

PERFECTIONISM AND THE COGNITIVE AND AFFECTIVE EXPERIENCE OF  
SOCIAL EXCLUSION

by

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## **Abstract**

Perfectionism is a multidimensional personality variable linked to a variety of maladaptive consequences and developmentally rooted in early interpersonal attachments. This has been hypothesized to predispose perfectionistic individuals to more maladaptive outcomes in response to being socially excluded. The current project reviews extant literature on the Comprehensive Model of Perfectionism described by Paul Hewitt, Gordon Flett, and colleagues, its developmental antecedents, and a review of specific vulnerability, diathesis-stress and perfectionism social disconnection models that explain perfectionistic vulnerability to stress, including social exclusion. Hypotheses regarding a moderating effect of perfectionism on cognitive and affective reactions to social exclusion were generated based on the aforementioned models. Using two undergraduate student samples, we exposed participants to a laboratory-based social exclusion experience (Cyberball) under controlled circumstances and performed a comprehensive pre- and post-task assessment of their affective and cognitive experience using a combination of explicit and implicit measures. Results indicated that concern over mistakes, perfectionistic cognitions, perfectionistic self-promotion, and nondisplay of imperfection dimensions of perfectionism were the strongest moderators of the experience of social exclusion in that individuals high on these dimensions experienced amplified post-Cyberball shame, anger, rejection, and self-critical affect and increased negative self-related thoughts, and decreased interdependence. Nondisclosure of imperfection in contrast predicted reduced rejected affect in response to social inclusion. Results are discussed in the context of extant literature in perfectionism and social exclusion domains, and in light of diathesis-stress literature and the Perfectionism Social Disconnection Model, as well as the hypothesized interpersonal underpinnings of perfectionistic behaviour.

## **Preface**

This dissertation is an original intellectual product of the author, J. Blasberg. The behavioural experiments described herein were reviewed by the UBC Behavioural Research Ethics Board under the project title Perfectionism and Social Exclusion, certificate H12-00987.

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(in order of appearance)

*Ad Astra Per Aspera*



## Introduction

Next to food, water, and shelter, the need to belong and be accepted by others is one of the most fundamental of human needs such that, when thwarted, it leads to serious physical and psychological consequences (Baumeister & Leary, 1995; Van Orden et al., 2010). Evolutionary theory suggests that social exclusion in early human social groups was akin to a death sentence due the dangers from predators and an inability to reliably obtain food and, as a result, we are biologically programmed to develop and maintain meaningful connections with others (Leary, Koch & Hechenbleikner, 2001). When our attempts to obtain acceptance and inclusion from others fail, it tends to be a highly distressing experience. Indeed, the top reported life stressors are often interpersonal, with the top three typically being loss of a relationship through death, divorce or separation (Holmes & Rahe, 1967). Furthermore, the post-loss risk of depression is especially significant if we are not the initiators of the end of the relationship (Slavich, O'Donovan, Epel & Kemeny, 2010).

Most people encounter rejection at some point in their lives, and while being excluded or rejected can generally be considered a universally unpleasant experience, most individuals who encounter occasional social rejection do not go on to develop serious psychopathology or experience longstanding distress (Wesselmann, Wirth, Mroczek & Williams, 2012). This points to the importance of factors that may confer increased vulnerability to psychological distress in the face of interpersonal rejection. Perfectionism, a neurotic personality style that includes trait dimensions, self-presentational facets, and cognitive elements, may be one such factor that has been shown to both generate and interact with different types of stressors, including social stress, to produce psychopathology (see Hewitt & Flett, 2002). In fact, much is known about the links between stress and perfectionism in the onset of psychological problems, especially in disordered eating (e.g., Cain, Bardone-Cone, Abramson, Vohs & Joiner, 2008) and depression (e.g., Enns &

Cox, 2005; Flett, Hewitt, Blankstein & O'Brien, 1991; Hewitt & Flett, 1993). In addition, perfectionism is thought to be underpinned by largely interpersonal processes that generate feelings of alienation and disconnection from others (Hewitt, Sherry, Flett & Caelian, 2006; Hewitt, Flett & Mikail, in press; see also Hamachek, 1978; Hollender, 1965; Missildine, 1963; Pacht, 1984), making social rejection a particularly relevant type of stressor.

While the literature abounds with research supporting the links between perfectionism and maladaptive outcomes (see Flett & Hewitt, 2002 for a review), much less is known about the internal experience of perfectionists when they face social rejection. Specifically, what kinds of thoughts and feelings occur after social rejection for perfectionists compared to the average person, and at what level of intensity. A deeper understanding of the experience of social rejection, especially for those most sensitive to it, would provide an excellent foundation for exploring the emotional and cognitive mechanisms that eventually lead to maladaptive behaviours and mental health problems for perfectionists.

The main purpose of this project is to examine the inner experience of perfectionistic individuals in the face of social exclusion. In the first section of the literature review, research will be reviewed that outlines the current understanding and conceptualization of perfectionistic personality and behaviour, some of its known consequences, and its developmental antecedents. In the second section, three theoretical models, the specific vulnerability and diathesis-stress models (Flett, Hewitt, Blankstein & Mosher, 1995; Hewitt, Flett & Ediger, 1996) and the Perfectionism Social Disconnection Model (PSDM; Hewitt et al., 2006, Hewitt, Flett & Mikail, in press) will be reviewed to provide a basis for understanding different ways the perfectionism construct is hypothesized to both generate social stress and interact with situational stressors like rejection and to generate hypotheses for the current experiment. Finally, rationale for further hypotheses will be reviewed by an in-depth exploration of both the general and perfectionism-

specific social exclusion literature. A greater understanding of the perfectionist's response to social exclusion will add to our understanding of perfectionism as a vulnerability factor for psychological distress, and why it has been linked to serious psychological (e.g., Sherry, Law, Hewitt, Flett & Besser, 2008) and physical (e.g., Molnar, Sadava, Flett & Colautti, 2012) difficulties in response to social exclusion.

### **A Brief History of the Conceptualization and Measurement of Perfectionism**

While early conceptualizations of perfectionism were primarily unidimensional in nature reflecting a cognitive need to be perfect (e.g., Burns, 1980; Hollender, 1965), the last twenty-five years of perfectionism research has seen a variety of multidimensional conceptualizations emerge (e.g., Chang, 2006; Frost, Marten, Lahart & Rosenblate, 1990; Hewitt & Flett, 1991a; Slaney, Rice, Mobley, Trippi & Ashby, 2001; see Flett & Hewitt, 2015). Two of the most popular conceptualizations cited in the perfectionism literature are the multidimensional models proposed by Frost and colleagues (1990) and Hewitt and Flett (1991a) respectively. Both maintained that perfectionism is a maladaptive personality style that involves a compulsive striving to be perfect combined with a crippling fear of failure and low tolerance for mistakes (Frost et al., 1990; Hewitt & Flett, 1991a).

Frost and colleagues described perfectionism in terms of its component characteristics, proposing that perfectionism involved high personal standards combined with concern over making mistakes, doubts about one's actions, and a need for organization. Parental criticism and expectations were also considered important interpersonal elements of perfectionism and highlighted the importance of parental relationships in the development of perfectionism. They developed the Multidimensional Perfectionism Scale (Frost et al., 1990) to measure each of these components. The organizational component was later dropped from the conceptualization as it was deemed not to be a core component of perfectionism. Beyond even the setting of personal

standards, it was the anxious overconcern about making mistakes that Frost and his colleagues considered central to the conceptualization of perfectionism (Frost et al., 1990).

Hewitt and Flett (1991a) initially described three trait dimensions of perfectionism that varied in terms of the target of the perfectionistic behaviour. They also developed their own scale, named identically to Frost's (1990) scale, to measure these dimensions. Self-oriented perfectionism (SOP) involves striving for self-perfection; other-oriented perfectionism (OOP) involves making perfectionistic demands of others; and socially-prescribed perfectionism (SPP) involves the perception of unrealistic expectations coming from significant others and society in general. These trait aspects of perfectionism have been shown to be differentially related to psychopathology, dysfunction, and personal distress (Flett, Besser & Hewitt, 2014; Flett & Hewitt, 2014; Hewitt & Flett, 1991a; Hewitt, Flett & Ediger, 1996; Hewitt et al., 2003; Shanmugasagaram et al., 2014; Stoeber, 2014). Both Frost's and Hewitt and Flett's initial models of perfectionism reflected both intrapersonal and interpersonal aspects of the perfectionism construct.

Others have proposed somewhat simpler models of perfectionism by either limiting the concept of "clinical" perfectionism to an overdependence on goal pursuit for personal well-being (Shafran, Cooper & Fairburn, 2002), or by dividing the construct into two basic parts: a positive striving for excellence or setting of high standards component and a negative component that reflects an inner awareness of and/or negative reaction to the possibility of imperfection (e.g. Slade & Owens, 1998; Slaney et al., 2001; also see Stoeber & Otto, 2006). These models have been criticized for confusing perfectionism with striving for excellence, which is considered by many to be a fundamentally different concept (Flett & Hewitt, 2006; Greenspon, 2000; Pacht, 1984), but also for the omission of the interpersonal aspects of perfectionism (Ayearst, Flett & Hewitt, 2012; Hewitt, Flett, Besser, Sherry & McGee, 2003).

Although most of these models capture at least some aspect of the anxious overconcern about failure and compulsive striving aspects of perfectionism, with the exception of Frost's and Hewitt's models the interpersonal aspect of perfectionism is largely absent from most modern conceptualizations of perfectionism (Enns & Cox, 2002; Flett & Hewitt, 2015). This is not in keeping with many, if not most, of the theoretical writers who have described perfectionism as being underpinned by a need to obtain and maintain the love and approval of others (Greenspon, 2000; Hamachek, 1978; Horney, 1950; Hollender, 1965; Missildine, 1963; Pacht, 1984). The two exceptions to this absence are the Comprehensive Model of Perfectionistic Behaviour (CMPB) proposed by Hewitt and colleagues (1991a; 1998; 2003; see also Hewitt, Flett & Mikail, in press) and the parental demands and criticism components of Frost and colleagues' (1990) model. In Frost's conceptualization however, the interpersonal aspect is largely limited to only the parental relationships in an individual's life. Although the other models of perfectionism and the research conducted with measures derived from these conceptualizations have largely aided in understanding the nature of the perfectionistic personality, conceptual problems have been identified with these measures that suggest problematic overlap with other, non-perfectionism constructs, such as achievement striving and conscientiousness (Blasberg et al., in press; see also Greenspon, 2000).

In contrast, the model proposed by Hewitt and colleagues (1991a; 1998; 2003; and in press) appears distinct from conscientiousness (Fry & Debats, 2009; O'Connor & O'Connor, 2004) and provides a conceptualization of perfectionism that fully integrates both intrapersonal and interpersonal elements at trait, interpersonal and intrapersonal levels of expression. In this sense, the CMPB is the best choice for exploring the effects of perfectionism on social exclusion and thus is the model of perfectionism we have chosen to focus on in the current project.

## **The Comprehensive Model of Perfectionistic Behaviour**

The origins of the CMPB can be traced to the description of a multidimensional trait model of perfectionistic behaviour (Hewitt & Flett, 1991a), with three unique but intercorrelated traits that energize and predispose individuals towards various aspects of perfectionistic behaviour. Later, the model was expanded to include the expression of these traits (see Buss & Finn, 1987), at both interpersonal and intrapersonal levels. A description of the traits and their expression follows along with research supporting their links to distress and psychopathology.

**Self-oriented perfectionism.** Self-oriented perfectionism, which describes a compulsive need for the self to be perfect, has occasionally and unfortunately been misconstrued as a positive personality variable (e.g., Davis, 1997; Klibert, Langhinrichsen-Rohling & Saito, 2005). However, strong evidence suggests it is better thought of as a vulnerability factor in the onset of unipolar depression (Enns, Cox, & Clara, 2005; Flett, Hewitt, Blankstein & Mosher, 1995; Hewitt & Flett, 1991b; Hewitt & Flett, 1993; Hewitt, Flett & Ediger, 1996), anorexia nervosa (Bastiani, Rao, Weltzin & Kaye, 1995), and other disordered eating behaviours (Bardone-Cone, 2007). Further, it is related to anxiety and worry (Blankstein & Lumley, 2008; Flett, Hewitt, Endler & Tassone, 1995; Mor, Day, Flett & Hewitt, 1995; Stoeber, Feast & Hayward, 2009; Stoeber, Schneider, Hussain & Matthews, 2014), suicidal ideation (Hewitt, Flett & Weber, 1994) and even early death (Fry & DeBats, 2009).

One of the possible reasons for the confusion is that research into the inner emotional experience of self-oriented perfectionists is somewhat conflicting and inconsistent. Supporting a model of perfectionism as being primarily maladaptive, at least two studies have shown negative associations with positive affect, and positive associations with negative affect (Kobori & Tanno, 2005; Saboonchi & Lundh, 2003). Other studies have shown associations with specific negative emotions such as guilt, self-disappointment and anger (Hewitt & Flett, 1991a; Saboonchi &

Lundh, 2003). However, some studies have found associations between self-oriented perfectionism and positive affect (e. g., Frost, Heimberg, Holt, Mattia & Neubauer, 1993; Molnar, Reker, Culp, Sadava & DeCourville, 2006).

This inconsistency may point to the importance of contextual factors in understanding the emotional lives of self-oriented perfectionists. Diathesis-stress research suggests the emotional tone of individuals high on self-oriented perfectionism is dependent on whether or not they feel they are meeting their stringent performance standards. This is supported by findings of a positive association between self-oriented perfectionism and negative emotionality after failure or when receiving negative feedback (Besser, Hewitt & Flett, 2004; Besser, Hewitt, Flett & Guez, 2008; Hewitt, Mittlestaedt & Wollert, 1989; Roberts & Lovett, 1994; Stoeber, Kempe & Keogh, 2008; Stoeber, Schneider, Hussain & Matthews, 2014).

The general cognitive experience of self-oriented perfectionism is one marked by irrational self-expectations (Hewitt, Flett, Blankstein & Koledin, 1991; Roberts & Lovett, 1994), rumination over past mistakes (Blankstein & Lumley, 2008; Flett, Madorsky, Hewitt & Heisel, 2002), automatic thoughts about being perfect and heightened processing of perfectionistic information (Flett, Hewitt, Blankstein & Gray, 1998; Hewitt & Genest, 1990). Self-oriented perfectionists tend to be highly self-critical (Gilbert, Durant & McEwan, 2006; Hewitt & Flett, 1991a; Powers, Milyavskaya & Koestner, 2012), engage in maladaptive self-blaming (Rudolph, Flett & Hewitt, 2007), and are vulnerable to negative cognitive reactions following failure feedback (Besser, Hewitt Flett, 2004; Hill, Hall, Duda & Appleton, 2011).

Even though self-oriented perfectionism can be considered a largely intrapersonal dimension of perfectionism, Hewitt and colleagues (in press) assert it is underpinned by relational concerns. Evidence suggests that self-oriented perfectionists are concerned about their relationships and obtaining approval from others. For example, Hewitt and Flett (1991a) noted

that self-oriented perfectionism is related to increased interpersonal sensitivity (i.e., an excessive awareness of the behaviour and feelings of others and a preoccupation with relationships; Boyce & Parker, 1989) and a tendency to value the importance of living up to other's standards and goals. Reis and Grenyer (2002) found self-oriented perfectionists tend to view relationships as fundamentally unstable and untrustworthy. Self-oriented perfectionism has also been associated with a high need for approval (Hill et al., 2004).

In addition, self-oriented perfectionism is also related to interpersonal difficulties, with reported associations with narcissism and entitlement, paranoia, and hostility (Hewitt & Flett, 1991a) and with high levels of competitiveness (Flett, Hewitt, Blankstein & Dynin, 1994). Two studies have shown that, for men especially, self-oriented perfectionism is associated with an arrogant, vindictive and domineering interpersonal style; for women, it is more likely related to interpersonal problems involving being overly nurturant and agreeable (Habke & Flynn, 2002; Hill, Zrull & Turlington, 1997).

**Socially prescribed perfectionism.** Socially prescribed perfectionism involves the perception, veridical or not, that others hold perfectionistic expectations for one's self. This dimension of perfectionism has also been associated with psychopathology including unipolar depression and suicidal ideation (Blankstein, Lumley & Crawford, 2007; Hewitt & Flett, 1991a; 1991b; Hewitt, Flett & Weber, 1994; Hunter & O'Connor, 2003) and attempts (Hewitt, Norton, Flett, Callander & Cowan, 1998) as well as generalized and specific forms of anxiety (Alden, Bieling & Wallace, 1994; Flett, Hewitt, Endler & Tassone, 1995; Hewitt & Flett, 1991a; Laurenti, Bruch & Haase, 2008; Mor, Day, Flett & Hewitt, 1995; Stoeber, Feast, & Hayward, 2009) and disordered eating symptoms (Bardone-Cone, 2007; Hewitt, Flett & Ediger, 1995; Sherry & Hall, 2009; Tissot & Crowther, 2008).



The emotional experience of socially prescribed perfectionists is one that is consistently marked by low mood and negative affect (Frost et al., 1993; Hewitt & Flett, 1991a). Presumably, their inability to live up to the exacting standards they perceive as coming from others leads to frequent feelings of shame (Tangney, 2002), hopelessness (Dean & Range, 1996; Hewitt, Flett & Weber, 1994; See also Flett, Hewitt & Heisel, 2014), and anger (Hewitt & Flett, 1991a; Hewitt et al., 2002; Stoeber, Schneider, Hussain, & Matthews, 2014). In addition, socially prescribed perfectionists feel disconnected from others, as evidenced by increased reports of loneliness, social hopelessness and lower levels of perceived social support (Flett, Hewitt & De Rosa, 1996; Roxborough, Hewitt, Kaldas, Flett, Caelian, Sherry & Sherry, 2012; Sherry, Law, Hewitt, Flett & Besser, 2008).

The thoughts and beliefs of socially prescribed perfectionists demonstrate maladaptive patterns that are also likely contribute to maladjustment. Socially prescribed perfectionists are prone to dysfunctional thinking strategies (Flett, Russo & Hewitt, 1994; Hunter & O'Connor, 2003; Rudolph, Flett & Hewitt, 2007) and rumination (Blankstein & Lumley, 2008; Flett, Madorsky, Hewitt & Heisel, 2002; O'Connor, O'Connor & Marshall, 2007; Olson & Kwon, 2008; Randles, Flett, Nash & Hewitt, 2010). Like self-oriented perfectionists, they tend to engage in all-or-nothing thinking where only perfect performance is viewed as a success and anything less than perfection is seen as abject failure. However, they also tend to place an irrational amount of importance on obtaining the approval of others (Besser, Flett & Hewitt, 2010b; Flett, Hewitt, Blankstein & Koledin, 1991; Hill et al., 2004).

Not surprisingly, the perception that one is being held to unrealistic expectations is associated with interpersonal discord including disharmony in romantic relationships and sexual dissatisfaction (Dimitrovssky, Levy-Schiff & Schattner-Zanany, 2002; Habke, Hewitt & Flett, 1999; Haring, Hewitt & Flett, 2003; Hewitt, Flett & Mikail, 1995; Sherry, Sherry, et al., 2014).

Socially prescribed perfectionists tend to be angry and hostile (Hewitt & Flett, 1991a), and have a cold and isolating interpersonal style that is associated with a wide variety of interpersonal problems, especially for women (Habke & Flynn, 2002; Hill, Zrull & Turlington, 1997). Further complicating their ability to cope in their interpersonal lives, socially prescribed perfectionists feel less equipped to deal with interpersonal problems when they arise and tend to feel less socially competent than others (Alden, Bieling & Wallace, 1994; Besser, Flett & Hewitt, 2010a; Flett, Hewitt, Blankstein, Solnik & Van Brunschot, 1996; Flett, Hewitt & De Rosa, 1996).

**Other-oriented perfectionism.** Other-oriented perfectionism involves holding unrealistic expectations for others. It appears to be less related to personal psychopathology than self-oriented or socially prescribed perfectionism, and even seems to act as a protective factor in some cases (Blankstein, Lumley & Crawford, 2007; Childs & Stoeber, 2010; O'Connor & O'Connor, 2003). This may be due to the external focus of perfectionism away from the self and towards others. However, other-oriented perfectionism has predicted anxious symptoms in college students, especially in conjunction with the experience of loneliness (Chang, Sanna, Chang & Bodem, 2008). Flett, Besser & Hewitt (2005) also showed that peer and self-report measures of other-oriented perfectionism predicted peer-reports of depressive symptoms. Finally, a significant correlation was noted between other-oriented perfectionism and the drug abuse subscale of the MCMI (Hewitt & Flett, 1991a).

Male and female other-oriented perfectionists have been described as having an arrogant, dominant and vindictive interpersonal style (Habke & Flynn, 2002; Hill, Zrull & Turlington, 1997). With a focus on making extreme demands of others and correlations with measures of narcissism, dominance and authoritarianism (Hewitt & Flett, 1991a; Stoeber, 2014; Stoeber, 2015), evidence of relationship problems among other-oriented perfectionists is well established (Habke, Hewitt & Flett, 1999; Hewitt, Flett & Mikhail, 1995; Mitchelson & Burns, 1998).

