. (SA)
 15. I wish I could spend more time with others, but they don't let me. (I)
 16. I often watch people hanging out, but I don't try to join in. (S)
 17. Although I desire to be with others, I feel nervous about interacting with them. (S)
 18. I often try to spend time alone because I don't like to be with others. (SA)
-

(S) = shyness item; (U) = unsociability item; (SA) = social avoidance item; (I) = isolation item

Appendix K

Child Social Preference Scale-3

(CSPS-3; Coplan, Ooi, Xiao, et al., 2018)

Please answer the items on this page about the behaviour of your child by *circling* one of the numbers following each item. We know that no item will apply to the child in every situation, but try to consider his/her usual or general behaviour. Please answer all questions-- there are no right or wrong answers.

How much is your child like that?

<u>Not at All</u>		\leftarrow		\rightarrow		<u>A Lot</u>
1	2	3	4	5		

-
1. My child often seems content to play alone. (U)
 2. My child seems to want to play with other children, but is sometimes nervous to. (S)
 3. My child is just as happy to play quietly by his/herself than to play with a group of children. (U)
 4. My child actively avoids playing with other children. (SA)
 5. My child is happiest when playing with other children. (*reversed*) (U)
 6. My child will turn down social initiations from other children because he/she is 'shy'. (S)
 7. My child does not want to play with other children. (SA)
 8. My child often approaches other children to initiate play. (*reversed*) (S)
 9. My child often goes out of his/her way not to play with other children. (SA)
 10. My child 'hovers' near where other children are playing, without joining in. (S)
 11. My child rarely initiates play activities with other children. (S)
 12. If given the choice, my child prefers to play with other children rather than alone. (*reversed*) (U)
 13. My child will often turn down social invitations from other children because he/she wants to be alone. (SA)
 14. My child often watches other children play without approaching them. (S)
 15. Although he/she appears to desire to play with others, my child is sometimes anxious about interacting with other children. (S)
-

(S) = shyness item; (U) = unsociability item; (SA) = social avoidance item

Appendix L

The Loneliness and Social Dissatisfaction Questionnaire for Young Children

(LSDQ-Y; Cassidy & Asher, 1992)

Ask the child to respond to each question with a “yes”, “no”, or “sometimes”.

1. Do you like to hear stories? *
2. Do you feel alone at school?
3. Do you play outside a lot? *
4. Do you feel left out of things at school?
5. Do you like to paint and draw? *
6. Are you lonely at school?
7. Do you like school? *
8. Is school a lonely place for you?

* filler items

Appendix M

The Strengths and Difficulties Questionnaire

(SDQ; Goodman, 1997)

For each item, please mark the box for Not True, Somewhat True or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain. Please give your answers on the basis of the child's behavior over the last six months or this school year.

Child's name Male/Female

Date of birth

	Not True	Somewhat True	Certainly True
Considerate of other people's feelings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Restless, overactive, cannot stay still for long	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Often complains of headaches, stomach-aches or sickness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shares readily with other children, for example toys, treats, pencils	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Often loses temper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rather solitary, prefers to play alone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Generally well behaved, usually does what adults request	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Many worries or often seems worried	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Helpful if someone is hurt, upset or feeling ill	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Constantly fidgeting or squirming	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Has at least one good friend	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Often fights with other children or bullies them	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Often unhappy, depressed or tearful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Generally liked by other children	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easily distracted, concentration wanders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nervous or clingy in new situations, easily loses confidence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kind to younger children	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Often lies or cheats	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Picked on or bullied by other children	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Often offers to help others (parents, teachers, other children)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Thinks things out before acting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Steals from home, school, elsewhere	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gets along better with adults than with other children	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Many fears, easily scared	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Good attention span, sees work through to the end	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix N

Spence Child Anxiety Scale – Parent Version

(SCAS-P; Spence, 1997)

INSTRUCTIONS: below is a list of items that describe children. For each item please circle the response that best describes your child. Please answer all the items.

Choices: ‘Never,’ ‘Sometimes,’ ‘Often,’ or ‘Always’