Much less is known about the presumed internal experience of other-oriented perfectionists compared to self-oriented and socially prescribed perfectionists. However, their authoritarian and dominant interpersonal style (Hewitt & Flett, 1991a; Habke & Flynn, 2002) would suggest anger may be one commonly experienced emotion. In contrast, one early study showed that other-oriented perfectionism was associated with increased positive affect (Frost, et al., 1993) and this was also found in university students after completing a classroom test (Flett, Blankstein & Hewitt, 2009). In addition, although links with rumination (Flett, Madorsky et al., 2002) and irrational fears (Blankstein, Flett, Hewitt & Eng, 1993) have been tested no significant relationships were found. It may be that the external focus of other-oriented perfectionism away from the self is unrelated to any particular type of cognitive or affective experience, especially when the self is threatened socially.

**Beyond trait perfectionism: self-presentation and automatic thoughts.** Since first proposing their multidimensional model of perfectionism, Hewitt and colleagues have expanded it to include self-presentational aspects (Hewitt et al., 2003), and automatic perfectionistic thoughts (Flett, Hewitt, Blankstein & Gray, 1998). In contrast to the trait dimensions, the self-presentational facets of perfectionism involve a need to *appear* perfect rather than be perfect and represents the interpersonal expression of perfectionism. In other words, whereas the traits can be thought of as internal motivators that drive and guide perfectionistic behaviour, perfectionistic self-presentation deals with the *interpersonal expression* of perfectionistic personality. In contrast, the experience of automatic thoughts relating to a need to be perfect is the *intrapersonal expression* of perfectionism, an indicator of the relationship that perfectionists have with themselves, expressed in automatic critical self-talk and self-admonitions to be perfect.

***The interpersonal expression of perfectionism.*** With regard to the specific elements of perfectionistic self-presentation, the first facet, perfectionistic self-promotion, involves the active

promotion of an image of perfection to others. The other two facets, nondisplay of imperfection and nondisclosure of imperfection, involve a tendency to avoid public displays or verbal admissions of flaws or mistakes, respectively. These facets, particularly nondisplay of imperfection, provide unique information in the prediction of psychopathology and well-being over and above what is provided by the traits (Hewitt et al., 2003). The self-presentational facets are related to disordered eating (Bardone-Cone, Sturm, Lawson, Robinson & Smith, 2010; Hewitt, Flett & Ediger, 1995; McGee, Hewitt, Sherry, Parkin & Flett, 2005), deficits in social problem solving ability (Besser, Flett & Hewitt, 2010a), and personality pathology with nondisclosure of imperfections, perfectionistic self-promotion, and nondisplay of imperfections related to DSM-IV-TR (American Psychiatric Association, 2000) cluster A, B, and C personality disorders respectively (Sherry, Hewitt, Flett, Lee-Baggely & Hall, 2007). They can also cause difficulties for those seeking psychological treatment. For example, individuals with a strong tendency to avoid disclosing personal imperfections (i.e. high on the nondisclosure facet) find interpersonal situations that require personal disclosure threatening, which may make cultivating therapeutic relationships difficult (Hewitt, Habke, Lee-Baggely, Sherry & Flett, 2008).

***The intrapersonal expression of perfectionism.*** The cognitive component of perfectionism involves information processing components that are reflected in the tendency to experience automatic thoughts involving perfectionistic themes (Flett, Hewitt, Blankstein & Gray, 1998). This is supported by evidence of an ideal self-schema that aids in the processing of perfectionistic content (Besser, Flett, Guez & Hewitt, 2008; Hewitt & Genest, 1990). Not only do individuals demonstrate differences in the perfectionism traits and the public expression of their perfection, they differ in the cognitive salience of their perfectionistic needs and the frequency with which they experience thoughts with perfectionistic content.

This can be illustrated by one study of perfectionistic cognitions in relation to negative and positive performance feedback (Besser, Flett, Hewitt, & Guez, 2008). Besser and colleagues had participants perform a reaction time test at varying levels of difficulty, and provided participants with randomly selected positive or negative performance feedback. They found that perfectionistic cognitions were not associated with any trait dimensions of perfectionism in the low difficulty, positive feedback condition. However, perfectionistic cognitions were moderately to strongly correlated with both socially prescribed and self-oriented perfectionism in the high difficulty, positive feedback condition, as well as under all negative feedback conditions, regardless of difficulty. This suggests that for both self-oriented and socially prescribed perfectionists, automatic perfectionistic cognitions tend to arise in response to either challenging situations, or situations where it is made salient that one's performance is not perfect. The study also found that this is likely to be a profoundly negative cognitive experience, with demonstrated links between perfectionistic cognitions and negative automatic thoughts, low state self-esteem (especially social self-esteem), dysphoria, anger, and anxiety (Besser, Flett, Hewitt & Guez, 2008).

This cognitive aspect of perfectionism is also uniquely predictive of psychopathology. For example, perfectionistic cognitions are uniquely predictive of depressive symptoms after controlling for perfectionism traits and neuroticism (Flett et al., 1998; Flett, Hewitt, Whelan & Martin, 2007). Similar results were found controlling for a general ruminative orientation (Flett, Madorsky, Hewitt & Heisel, 2002). This fits with early conceptualizations of depression as associated with maladaptive thinking (Burns & Beck, 1978). Perfectionistic cognitions have also been linked with obsessive compulsive symptoms (Frost, Novara & Rheaume, 2002), a tendency to suppress anger (Ferrari, 1995), anxiety sensitivity (Flett, Greene & Hewitt, 2004), bulimic thoughts (Flett, Newby, Hewitt & Persaud, 2011) and eating disturbances (Downey, Reinking,

Gibson, Cloud & Chang, 2014). Furthermore, individuals who experience high levels of perfectionistic cognitions tend to have difficulties with cognitive inflexibility, self-blaming, and experience a paucity of positive self-talk (Flett, Hewitt, Whelan & Martin, 2007). They also appear to have achievement-related problems with evidence associating perfectionistic thoughts with feelings of imposterism (Ferrari & Thompson, 2006) and burnout (Hill & Appleton, 2011).

Although there is considerable research to suggest that the traits, self-presentational facets, and cognitive components are unique aspects of perfectionism (e.g., Flett et al., 1998; Hewitt & Flett, 1991a; Hewitt et al., 2003), including recent large-scale factor analytic findings (Hewitt et al., in press), the Comprehensive Model of Perfectionistic Behaviour described by Hewitt and colleagues can be thought of as capturing a wholistic perfectionistic personality configuration as it is expressed at different experiential levels: at a trait-motivational level that organizes, drives, and shapes an individual's perfectionistic behaviour, at an interpersonal level in relationships with others (i.e., perfectionistic self-presentation), and at a cognitive level expressed in automatic thoughts and concerns about achieving perfection. The trait dimensions are often found to be moderately intercorrelated (with  $r$ 's typically in the .25 to .40 range; Hewitt & Flett, 1991a) and are also unsurprisingly correlated with the self-presentational facets and automatic cognitions (Flett, Hewitt, Blankstein & Gray, 1998; Hewitt et al., 2003). In keeping with Allport's (1931) assertion that personality can be examined in terms of both unique and universal aspects, it can be useful to consider each perfectionism dimension in isolation for research purposes (i.e., their universal aspect), but when considering the clinical and personal impact of perfectionism it is also helpful to remember that individuals are likely to express varying constellations of the trait dimensions, cognitions and self-presentational facets (i.e., their unique aspect). In other words, while some individuals may score highly on one particular trait dimension or self-presentational facet (e.g., self-oriented perfectionism, or nondisclosure of

imperfection), some may score highly on all dimensions. Others may only score highly on the self-presentational facets, signifying an individual who is solely concerned with *appearing* perfect rather than being perfect per se.

In summary, perfectionism is understood to be a multidimensional personality variable with links to a variety of negative psychological outcomes and both intrapersonal and interpersonal consequences. However, although there is a good deal of literature to support the maladaptiveness of perfectionism and its links to poor psychological outcomes, the actual internal experience of perfectionists when they encounter rejection remains obscure. An exploration into how perfectionism is thought to develop can provide understanding as to what drives perfectionistic behaviour and ultimately provide some direction in terms of predicting what role the trait dimensions and self-presentational facets of perfectionism might play in the experience of social exclusion.

### **The Development of Perfectionism**

**Theoretical underpinnings of the development of perfectionism.** One of the reasons social exclusion is thought to be particularly aversive for perfectionists is due to the interpersonal context in which perfectionism develops. Theorists have suggested that perfectionism, like many other personality traits, develops early on in childhood and has multiple hypothesized causal pathways (Flett, Hewitt, Oliver & Macdonald, 2002; Hewitt et al., in press). Both early and modern theorists and researchers have suggested that early interpersonal relationships are key to the development of perfectionism (Barrow & Moore, 1983; Flett et al., 2002; Greenspon, 2000; 2008; Hewitt et al., in press; Hollender, 1965; Horney, 1950; Missildine, 1963; Pacht, 1984).

Many theorists have written about how perfectionistic behaviour arises out of a deep-seated need for acceptance and approval from others and an overwhelming sense of isolation and loneliness. Horney was one early theorist who suggested that perfectionism developed out of an

underlying anxiety which, as she described, left one feeling “lonely and helpless in a hostile world.” (Horney, 1937, p. 89). For Horney, perfectionism, characterized by a need to exercise absolute control in one’s external life and the experience of what she coined the “tyranny of shoulds”, or highly critical internal dialogue, were means of escaping powerful feelings of aloneness and anxiety. Adler (1956) also spoke of striving for perfection as stemming from underlying feelings of inferiority.

The neurotic anxiety that Horney spoke of is thought to arise from an early deprivation of the safety of a warm and loving relationship with a caregiver. Hamachek (1978) wrote that perfectionism is a response to early relationships characterized by nonexistent, inconsistent, or contingent love and approval. For Hamachek, perfectionistic behaviour was “not only a way of avoiding disapproval, but is an active striving for self-other acceptance through super human effort and grandiose achievements.” (p. 29). Hollender (1965) noted that the parent of a perfectionistic child is one whose approval is an all-or-nothing affair, either approval or rejection, whereas Missildine (1963) noted an environment of continued (albeit often subtle) belittlement of the child’s performance that eventually leads to the perfectionist’s tendency to belittle and devalue their own performance.

Later theorists have also suggested that perfectionism is an attempt to gain acceptance and belonging from important others (e.g., Blatt, 1995, Flett et al., 2002; Pacht, 1984). This is underpinned and supported by Baumeister and Leary’s (1995) seminal work that described the need to belong and be accepted by others as a fundamental human need, and that failure to fulfill this need leads to psychological distress. Pacht (1984) wrote that being perfect is seen as a prerequisite for success and acceptance, and that, in his clinical experience, the prototypical perfectionist is, even in adulthood, attempting to gain the acceptance and love of his or her parents. Greenspon (1998; 2000; 2008; 2014) echoed early theorists by describing perfectionism



as an interpersonal phenomenon that arises during childhood in an environment where parental approval and love is contingent upon perfect performance. In this way, children learn that in order to be loved and accepted they must either be perfect or perform perfectly, and thus they become preoccupied with the pursuit of perfection in the quest to feel like they belong. Frost and colleagues also suggested parental expectations and parental criticism were not only related to the development of perfectionism but were key components of perfectionism itself (Frost et al., 1990).

In an alternate conceptualization of the perfectionism construct, Sorotzkin (1985) contrasted neurotic perfectionism, defined as a compulsive striving for perfection as a defense against anxiety and internal conflict, with narcissistic perfectionism, which he described as perfectionistic behaviour that acted to stabilize a fragile or underdeveloped sense of self by securing the love and approval of important others. Sorotzkin (1998) also described the importance of parental influence in the etiology of perfectionism, citing, like others, harsh and non-approving or conditionally approving parents in addition to suggesting that children may also develop a need for perfect control of their emotions in response to parents who are unresponsive or overly critical to the child's expression of negative emotions.

Flett, Hewitt, Oliver and Macdonald (2002) summarized and reviewed the literature in their chapter on the development of perfectionism and presented evidence of four developmental pathways of perfectionism. First, the social learning model suggests that some may learn perfectionistic behaviour by observing and learning from the perfectionistic tendencies of others. This is conceptually similar to the second model, the anxious rearing model, which suggests that perfectionism may develop in response to parents who are overly concerned with making mistakes, cueing the child to overemphasize the importance of and consequence of making mistakes in their own lives. Third, the social reaction model describes a pathway to

perfectionistic behaviour as a result of a harsh childhood environment of abuse and insecurity.

Finally, the social expectations model, which suggests that perfectionism develops in the presence of contingent approval and love based on meeting a parent's overly demanding expectations (Flett et al., 2002). Hewitt and colleagues (in press) add that parents who have idolized their children or treated them as if they were perfect and/or reward them for perfect performance may be other pathways for perfectionism to develop. All of these theories point to the importance of early interpersonal relationships in the development of perfectionism.

Neumeister, Williams and Cross (2009) interviewed a selection of gifted students with perfectionistic tendencies and found anecdotal evidence supporting all of the developmental models of perfectionism described by Flett and colleagues (2002), particularly the social expectations, social reactions, and social learning models.

Hewitt and colleagues (in press) have recently put forward an updated model of the development of perfectionistic behaviour that places the seed of perfectionism in the models of the self and others that young children develop as a result of a lack of attunement between themselves and their caregivers. This shifts the focus from the parenting environment, which was a prominent focus of Flett and colleagues (2002) model, to the internal experience of the child and the beliefs about the world and one's self that arise as a result of their experiences. In short, Hewitt and colleagues (in press) posit that perfectionism develops in early childhood out of an asynchrony between the support, soothing, and security needs of the child and the capability or willingness of parental figures to meet those needs. This contributes to the development of a sense of self as flawed and unworthy of love, along with the chronic experience of aversive affects (e.g., shame, anger, anxiety, loneliness) that accompany unmet relational and soothing needs and the anticipation of those needs remaining unmet in the foreseeable future. It also fosters the development of a conceptualization of relationships as inherently unstable, and of

significant others as either indifferent and unavailable or hypercritical and demanding. While the powerful negative affect these children experience is often met with defensive numbing, in times of stress the individual is overwhelmed with these preexisting feelings of shame and anxiety stemming from early attachment failures. The need to fill the void and soothe the powerful affect that was left by these unmet early attachment needs is expressed as a need for validation, love and acceptance from others, and the compulsive drive to repair the damaged sense of self through attaining (or projecting an image of) perfection is seen as the means for obtaining this love. Unfortunately, given our understanding of perfectionists' experiences according to the Perfectionism Social Disconnection Model (Hewitt et al., 2006; Hewitt et al., in press), perfectionistic behaviour instead generates actual and perceived disconnection that are precisely the opposite of what is so deeply desired.

Studies examining the link between parenting styles, including parental perfectionism, have supported early relationships as an important factor in the development of perfectionism. Flett, Hewitt and Singer (1995) found that for men, an authoritarian parenting style was associated with increased levels of socially-prescribed perfectionism. This did not hold for women, but they did find an association for women between self-oriented perfectionism and authoritativeness in either parent. This suggests that the child's gender is important in considering what contributes to the development of perfectionism.

Evidence suggests that the match between parent and child gender is also important. Frost, Lahart & Rosenblate (1991) examined perfectionism in a sample of young women and their parents and found that parental harshness, assessed both by daughters' and by parents' self-report, predicted many of Frost's perfectionism dimensions. In their study the perception of harshness (i.e., daughters' reports) seemed to be more predictive of daughters' perfectionism than parental self-report. Objective measures of harshness were not included. Parental

perfectionism, especially mother's perfectionism, was correlated with daughter's overall perfectionism ratings. Together the combination of mother's harshness and perfectionistic tendencies explained 30% of the variance in daughters' overall perfectionism scores.

More recently, Chang (2000) and Vieth and Trull (1999) found similar results to Frost and colleagues (1991) findings that correlations between parents' and children's levels of self-oriented perfectionism were only significant for the same-sex parent. However, an experimental manipulation of parenting behaviours on a copy task found that perfectionistic rearing significantly increased self-oriented perfectionism in children regardless of gender (Mitchell, Broeren, Newall & Hudson, 2013) and a correlational study found significant associations only between maternal self-oriented and socially-prescribed perfectionism and self-oriented perfectionism in sons, but not daughters (Cook & Kearney, 2009; 2014). The empirical evidence seems to suggest that gender, parental perfectionism, warmth (e.g. harshness) and dominance (authoritarianism) all seem to play a role in the development of perfectionism. At this point however, the evidence remains largely at a descriptive level, and we await an explanatory model of precisely how and why same- or other-sex parents' perfectionism and parenting style fosters the development of perfectionism.

Flett and colleagues (2002) first considered some of the factors that might determine whether the demand for perfection remains externally oriented (as in socially prescribed perfectionism), is internalized (as in self-oriented perfectionism), or is externalized to demands on others (as in other-oriented perfectionism). Factors they considered included how open the child is to parental and societal influence, whether the child perceives a possibility of actually attaining perfection in some way, and whether there is exposure to a self-oriented perfectionist role model to learn from, all of which are thought lead to the internalization of perfectionistic tendencies as self-oriented perfectionism. Some support has been found for the role of the child's

internalization of mother's ideals in the development of self-oriented perfectionism, but not socially prescribed perfectionism (Tong & Lam, 2011) and Damian, Stoeber, Negru and Baban (2013) found evidence that perceived parental expectations predicted increases in socially prescribed perfectionism but not self-oriented perfectionism.

Hewitt and colleagues (in press) suggest that the development of different perfectionism traits and behaviours involves the specific nature of the asynchronous relationship between parent and child. If there is only partial asynchrony, in that the child's needs are met sometimes but not others, this is a setting condition for self-oriented or socially-prescribed perfectionism. Given young children's tendency to view the world through an egocentric lens, the intermittent lack of responsiveness on behalf of the parent is interpreted as wrongdoing or a failure on behalf of the child, while resumption of responsiveness is associated with having done right or behaved appropriately. Love, approval and attention are internalized as conditional, which motivates the child towards perfection as a way to stabilize their inconsistent relational needs (i.e., "if I am perfect I will always be loved"). For self-oriented perfectionists, this eventually becomes internalized as a part of their working model for self-acceptance, in that any failures to live up to their exacting standards are met with harsh self-recriminations and self-directed negative affect. For socially prescribed perfectionists, these pressures are thought to remain external. Other-oriented perfectionism instead is thought to develop from a more or less consistent experience of others as unwilling or incapable of providing basic relational needs. Being hypercritical, demanding and controlling of others is seen as a way to manage the underlying sense that others cannot be relied upon and the hurt that stems from their early experience with unavailable caregivers. Although other-oriented perfectionism involves a defensive focus on perfecting others and projecting a narcissistic sense of positive self-regard, these individuals still tend to suffer from the same internal frailties as self-oriented and socially-prescribed perfectionists

experience, that is a sense of conditional self-acceptance and a sensitivity to rejection by others (Flett et al., 2003; Flett et al., 2014).

From theoretical and empirical findings, perfectionism seems to develop in an interpersonal context where parental love and approval are to be gained only through perfect performance or behaviour. This is congruent with how motives, such as the need to belong, are thought to be expressed and channeled through traits. Winter and colleagues (1998) have theorized and presented evidence on how traits like perfectionism guide behaviour in the channeling and expression of underlying motives. According to Winter's model and the theorized underpinnings of perfectionism, perfectionism can be conceptualized as a channel for the expression of a deep-seated unmet need to belong, be approved of, and be loved.

**Perfectionism and attachment styles.** The internal working models of relationships (attachment styles) held by perfectionists tend to persist into adulthood and supports a conceptualization of perfectionism as underpinned by a continued unmet need to belong. Attachment styles are generalized attitudes and ways of relating to others that are thought to develop out of our earliest interpersonal experiences (Bowlby, 1969). Several conceptualizations of different types of attachment styles exist (Bartholomew & Horowitz, 1991; Bowlby, 1969; Brennan, Clark & Shaver, 1998) but are primarily divided into secure and insecure attachment, with secure attachment indicative of an internal conceptualization of relationships as generally being warm and stable, while insecure attachment suggests a conceptualization of relationships as unstable and potentially hostile. Insecure attachment can further be subdivided into fearful, pre-occupied and dismissive styles, as descriptive indicators of the ways individuals tend to behave in relation to their concept of interpersonal relationships (Bartholomew & Horowitz, 1991). Fearful attachment is expressed by individuals who tend to see relationships with others as threatening and fundamentally unstable. They also see themselves as undeserving of love and

affection. These individuals tend to withdraw from others to avoid the anticipated pain of being hurt or rejected. Individuals who hold a positive view of others but doubt they are worthy of love tend to be pre-occupied with relationships, are eager to please others and often require reassurance from loved ones that their relationships are not in jeopardy. Finally, dismissive individuals hold a negative view of others and relationships but a positive view of themselves. They reject a need for meaningful attachment to others as they do not expect others to be able to provide warmth and love.

Empirical research suggests perfectionists seem to have unhealthy inner working models of relationships (Andersson & Perris, 2000; Boone, 2013; Chen et al., 2012; Chen et al., 2015; Flett et al., 2002; Reis & Grenyer, 2002; Rice, Lopez & Vergara, 2005; Rice & Mirzadeh, 2000; Wei, Heppner, Russell, & Young, 2006; Wei, Mallinckrodt, Russell, & Abraham, 2004). Andersson & Perris (2000) found that a perfectionistic attitude (as measured by the Dysfunctional Attitudes Scale; Weissman & Beck, 1978) was associated with a high need for approval and a preoccupation with relationships. Relationships between the traits and attachment styles have shown conflicting results, Flett and colleagues (2002) found that only socially prescribed perfectionism was associated at all with two attachment measures, whereas Reis and Grenyer (2002) found all three perfectionism traits to be correlated with both fearful and pre-occupied attachment styles. In terms of the self-presentational facets, Chen and colleagues (2012) found both nondisclosure and nondisplay of imperfections to be negatively correlated with secure attachment. Chen and colleagues also found a positive association between nondisclosure and fearful attachment, which exerted an indirect effect on social disconnection through the nondisclosure facet. This supports a connection between interpersonal attachment, perfectionism and vulnerability to social disconnection. Furthermore, Wei and colleagues (2004) found perfectionism acted as an intermediary in the relationship between depression and insecure

attachment and Boone (2013) found similar support for a model predicting binge eating in late adolescents. As mentioned previously, attachment insecurity is thought to be key in the development of perfectionistic behaviour (Hewitt et al., in press), and that different attachment styles are likely to foster different kinds of perfectionistic behaviour.

Overall, perfectionists tend to be pre-occupied with their relationships, have a strong need for approval from others, and see relationships as inherently insecure and unstable. Their underlying needs, attitudes and beliefs about being accepted by others seems to, through their perfectionistic behaviour, lead to difficulties connecting with others (Hewitt et al., in press). A final study which illustrates support for the pathways from early attachment to perfectionism was recently published by Chen et al. (2015) who tested whether the relationships between pre-occupied attachment and the interpersonal dimensions of perfectionism were mediated by both an unmet need to belong and aversive affect (shame) that reflected a flawed sense of self. With the exception of nondisclosure of imperfection, support was found for both mediational pathways for all of the interpersonal perfectionism dimensions.

**Perfectionism and other personality factors.** In addition to attachment styles, other interpersonal variables may also play a role in how perfectionism develops and how it relates to interpersonal vulnerability. Hollender (1965) identified that children who are already insecure and sensitive are prone to develop perfectionism. In a sample of African American youth, perfectionism was associated with shyness (Herman, Trotter, Reinke & Ialongo, 2011) and Randles, Flett, Nash, McGregor and Hewitt (2010) found that socially prescribed and self-oriented perfectionism were correlated with a measure of behavioural inhibition in adults. Other studies have also found socially prescribed perfectionism to be associated with increased shyness, fear of negative evaluation (Hewitt & Flett, 1991a; Hewitt, Flett & DeRosa, 1996) and rejection sensitivity (Flett, Besser & Hewitt, 2014). There is also evidence to suggest that



interpersonal concerns and a need for approval remain important to self-oriented perfectionists. Just like socially prescribed perfectionists, self-oriented perfectionists endorse the importance of meeting others' standards for performance and are especially sensitive to other's criticism (Hewitt & Flett, 1991a; Hill et al., 2004). In an environment where parental approval is contingent on performance, interpersonal insecurity and sensitivity is likely to further strengthen the need for acceptance and belonging (Hollender, 1965).

Although earlier theorists have focused primarily on unmet love and approval needs (e.g., Hamachek, 1978; Pacht, 1984; Greenspon, 2000), perfectionists seem to learn more broadly that they are unworthy of having any of their needs for support and emotional soothing met in the way young children need in order to develop a healthy sense of self (Bowlby, 1988; Sullivan, 1953). This is evident in the working models that perfectionists hold about relationships and in the development of a sense of self as fundamentally flawed and imperfect. Self-oriented and socially prescribed perfectionistic behaviour can be thought of as an attempt to meet unfulfilled belongingness needs. Self-oriented perfectionism is further characterized by an internalization of perfectionistic demands. This unmet need to belong underlying both dimensions is hypothesized to make perfectionists more vulnerable to social rejection stress.

### **Perfectionism and the Experience of Stress**

Modern multidimensional conceptualizations of perfectionism and their attendant measures have been used in the literature to support the idea of perfectionism as a maladaptive personality style that is associated with a broad variety of psychological disorders, dysfunction, and distress as reviewed above. Several mechanisms have been proposed to explain the role of stress in the link between perfectionism and psychopathology. In their chapter on perfectionism and stress processes in psychopathology, Hewitt and Flett (2002) provided the first comprehensive outline of how perfectionism and stress are linked. They suggested that

perfectionists spend more time anticipating future stress and ruminating over past stressors, a cognitive style that is likely to both increase the amount of stress experienced and extend the length of time a given stressor is experienced as stressful. They also described two additional processes. One by which existing stress is amplified, known as the stress amplification process, and another by which new stress is created, known as the stress generation process. Both processes are thought to be a direct result of individuals' perfectionistic tendencies and underpin both moderational and mediational models of the development of maladjustment in perfectionists. Hewitt and colleagues (in press) recently updated this model in the context of the Perfectionism Social Disconnection Model (Hewitt et al., 2006; Hewitt et al., in press; described in the following section), suggesting that the generation of interpersonal stress (in the form of objective and subjective social disconnection) is one of the major mechanisms underpinning the significant distress experienced by perfectionists.

**Perfectionism as moderator of distress: specific vulnerability and diathesis-stress.**

Stress is thought to have a multiplicative effect on the relationship between perfectionism and psychopathology in that perfectionism acts as a diathesis in the onset of depressive symptoms (Flett et al., 1995; Hewitt & Flett, 1993; Hewitt & Dyck, 1986; Hewitt, Flett & Ediger, 1996) and thoughts about suicide (Hewitt, Flett & Weber, 1994). Early research on the interaction between life stress and perfectionism using the Burns Perfectionism Scale (Burns, 1980), a brief unidimensional measure of perfectionistic attitudes, found that the relationship between life stress and depression was significant only for individuals scoring above median levels of perfectionism (Hewitt & Dyck, 1986). Another early study by Hewitt, Mittlestaedt & Wollert (1989) found that perfectionism predicted dysphoric mood following perceived failure only on ego-involving tasks. It should be noted that the measure used in these early studies largely tapped content relevant to self-oriented perfectionism only. Once multidimensional conceptualizations

of perfectionism emerged, it was hypothesized that different dimensions of perfectionism might have specific interactive relationships with stressors that were congruent only with the particular domains that were of primary concern to each (see Oatley & Bolton, 1985; Segal, Shaw & Vella, 1989). The Specific Vulnerability Hypothesis (SVH; Hewitt & Flett, 1993) posited that self-oriented perfectionism, with concerns involving the attainment of a perfect self, would only interact with achievement-related stressors to predict depression. In contrast, socially-prescribed perfectionism, being concerned more with maintaining relationships by meeting the perceived demands for perfection from others, would be expected to interact only with interpersonal stressors.

Hewitt and Flett (1993) first tested the specific vulnerability hypothesis in two clinical samples, one was comprised solely of individuals diagnosed with major depression and the other was heterogeneous. They found that in both samples, self-oriented perfectionism interacted only with achievement stress (in the form of daily hassles) to predict depression symptoms. Results with socially prescribed perfectionism were more equivocal, as although socially prescribed perfectionism interacted only with interpersonal stressors in the clinically depressed sample, it interacted only with achievement stressors in the general psychiatric sample. Hewitt, Flett and Ediger (1996) also found some support for the specific vulnerability of self-oriented perfectionism in another clinical sample using a longitudinal design. Self-oriented perfectionism at time one interacted with achievement stress to predict depression at time two four months later. Results for socially prescribed perfectionism did not support specific vulnerability or even diathesis-stress; only a main effect of time one socially prescribed perfectionism predicting time two depression was reported. Enns, Cox and Clara (2005) found similar results in a sample of medical students. In this case, the vulnerability of self-oriented perfectionists to depressive

symptoms in response to achievement stress was strongly supported, but support for a specific vulnerability model for both self and social aspects of perfectionism remained elusive.

Joiner and Schmidt (1995) tested the role of gender in the SVH in a university sample. Assessing socially prescribed and self-oriented perfectionism using items from the perfectionism subscale of the Eating Disorders Inventory (Garner, Olmstead & Polivy, 1983), no support for specific vulnerability was found. However, they did find evidence of a diathesis-stress relationship for male university students such that, after controlling for time one depression, socially prescribed perfectionism interacted with both negative interpersonal and achievement life events to predict depression at time two. Contrary to what would be predicted by a specific vulnerability model, self-oriented perfectionism interacted only with interpersonal events to predict time two depression. In fact, the three-way gender by self-oriented perfectionism by achievement events interaction term was the only nonsignificant term in their analysis. Sherry, Hewitt, Flett and Harvey (2003) also tested for gender differences in the SVH using both psychiatric and university samples. They found that socially prescribed perfectionism interacted with both interpersonal and achievement hassles in female university students to predict depression, and that both interactions were similar in nature in that higher levels of stress strengthened the relationship between socially prescribed perfectionism and depression. Self-oriented perfectionism interacted only with a measure of perceived coping difficulties to predict depression in such that female self-oriented perfectionists who perceived high levels of coping difficulties demonstrated increased depression compared to those who perceived only moderate or low levels of coping difficulties. They concluded, as others have, that the findings were inconsistent with a specific vulnerability model.

Finally, research with adolescents has also found support for diathesis-stress, but not specific vulnerability. Hewitt, Caelian, Flett, Sherry, Collins, and Flynn (2002) tested the specific

vulnerability hypothesis in a sample of early adolescents. Self-oriented perfectionists seemed to be the most vulnerable to depression in the context of any kind of stressor, interacting with social stressors and achievement stressors to increase reported feelings of depression and with social stress to increase anxiety. Socially prescribed perfectionism, in contrast, predicted increased anxiety, depression, and anger, but only as main effects. In more recent research, support for a diathesis-stress relationship for socially prescribed perfectionism in adolescents illustrates the serious implications that stress has for perfectionistic adolescents. Hewitt, Caelian, Chen & Flett (2014) found that socially prescribed perfectionism interacted with daily hassles to predict an additional nine percent of variance in suicide potential after accounting for levels of depression and hopelessness, patient status (in/out), previous suicide attempts, and daily stress as a main effect. This suggests that the interactive relationship between perfectionism and stress provides unique and important information in understanding and assessing adolescent mental health and suicide risk.

In light of the equivocal evidence, one can reasonably conclude that support for the specific vulnerability hypothesis is weak, but support for a general diathesis-stress model is quite strong. Both self-oriented and socially prescribed dimensions of perfectionism are vulnerable to distress and psychopathology in the face of major life events and daily hassles in both interpersonal or achievement domains, in adults and adolescents, across genders, and in community and clinical samples. This suggests both are likely to be vulnerable in the context of social exclusion. This is consistent with previously discussed theory regarding the interpersonal context in which perfectionistic behaviour is thought to develop.

Also of interest in the previous research findings is that socially prescribed perfectionism can predict depression and other negative emotional outcomes as a main effect on its own (e.g., Hewitt, Flett & Ediger, 1996; Hewitt et al., 2002). This suggests that socially prescribed

perfectionism may also act as a generator of stress. Dunkley, Blankstein, Halsall, Williams and Winkworth (2000) found that “evaluative concerns” perfectionism, a combination of interpersonal and anxious attitudinal aspects of perfectionism, not only moderated the response to daily hassles to predict distress, but was indirectly linked to distress mediational through low levels of perceived social support. This fits very well with a newer theory referred to as the Perfectionism Social Disconnection Model (PSDM; Hewitt et al., 2006; Hewitt et al., in press). It represents a significant advancement in the theory linking proposed developmental antecedents of perfectionism and mediating interpersonal components to the link between perfectionism and psychological distress. It can also explain and generate testable hypotheses regarding potential moderating effects of perfectionism in the face of social exclusion that are consistent with the aims of the current research.

**Perfectionism as a generator of distress: the Perfectionism Social Disconnection Model.** The Perfectionism Social Disconnection Model (PSDM) was initially proposed to explain the relationship between socially prescribed perfectionism and suicidal behaviour (Hewitt et al., 2006) but has also served to explain the relationship between socially prescribed perfectionism, interpersonal stressors and depression (Sherry, Law, Hewitt, Flett & Besser, 2008). It has recently been revised and expanded to incorporate all dimensions and aspects of perfectionistic behaviour including perfectionistic self-presentation and automatic perfectionistic cognitions as well as the developmental links to attachment described previously (Chen et al., 2012; Chen et al., 2015; Hewitt et al., in press; Roxborough et al., 2012; Sherry, Mackinnon & Gautreau, 2016) and offers the potential to explain additional psychopathology and dysfunction associated with perfectionism beyond depression and suicide (Mackinnon, Kehayes, Leonard, Fraser & Stewart, 2016; Sherry et al., 2016). The PSDM suggests that perfectionists generate significant levels of social disconnection which then leads to the wide variety of emotional

problems and maladaptive behaviours (including suicide) that have been associated with perfectionism.

The PSDM identifies two overarching mediational pathways from interpersonal components of perfectionism to emotional distress and/or suicidal behaviour: subjective social disconnection and objective social disconnection (See Figure 1). Subjective disconnection, or the internal experience of loneliness and a perceived lack of social support, is thought to arise as a result of perfectionists' tendency to be highly sensitive to cues of interpersonal rejection (Flett, Besser & Hewitt, 2014; Hewitt & Flett, 1991a), meaning they are likely to feel rejected more often and more erroneously than others, and thus feel unsupported and lonely. Objective social disconnection is thought to occur as a result of the interpersonal hostility that perfectionists express in their relationships (Habke & Flynn, 2002; Haring, Hewitt, & Flett, 2003).

Support for the subjective disconnection path of the model (Path A in Figure 1) comes from studies using young adult and adolescent samples (Chen et al., 2012; Dunkley, Blankstein, Halsall, Williams & Winkworth, 2000; Roxborough et al., 2012; Sherry, Law, Hewitt, Flett & Besser, 2008). Dunkley and colleagues (2000) found that socially prescribed perfectionists tend to perceive lower levels of social support, which (consistent with Baumeister & Leary, 1995) then leads to the experience of psychological distress. Sherry and colleagues (2008) found that perceived social support partially mediated the link between socially prescribed perfectionism and depressive symptoms. However, socially prescribed perfectionism was not associated with levels of actual received social support suggesting that the internal experience of disconnection may be more important in predicting depressive symptoms than actual level of support. Roxborough, Hewitt, Kaldas, Flett, Caelian, Sherry and Sherry (2012) found support for the PSDM in children and adolescents using social hopelessness as a marker of subjective social disconnection. Social hopelessness partially mediated the link between suicide risk and

perfectionistic self-promotion, nondisclosure of imperfection, and socially prescribed perfectionism; it fully mediated the link for nondisplay of imperfection. Subjective social disconnection has also been studied using indicators of mattering to others. Mattering is defined as the feeling that we are important to others, that they are concerned with our fate, and that we are interdependently entwined with them (Rosenburg & McCulloch, 1981). Flett, Galchi-Pechenkov, Molnar, Hewitt and Goldstein (2012) and more recently, Cha (2016) both found that mattering mediates the relationship between interpersonal dimensions of perfectionism and depression in a manner consistent with the PSDM.

A proposed intervening variable in the link between perfectionism and subjective disconnection is an interpersonal hypersensitivity characterized by a fear of negative evaluation, overattentiveness to interpersonal and social cues, and chronically anxious expectations of rejection (Flett, Besser & Hewitt, 2014; Hewitt & Flett, 1991a; Hewitt, Flett & DeRosa, 1996). This hypersensitivity leads to chronic subjective perceptions of social disconnection and rejection even when it is not there. It may also explain how perfectionism acts as a diathesis in the face of social stressors, which makes the PSDM a highly useful theory in generating hypotheses regarding how perfectionists might react to social exclusion.

Support for the link between perfectionism and objective social disconnection (Path B, in Figure 1) is mounting. In the same study by Roxborough and colleagues (2012) looking at subjective disconnection and suicide risk, all three facets of perfectionistic self-presentation were also linked to suicide risk with the experience of being bullied, a marker of objective disconnection. Being bullied acts as a partial mediator between all three facets of perfectionistic self-presentation and suicide risk. Another study found that objective interpersonal disconnection in the form of partner-conflict was in fact a significant mediator between perfectionistic concerns and depression symptoms (Mackinnon, Sherry, Antony, Stewart, Sherry and Harting, 2012).



Perfectionists' experience of chronic objective disconnection also supports perfectionists' hypothetical vulnerability to social exclusion, in that being excluded may act as salt in the wound of pre-existing isolation.

Both path A and B of the PSDM are thought to generate psychological problems for perfectionists (i.e., maladaptive outcomes) because disconnection, actual or perceived, generates intense self-conscious affects (shame, humiliation) and automatic thoughts (self-criticism, self-censure) related to an underlying feeling of defectiveness and unworthiness. Shame and self-criticism are core experiences for perfectionists, which also limits self-acceptance and self-compassion and leaves individuals feeling as disconnected from themselves as they are from others (Path C in Figure 1). In this way, the PSDM acts as a powerful engine of distress that leaves perfectionistic individuals vulnerable to social exclusion.

**Diathesis-stress, social disconnection, and social exclusion.** In sum, evidence from tests of diathesis-stress, the PSDM, and the interpersonal context in which perfectionism is theorized to develop, would all suggest that both interpersonal and intrapersonal dimensions of perfectionism are likely to act as vulnerability factors that moderate responses to social exclusion. In the past, this theory has helped researchers explore and understand the relationship between perfectionism and life stress in the onset of psychological problems and distress but can also be useful in generating hypotheses about how perfectionists might react internally to social exclusion.

### **Social Exclusion**

As previously mentioned, rejection and social exclusion are aversive experiences for most people. In fact, Leary (2001) further suggested that merely perceiving rejection is all that is needed to cause distress, as individuals may sense rejection and react accordingly whether or not a threat actually exists. This is thought to be because the need to belong and be accepted by

others is fundamental to human existence (Baumeister & Leary, 1995); a need that has been reinforced on an evolutionary scale by the increased survival benefit to living in groups compared to trying to survive alone (Baumeister & Tice, 1990). The negative affective consequences that people feel when rejected can be thought of as part of a feedback system to motivate the maintenance of one's inclusionary status and the avoidance of rejection (Leary, Tambor, Terdal & Downs, 1995). In addition, Leary and colleagues (1995) suggested that the main function of self-esteem is to provide an index of one's inclusionary status, a sociometer. The sociometer hypothesis maintains that self-esteem affects both how we think and feel about ourselves as an indicator of how accepted and included we feel in our social group, and motivates us to seek inclusion. This is similar to social self-preservation theory (e.g., Kemeny, 2009), which suggests that, for survival reasons, social rejection evokes a powerful emotional response of shame designed to promote submission and enhance group cohesion.

Early theoretical writings on social exclusion theory suggested that the experience of rejection was likely to generate feelings of anger, sadness, loneliness and jealousy, although jealousy was only postulated to arise when an identifiable third person was implicated in the reasons for rejection (Leary, 1990). Recent meta-analytic research has found support for an overarching negative emotional experience characterized by reduced positive mood and amplified negative mood (often assessed by the Positive and Negative Affect Schedule, Watson, Clark & Tellegen, 1996) in response to social rejection (Gerber & Wheeler, 2009). However, another meta-analysis found that while social rejection is uniformly unpleasant, the affective response to rejection is better characterized as an affective flattening, numbing or emotional withdrawal (Blackhart, Nelson, Knowles & Baumeister, 2009; See also DeWall & Baumeister, 2006).

This may be partly due to the rejection paradigm that is used to study rejection. For example, two recent studies (Bernstein & Claypool, 2012a, 2012b) did show that participants undergoing less intense rejection experiences (e.g., using the Cyberball paradigm where participants are led to believe they are being excluded from a computerized game of catch; Williams & Jarvis, 2006) demonstrated marked differences in mood after exclusion versus inclusion, while more intense experiences (e.g., the future-alone paradigm where participants are told they will essentially end up alone in life; Twenge et al., 2001) did not show any differences between conditions. They attribute this to a curvilinear relationship between exclusion intensity and emotional response where once rejection experiences reach a certain threshold of intensity, the result is numbing affect rather than negative affect.

It is important to note that the outcome measures used in the first study by Bernstein and Claypool (2012a, study one) were of limited reliability and validity, with only a few items dedicated to assessing feelings of belonging, self-esteem, control, meaning, and mood. Although the items showed internal consistency, it is unclear whether they adequately measured their respective constructs in a valid manner. The second study mood outcome variable was a more well known measure of positive and negative affect (the Positive and Negative Affect Schedule; Watson, Clark, & Tellegen, 1988), but this measure may have been too general to detect any of the real differences in emotions elicited after feedback.