-
1. My child worries about things
 2. My child is scared of the dark
 3. When my child has a problem, (s)he complains of having a funny feeling in his / her stomach
 4. My child complains of feeling afraid
 5. My child would feel afraid of being on his/her own at home
 6. My child is scared when (s)he has to take a test (SP)
 7. My child is afraid when (s)he has to use public toilets or bathrooms (SP)
 8. My child worries about being away from us / me
 9. My child feels afraid that (s)he will make a fool of him/herself in front of people (SP)
 10. My child worries that (s)he will do badly at school (SP)
 11. My child worries that something awful will happen to someone in our family
 12. My child complains of suddenly feeling as if (s)he can't breathe when there is no reason for this
 13. My child has to keep checking that (s)he has done things right (like the switch is off, or the door is locked)
 14. My child is scared if (s)he has to sleep on his/her own
 15. My child has trouble going to school in the mornings because (s)he feels nervous or afraid
 16. My child is scared of dogs
 17. My child can't seem to get bad or silly thoughts out of his / her head
 18. When my child has a problem, (s)he complains of his/her heart beating really fast
 19. My child suddenly starts to tremble or shake when there is no reason for this
 20. My child worries that something bad will happen to him/her
 21. My child is scared of going to the doctor or dentist
 22. When my child has a problem, (s)he feels shaky
 23. My child is scared of heights (eg. being at the top of a cliff)
 24. My child has to think special thoughts (like numbers or words) to stop bad things from happening
 25. My child feels scared if (s)he has to travel in the car, or on a bus or train
 26. My child worries what other people think of him/her (SP)
 27. My child is afraid of being in crowded places (like shopping centres, the movies, buses, busy playgrounds)
 28. All of a sudden my child feels really scared for no reason at all
 29. My child is scared of insects or spiders
 30. My child complains of suddenly becoming dizzy or faint when there is no reason for this

31. My child feels afraid when (s)he has to talk in front of the class (SP)
 32. My child's complains of his / her heart suddenly starting to beat too quickly for no reason
 33. My child worries that (s)he will suddenly get a scared feeling when there is nothing to be afraid of
 34. My child is afraid of being in small closed places, like tunnels or small rooms
 35. My child has to do some things over and over again (like washing his / her hands, cleaning or putting things in a certain order)
 36. My child gets bothered by bad or silly thoughts or pictures in his/her head
 37. My child has to do certain things in just the right way to stop bad things from happening
 38. My child would feel scared if (s)he had to stay away from home overnight
-

SP = *Social Phobia* subscale item

Appendix O

Child Rejection Sensitivity Questionnaire

(CRSQ; Downey et al., 1998)

INSTRUCTIONS: Please imagine yourself in each of the following situations described here and tell us how you would feel if you were in each situation.

1. Imagine that a kid in your class tells the teacher that you were picking on him/her. You say you didn't do it. The teacher tells you to wait in the hallway and she will speak to you. You wonder if the teacher will believe you.

- a) How NERVOUS would you feel, RIGHT THEN, about whether or not the teacher will believe your side of the story?

1 = Not nervous at all 2 = A little nervous 3 = Very, very nervous

- b) How MAD would you feel, RIGHT THEN, about whether or not the teacher will believe your side of the story?

1 = Not mad at all 2 = A little mad 3 = Very, very mad

- c) Do you think she will believe your side of the story?

1 = Yes 2 = Maybe 3 = No

2. Imagine that a famous person is coming to visit your school. Your teacher is going to pick five kids to meet this person. You wonder if she will choose you.

- a) How NERVOUS would you feel, RIGHT THEN, about whether or not the teacher will choose you?

1 = Not nervous at all 2 = A little nervous 3 = Very, very nervous

- b) How MAD would you feel, RIGHT THEN, about whether or not the teacher will choose you?

1 = Not mad at all 2 = A little mad 3 = Very, very mad

- c) Do you think the teacher will choose YOU to meet the special guest?

1 = Yes 2 = Maybe 3 = No

3. Now imagine that you're back in class. Your teacher asks for a volunteer to help plan a party for your class. Lots of kids raise their hands so you wonder if the teacher will choose YOU.

- a) How NERVOUS would you feel, RIGHT THEN, about whether or not the teacher will choose you?

1 = Not nervous at all 2 = A little nervous 3 = Very, very nervous

- b) How MAD would you feel, RIGHT THEN, about whether or not the teacher will choose you?

1 = Not mad at all 2 = A little mad 3 = Very, very mad

Appendix P

Children's Evaluation of Everyday Social Encounters Questionnaire (Selected Items)

(ChEESE-Q; Bell et al., 2009)

A. You've just joined a club (like scouts) and are going to your first meeting. You see that all of the other kids are looking at you when you come in, and one kid asks who you are.