Although there may be some instances where the affective response is flattened when individuals are rejected, we can still safely conclude from much of the literature that, generally speaking, being rejected is an emotionally unpleasant experience. Indeed, the literature is replete with studies that have refined our understanding of the specific types of emotional experiences that individuals have when rejected. Primarily studies have focused on feelings of general negative affect (Baumeister, Twenge & Nuss, 2002; Blackhart, Eckel, & Tice, 2007; Maner,

DeWall, Baumeister & Schaller, 2007; Murray, Derrick, Leder, & Holmes, 2008; Reijntjes, Stegge, Terwogt, Kamphuis, & Telch, 2006; Stroud, Tanofsky-Kraff, Wilfley & Salovey, 2000; Twenge et al., 2001; Williams, Cheung & Choi, 2000), self-conscious emotions like shame and guilt (Dickerson, Mycek, & Zaldivar, 2008; Gruenewald, Kemeny, Aziz & Fahey, 2004; Kemeny, 2009), and the experience of hostility and anger (Buckley, Winkel & Leary, 2004; Catanese & Tice, 2005; Chow, Tiedens & Govan, 2008; Gaertner, Iuzzini & O'Mara, 2008; Leary, Twenge & Quinlivan, 2006; Twenge, 2005).

### **Affective reactions to social exclusion and implications for perfectionists.**

*Positive and negative affect.* One of the more common outcomes studied in response to social rejection is positive and negative affect, but results have been somewhat inconsistent. Using a one-item measure of mood, Baumeister, Twenge & Nuss (2002) did not find any difference between excluded participants and controls in mood ratings. Reijntjes et al. (2006) found that using a computer game rejection paradigm, being rejected was associated with reduced positive affect overall, but that only 38% of participants experienced a reliable drop in mood over the entire course of the paradigm.

Twenge, Baumeister, Tice and Stucke (2001, experiment three) used a “future alone” paradigm and measured its effect on aggressive behaviour and mood. In this paradigm, participants are given false feedback suggesting they will either end up alone in life (exclusion condition), have many happy relationships in life (acceptance condition), or have many unfortunate accidents (misfortune control). They found future-alone participants reported lower levels of mood compared to the future acceptance condition, but that overall, their level of negative affect was comparable to the misfortune controls. In experiment four in the same paper, when participants were told no other participants wanted to work with them on a laboratory task, no differences in positive or negative mood were found between rejected and accepted

participants. However, experiment five, using the same paradigm, found a significant decrease in positive mood for rejected participants. Blackhart, Eckel & Tice (2007) used a similar paradigm to experiments four and five (Twenge et al., 2001) and found a significant increase in negative affect and decrease in positive affect immediately following rejection, but differences between accepted, rejected and control groups disappeared after fifteen minutes, suggesting that even where mood effects are observed, they do not last long.

Maner, DeWall, Baumeister & Schaller (2007) also found mixed results across five out of the six studies in their article. In study one, they found no difference in negative or positive affect across individuals who were asked to either imagine a time when they felt rejected, a time when they felt accepted, or their activities the previous day. Using the future alone paradigm, rejected participants experienced more negative affect than accepted participants or controls. Using an exclusion paradigm similar to their first study but with a different mood measure, participants again did not differ on a general affect measure according to condition. Study four did not specifically report on rejection effects on mood. Finally, in studies five and six, using a paradigm that involved being told by a confederate that they did not want to interact with the participant after viewing a brief video of them, no effect of rejection on mood was found. Over multiple paradigms in five studies, four reported no effect of rejection on negative affect.

In contrast, Murray et al. (2008) found that for participants who were asked to write about a time they were hurt by another person close to them, recalling and writing about a negative interpersonal incident predicted increased state negative affect after the task. Stroud et al. (2000) used their own highly realistic interpersonal stressor paradigm where trained confederates systematically exclude a participant over the course of a conversation by ignoring the participant or criticizing their attempts to participate in the conversation, and found that

participants in the exclusion condition experienced more negative affect and less positive affect than controls, with moderate effect sizes.

One paradigm shows fairly unequivocal negative effects on mood (Boyes & French, 2009; Lawrence, Channen & Allen, 2011; Van Beest & Williams, 2006; Williams, Cheung and Choi, 2000; Zadro, Williams & Richardson, 2004). The Cyberball paradigm (Williams, Cheung & Choi, 2000; Williams & Jarvis, 2006) has participants playing a game of “cybercatch” over the internet with two or three other “participants” who are in fact controlled by the computer, and who after several initial ball passes to the participant proceed to exclude the actual participant to varying degrees. Participants can be included or overincluded in the game, in which case they are thrown the “ball” equally often or more often than it is thrown to the other players. In the exclusion conditions, they are either thrown the ball noticeably less, or not at all. Using a large sample ( $n = 1486$ ) to test the Cyberball paradigm over the internet, Williams and colleagues found that as level of inclusion decreased, the aversive impact on participants (including negative mood) increased. Zadro, Williams and Richardson (2004) reported similar findings. Interestingly, Zadro and colleagues found that it did not matter whether participants were told the other players were computer-controlled or actual humans, participants still reported feeling worse after exclusion either way. Other studies have found similar effects on overall mood following Cyberball exclusion (Boyes & French, 2009, study one; Lawrence, Chanen & Allen, 2011; Van Beest & Williams, 2006). Regardless of paradigm, perfectionists, especially socially prescribed perfectionists and perfectionistic self-presenters, are likely to be particularly vulnerable to negative mood following social exclusion because of their deep-seated need to belong and be accepted. However, it is of greater interest to uncover the specific types of negative emotions that perfectionists are likely to experience in response to social exclusion, rather than their overall emotional experience.

*Anaclitic and introjective affect.* At a more specific level of emotional experience, two broad emotional states described by Blatt and Shichman (1983) are relevant in considering the possible emotional reactions to social rejection. Blatt and Shichman identified two complex emotional substrates that seem to underpin depressive experience and describe two overarching emotional themes: interpersonal relatedness (anaclitic) and self-definition (introjective).

Anaclitic emotional concerns are rooted in feelings of connection and disconnection from important others, and involve feelings of rejection and a sense of being unlovable. In contrast, introjective emotions are more self-focused, involving self-critical feelings of failure, self-worth and guilt. Recent research suggests that individuals who are prone to anaclitic emotions are likely to respond with negative affect to imagined interpersonal rejection than individuals who are more self-critical and introjective (Besser and Priel, 2011). The authors found this was mediated by the way anaclitically predisposed individuals felt the rejection threatened their sense of self-worth and the perceived security of their relationships. Anaclitically themed emotional reactions are therefore one possible experiential outcome of social rejection.

This is thought to be especially true for socially-prescribed perfectionists and those who compulsively attempt to portray an image of perfection to others, because social acceptance is central to them. For self-oriented perfectionists, who may perceive social rejection as a personal failure to live up to their own self-set standards of social acceptability, social rejection may be met with more self-criticism and guilt than concern about being unlovable. Reis and Grenyer (2002) looked at the roles self-oriented and socially prescribed perfectionism played in mediating the link between attachment styles and depression. In their study, self-oriented perfectionism was correlated with both anaclitic and introjective types of depressive experiences, but was much more strongly correlated with introjective over anaclitic experience ( $r = .41$  for introjective versus  $r = .16$  for anaclitic). Further, self-oriented perfectionism only mediated the relationship

between attachment and introjective depression, whereas socially prescribed perfectionism seemed to mediate the relationship between attachment and both types of depressive experiences.

Rejected affect is likely an important emotion to study with regard to perfectionism. McGee (2007) studied perfectionists' response to social exclusion in predicting thoughts related to anorexia and found that when women who were high on perfectionistic self-promotion received social exclusion feedback (using the previously described future-alone paradigm), they experienced rejected affect which then lead to the experience of thoughts about rigid weight control. It is possible that anacritically-themed affect also mediates the relationship between perfectionism and other negative outcomes, and therefore it is important to understand under what conditions it arises.

***Shame and guilt.*** Leary and colleagues (1995) suggested that self-referent emotions (e.g., shame and guilt) are particularly relevant in the response to social exclusion. Shame is especially relevant given it has been typically defined as a powerfully negative emotion experienced when an important self-deficiency is detected and (potentially) exposed to the self and others (Gilbert, 1997; Jacobson, 1964; Lewis, 1971; Lewis, 1992; Tangney, 1995; 2002). It is thought by some to be the primary emotion experienced in response to threats to social inclusion (Kemeny, Gruenewald & Dickerson, 2004; Scheff, 1988). Guilt on the other hand is more reflected in a concern that one has had a negative effect on others (Tangney, 2002).

Shame has been both theoretically and empirically linked to the experience of social exclusion (Dickerson, Gruenewald & Kemeny, 2004; Kemeny et al., 2004; Gruenewald, Kemeny, Aziz & Fahey, 2004). In terms of its evolution, shame is thought to have evolved from animal displays of submission, which are considered crucial in promoting social cohesion and avoiding conflict (Kemeny et al., 2004). The social self-preservation theory (Kemeny, Gruenewald & Dickerson, 2004) suggests that shame is one of the first reactions in a



psychobiological cascade set off by social rejection threats. For example, Gruenewald and colleagues (2004) found that when university students were asked to perform difficult tasks in a socially evaluative setting (i.e., in front of an audience), individuals experienced significantly more post-task shame compared to individuals who performed the same tasks alone.

Guilt, in contrast, is less about personal defects and more about a sense of behavioural transgression, of having *done* something wrong (Lewis, 1971; Tangney, 1995) and is thus theoretically less related to threats to belongingness. Inasmuch as guilt can serve to focus one's attention towards others' feelings, it can be said to be a more adaptive emotion than shame (Baumeister, Stillwell & Heatherton, 1994; Tangney, 1995). However, when guilt arises out of a failure to meet one's own exacting demands for perfection and involves a tendency to engage in harsh self-criticism, the affective experience of guilt is unlikely to lead to any positive outcomes but rather many negative ones.

The tendency for perfectionists to predicate their self-worth on the achievement of perfection is essentially a recipe for the experience of shame and guilt, and distinctions between the trait dimensions of perfectionism may be relevant in understanding the different relationships between the two emotions. Theoretical perfectionism writings have noted that shame is a likely experience for perfectionists (Blatt, 1995; Hamachek, 1978; Hollender, 1965). Hollender (1965) suggested shame would result when inner standards were too high, whereas Hamachek (1978) theorized that perfectionists would be more prone to experience shame when they felt they let down emotionally important people in their lives, and would experience guilt when they violated their own inner standards of behaviour or performance. This would suggest that socially prescribed perfectionists would be more prone to feelings of shame whereas self-oriented perfectionists would be more prone to feelings of guilt.

Sorotzkin (1985) distinguished narcissistic perfectionists from neurotic perfectionists as individuals motivated by a need to avoid shame or guilt respectively. Speaking from a psychodynamic perspective, Sorotzkin suggests narcissistic perfectionists experience shame because of their inability to fully differentiate their own identity from that of their loved ones (see Kohut, 1971), and any perceived loss of approval from others is interpreted as a devastating attack on the self. Perfectionism is seen as a defensive strategy to avoid these respective emotions, and therefore when perfectionists fail to achieve perfection or perceive any evidence of personal flaws, they respond strongly with shame or guilt. When comparing Sorotzkin's neurotic and narcissistic perfectionists to Hewitt and Flett's trait model, one might draw parallels between self-oriented perfectionism and the self-critical neurotic type of perfectionism while socially prescribed perfectionism might fit more with narcissistic perfectionism. This would also suggest different relationships for each with shame and guilt.

One reason the internal experience of perfectionists might be characterized more by shame rather than guilt is that perfectionists tend to take an all-or-nothing mentality regarding their self-worth (Pacht, 1984; Sorotzkin, 1985). Pacht (1984) described this as the "god/scum phenomenon" (p. 387). Either a perfectionist is elevated to their highest level of esteem possible through their ability to achieve perfection, or they are lower than dirt. Therefore, whereas an average person might merely feel guilty about a particular behavioural error, a perfectionist may be more likely to convert a single transgression or mistake into a shameful global character flaw (Lewis, 1992).

Empirically speaking, shame has shown more consistent links with perfectionism traits than guilt, and socially prescribed perfectionism tends to be more consistently related to shame than self-oriented perfectionism (Klibert et al., 2005; Mann, 2004; Tangney, 2002; Wyatt & Gilbert, 1998). In early research however, Hewitt and Flett (1991a) found a significant

correlation between guilt and self-oriented perfectionism and only marginal associations between socially prescribed perfectionism and both shame and guilt. Tangney (2002) identified potential issues with the instrument used to measure guilt in the Hewitt and Flett study (Problem Situation Questionnaire; Klass, 1987) that may have been responsible for these results that are largely inconsistent with subsequent research.

In an examination of shame and guilt and procrastinatory behaviour, Fee and Tangney (2000) also examined the relationship between perfectionism and proneness to shame and guilt. Self-oriented perfectionism was found to be positively and significantly related to trait shame and guilt, but neither relationship reached significance when guilt was partialled out of shame (i.e., guilt-free shame) and vice versa (shame-free guilt). Socially prescribed perfectionism was positively related to shame, and remained significant when looking at guilt-free shame. Tangney (2002) found only one significant correlation between self-oriented perfectionism and shame across three studies. In contrast, socially prescribed perfectionism was uniformly positively correlated with shame and guilt-free shame in all three studies. Subsequent part-correlation analyses with guilt suggested that a positive correlation observed between guilt and socially prescribed perfectionism in one of the studies was largely due to overlap with shame. Klibert and colleagues (2005) also found that socially prescribed perfectionism was associated with both guilt and shame, whereas self-oriented was not associated with either. Finally, Fedewa, Burns and Gomez (2005) looked at positive and negative aspects of perfectionism and found the negative aspects to be uniformly related to higher levels of state and trait shame and guilt, as well as guilt-free shame, but not shame-free guilt. Overall the evidence suggests shame is a highly relevant experience for perfectionists, and guilt somewhat less so.

Perfectionists may also be more vulnerable to shame and guilt in the context of environmental stressors, especially negative feedback. However, the evidence of an interaction

between negative feedback and the experience of shame for perfectionists is mixed (Stoeber, Harris & Moon, 2009; Stoeber, Kempe & Keogh). Using an altered factor structure of the Multidimensional Perfectionism Scale (Hewitt & Flett, 1991a) that divides self-oriented and socially prescribed perfectionism into subfactors that reflect underlying perfectionistic beliefs (Campbell & DiPaula, 2002), Stoeber, Kempe and Keogh (2007) showed that an element of socially prescribed perfectionism they called conditional acceptance uniquely predicted both shame and guilt in the context of failure on an artificial laboratory task. In addition, being high on conditional acceptance was also predictive of an inability to experience positive emotions in the face of success, leading the authors to conclude that perfectionists who strive for perfection in order to be accepted by others are most vulnerable to negative outcomes.

In contrast, Stoeber, Harris and Moon (2007) looked at how what they called “healthy” and “unhealthy” perfectionists (i.e., individuals who are setting high standards without experiencing a negative reaction to imperfection, versus those who are) reacted to success or failure on a laboratory task. They found that overall, unhealthy perfectionists experienced more trait and state shame and guilt than healthy perfectionists, but that there was no difference across feedback conditions for either type of perfectionist in the amount of shame or guilt they experienced. The authors suggested this may have been due to their method of determining healthy versus unhealthy perfectionists (median splits on two perfectionism dimensions) which has a tendency to reduce power dramatically and inflate type II error rates (MacCallum, Zhang, Preacher & Rucker, 2002). That aside, Stoeber and colleagues’ findings are generally consistent with the tendency for perfectionists to experience increased shame and the possibility remains that failure experiences may exacerbate shame feelings for interpersonally-oriented perfectionists. It is also conceivable that social failures are more relevant to perfectionists in their experience of shame.

With regard to perfectionistic self-presentation, current conceptualizations of shame as a public exposure of characterological flaws would suggest that individuals who feel a need to appear perfect to others would be especially vulnerable to feelings of shame. To our knowledge, only one study showing a developmental link between shame and self-presentational perfectionism has been published (Chen et al., 2015), and none have examined shame or guilt as outcomes of perfectionistic self-presentation. However, individuals who are publicly self-conscious are prone to shame experiences but not guilt (Darvill, Johnson & Danko, 1992) which supports the idea that perfectionistic self-presentation is largely associated with shame as well.

In sum, research supports shame as a common emotional response to social exclusion, and given that perfectionists, especially those high on the interpersonal dimensions, are particularly prone to shame experiences, we might expect them to feel even more shame when they are rejected. Alternatively, it may be that self-oriented perfectionists may be more vulnerable to guilt instead, given their tendency towards self-disappointment and self-criticism, and less of an overt concern for how others view them.

**Anger.** The relationship between anger and social rejection has long been studied (Buckley et al., 2004; Craighead, Kimball & Rehak, 1979; Leary, Twenge & Quinlivan, 2006). One early study of the affective and cognitive reactions to social rejection examined a group of young university women who scored either high or low on a measure of need for approval (Craighead, Kimball & Rehak, 1979). In response to imaginal social rejection, participants generally reported an increase in feelings of hostility. Of particular interest to the current study, however, is the fact that the high need for approval participants felt even more hostility than those low in need for approval. Given that socially prescribed perfectionism and the self-presentation facets are highly correlated with a need for approval (Hewitt & Flett, 1991a; Hewitt

et al., 2003), individuals high on these dimensions of perfectionism are likely to respond to rejection with considerable anger.

Two individual differences have been identified that reliably affect an individual's anger response to social exclusion (Leary, Twenge & Quinlivan, 2006). Interestingly, they are both personality characteristics with important conceptual relevance and empirical links to perfectionism. The first is attachment style. Dutton, Saunders, Starzomski & Bartholomew (1994) noted that fearful and preoccupied attachment styles were positively associated with anger. The second is rejection sensitivity, which can be defined as a heightened tendency to expect and fear rejection (Downey & Feldman, 1996). Given that all of the trait dimensions of perfectionism are associated with both fearful and preoccupied attachment styles (Chen et al., 2015; Reis & Grenyer, 2002) and that both socially prescribed and self-oriented perfectionism are related to interpersonal sensitivity (Flett, Hewitt & De Rosa, 1996; Hewitt & Flett, 1991a) and rejection sensitivity (Flett, Besser & Hewitt, 2014) it is reasonable to suspect perfectionists are likely to experience increased anger in response to social exclusion.

The direct relationship between perfectionism and the experience of anger is also well supported and studied. Hewitt and Flett's (1991a) paper showed both socially prescribed and self-oriented perfectionism was associated with increased anger. However, Hewitt, Caelian and colleagues (2002) showed that in children only socially prescribed perfectionism was related to increased anger expression and decreased anger suppression and others have found similar findings in adults (Dunkley & Blankstein, 2000). For socially prescribed perfectionists, anger may be a natural response to the feeling that others hold unrealistic expectations of you, given that anger can often arise out of perceived transgressions against the self by others (Averill, 1983). However, anger has also been conceptualized as a feeling arising from the frustration of one's goals (Stein & Levine, 1990), which would mean it would apply equally as well to the

experience of self-oriented perfectionists. In fact, in a study of anger and somatic health in relation to perfectionism, only self-oriented perfectionism showed relationships with trait anger (Saboonchi & Lundh, 2003).

Anger may be triggered as a response to failure to live up to self-set or other-set standards. Besser and colleagues (2004) reported a three-way interaction in which individuals who were high on self-oriented perfectionism reacted with increased hostility when they received negative feedback about their performance on a difficult task. Stoeber, Schneider, Hussain and Matthews (2014) examined the relationship between trait perfectionism and anger after repeated failure and found that socially prescribed perfectionism was related to the experience of anger after failure, and this anger increased after repeated failure, while self-oriented perfectionism was related to anger only after repeated failure. The relationship between perfectionism and anger also makes sense given other findings that suggest simply perceiving a discrepancy between one's ideal achievement goals and actual performance is predictive of hostility (Ongem, 2010). Using a qualitative interview design, Neumeister, Williams and Cross (2007) described how some children high on self-oriented perfectionism reacted with intense anger towards the self when they failed to live up to their own standards of performance.

In contrast to the traits, the tendency to experience perfectionistic thoughts is more related to a tendency to suppress anger and direct it inwards (Ferrari, 1995). This was thought to be related to a tendency for perfectionists to exert tight control over their affective displays, which should ring true for perfectionistic self-presentation facets as well. Although less research exists looking at perfectionistic self-presentation and anger, Geller, Cockell, Hewitt, Goldner & Flett (2000) found all facets of perfectionistic self-presentation to be strongly and positively correlated with a tendency towards anger suppression in a combined sample of anorexic patients, general psychiatric patients and hospital staff controls. While this suggests that anger is a

common internal experience for individuals across most social aspects of perfectionism, less is known about perfectionistic cognitions and self-presentational tendencies and the state experience of anger.

Some evidence also hints at gender differences between perfectionistic men and women in how they experience anger. For example, Blankstein and Lumley (2008) found self-oriented perfectionism to be predictive of anger in men but not in women. In children, Hewitt, Caelian and colleagues (2002) found a trend towards anger being more relevant for boys than for girls. However, no gender differences in the relationships between trait perfectionism and anger were noted in the original trait perfectionism conceptualization paper (Hewitt & Flett, 1991a).

Overall, anger is an experience common both to those who experience social rejection, and to those who struggle with both self-oriented and socially prescribed perfectionism. Therefore it is proposed that perfectionists will react with increased anger to social exclusion. The finding that anger and hostility is also typically associated with feelings of shame (e.g., Lewis, 1971; Tangney & Dearing, 2002; Tangney, Wagner, Fletcher & Gramzow, 1992) begins to hint at an overall emotional experience that we could expect from perfectionists experiencing social rejection.

***Loneliness.*** On a theoretical level, it also makes sense that the reaction to the loss or threatened loss of interpersonal relationships is likely to induce feelings of loneliness and the perception of disconnection from others (Jones, 1990; Leary, 1990). Loneliness can be defined as an unpleasant dissatisfaction with one's current relationships and is thought to have both affective and cognitive elements (Peplau & Caldwell, 1978). Although some of the more common conceptualizations of loneliness seem to focus only on a subjective perception of social (dis)connection (e.g., Russell, 1996), others have criticized this approach in that loneliness may be better conceptualized as multidimensional (Scalise, Ginter & Gerstein, 1984; Weiss, 1973)



and that some measures exclude emotional components that are distinct from cognitive elements of perceived social disconnection (Scalise et al., 1984). In fact, an analysis of loneliness and perceived social support suggest they fit well together in a higher order factor of general social attachment suggesting that while perceived social support and loneliness are unique, they are part of an overarching social connection construct (Jones & Moore, 1987; Newcomb & Bentler, 1986).

The affective aspect of loneliness is similar to anacritically themed emotions of feeling unloved, rejected, and disconnected from others. However, through a factor analysis of adjective ratings reflecting different aspects of the loneliness experience, Scalise, Ginter and Gerstein (1984) identified four different factors of affective loneliness: depletion, isolation, agitation, and dejection. Although it could be argued that agitation shares considerable conceptual overlap with the affective experience of hostility, and might be more of a correlate of loneliness than a component, Scalise and colleagues' model of the affective experience of loneliness is one of the more comprehensive in the literature (see Cramer & Barry, 1999).

Weiss (1973) conceptualized loneliness as being both the emotional experience of loss felt when an important relationship is lost and the social experience of isolation from others. The loss of an emotional attachment is likely to be felt affectively, but in addition, isolation is experienced as a perception of the absence of meaningful connection. This cognitive aspect of loneliness is an equally important element to consider as a possible response to social exclusion.

Indeed, research supports the experience of loneliness, both emotionally and cognitively, as a common response to social rejection. Much of the research in this area focuses on childhood and adolescent experiences of peer rejection and the prediction of loneliness. For example, self-reported loneliness in childhood appears to be preceded by peer rejection experiences and rejected adolescents report more loneliness than non-rejected adolescents (Boivin, Hymel &

Burkowski, 1995; Parkhurst & Asher, 1992; Witvliet, Brendgen, Van Lier, Koot & Vitaro, 2010).

Perfectionists, particularly those high on the interpersonal dimensions of perfectionism, are prone to feelings of loneliness, even without encountering social exclusion (Chang, Hirsch, Sanna, Jeglic & Fabian, 2011; Clark, Steer, Beck & Ross, 1995; Flett, Hewitt & De Rosa, 1996; Wang, Yuen & Slaney, 2008). Flett, Hewitt and De Rosa (1996), for example, found that socially prescribed perfectionists felt particularly lonely. In addition to feelings of loneliness, the authors found that socially prescribed perfectionists tended to see themselves as having poor social skills, which suggests socially prescribed perfectionists feel that they are lonely and that they lack the ability to remedy their loneliness, which is likely to contribute to their distress. One study suggests that loneliness is a common experience for self-oriented perfectionists as well. Dunkley, Zuroff and Blankstein (2006) found that both self-oriented and socially prescribed perfectionism dimensions, as well as attitudinal elements of concern over mistakes and doubting one's actions, were all related to lower levels of perceived social support.

Current research by Chang, Sanna, Chang & Bodem (2008) suggests that loneliness plays an interactive role in the link between perfectionism and distress for all three trait dimensions. Chang and colleagues found that socially prescribed perfectionism was directly associated with feelings of loneliness and that loneliness interacts with both socially prescribed and other-oriented perfectionism to predict anxiety symptoms. Self-oriented perfectionism and socially prescribed perfectionism also interacted with loneliness to predict depressive symptoms. In all cases, the nature of the interaction was such that the relationship between perfectionism and psychological symptoms was amplified when loneliness was high. Dunkley, Sanislow, Grillo, and McLashan (2006) also found that perceived social support played a mediating role in predicting the depressive symptoms of perfectionists.

Evidence from tests of PSDM suggests loneliness, or disconnection from others, plays an important role in the development of distress for perfectionists, and several studies have supported the assertion that socially prescribed perfectionists feel unsupported and disconnected from others (Dunkley et al., 2000; Sherry et al., 2008). This is also true for perfectionistic self-presenters, particularly those high on the nondisclosure and nondisplay facets (Chen et al., 2012; Roxborough et al., 2012). In addition, those who have difficulty disclosing personal imperfections to others are especially vulnerable to feelings of social disconnection, as intimacy and connection is typically fostered by personal disclosure (Derlega, Wilson & Chaikin, 1976; Gaebelin, 1976; Reis & Shaver, 1988). This is especially apparent in clinical situations where individuals are expected to answer questions and disclose personal problems and weaknesses (Hewitt et al., 2008).

To summarize, feeling lonely is a common experience for individuals who are socially rejected. For perfectionists, who seem to be particularly prone to feelings and thoughts of loneliness, rejection-based loneliness may be experienced at a higher level of intensity than for the average person. Further, loneliness and social disconnection seem particularly relevant in the prediction of psychological problems for socially prescribed perfectionists and perfectionistic self-presenters. Taken together with the perfectionist's experience of anger, shame and anaclitic mood, this presents a powerfully negative picture of the affective experience of rejection for perfectionists.

***Chronicity of mood effects.*** In addition to the types of emotional experiences individuals are likely to experience after being social excluded, the amount of time individuals experience them can also be an important variable that may be moderated by perfectionism. Not all social exclusion methods have been evaluated in terms of how long their effect lasts, particularly because it may be unethical to allow individuals to continue to believe they are socially

undesirable or that they will end up alone in life for extended periods of time while their mood is repeatedly measured. However, in the methodology we are proposing to use here, the Cyberball paradigm, the mood effect has typically been shown to last from ten to fifteen minutes (Lau, Moulds & Richardson, 2009; Lawrence, Channen & Allen, 2011; Sethi, Moulds & Richardson, 2013; Wirth & Williams, 2009; Zwolinski, 2014). Using the future-alone paradigm, Twenge and colleagues (2001) noted the differences between included and excluded groups also disappeared after 15 minutes. While no direct evidence has examined how long perfectionists typically experience the effects of negative feedback or social exclusion, some indirect research suggests the ill-effects of exclusion may last longer for perfectionists.

For example, Hewitt, Flett, Ediger, Norton and Flynn (1998) found that self-oriented perfectionism predicted the chronicity of unipolar depression symptoms, while socially prescribed and other-oriented perfectionism predicted the chronicity of bipolar depression symptoms, even when controlling for concurrent state depression, suggesting that perfectionists are likely to experience depressed moods for longer than the average individual. Furthermore, perfectionists' ruminative tendencies (Blankstein & Lumley, 2008; Flett, Madorsky et al., 2002) are likely to play a role in the persistence of negative emotional experiences like social exclusion. Therefore, in addition to perfectionism increasing the intensity of emotional experience following social exclusion, we might expect the emotional effects of social exclusion to last longer as well.

**Cognitive reactions to social exclusion and implications for perfectionists.** Negative life events such as social exclusion or rejection have also been shown to have negative cognitive effects, particularly in the area of self-evaluation (Monroe, Slavich, Torres & Gotlib, 2007, Nesdale & Pelyhe, 2009; Smart-Richman & Leary, 2009). Though other research has found deficits in self-regulation (Baumeister, DeWall, Ciarocco & Twenge, 2005), self-awareness

(Twenge, Catanese, & Baumeister, 2003) and intelligent thought (Baumeister, Twenge & Nuss, 2002). In the current study, our focus is on the effects on thoughts about one's self, particularly self-evaluative thoughts, thoughts about others, and thoughts about one's self in relation to others (i.e., the aspects of the self-concept that include others; see Aron, McLaughlin-Volpe, Mashek, Lewandowski, Wright & Aron, 2004). Self-evaluation tends to be of primary concern to perfectionists in social contexts (Alden, Bieling & Wallace, 1994) which is where we would expect to see a moderating effect of perfectionism most clearly. However, it is also possible that in the context of social exclusion interpersonal aspects of perfectionism might increase the frequency of thoughts relating to others as well, given their observed propensity towards interpersonally-themed rumination (Nepon, Flett, Hewitt & Molnar, 2011).

***Thoughts about self.*** One type of cognitive reaction that individuals are likely to have in response to social exclusion involves a reduced evaluation of one's self, particularly in the social domain, in the form of reduced social self-esteem. Social exclusion has been shown to have strong negative effects on individuals' trait and state self-esteem (Leary, Tambor, Terdal & Downs, 1995; Stanley & Arora, 1998; Zadro, Williams & Richardson, 2004). This makes sense given that self-esteem has been conceptualized by some as a marker of social inclusion (e.g., Leary et al., 1995). One way low state self-esteem is likely to be expressed is through the experience of thoughts about one's competence and self-worth. Therefore the cognitive element of self-esteem can be conceptualized both as the valence and intensity of thoughts about one's self, and, given the sociometer hypothesis, in the valence and intensity of thoughts about our relationships with others. In this regard, both the tone and specific content of thoughts are important.

Individuals with high self-esteem exhibit a buffer in the response to social exclusion or rejection (DeWall, Twenge, Koole, Baumeister, Marquez & Reid, 2011; Ford & Collins, 2010;

Nezlek, Kowalski, Leary, Blevins & Holgate, 1997; Sinclair & Lentz, 2010, Waller & Macdonald, 2010), which would be in keeping with the sociometer hypothesis. However, this would also support the idea that, being generally associated with low self-esteem (e.g., Hewitt et al., 2003; McArdle & Duda, 2008; Zeigler-Hill & Terry, 2007), most of the dimensions of perfectionism would confer more vulnerability to distress for perfectionistic individuals experiencing social exclusion.

Other research suggests that, in the face of imagined rejection, individuals whose self-esteem is contingent on meeting certain performance or relationship standards, are more vulnerable to lowered self-esteem and negative affect as opposed to individuals whose self-esteem is derived from one's intrinsic value as a person. Zeigler-Hill, Besser and King (2011) found that when asked to imagine both social rejection and achievement threats, individuals who were high on contingent self-esteem anticipated lower levels of state self-esteem and increased negative affect compared to those low on contingent self-esteem or high in noncontingent self-esteem. Similar results have been found by other researchers (e.g., Park & Crocker, 2008). The contingency of achieving perfectionistic goals on experiencing any sense of positive self-worth is part and parcel of the perfectionistic personality (DiBartolo, Frost, Chang, LaSota & Grills, 2004; Flett, Besser, Davis & Hewitt, 2003; Scott, 2007; Sturman, Flett, Hewitt & Rudolph, 2009), and is yet another reason why perfectionists are likely to be especially vulnerable to rejection threats, including experiencing lower levels of state self-esteem following rejection.

Specifically, social domains of self-esteem are likely to be especially relevant. William James (1890) suggested that self-esteem may be derived from varying domains and that it is dependent on an individual's ability to achieve success in that domain. For example, athletes may derive their self-esteem from their ability to excel in a given sport, while their self-esteem is not as dependent on appearance or social ability as it may be for others (Heatherton & Polivy,

1991). For socially prescribed perfectionists and perfectionistic self-presenters, social self-esteem, defined as an estimation of one's ability to gain and maintain love and approval from important others, is likely to be of particular importance but is also likely to be lower than average (Blankstein, Lumley & Crawford, 2007; Flett, Hewitt, Blankstein & O'Brien, 1991; Flett, Hewitt & De Rosa, 1996; Klibert et al., 2005; Pruesser, Rice & Ashby, 1994; Tissot & Crowther, 2008). Because these perfectionists are motivated to be perfect to maintain relationships, social exclusion will likely be interpreted as a threat to social self-esteem.

Evidence for the relationship between self-presentational aspects of perfectionism, self-esteem, and self-concept, is less definitive, as fewer studies have included these facets of perfectionism compared to the traits. However, Hewitt, Flett & Ediger (1995) examined perfectionistic self-presentation in the context of eating disorders and found that all three facets were related to low global self-esteem and Cockell and colleagues (2002) found similar results. However, Hewitt, Flett, Sherry and colleagues (2003) found only the concealing aspects of perfectionistic self-presentation to be significantly associated with low levels of self-esteem. Although perfectionistic self-promotion exhibited a negative correlational trend with self-esteem ( $r = -.11$ ), the results were nonsignificant. Evidence from general self-presentation theory (Schlenker & Leary, 1985) also suggests individuals who are overly concerned with making a positive impression on others yet doubt their ability to do so feel social anxious, and have lower levels of self-esteem than individuals who are not as concerned with impression management.

One way we would expect perfectionists to react differently than the average person to social exclusion threats is in their experience of automatic thoughts relating to their extreme need to be perfect. While the average person might experience negative thoughts in response to rejection, only perfectionists would be expected to reflect about perfectionistic desires and goals. Because interpersonally oriented perfectionists (i.e., socially prescribed perfectionists and the

three self-presentational facets) are concerned with being or appearing perfect in order to preserve their relationships, threats to their relationships can be expected to activate their perfectionistic ruminative processes.

Theory supports a generally negative cognitive experience of perfectionism. Horney (1950) described that individuals who neurotically strive for perfection suffer from a “tyranny of shoulds” (p. 65) as they urge themselves to live up to an unrealistic self-ideal in the hopes of escaping their inner anxiety. Klinger (1977) also described how underlying desires and goals, called current concerns, drive the conscious content of thoughts, and that these concerns are especially likely to be expressed in conscious thought when goals are frustrated. According to Klinger then, perfectionistic individuals with a strong need to belong are likely to experience thoughts related to being perfect and belonging after social exclusion.

Empirical evidence also suggests perfectionists are prone to increased rumination (Burns & Fedewa, 2005; Flett, Madorsky et al., 2002). Indeed, rumination was considered by some researchers to be so central to the perfectionistic experience that a rumination subscale was included in a recently developed measure of perfectionism (Hill et al., 2004). This is important because ruminative thoughts are considered a key component in depression (Burns & Beck, 1978; Nolen-Hoeksma, 2000). This in turn has generated research that supports a mediating role of rumination as a pathway to distress for perfectionists (Egan, Hattaway & Kane, 2014; Flett, Coulter, Hewitt, & Nepon, 2011; Harris, Pepper & Maack, 2008; Nepon et al., 2011; O’Connor, O’Connor & Marshall, 2007; Olson & Kwon, 2008).

Both self-oriented and socially prescribed perfectionists report a ruminative response style to failures and stress where they brood over the tiniest perceived mistake (Flett, Madorsky et al., 2002; O’Connor, O’Connor & Marshall, 2007). However Rudolph, Flett & Hewitt (2007) found that socially prescribed perfectionists appear to engage most strongly in maladaptive



cognitive coping, with strong associations with self-blame, rumination and catastrophizing. In contrast, self-oriented perfectionism was only associated with self-blaming. In addition, Rudolph et al. (2007) found individuals who experienced increased perfectionistic thoughts were also likely to ruminate and catastrophize, suggesting the ruminative content may involve perfectionistic themes. One study, examining a sample of young adolescents, found a positive correlation between self-oriented perfectionism and rumination while the correlation for socially prescribed perfectionism failed to reach significance (Flett, Coulter, Hewitt & Nepon, 2011). Other research has found more support for ruminative tendencies in socially-prescribed versus self-oriented perfectionists (Blankstein & Lumley, 2008; Randles et al., 2010).

Frost and Henderson (1991) provided early evidence of the content of perfectionistic thinking when they examined a sample of female athletes and their reactions to mistakes during a competition. They found that two characteristics of perfectionism, concern over mistakes (correlated with all three trait dimensions of perfectionism) and doubts about actions (correlated with both self and socially prescribed perfectionism), were strongly related to increased thoughts related to the mistake they made. In particular, the content of the thoughts centered on letting important others down (e.g., their coach and team mates), letting themselves down, and thinking deeply about the mistake itself. Perfectionistic individuals also reported that mental imagery of their mistake kept intruding on their concentration throughout the rest of the competition and that they had a difficult time forgetting about the mistake. Harris, Pepper and Maack (2008) found very similar results after perfectionists received a disappointing result on an academic test.

Perfectionistic cognitions are thought to arise automatically when perfectionists sense a discrepancy between their actual and ideal selves or between their actual performance and their idealistic goals (Flett et al., 1998; 2002). Frost, Trepanier and colleagues (1997) suggested these thoughts may reflect a process whereby performance is first judged against an ideal and then

perfectionistic self-talk automatically arises to motivate the individual to try to achieve the ideal. Furthermore, Flett, Madorsky et al. (2002) found perfectionistic thoughts were associated with intrusive thoughts, although it was not clear if the intrusive thoughts actually involved perfectionistic content, perfectionistic thoughts are likely to be intrusive and difficult to control (Flett Madorsky et al., 2002; Rudolph, Flett & Hewitt, 2007).

Research suggests these thoughts are particularly likely to arise under situations of evaluative threat (e.g. Frost & Marten, 1990), challenging tasks (Besser, Flett, Hewitt & Guez, 2008) and in the face of mistakes or negative feedback (Besser, Hewitt & Flett, 2004; Besser, Flett, Hewitt & Guez, 2008; Frost, Turcotte, Heimberg & Mattia, 1995). Frost and Marten (1990) found when the evaluation of a writing task was made highly salient (i.e., subjects were told their performance would be compared to others at a national level), perfectionistic university students thought they should have performed better afterwards than nonperfectionists or perfectionists in a low evaluative threat condition. Besser and colleagues (2004) found that self-oriented perfectionists were particularly vulnerable to perfectionistic thinking after receiving negative performance feedback on a reaction time task. Compared to those low on self-oriented perfectionism, they were more disappointed and dissatisfied with their performance, and felt a greater need to do better. Self-oriented perfectionists ruminated most about their performance and the mistakes they made when they received negative feedback even though their objective performance was good. A similar experiment was conducted by Besser and colleague (2008) who found that a state version of the perfectionistic cognitions inventory (Flett et al., 1998) was associated with both self-oriented and socially prescribed perfectionism only when negative feedback was received or the task was difficult. Interestingly, in this experiment perfectionistic thoughts were also highly related to the experience of thoughts about social competence. Across

all four conditions in Besser and colleagues (2008) study, some of the strongest negative correlations were between state perfectionistic thoughts and state social self-esteem.

Although most of the studies examining perfectionists' response to negative feedback in the research literature has looked at achievement or performance related feedback, it is expected that for individuals high on the interpersonal dimensions of perfectionism, social feedback (i.e., being excluded/included by others) will elicit perfectionistic thoughts as well, given that achieving perfection is how these individuals attempt to maintain the love and security of their relationships. However, some evidence to the contrary has been found (McGee, 2007). McGee (2007) found that social exclusion feedback did not interact with perfectionism to predict cognitions centered around maintaining thinness (i.e., a perfect body) to gain others' approval. It may have been that these types of cognitions were too domain-specific to show strong results. Still, perfectionistic self-promotion and nondisclosure of imperfections significantly predicted a main effect of increased anorectic cognitions longitudinally, even after baseline cognitions were covaried.

Ruminative perfectionistic thinking is important to study because research supports rumination as one of the main mediating factors in the relationship between perfectionism and distress (Flett, Molnar, Nepon & Hewitt, 2012; Harris, Pepper & Maack, 2008; O'Connor, O'Connor & Marshall, 2007; Randles et al., 2010). One study found that perfectionistic rumination mediated the relationship between perfectionism and increased negative affect and stress which in turn lead to psychosomatic symptoms (Flett, Molnar, Nepon & Hewitt, 2012). Moderating effects of perfectionism and rumination on distress have also been found. Olson and Kwon (2008) examined the role of life stressors, rumination and perfectionism in longitudinally predicting depression and found three-way interactions for both socially prescribed and self-oriented perfectionism such that individuals who were highly perfectionistic and experienced

high levels of brooding rumination also experienced the highest levels of depressive symptoms when under stress.

***Thoughts about others.*** Perfectionists are also likely to respond to social exclusion with thoughts about others, including thoughts about the people who exclude them, but also thoughts about their level of connectedness in general. Nepon, Flett, Hewitt & Molnar (2011) found that all trait and self-presentational dimensions of perfectionism were associated with increased tendency to ruminate about a past interpersonal transgression, suggesting that perfectionists have a tendency to rehash their negative interpersonal experiences. Negative social feedback was also measured in this study and although moderational analyses were not conducted, socially prescribed perfectionism and all three self-presentation facets were correlated with the tendency to report experiencing negative social feedback (e.g., criticism from others). Nepon and colleagues also found interpersonal rumination to be relevant for perfectionists in that it appears to partially mediate the relationship between perfectionism (nondisplay of imperfections, specifically) and depressive symptoms.