1. Why do you think the person asked who you are?
2. Do you think it was because: (1=definitely not to 5 = definitely)
 - a) You are new
 - b) You look strange
 - c) She is interested in meeting you
 - d) She is suspicious of you
 - e) She was being nice to you
 - f) She was being mean to you
 - g) She just wanted to (it wasn't about you)
 - h) It was an accident (she didn't mean to do it)
3. If this happened to you, how would you feel? (1 = not at all to 5 = very much)
 - a) Worried or nervous
 - b) Angry or mad
 - c) Sad or down
 - d) Happy or excited
4. If this happened to you, how much would your goal be to: (1 = not at all to 5 = very much)
 - a) Just work out the situation
 - b) Try to avoid or ignore the situation
 - c) Show that it's okay/not a big deal
 - d) Try to make yourself feel better
 - e) Show that you're angry or upset
 - f) Just focus on getting along with the person
5. If this happened to you, what would you do? Your answer should be what you *WOULD* do, not what you think you *should* do. How much do you think you would: (1 = not at all to 5 = very much)
 - a) Tell the kid your name
 - b) Talk to the kid and ask her name
 - c) Ignore the kid
 - d) Talk to the parents or teachers instead
 - e) Leave
 - f) Tell her you don't want to talk
 - g) Insult or say something smart to her
 - h) Tell her it's none of her business
 - i) Other: _____
6. Which of these choices would you be most likely to do?
7. How well do you think you could do the response you chose? (1 = not at all to 5 = very much)

B. It's the beginning of the school year and you are in a class with a bunch of kids you don't know. Everybody is doing introductions. Your teacher asks you to stand up, introduce yourself, and say something about yourself.

1. Why do you think the teacher asked you to introduce yourself?
2. Do you think it was because: (1=definitely not to 5 = definitely)
 - a) You are new
 - b) You hadn't volunteered
 - c) She wanted everyone to meet you
 - d) She wanted to see how you could handle it
 - e) She was being nice to you
 - f) She was being mean to you
 - g) She just wanted to (it wasn't about you)
 - h) It was an accident (she didn't mean to do it)
3. If this happened to you, how would you feel? (1 = not at all to 5 = very much)
 - e) Worried or nervous
 - f) Angry or mad
 - g) Sad or down
 - h) Happy or excited
4. If this happened to you, how much would your goal be to: (1 = not at all to 5 = very much)
 - g) Just work out the situation
 - h) Try to avoid or ignore the situation
 - i) Show that it's okay/not a big deal
 - j) Try to make yourself feel better
 - k) Show that you're angry or upset
 - l) Just focus on getting along with the teacher
5. If this happened to you, what would you do? Your answer should be what you *WOULD* do, not what you think you *should* do. How much do you think you would: (1 = not at all to 5 = very much)
 - a) Introduce yourself
 - b) Say a few things about yourself
 - c) Pretend you didn't hear the teacher
 - d) Just sit down and don't say anything
 - e) Ask not to do it
 - f) Say you have to go to the bathroom
 - g) Refuse to do it
 - h) Argue with the teacher
 - i) Other: _____
6. Which of these choices would you be most likely to do?
7. How well do you think you could do the response you chose? (1 = not at all to 5 = very much)

Appendix Q

Abbreviations List

Abbreviation	Full Name
AIC	Akaike Information Criterion
ASSIQ	Ambiguous Social Situations Interpretation Questionnaire
BAS	Behavioural Activation System
BDI	Beck Depression Inventory
BI	Behavioral Inhibition
BIC	Bayesian Information Criterion
BIS	Behavioural Inhibition System
CBM	Cognitive Bias Modification
CBT	Cognitive Behavioural Therapy
CCSH	Cognitive Content Specificity Hypothesis
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
ChEESE-Q	Children's Evaluation of Everyday Social Encounters Questionnaire
CRSQ	Children's Rejection Sensitivity Questionnaire
CSPS-3	Child Social Preference Scale-3
CTI-F	Cognitive Triad Inventory-Future
CTI-S	Cognitive Triad Inventory-Self
CTI-W	Cognitive Triad Inventory-World
DAQ	Depressive Attributions Questionnaire
FIML	Full Information Maximum Likelihood
FNE	Fear of Negative Evaluation
LSDQ-Y	Loneliness and Social Dissatisfaction Questionnaire for Young Children
LV	Latent Variable
MCAR	Missing Completely at Random
MLR	Maximum Likelihood with Robust Standard Errors
OCQ	Outcome Cost Questionnaire
OPQ	Outcome Probability Questionnaire
RMSEA	Root Mean Square Error of Approximation
RSQ	Rejection Sensitivity Questionnaire
SAD	Social Anxiety Disorder
SCAS-P	Spence Child Anxiety Scale - Parent version
SDQ	Strengths and Difficulties Questionnaire
SEM	Structural Equation Modeling
SIAS	Social Interaction Anxiety Scale
SIP	Social Information Processing
SPH	Social Phobia Scale
SPS-R	Social Preference Scale Revised
SPS-EA	Social Preference Scale for Emerging Adults
SRMR	Standardized Root Mean Square Residual
TLI	Tucker-Lewis Index
VIF	Variance Inflation Factor