The PSDM would suggest that perfectionists are prone to feelings of reduced social support, and this assertion has been supported empirically (Sherry et al., 2008). Interpersonal aspects of perfectionism tend to be related to lower levels of perceived social support (Casale, Fioravanti, Flett & Hewitt, 2014; Dunkley, Sanislow, Grilo, McGlashan, 2006; Flett, Druckman, Hewitt & Wekerle, 2012; Molnar, Sadava et al., 2012; Sherry et al., 2008). Given this, It would make sense that they may be vulnerable to further decreases in social support in response to social exclusion.

***Thoughts about self in relation to others.*** Responses to exclusion may also be reflected in our self-concept, defined by Piers and Harris (1969) as “a relatively stable set of self-attitudes reflecting both a description and evaluation of one’s own behaviour and attributes” (p. 1). In this

case we refer to the self-concept as purely the descriptive aspects of the self, while the evaluative component reflects self-esteem (Beane & Lipka, 1980). Individuals experiencing lower self-esteem are likely to conceptualize themselves in more negative ways than individuals with high self-esteem. In addition, theory suggests it is possible that in response to social exclusion, relational or social roles may be made more salient (Baumeister & Leary, 1995), especially for perfectionists, who are typically preoccupied with interpersonal acceptance. In other words, when perfectionistic individuals are rejected, the aspects of self-concept that are more salient are likely to involve the individual's connection to others or group memberships (e.g., as a mother, sister, Roman Catholic, or Canucks fan) than descriptors involving self-definitional roles (e.g., baseball player, scientist, etc.). This is often referred to as interdependent self-construal (Cross, Bacon & Morris, 2000) or allocentrism (Triandis, Leung, Villareal & Clack, 1985), which is considered similar to interdependence but reflects the cultural construct of collectivism at an individual level. For our purposes we make no large distinction between interdependence and allocentrism. In considering both self-concept and self-esteem together, given the self-critical tendencies most perfectionists exhibit (Hewitt & Flett, 1991a), we might expect interpersonally-oriented perfectionists to both conceptualize themselves more in terms of their interdependence with others *and* evaluate themselves more negatively in the context of those relationships after social rejection.

In sum, perfectionistic individuals are likely to respond to threats of social exclusion with reduced self-esteem, particularly self-esteem regarding their ability to maintain positive social relationships. Their current relationships may also be increasingly salient for them, both generally and how they perceive themselves in terms of their interpersonal relationships after experiencing social exclusion. This is likely to be particularly relevant for individuals high on socially prescribed perfectionism and the self-presentational facets. Perfectionists are expected to

demonstrate a variety of cognitive reactions to social exclusion feedback. It is thought that this will be reflected at both an evaluative level and a descriptive level. Specifically, it is anticipated that, especially for the individuals high on the interpersonal dimensions of perfectionism, social exclusion will result in increased negatively toned thoughts about themselves and their interpersonal competence, about their relationships, and about a deep-seated need to be perfect. This is likely to be evident both in their responses to structured self-report measures of perfectionistic thinking and social self-esteem, but also in more open-ended measures of cognitive responses including simply listing thoughts and self-descriptive statements as they occur (e.g., Cacciopo & Petty, 1981; Kuhn & McPartland, 1954).

***Implicit reactions to social exclusion.*** Much of the research in social exclusion has focused on the effects detectable through either behavioural measures or through self-report questionnaires. However, Freud (1899/2010) and later theorists (e.g., Atkinson, 1958; Maslow, 1943; McLelland, 1985; Murray, 1938) have conceptualized motivational processes that operate on an unconscious or implicit level. McLelland, Koestner & Weinberger (1989) described implicit motives as processing that occurs outside of conscious awareness that directs individuals to engage in behaviours and pursue goals that are congruent with the underlying motive. For example, an individual who is implicitly motivated towards achievement might find him or herself drawn towards more challenging courses at university. Implicit motives are in contrast with self-attributed (explicit) motives, which are consciously accessible value-judgments towards certain goal pursuits over others. McLelland and colleagues (1989) also described implicit motives as guided more by automatic associations between certain types of goal pursuits and positive emotional rewards, while explicit motives, or values, are guided by conscious cognitive processes and explicit social incentives. In other words, implicit motives guide us towards goals because we have learned through conditioning and experience that they are emotionally

rewarding, while explicit motives are guided more by our conscious expectations and beliefs about what we want and how we should behave.

In the last 15 years, a new method of measuring implicit attitudes has evolved out of an underlying cognitive-association network theory (Greenwald et al., 1998; Greenwald, Banaji et al., 2002; see Banse & Greenwald, 2007 and Nosek, Greenwald & Banaji, 2005 and 2007 for more methodological reviews). The underlying theory is based on the existence of a semantic network in the mind that represents connections of varying strengths between concepts (referred to as social knowledge structures). For example, an individual's concept of his or her local mail delivery person might be connected to other conceptual attributes such as the gender of the person, physical attributes such as brown hair colour, blue eyes, or other abstract conceptual constructs such as friendliness, timeliness, and so on. The self also exists in this network as a conceptual node that is connected to other attribute nodes that represent descriptive elements of the self-concept (e.g., mother, female, athletic, old, strong, and so on). The self (and other conceptual nodes) may also be linked to valence attributes (i.e., good or bad) to represent general positive or negative associations with a given conceptual node. Associations between concepts vary in strength such that for some people, the concept of 'athlete' is strongly associated with a positive valence, while for others, the association may be less strong or even negative. The Implicit Association Test (IAT; Greenwald, McGhee & Schwartz, 1998) is a computer based task that uses latencies in response times when categorizing associated attributes and concepts to measure implicit motives.

The IAT and other methodological advances in the implicit measurement of attitudes has resulted in an explosion of literature in the realm of implicit stereotypes and prejudice (Baron & Banaji, 2006; Gawronski, 2002; Greenwald, McGhee & Schwartz, 1998), consumer attitudes (Gibson, 2008; Perkins, Forehand, Greenwald & Maison, 2008), self-esteem (Greenwald &

Farnham, 2000), and underlying motivation (Aspden, Ingledew & Parkinson, 2011; Sheldon, King, Houser-Marko, Osbaldiston & Gunz, 2007; Slabbinck, De Houwer & Van Kenhove, 2011). However, only one study to date has measured implicit perfectionism (De Cuyper, Pieter, Claes, Vandromme, & Hermans, 2013). The current study provides a unique opportunity to measure perfectionistic tendencies beyond that which is accessible using traditional self-report instruments.

One practical issue that has been identified with the IAT is that it is only able to assess bipolar target concepts (e.g., black vs. white faces) with bipolar attributes (e.g., good vs. bad). As a solution to this problem, a variant of the IAT was developed to assess concepts which either do not have a natural polar opposite or in situations where the measurement of an absolute attitude is desired (Karpinski & Steinman, 2006). This Single Category IAT (SC-IAT; Karpinski & Steinman, 2006) has since been carefully evaluated in terms of its reliability and validity (Steinman & Karpinski, 2008) and has been used to measure a variety of implicit attitudes including implicit motives (e.g., Aspden, Ingledew & Parkinson, 2011).

The assessment of implicit attitudes is important because it provides information on an individual's internal experience beyond what is accessible by self-report. Typically implicit and explicit motives are only modestly correlated, if at all, which suggests they tap different motivational systems in the mind (Sheldon et al., 2007; Slabbinck et al., 2011). As perfectionism is thought to be motivated by a strong need to belong and characterized by an anxious concern about making mistakes and given the long term stability and early development of perfectionistic behaviour, these attitudes should be deeply ingrained in the way perfectionists' minds work and therefore detectable at an automatic and unconscious level of processing (Bargh & Barndollar, 1996). Further, results of implicit association testing have been shown to be responsive to laboratory manipulations (Bluemke, Friedrich & Zumbach, 2010; Ito, Chiao, Devine, Lorig &



Cacioppo, 2006; Karpinski & Hilton, 2001; Prestwich, Perugini, Hurling & Richetin, 2010; Rudman & Lee, 2002) and saliency characteristics (Rothermund & Wentura, 2004) which presents the possibility that social exclusion might alter the strength of certain associations, particularly underlying associations indicative of perfectionistic personality.

*Implicit concern over mistakes.* Very little research exists measuring implicit perfectionistic tendencies; however, Hewitt and Genest (1990) found support for an active ideal-self schema that processes and aids in the recall of perfectionistic content for perfectionists, which supports the idea that there are underlying processing that perfectionists use automatically for processing perfectionistic information. This was also tested by Besser, Flett, Guez and Hewitt (2008). They found that socially prescribed perfectionists and individuals experiencing high levels of perfectionistic thoughts had greater recognition memory for perfectionistic content while in a negative mood compared to a neutral mood. It is likely then that after social exclusion, perfectionistic individuals are likely to be attuned to negative stimuli indicating a lack of perfection. The one study of implicit perfectionism using a single-category variant of the implicit association test (De Cuyper et al, 2013) found that implicit perfectionism was negatively correlated with a higher order, evaluative concerns dimension of perfectionism (an additive combination of socially prescribed perfectionism and an attitudinal measure of concern over mistakes, doubts about actions, parental expectations and criticism), but not a combination of self-oriented perfectionism, other-oriented perfectionism, and a measure of high personal standards (which they called achievement striving perfectionism). This perfectionism IAT also predicted increased GPA and fewer failed exams at the end of the school year. One critique of this attempt to measure perfectionism implicitly is that it actually measures implicit achievement orientation, since the lexical exemplars they use to describe the perfectionism target concept included ambitious, driven, competitive, and purposeful. This makes it difficult to differentiate

between the extreme nature of perfectionism and simply striving for excellence in achievement (see Blasberg, Hewitt, Sherry & Flett, 2008; 2009; 2014; in press).

Perhaps a more accurate way an implicit perfectionistic motive can be conceptualized is as the strength of the automatic association between mistakes and a negative valence characteristic (i.e., mistakes = bad). Frost and colleagues (1990) suggested that concern over mistakes is at the core of the perfectionism construct. Therefore, perfectionists are likely to associate mistakes with negativity. Furthermore, because perfectionists are thought to be motivated to avoid rejection and seek belonging by avoiding mistakes and achieving perfection, social exclusion is likely to activate automatic cognitive structures responsible for the detection of mistakes. This should theoretically strengthen associations between negativity and mistakes using a single-category implicit association test. As mistakes are generally not seen as positive events by most people, it is expected that most individuals will have a strong negatively-valenced association for errors, but that the association will be stronger in perfectionists and even stronger in perfectionists who experience social exclusion.

*Implicit need to belong.* While an implicit motivation to belong has not been explicitly studied in the literature, intimacy and affiliation motives have both been measured using an implicit association test framework (Aspden et al., 2011; Sheldon et al., 2007; Slabbinck et al., 2011) but each has approached this using different methods. For instance, Aspden et al. (2011) used a single-category IAT test with words selected to reflect different aspects of the intimacy motive. These words were paired with target attributes reflecting the self versus other people, reflecting the degree of association between trait intimacy motivation and the self. However, there are some conceptual issues with using the self as an associational target to measure implicit attitudes. First, unless explicitly controlled for, the tendency to view the self in a positive light can confound the self-target associations with implicit self-esteem (Schnabel, Asendorpf &

Greenwald, 2008). Second, the self is a complex construct composed of different schematic elements (Markus, 1977; Markus & Nurius, 1986; see also Higgins, 1987) such as the actual self (who we think we are presently) the ideal self (who we would ideally like to be), and the ought self (our perceptions of who we are expected to be by others). For perfectionists, who seem to process information using an activated ideal self-schema (Hewitt & Genest, 1990), it may be difficult to tease apart associations between belongingness and the ideal self, and belongingness and the actual self.

Furthermore, at least one study supports the use of attitudinal valence targets (e.g. good/bad) over self-other targets when measuring implicit attitudes (Slabbinck et al., 2011). Slabbinck found that implicit association tests of power motivation demonstrated greater congruence with other explicit and implicit measures of power motivation when an attitude test (good vs. bad) was used over a self-association test. This suggests attitudinal measures might be more appropriate for the assessment of underlying motives, and may also avoid some of the problems with using self-related targets in the IAT. In light of this, it makes sense to conceptualize an implicit need to belong as a tendency to associate belongingness stimuli with a positive valence characteristic. This has the added benefit of being comparable to our conceptualization of implicit perfectionism.

While many theorists have written about perfectionism and a need for belonging or approval, and some studies have looked at the effect of social connection and belongingness on various outcomes in general (Blackhart et al., 2009; Gerber & Wheeler, 2009) and for perfectionists in particular (McGee, 2007; Roxborough et al., 2012; Sherry et al., 2008) no empirical studies have examined the effect of social exclusion on underlying belongingness needs or how perfectionism affects that relationship. However, one study that has looked at the

role of implicit/explicit motive congruency suggests that implicit belongingness motives may be especially important for perfectionists.

Langan-Fox and Canty (2010) found increased levels of depression for individuals who scored highly on a measure of perfectionistic personal standards (Temperament and Character Inventory – Revised; Cloninger, 1999), and high on a self-report measure of affiliation motivation, but low on a measure of implicit affiliation motivation. Interestingly, when implicit and explicit motives were congruent, high personal standards seemed to provide a protective effect against depression. Although this research was limited by the nature of the instrument measuring perfectionism (primarily tapping high achievement standards without the interpersonal elements of perfectionism) this study highlights the importance of considering implicit attitudes in perfectionism research, especially attitudes related to social belonging.

The assessment of implicit attitudes should be especially interesting with regard to self-oriented perfectionism. Although self-oriented perfectionism has not typically shown the same relationships with social disconnection as the interpersonal dimensions of perfectionism have, it may be that for self-oriented perfectionists, the response to social exclusion is only moderated at levels of processing outside of conscious awareness. Anecdotal evidence from clinicians who treat perfectionism suggests social disconnection themes are less accessible for self-oriented perfectionists at first (Hewitt et al., in press). If so, we could expect to see little difference on self-report measures between socially excluded self-oriented perfectionists and non-perfectionistic individuals, but significant differences between them on implicit measures of belonging and perfectionism. For both interpersonal and intrapersonal aspects of perfectionism implicit assessment measures are expected to provide valuable insight into the experience of socially excluded perfectionists.

## Summary

Perfectionism is a multidimensional personality style with trait, self-presentation and cognitive information processing aspects. Perfectionistic behaviour is thought to be underpinned by a deep-seated need to be loved, to be accepted, and to belong. This confers significant vulnerability to stressors for perfectionists according to specific vulnerability, diathesis-stress, and perfectionism social disconnection models, especially for interpersonal stressors like social exclusion. This is especially true for individuals high on dimensions that reflect interpersonal elements of perfectionism (i.e. socially prescribed perfectionism and the perfectionistic self-presentation facets). For self-oriented perfectionism, the two models predict conflicting results. Other-oriented perfectionism, with an external focus away from the self, is unlikely to confer any additional vulnerability to social exclusion.

The internal response to social exclusion is thought to include both cognitive and affective elements. Affectively, interpersonally-oriented perfectionists are likely to experience increased emotions reflecting rejection and unlovableness, shame, anger and loneliness in response to social exclusion. According to the specific vulnerability model, self-oriented perfectionists are unlikely to experience social exclusion any more aversively than the average person, while the PSDM predicts self-oriented perfectionists will experience a similar reaction to social exclusion as individuals high on the interpersonal dimensions of perfectionism. However, given the self-critical nature of self-oriented perfectionists and previous research findings, self-oriented perfectionists may respond more with self-critical emotions and guilt than rejection-themed emotions and shame.

The cognitive response to social exclusion is likely to be evidenced by an increased saliency of thoughts about relationships, social roles and interdependently-themed self-concept. Individuals are also likely to experience more negative thoughts about their interpersonal

abilities. Perfectionism is expected to amplify this relationship. Perfectionists are also expected to experience increased perfectionistic thought content after social exclusion. These cognitive reactions are also expected to be expressed at a nonconscious level as assessed by implicit association tests for perfectionistic and belongingness motives. It is possible that for intrapersonal dimensions of perfectionism, moderating effects on the experience of social exclusion are only detectable at an implicit level.

### **Overview of the Current Study**

The goals of the current research are therefore to provide an accounting of the affective and cognitive reactions of perfectionists experiencing social exclusion and inclusion and to test hypotheses derived from developmental theory of perfectionism, diathesis-stress findings, the PSDM, and current knowledge regarding the general internal emotional and cognitive experience of perfectionists. We used the Cyberball paradigm (Williams, Cheung & Choi, 2000; Williams & Jarvis, 2006) to provide participants with either an artificial social exclusion or inclusion experience, and then measure their reactions.

The Cyberball paradigm involves participants playing a computerized game of catch with what appear to be two other participants represented by humanoid icons and names on the computer screen. A virtual ball is then “tossed” from person to person for the duration of the game while the participant is told to visualize a real game of catch as vividly as possible. Unbeknownst to the participant, the other two players are computer controlled and the number of times the ball is passed and to whom is determined by an automated script. The participants who were randomly assigned to the exclusion condition had the ball passed to them four times initially, but then were not passed the ball for the rest of the experiment (which lasts for approximately five minutes). Participants in the inclusion condition had the ball passed to them by each computer participant sixteen times (62%) of the time to give the impression that

participants were passed the ball even more than would be expected equally. After the game, the inner affective and cognitive experiences of participants were assessed. Participants then completed a manipulation check and were fully debriefed as to the nature of the study. Because previous research has shown that the Cyberball exclusion effect typically only lasts for 10-15 minutes (Lawrence, Channen & Allen, 2011; Sethi, Moulds & Richardson, 2013; Wirth & Williams, 2009; Zwolinski, 2014), we assessed affective reactions in one sample and implicit and explicit cognitive reactions in a second sample in order to allow enough time for participants to complete the measures while they are still affected by the Cyberball experience.

In the first sample, participants' affective experience was measured using self-report rating scales and visual analogue scales measuring levels of anacritic and introjective mood states, self-conscious emotions of shame, guilt, anger, and loneliness. In the second study, measures of cognitive reactions will include the experience of negative self-evaluative thoughts social self-esteem, and thoughts about being perfect, as well as thoughts about others and perceived social support. These will be measured using self-report and open-ended measures. In addition, the degree of interdependence expressed in individuals' self-concept (i.e., to what degree are relationships with others incorporated into one's self-concept after exclusion) will also be measured using a self-report questionnaire and an open-ended measure. Finally, implicit reactions to social exclusion will be measured using two single category implicit association tests (Karpinski & Steinman, 2006) to measure implicit attitudes about belongingness and perfectionistic concern about mistakes.

We expect both trait and self-presentational aspects of perfectionism to moderate the relationship between social exclusion, mood and implicit and explicit beliefs and attitudes. However, the self-presentational aspects of perfectionism, being the aspects of perfectionism that are expressed interpersonally and reflect an overt need to be accepted by and/or avoid rejection

from others, should demonstrate some of the strongest relationships to the predicted affective and cognitive reactions to social exclusion.

We are primarily interested in the impact of perfectionistic personality as it is thought to co-occur naturally with other higher and lower-order personality factors that may also impact the experience of social exclusion. It is therefore important to consider the possibility that hypothesized relationships between perfectionism and social exclusion might be due to these co-occurring factors (i.e., neuroticism, need to belong, rejection sensitivity, or more chronic mood effects) even if our primary analyses do not attempt to hold these variables constant. Given past research on the incremental validity of perfectionism dimensions in predicting a variety of outcomes (Flett et al., 1998; Hewitt et al., 2003; Page, Bruch & Haase, 2008; Rice, Ashby and Slaney 2007; Sherry et al., 2007; cf. Enns, Cox and Clara, 2005) we do not expect our findings to be impacted significantly by including personality and mood covariates in our predictive models, however to test this empirically, we measured neuroticism, need to belong, rejection sensitivity along with perfectionism dimensions for use in secondary analyses to determine any effects of shared variance among these factors.

## **Hypotheses**

Based on the literature reviewed above, the following hypotheses are proposed:

**General hypotheses regarding affective reactions to social exclusion (H1).** With regard to the affective consequences of social exclusion (by Cyberball), we would expect a main effect of social exclusion (i.e., Cyberball condition) on state affect including higher predicted levels of anaclitic affect, shame, anger, and, loneliness. We would expect these effects to be evident even after controlling for maladaptive higher-order personality factors such as trait neuroticism, relevant lower order factors such as the need to belong and rejection sensitivity, and symptoms of psychological distress (i.e., depression and anxiety).



**Affective moderational hypothesis for dimensions of perfectionism (H2).** Individuals high on the measured dimensions of perfectionism are likely to experience social exclusion more negatively than individuals who are low on perfectionism dimensions. Specifically, it is expected that components of perfectionism will interact with social exclusion to predict a more intense affective response such that affects as listed in H2 are more intense as perfectionism increases.

**Hypothesis regarding the chronicity of affective exclusion effects (H3).** Perfectionistic individuals are likely to experience the negative affective sequelae of social exclusion for longer than individuals who are not highly perfectionistic. Specifically, it is expected that a three-way interaction between respective dimensions of perfectionism, experimental condition, and post-Cyberball negative affect will be found such that as perfectionism increases, the slope of the relationship between negative affect measured immediately after Cyberball and negative affect measured at the very end of the experiment will be stronger in the exclusion condition compared to the inclusion condition.

**General hypotheses regarding explicit cognitive reactions to social exclusion (H4).** Perfectionistic individuals are also likely to experience more intense negative cognitive reactions in response to exclusion compared to nonperfectionists. Specifically, we also expect to see a main effect of social exclusion on explicit thoughts, attitudes, and self-concept including: reduced social self-esteem, reduced perceived social support, increased interdependent and allocentric self-construal, increased negatively toned thoughts about self and others.

**Cognitive moderational hypotheses for dimensions of perfectionism (H5).** It is expected that perfectionism will interact with social exclusion to predict a more intense cognitive response such that cognitive effects as listed in H4 are more intense as perfectionism increases. In addition, perfectionism should predict increased perfectionistic thoughts in response to social exclusion.

**General hypothesis regarding change in implicit attitude towards belonging and mistakes in response to social exclusion (H6).** Specific implicit reactions are also expected for socially excluded individuals such that the association between implicit belonging and positivity should increase in strength after being excluded compared to being included.

**Moderational hypotheses regarding changes in implicit attitudes towards belonging and mistakes in response to social exclusion as a function of perfectionism (H7/H8).** We also expect perfectionism dimensions to have specific moderating effects on implicit attitudes towards belonging and mistakes in response to social exclusion. Specifically, we expect perfectionists will demonstrate a stronger implicit association between belonging and positivity after being socially excluded compared to when included (H7). We also expect perfectionists will demonstrate a stronger implicit association between mistakes and negativity after being socially excluded compared to when included (H8).

## **Methods**

### **Overview**

In order to test the moderational effects of perfectionism on potential affective and cognitive effects of social exclusion, two separate samples were recruited. Both underwent identical initial procedures and exclusion paradigm. One sample measured participants' affective reactions to exclusion whereas the other measured cognitive reactions at both implicit and explicit levels. Participants were randomly assigned to either the affective sample (sample one) or the cognitive sample (sample two).

### **Participant Recruitment**

Based on Erickson's (1968) developmental theory that suggests individuals in early adulthood are primarily facing the developmental challenge of achieving intimacy with others, we restricted our sample to young adults aged 18 to 29. Participants were recruited from a departmental subject pool (81%) and from a paid study e-mail list (19%), and received either course credit or a small honorarium for their participation. We recruited 363 participants overall and screened out 37 individuals who had been recently experiencing moderate symptoms of depression or anxiety at time one. Of the remaining 326 participants, 169 were randomly assigned to the affective outcomes sample and 157 were assigned to the cognitive outcomes sample and instructed to return for time two.

Of the participants who completed time one measures in the affective sample, 128 (76%) returned approximately one week later to play Cyberball and complete outcome measures. One participant was accidentally debriefed before playing Cyberball and another could not complete the experiment because of a computer malfunction. This left 126 participants who successfully completed the experiment in the affective sample, 55 of whom were then randomly assigned to the social inclusion condition, and 71 to the social exclusion condition.

Of those assigned to the cognitive outcomes sample, 152 (97%) returned to play Cyberball and complete the cognitive outcome measures; however another two participants did not complete the study due to a computer malfunction. Participants who completed all measures ( $n = 150$ ) were randomly assigned to each Cyberball condition, with 75 participants in each condition.

### **Participant Demographics**

Seventy-three percent of participants were female and the average age across both samples was 20.21 years with a standard deviation of 2.48. Sixty-three percent of participants reported their relationship status as single, while 33% reported dating someone, 3% reported cohabitating or being married, and 1% did not report their relationship status. The median family income bracket in both samples was between CDN\$60,000 and CDN\$79,000; however 21% of participants overall did not report their family income. The majority of participants (62%) were full-time students and did not work, while about a third of participants (28%) reported either full or part-time employment as well. A smaller percentage of students were either only part-time students (4%) or were part-time students while employed either full or part-time (3.5%). With regards to academic year and subject of study, 43% percent of participants were in their first year of university, 20% were in their second year; 16% were in their third year; 9% were in their fourth year; and 9% were in their fifth year or more. Twenty-four percent of participants declared psychology as their major, while 45% of participants declared other majors and 31% had not declared a major.

Asian heritage was the most commonly reported ethnicity (72%) with Caucasian heritage (17%) and mixed heritage (5%) being second and third respectively. A small number of participants reported middle eastern heritage or other heritage (5%) or did not report their ethnicity (1%). Fifty-two percent of students reported being born in Asia, while 40% reported

being born in North America with the remainder reporting origins in Europe, the middle east, or other regions. For those born outside of North America, the average length of time in Canada was 8.66 years ( $SD = 5.79$  years); however, 49% of participants did not respond to this question. With regards to language, 59% of participants reported speaking English as a second language. Of these participants, 50% did not speak English at home and reported having spoken English for an average of 12.71 years ( $SD = 5.08$  years).

### **Time One Materials (Samples One and Two)**

**Screening measures / mood covariates.** All participants completed measures of depression and anxiety as indicators of current psychological symptoms in order to exclude students for whom participation may be too distressing. These measures were also used for supplementary analyses covarying perfectionism-related personality and psychopathology variables in regression analyses testing the main study hypotheses.<sup>1</sup>

***The Beck Depression Inventory II.*** The Beck Depression Inventory II (BDI-II; Beck, Steer & Brown, 1996) was used as a screening measure to detect individuals suffering from more than minimal or mild symptoms of depression. The BDI-II is a popular and easy to administer measure of depression symptomatology that has been validated for use in clinical and nonclinical samples (Beck, Steer & Brown, 1996). Respondents rated the degree to which they had been experiencing 21 different depressive symptoms over the previous two weeks. Reported coefficients alpha of .89 to .91 for the BDI-II suggest its test scores are internally consistent (Dozois, Dobson & Ahnberg, 1998; Steer & Clark, 1997; Storch, Roberti & Roth, 2004). Test-retest reliability coefficients between .74 and .96 for intervals between 7 and 12 days have also been reported (Leigh & Anthony-Tolbert, 2001; Sprinkle et al., 2002). Concurrent validity for the BDI-II test score inferences is evidenced by strong correlations with levels of depressive symptoms as measured by a structured interview measure of depression (Sprinkle et al., 2002).

***The Beck Anxiety Inventory.*** The Beck Anxiety Inventory (BAI; Beck, Epstein, Brown & Steer, 1988) is a 21-item measure of the severity of anxiety symptoms. Participants rated the degree to which they have experienced each of the symptoms (e.g. feeling hot, nervous, unsteady, terrified) in the past week. Ratings are on a four point scale from “not at all” to “severely-I could barely stand it.” Psychometric properties of the scale scores are excellent with reported coefficient alpha of .92 and one week test-retest correlations of .75 (Beck et. al., 1988). A variety of studies have supported the reliability and validity of the BAI scores (e.g., Beck & Steer, 1991; Fydrich, Dowdall & Chambless, 1992; Sanford, Bush, Stone, Lichstein Aguiard, 2008).

**Personality covariates.** In order to ensure any observed effects of perfectionism were not due to other personality factors such as neuroticism, rejection sensitivity or a need to belong, measures of these constructs were administered at time one alongside the perfectionism measures.

***Neuroticism scale from Big Five Inventory.*** The Neuroticism subscale of the Big Five Inventory (BFI; John, Donahue & Kentle, 1991; John & Srivastava, 1999) is an 8-item measure of neuroticism. Respondents rate their agreement with phrases that complete the stem “I see myself as someone who...” and examples from the neuroticism scale include “worries a lot” and “can be tense.” Ratings are completed along a five-point scale from “disagree strongly” to “agree strongly.” The BFI neuroticism scores have excellent internal consistency, with coefficients alpha averaging around .84 (John & Srivastava, 1999; Kendler, Myers & Reichborn-Kjennerud, 2011). Three month test-retest reliabilities are also high ranging from .80 to .90 (John & Srivastava, 1999). Strong correlations between the BFI Neuroticism subscale and two other popular five-factor model instruments (i.e., the NEO-Five Factor Inventory by Costa & McCrae, 1992 and the Trait Descriptive Adjectives by Goldberg, 1992) support the convergent validity of

the neuroticism subscale ( $r$ 's averaging .88 depending on the instrument; John & Srivastava, 1999).

***Need to Belong Scale.*** The Need to Belong Scale (NBS; Leary, Kelly, Cottrell & Schreindorfer, 2006) is a ten-item scale assessing an explicit need to belong. Participants rate items (e.g., "I have a strong need to belong") on a five-point scale anchored by "strongly disagree" to "strongly agree", some items are reversed-scored and all items are summed to create a total score. The scale has demonstrated adequate reliability, with one study reporting a coefficient alpha of .83 (Pickett, Gardner & Knowles, 2004). Leary and colleagues (2006) also demonstrated that the NBS correlated with but is distinct from measures of other constructs which reflect an attraction towards social contact (e.g. extraversion, need for affiliation).

***Rejection Sensitivity Questionnaire.*** The Rejection Sensitivity Questionnaire (Downey & Feldman, 1996) was originally an 18-item scale measuring anxious expectations of being rejected by important others designed for use with older adolescents and college students. The scale was reduced to an eight-item version by including only the items with the highest factor loadings on the full scale (Romero-Canyas et al., 2010). For each scale item, participants read a brief scenario (e.g., "You ask your boyfriend/girlfriend if he/she really loves you") and answer two questions, one measuring the anxiety aspect (e.g., "How concerned or anxious would you be that your boyfriend/girlfriend would say yes?") and the other measuring expectations ("I would expect that he/she would say yes sincerely"). The expectations question is reverse scored and a cross-product is generated from the two responses. These products are summed for each scenario to create a total score. The short version has demonstrated adequate internal reliability with a previously reported coefficient alpha of .77 (Romero-Canyas et al., 2010) and the original demonstrated good three week test-retest reliability of .83 in a university sample (Downey & Feldman, 1996). As evidence of construct validity, Downey and Feldman (1996) found that

individuals high on their original RSQ scale were more likely to interpret ambiguous social feedback as rejection, suggesting that rejection sensitivity reflects a readiness to perceive rejection. Interestingly, the RSQ did not correlate with the NBS in the affective sample ( $r = .02$ ,  $ns$ ) and was correlated only weakly with NBS in the cognitive sample ( $r = .18$ ,  $p < .05$ ). This suggests the two covariates may be measuring different aspects of the motivation to obtain and maintain social connections.

### **Perfectionism measures.**

***The Multidimensional Perfectionism Scale.*** The Multidimensional Perfectionism Scale (MPS; Hewitt & Flett, 1991a) is a 45-item measure that assesses all three trait dimensions of perfectionism. 15 items describe each of the trait dimensions: self-oriented perfectionism (SOP; e.g., “One of my goals is to be perfect in everything I do”), socially-prescribed perfectionism (SPP; e.g., “The people around me expect me to succeed at everything I do”), and other-oriented perfectionism (OOP; e.g., “I have high expectations for the people who are important to me”). Participants rate agreement with items on a seven point Likert scale and ratings are summed to generate subscale scores. Some of the items are reverse-scored. Reliability and stability of the test scores is well-established with internal consistency coefficients (Cronbach’s alpha) typically above .80 for all three dimensions (Hewitt & Flett, 1991a; Mor, Day, Flett & Hewitt, 1995; Sherry, Hewitt, Flett & Harvey, 2003; Wade, Kyrios & Jackson, 1998) and three-month test-retest correlations averaging above .80 across dimensions (Cox & Enns, 2003; Einstein, Lovibond & Gaston, 2000; Flett, Hewitt, Blankstein & Mosher, 1995; Hewitt & Flett, 1991a).

Validity of the test-score inferences have been supported in both clinical and university samples. Convergent validity is supported by the fact that all three dimensions demonstrate moderate to strong correlations with other measures of perfectionism (Frost et al., 1993; Hewitt & Flett, 1991a). Discriminant validity among the dimensions is supported by findings that only



socially prescribed perfectionism was found to correlate with fear of negative evaluation, only self-oriented perfectionism was associated with ratings of the importance of meeting one's own performance standards and goals, and only other-oriented perfectionism was associated with tendencies towards authoritarianism and dominance (Hewitt & Flett, 1991a). Finally, the dimensions do not appear to be vulnerable to social desirability bias (Hewitt & Flett, 1991a; Hewitt, Flett & Blankstein, 1991).

***The Perfectionistic Self-Presentation Scale.*** The Perfectionistic Self-Presentation Scale (PSPS; Hewitt et al., 2003) is a self-report scale with subscales that measures the three facets of perfectionistic self-presentation. Perfectionistic Self-Promotion (PSP; e.g., "I always try to present a picture of perfection"), Nondisplay of Imperfection (NDP; e.g., "I hate to make errors in public"), and Nondisclosure of Imperfections (NDC; e.g., "I try to keep my faults to myself"). Items are rated on a seven point Likert scale based on the degree of participant agreement. Internal consistency of the subscale scores as measured by coefficients alpha have been reported to range from .72 to .91 in one study (Hewitt et al., 2003), from .86 to .93 in another study (Bardone-Cone, Sturm, Lawson, Robinson & Smith, 2010) and from .83 to .85 in a third (Besser, Flett & Hewitt, 2010). Three week test-retest coefficients are reported to average above .80 for all three facets (Hewitt et al., 2003). The subscale scores are typically moderately intercorrelated which suggests some overlap in the subscales but also supports the uniqueness of the facets (Besser, Flett & Hewitt, 2010a; Hewitt et al., 2003). The self-presentational facets also demonstrate moderate to strong correlations with the perfectionism traits, yet still account for unique variance in self-esteem (Hewitt, Flett & Ediger, 1995), anxiety, and depression ratings (Hewitt et al., 2003). Construct validity is further supported by demonstrated correlations between a fear of expressing observable symptoms of anxiety in public and all three self-presentation facets (Flett, Greene & Hewitt, 2004). Discriminant validity between the facets is

supported by findings that only individuals who have difficulty verbally admitting mistakes (i.e., high on the nondisclosure facet) find clinical interviews particularly threatening (Hewitt et al., 2008) while only perfectionistic self-promotion and nondisplay of imperfections are related to increased thoughts about having cosmetic surgery performed (Sherry, Hewitt, Lee-Baggley, Flett & Besser, 2004). Finally, perfectionistic self-promotion is the only facet related to narcissism (Hewitt et al., 2003).

***The Perfectionistic Cognitions Inventory.*** The Perfectionistic Cognitions Inventory (PCI; Flett, Hewitt, Blankstein & Gray, 1998) is a 25-item measure designed to assess the frequency of automatic perfectionistic thought content reflecting activation of an ideal-self schema (Hewitt & Genest, 1990). Respondents rate the frequency with which they experience a variety of perfectionistic thoughts (e.g., “I should be perfect”, “Maybe I should lower my goals”, and “I should be doing more”) over the previous seven days on a five point scale from “not at all” to “all the time.” Reported coefficients alpha for the PCI range from .79 to .96 (Ferrari, 1995; Flett et al., 1998; Flett, Hewitt, Whelan & Martin, 2007). A three month test-retest correlation of .67 in a student sample suggests the PCI is an adequately stable measure of individual differences in perfectionistic thought content (Flett et al., 1998). The unitary factor structure of the PCI has also been replicated in both student and clinical samples (Flett et al., 1998; Flett et al., 2007). Validity evidence for the PCI is demonstrated by positive correlations with trait perfectionism and measures of automatic thoughts and negative correlations with indices of cognitive self-management (Flett et al., 1998). The PCI also demonstrates incremental predictive validity beyond trait perfectionism in that it significantly predicts unique variance in depression symptoms even after perfectionism traits have been controlled (Flett et al., 1998; Flett et al., 2007). Validity is also supported by findings that obsessive-compulsive clinical samples appear to have higher scores on the PCI than non-clinical samples (Ferrari, 1995). Finally, the

PCI does not correlate significantly with measures of socially desirable responding suggesting its scores are not vulnerable to impression management biases (Ferrari, 1995; Flett et al., 1998).

The original version of the PCI was administered during the initial measurement session as an indicator of a general tendency to experience perfectionistic cognitions, however a state version of the PCI that was developed by Besser, Flett, Hewitt & Guez (2008) will be used to measure participants' perfectionistic thought content in response to social exclusion.

***The Frost Multidimensional Perfectionism Scale.*** The Frost Multidimensional Perfectionism Scale (FMPS; Frost et al., 1990) is a 35-item measure of perfectionism that focuses on six different attitudinal aspects of perfectionism. The scale has six subscales that measure different perfectionistic attitudes. Two subscales are of particular interest to the current study. Specifically, Concern over Mistakes (CM; e.g., "I should be upset if I make a mistake"), and high Personal Standards (PS; e.g., "It is important that I be thoroughly competent in everything I do"). Concern over Mistakes and high Personal Standards were included as additional attitudinal measures of perfectionism that complement the comprehensive model of perfectionism as described previously (Hewitt et al., in press). Frost and colleagues (1990) identified concern over mistakes as the core component of perfectionism in their model, and both personal standards and concern over mistakes have been hypothesized as central by others (Shafran & Mansell, 2001). Both subscales have previously been used on their own as indicators of perfectionistic attitudes (e.g., Egan, Hattaway, & Kane, 2014; Tops, Koole & Wijers, 2013).

The subscale scores also show very good levels of internal consistency (i.e., Chronbach's alphas of .88 and .83 for CM and PS respectively in Frost et al., 1990) and test-retest reliability (10-week test-retest correlations of .78 for CM and .73 for PS, Rice & Dellwo, 2001). Finally, established moderate to strong correlations with other perfectionism measures suggest scores can

be considered valid indicators of perfectionism (Frost et al., 1990; Frost et al., 1993; Flett, Sawatzky & Hewitt, 1995).

### **Time Two Materials - Affective Criterion Measures (Sample One)**

Before and after playing Cyberball, participants completed the following visual analogue scales and questionnaire measures of anacritic and introjective affect, shame, guilt, anger, and loneliness.

**Visual analogue scales.** As brief measures of affective states over time, participants completed Visual Analogue Scales (VAS) to report feelings of rejection (anacritic affect), self-criticism (introjective affect), shame, guilt, anger and loneliness. Visual analogue scales are quick and easy measurement instruments that have previously been used to assess a variety of constructs including mood ( Kilgore, 1999), physical pain (Burckhardt & Jones, 2003), occupational stress (Lesage & Berjot, 2011) and quality of life (Ivarsson, Malm, Lindstrom & Norlander, 2010) in a variety of populations including university students (Quilter, Band, Miller, 1999). The visual analogue scale consists of a horizontal “slider” that participants can shift either left or right, with a pair of anchor points on either end (i.e., *not at all* and *extremely*). Participants are asked to indicate the intensity of a given affect using the slider and a score is derived by the distance from the endpoint to the participant’s slider position, typically starting from the leftmost, or “not at all” anchor point and using a metric of 0 to 100. As single item measures, traditional indicators of reliability such as internal consistency do not apply and validity is dependent on the particular emotion or construct being measured. However, many studies suggest the VAS is a valid and reliable method for measuring a variety of mood states (Kilgore, 1999; Luria, 1975; Wilner & Jones, 1996; Yamashita, Terao & Mizokami, 2012) in a variety of populations, including university students (Johnson, Vincent, Johnson, Gilliland & Schlegel, 2008; Quilter, Band & Miller, 1999). For example, Luria (1975) found the Visual Analogue

Mood Scale, a general measure of mood correlated strongly with the Self-Report Depression scale (Zung, 1965) in an inpatient sample. Test-retest reliabilities were also significant, ranging from .73 to .91 after two hours and .56 to .72 over 24 hours. Little and Macphail (1973) performed a similar analysis using the Beck Depression Inventory (Beck, Ward, Mendelson, Mock & Erbaugh, 1961) with outpatients and found similarly strong correlations. More recent tests of concurrent validity have shown similar results using visual analogue mood scales with college students (Johnson et al., 2008). Correlations between the VAS and the Likert-scale affect measures will help further establish convergent validity. The VAS measures were completed prior to playing Cyberball, immediately after playing Cyberball, and at the very end of the experiment (follow-up), an average of ten minutes post-Cyberball to test if perfectionism moderates the chronicity of post-Cyberball affect

**Introjective and anacritic affect.** Participants rated adjectives that capture anacritic and introjective mood states. As per Blatt and Shichman (1983), anacritic adjectives represent emotions with a focus on disconnection from others (e.g., “neglected”, “unwanted”, and “unloved”) while introjective adjectives represent emotions with a focus on self-definitional concerns (e.g., “self-critical”, “like a failure”, and “worthless”). The adjectives are rated on a seven-point scale anchored by *not at all*, *moderately*, and *extremely*. The summed ratings were taken as the individual scores for each mood state.

The adjective rating scales have been used in previous research (Kopala-Sibley & Zuroff, 2010; Zuroff & Mongrain, 1987; Zuroff, Igreja & Mongrain, 1990) and scores show good evidence of reliability and validity. Coefficients alpha for the two rating scales have been reported as .87 and .93 for anacritic and introjective mood respectively in one study (Kopala-Sibley & Zuroff, 2010), and .92 and .93 in another (Zuroff, Igreja & Mongrain, 1990). Zuroff and colleagues (1990) supported the construct validity of the rating scales’ scores by showing

that the anaclitic adjectives were predicted by a measure of dependency while the introjective adjectives were predicted by a measure of self-criticism. In the current sample, the ‘Rejected’ VAS was correlated .75 ( $p < .001$ ) with the Anaclitic subscale, and the “Self-Critical’ VAS was correlated .54 ( $p < .001$ ) with the Introjective subscale.

**State shame and guilt.** The State Shame and Guilt Scale (SSGS; Marschall, Sanftner & Tangney, 1994) is a 15-item scale that measures state levels of shame, guilt and pride, although only the shame and guilt subscales were used in the current study. Respondents rated five items for each emotion subscale on a five point Likert scale anchored by *Not feeling this way at all* to *Feeling this way very strongly*. Respective coefficients alpha for shame and guilt of .85 and .87 attest to the strong reliability of the subscale scores (Stoeber, Harris & Moon, 2007). Validity is supported by observed positive correlations between depression and shame and depression and guilt (Ghatavi, Nicolson, MacDonald, Osher & Levitt, 2002). In the current study, the state shame and guilt subscales were correlated with their respective VAS measures at .53 and .61 respectively ( $p < .001$ ).

**State anger.** The State Anger-Feelings subscale of the State/Trait Anger Expression Scale 2<sup>nd</sup> Edition (STAXI-2; Spielberger, 1999) is a 5-item subscale measuring current intensity of anger. Respondents rate items on a 4-point Likert scale from *not at all* to *very much*. A psychometric evaluation by Culhane and Morera (2010) found the State Anger scale scores demonstrate good internal consistency in two student samples ( $\alpha$ 's of .83 and .86). Culhane and Morera (2010) also reported moderate correlations between the State Anger subscales and two other dispositional anger measures, and the correlation between the ‘Angry’ VAS and State Anger in the current study was .70 ( $p < .001$ ). This evidence all suggests the State Anger subscale can be considered a valid indicator of state anger.

**State loneliness.** State Loneliness will be assessed using the Loneliness Rating Scale (LRS; Scalise, Ginter & Gerstein, 1984). The LRS consists of 40 adjectives that access four affective factors of loneliness: depletion (e.g., feeling “drained”, “empty”, or “hollow”), isolation (e.g., feeling “unloved”, “worthless”, “disliked”), agitation (e.g., “angry”, “nervous”, “humiliated”), and dejection (e.g., “discouraged”, “confused”, “miserable”). Although the initial scale was developed to measure both the frequency (from *never* to *often*) and intensity (from *bothersome* to *overwhelming*) of loneliness feelings, in this study the adjectives will be rated based on how participants are feeling in the immediate moment on a seven point Likert scale from *not at all* to *moderately* to *extremely*, which matches the anchors of the anaclitic and introjective mood state measure. As we are interested in the general affective experience of loneliness, the subscales will be summed to create a total loneliness score (in support of this, a principal components analysis of the items in the current data set extracted a single factor from the four subscale scores explaining 88.68% of total variance). Cronbach’s alpha for each of the subscales range from .82 to .89, suggesting the subscale scores are internally consistent (Scalise et al., 1984). Cronbach’s alpha for the total scale was .98 in the current sample. Convergent validity is supported by Cramer and Barry (1999) who found moderate to strong correlations between the four LRS subscales and six other loneliness measures. In the current study, the correlation between the total LRS scale and the Loneliness VAS scale was modest at .36 ( $p < .001$ ).

### **Time Two Materials – Cognitive Criterion Measures (Sample Two)**

In the second sample, participants completed questionnaire-based and open-ended measures of cognitions, attitudes and self-concept both before and after the Cyberball manipulation, in order to measure how social exclusion and perfectionism predicts changes in thought content, self-concept, and self-evaluation. Participants completed self-report measures of

positive and negative automatic thoughts and a state version of the PCI as previously described, a measure of state social self-esteem as a measure of self-esteem in relation to others, a measure of relational self-concept, and a measure of perceived social support. In addition, participants completed a thought listing task and the Twenty Statements Test to assess current thoughts and self-concept in an open-ended format and two SC-IAT measures designed to assess implicit attitudes about belonging and making mistakes.

### **Self-report measures.**

***Negative automatic thoughts.*** The Automatic Thoughts Questionnaire (ATQ; Hollon & Kendall, 1980) is a measure of negative automatic thoughts thought to reflect cognitive elements of depression. In this study, we used a modified, 11-item, state-version of negative automatic thoughts derived from the ATQ by Besser and colleagues (2008). Coefficient alpha for the brief state ATQ was .80 (Besser et al., 2008). In terms of validity, the ATQ has shown appropriate correlations with other outcome measures in past studies, for example, Besser and colleagues (2008) found that the ATQ was positively correlated with dysphoria, anxiety and hostility and negatively correlated with positive affect.

***Social self-esteem.*** The Current Thoughts Scale (CTS; Heatherton & Polivy, 1991) is a 20-item measure of state self-esteem measuring performance, appearance and social aspects of state self-esteem (Heatherton & Polivy, 1991). Only the eight-item social self-esteem subscale will be used in this study as an indicator of self-evaluation in relation to others. Respondents are instructed to respond as a measurement of what they “are thinking at this moment” and rate items (e.g., “I am worried what other people think of me”) on a five-point Likert scale anchored by *not at all* to *extremely*. Research has shown the subscale is responsive to situational changes in self-evaluation (Crocker, Cornwell & Major, 1993). Coefficients alpha of .92 have been reported for



the overall scale and test-retest coefficients for each of the subscales averaged between .62 and .71 (Heatherton & Polivy, 1991).

***Interdependent self-construal.*** The Relational-Interdependent Self-Construal Scale (RISC; Cross, Bacon & Morris, 2000) is a self-report scale that measures the tendency to include one's relationships with others in one's own self-concept. Participants rate items (e.g., "When I think of myself, I also think of my close friends or family") on a seven point Likert scale, based on the degree to which they agree or disagree with the statement. The scale was validated on eight samples of undergraduate students and its scores demonstrate excellent reliability and validity (Cross et al., 2000). Average internal consistency estimates (coefficient alpha) across the eight samples was .88. The scale scores are also relatively stable over time with average (across two samples) one-month test-retest reliability coefficients of .75. Factor analysis in a pooled sample of 2483 students generated a single-factor solution explaining 47% of the total variance in RISC scores (Cross et al., 2000). Cross and colleagues (2000) also found the validity of the test score inferences was supported by concurrent positive correlations with other measures of collectivism and interdependence, as well as a measure of collective self-esteem. The RISC scores were not correlated with measures of depression or wellbeing (satisfaction with life and global self-esteem) or with social desirability. Finally, predictive validity was established by showing the RISC scores positively predicted the number of relational factors listed on an open-ended measure of a decision making process, and predicted increased levels of both individual's and partner's relationship satisfaction (Cross, Bacon & Morris, 2000; Cross, Gore & Morris, 2003).

***Perfectionistic thoughts.*** As described previously in the description of the trait-PCI, the state version of the PCI scale will be administered to participants before and after they play Cyberball in order to measure perfectionistic thought content. The state version is an 18-item

scale reflecting current perfectionistic thoughts (e.g., “I should be perfect” and “I expect to be perfect”). Participants are instructed to rate each potential thought based on how frequently they are experiencing it right now or since the experimental session began. Coefficient alpha for the 18-item state version as reported by Besser and colleagues (2008) is .89 which suggests the state version scores are internally consistent. In the current sample, the state-version of the PCI was correlated .66 with the original version, while intercorrelations with other perfectionism dimensions ranged from .26 to .50 ( $p \leq .001$ ). This supports the convergent validity of the instrument as a measure of perfectionism-related cognitions.

***Perceived social support.*** In order to assess attitudinal aspects of loneliness, the Social Provisions Scale (SPS; Cutrona & Russell, 1987) will be used to measure perceived social support. Three subscales of the SPS have been used in previous perfectionism research to access self-reported levels of perceived social support (Dunkley et al., 2000; Sherry et al., 2008). Guidance (access to advice and information), Reliable Alliance (access to tangible assistance), and Attachment (feelings of emotional closeness and security). In the current sample as in Sherry and colleagues (2008) study, these subscales were combined to create an aggregate measure of perceived social support. The subscale scores have demonstrated adequate reliability in previous research with coefficients alpha of .65 to .80 in three studies (Cutrona & Russell, 1987; Dunkley et al., 2000; Sherry et al., 2008). Test-retest reliability coefficients have been reported to range from .37 to .66 (Cutrona, Russell & Rose, 1986). Finally, construct validity is supported by theoretically expected inverse relationships to depressive symptomatology (Cutrona, 1989; Sherry et al., 2008) and positive correlations with measures of loneliness (Cutrona & Russell, 1987).

**Open-ended measures.** Although automatic thoughts can be measured by using self-report scales asking participants to endorse statements that are predetermined by the

experimenter, there is also value in asking participants to simply report the thoughts they are currently thinking. Such measures can be described as open-ended because they do not guide the participant towards any particular type of response and are thus less vulnerable to experimenter demand characteristics (Cacciopo & Petty, 1981).

***Thought-listing protocol.*** The thought-listing protocol was first developed by Brock (1967) and Greenwald (1968). It was then extended by Cacciopo and Petty (1981) who developed a categorical scoring system and reviewed a variety of variables that can affect thought-listing output. It has since been used to measure cognitive reactions to persuasive stimuli (Cacciopo & Petty, 1981), in social anxiety and test anxiety research (Blankstein, Toner & Flett, 1989) and in measuring perfectionists' reactions to positive and negative feedback (Grzegorek, 2002).

Reliability data for the thought-listing technique is sorely lacking. One of the few psychometric analyses of thought-listing was reported on in an unpublished dissertation. Cullen (1968), reported on the reliability of thought listing methods and found adequate split-half reliabilities ( $r_s$  averaging .78) and a test-retest reliability coefficient of .64. Fichten, Amsel & Robillard (1988) tested the reactivity of thought-listing procedures to order effects and found that thought listing is not influenced by order of administration with other measures. Fichten and colleagues also noted that inventory measures and thought listing measures tended to produce comparable results. However, other studies examining thought listing in social anxiety research have found that self-report and thought listing measures show only small or nonsignificant intercorrelations (Glass & Furlong, 1990; Myszka, Galassi & Ware, 1986). Glass and Arnkoff (1994) reviewed thought-listing as a measurement method and reported that the thought-listing method demonstrates good criterion validity. Validity was also supported by Blankstein and colleagues' (1989) findings that task-related positive thoughts were positively correlated with

increased test performance, while negative thoughts about the self were negatively correlated with performance. Negative thoughts collected using thought listing have also been able to distinguish between anxious and nonanxious groups (Cacciopo et al., 1979; Myszka et al., 1986).

The thought listing technique is easy to administer. Participants are simply instructed to record any thoughts, regardless of topic, as they experience them currently or as they recall experiencing since the experimental session began. They are instructed not to pay attention to grammar, spelling or punctuation and to express their thoughts as concisely as possible. Thoughts were recorded on a computer that would accept up to twenty thoughts per participant at each measurement point within a three-minute time limit. Measuring thoughts over a relatively short time-frame helps ensure only the most salient thoughts are recorded (Cacciopo & Petty, 1981).

Each thought was coded by a trained rater blind to the hypotheses of the current study, the social inclusion/exclusion condition of each participant, and the participant's scores on any other measures. An additional rater coded a subset of the data set to establish reliability. The training process and coding procedures are described in further detail in the coding manual (Appendix A). The specific coding system used was first designed by Cacciopo and Petty (1981). They outlined a scoring system that categorizes thoughts first according to polarity (positive, negative or neutral), and then according to the target of the thought (self-related, task-related, and thoughts unrelated to either self or task). This process generates nine possible thought-categories (self-positive, self-negative, self-neutral, task-positive, task-negative, task-neutral, unrelated-positive, unrelated-negative or unrelated neutral) and each thought is assigned to only one of these categories. Blankstein, Toner & Flett (1989) used this coding system to examine the thoughts of test anxious students during and after an anagram task.

Cacciopo & Petty (1981) also stated that it is important for researchers to consider other categories for classification based on the particular research questions at hand. Indeed, many have used Cacciopo and Petty's system as a starting point and altered it for their purposes (e.g., Blackwell, Galassi, Galassi and Watson, 1985; Blankstein et al., 1989; Heimberg, Nyman & O'Brien, 1987). In the current project, because we hypothesized perfectionists are likely to experience amplified activation of interpersonal concerns in response to social exclusion, we coded for additional categories that reflect positive, negative and neutral thoughts about other people. Fichten (1986) adapted Cacciopo & Petty's (1981) coding system to add a category for reference to other individuals. In the Fichten (1986) study, an average of 83% inter-rater agreement was reported. Finally, proportion scores were derived for each of the categories by dividing the number of thoughts in each category by the total number of thoughts to control for individual differences in the numbers of thoughts produced (Cacciopo & Petty, 1981). Given the current research hypotheses, the main categories of interest for the current study were negative self-related thoughts and negative other-related thoughts. Positive and neutral thoughts about self and others, as well as task-related thoughts, were not used in the analyses, as they were not germane to the current hypotheses.

Inter-rater reliability was assessed using the Kappa statistic ( $\kappa$ ; Cohen, 1960) as an indicator of inter-rater agreement that adjusts for chance. Kappa for the thought-listing coding was .69, 95% C.I. = [.65, .72], which is reflective of a 'substantial' level of agreement (as per Landis & Koch, 1977). Prior to the post-Cyberball thought-listing data being coded, reliability was assessed again using another 10% of the post-Cyberball responses, to guard against any drift in inter-rater reliability. This test of kappa was calculated at .65, 95% C. I. = [.59, .72] which remained in the substantial agreement range. Overall, this suggests that the coding system was reliably applied.

Validity evidence was also assessed by examining the intercorrelations amongst the baseline variables. Negative self-related thoughts correlated weakly with the ATQ ( $r = .17, p < .05$ ) but negative other-related thoughts did not ( $r = .08, ns$ ). Overall evidence for the concurrent validity of the coded thoughts, although the small but significant correlation between ATQ and negative self-related thoughts may imply weak support for the validity of the inferences drawn from thoughts coded as self-related.

***Spontaneous self-concept protocol.*** Participants' spontaneous expression of their self-concept was measured using the Twenty Statements Test (TST; Kuhn & MacPartland, 1954), an open-ended assessment procedure where participants provide twenty responses to the question "Who Am I?" Participants were provided with a response form that instructs them to complete 20 sentence blanks that begin with the stem "I am" and to provide as many responses as possible; however participants were not required to complete all the stems. Three minutes was allowed for completion as in the thought-listing protocol. The reliability and validity of the TST is dependent on the scoring system used (McCrae & Costa, 1988), and though inter-rater reliability is consistently reported as high when reported (Crawford & Novak, 2011; Funk & Werhun, 2011; Johnson, Smeesters & Wheeler, 2012; McCrae & Costa, 1988; Redeker, Stel & Mastop, 2011) few other psychometric details are often reported. Small correlations have been reported between questionnaire-based measures of interdependent self-construal and allocentric responding on the TST (Grace and Cramer, 2003). Despite its reported problems, the TST provides an opportunity to assess elements of the self-concept without providing direction or exposing participants to experimental demand characteristics.

Responses were coded according to a similar process used by Watkins, Yau, Dahlin and Wondimu (1997) coding for idiocentric (individually valenced) and allocentric (socially valenced) content. In Watkins et al.'s study, identification with large and small group

membership categories were also coded, while in this case, they were subsumed under the allocentric category, as we are not concerned with the size of group memberships or differences between them. Furthermore, we initially subcoded for positively and negatively toned self-concept statements, but collapsed these subcategories for purposes of hypothesis testing. Idiocentric content includes self-statements that directly identify the self in terms of its individuality and uniqueness, (e.g., “I am a soccer player”), that identify how one is different from others (e.g., “I am the best swimmer”), or that identify a physical or abstract characteristic (e.g., “I am tall”, “I am smart”) but without reference to a direct relationship to others. In contrast, allocentric content involves reference to the self in relation to others (e.g., “I’m a mother/sister”) or group membership (e.g., “I’m a Christian” or “I’m a Packer’s fan”) or any content that reflects “interdependence, friendship, responsiveness to others, or sensitivity to how others perceive you” (Watkins et al., 1997, p. 629). Prior to applying Watkins and colleagues’ coding system, the TST data was refined by coding each response as self-concept or unrelated to self-concept. This was necessary due to the overwhelming number of participants who completed multiple stems with responses such as “hungry”, “tired”, and “bored.” Coding for self-concept is described in the coding manual in Appendix A. Proportion scores were calculated to control for variation in the number of statements produced as with the thought listing protocol. Given that all responses (pruned to only include self-concept) were coded into either allocentric and idiocentric categories, they are perfect inverse proportions, and therefore only one variable (in this case the proportion of allocentric responses) was retained for analysis.

Kappa based estimate of inter-rater agreement for whether or not items qualified as indicative of self-concept was initially .75, 95% C. I. = [.70, .80] and .81, 95% C. I. = [.73, .89] for the post-Cyberball reliability drift test. Inter-rater agreement for the Allocentric/Idiocentric coding system was .71, 95% C. I. = [.47, .75] initially, and .64, 95% C. I. = [.56, .72] when

testing for drift. In terms of validity, the baseline proportion of allocentric responses on the TST was not correlated with any of the other baseline questionnaire measures, including the Relational Interdependent Self-Construct scale, even though it would theoretically be expected to be related to allocentric responding (albeit weakly, e.g., Grace & Cramer, 2003). This is a concerning finding for the underlying validity of this coding system, and suggests that any analyses involving this variable should be interpreted with caution.

### **Implicit attitude measures for belonging and mistakes.**

*Single-Category Implicit Association Tests.* Implicit attitudes towards mistakes and belonging were assessed using a variant of the implicit association test (IAT; Greenwald, McGhee & Schwartz, 1998). The IAT operates on the underlying theoretical principle that we are faster at categorizing pairs of stimuli that are strongly associated in our mind than stimuli that are not as strongly associated (Greenwald et al., 2002). The IAT was originally designed for and has frequently been used in research on prejudice and in-group preference (Greenwald et al., 1998) but has also been used to study implicit motivation for achievement (Brunstein & Schmitt, 2004), power (Slabbinck, De Houwer & Van Kenhove, 2011), power and intimacy (Sheldon, et al. 2007), and a variant association task, the single-category IAT (SC-IAT; Karpinski & Steinman, 2006) has been used to study all three motives (Aspden, Ingledew & Parkinson, 2011). The IAT and the SC-IAT are useful added assessments to explicit self-report instruments in that they are less susceptible to faking or impression management (McDaniel, Beier, Perkins, Goggin & Frankel, 2009).

The single-category IAT (SC-IAT) was used in this case to assess a broad negative association with mistakes (i.e., mistakes = bad), and a broad positive association with belonging (i.e., belonging = good). The SC-IAT has been used to measure a variety of implicit attitudes and demonstrates similar reliability and validity to the original IAT (Karpinski & Steinman, 2006;



Steiger, Gortiz, Hergovich & Voracek, 2011; Steinman & Karpinski, 2008). Spearman-Brown corrected reliability estimates for various SC-IATs range from .55 to .85 which is generally comparable with reliability of regular IAT measures (Karpinski & Steinman, 2006; Steiger et al., 2011). Karpinski & Steinman (2006) also provide evidence of construct validity with SC-IATs assessing soda preference (one for Coke and one for Pepsi) and implicit racial attitudes.

The procedure of the SC-IAT takes place over four trial blocks. On screen for the entire task are two attribute category labels (*good* and *bad*) that appear in the top left and right corners of the screen. After the participant is presented with on screen instructions for the task, the participant will press a key for the first trial block to begin. The first part of the task consists of a practice block where exemplars from the two attribute categories are presented in the center of the screen one at a time. Participants press one key (in this case the 'E' key) in response to positively-valenced words (i.e., *paradise, peace, rainbow, gift*) and the 'I' key in response to negatively-valenced words (i.e., *hatred, stink, prison, cancer*). The second block adds the target category words (either mistake-related words or belongingness related words), initially paired with the same keypress response to either the negative or positive words. The first twelve trials are typically considered a practice-block that leads seamlessly into a test block of an additional 36 trials although all trials are often included in the analysis. During the first and second trial blocks, the target category label (Mistakes or Belonging) appeared directly below the positive attribute label. The third and fourth trials are practice and test blocks where the key assignments are reversed, so participants now sort target words with the opposite-valenced words from the first two trial blocks. As a reminder of this change, the target category label now appears below the negative attribute label. If participants make an error, a red 'X' will appear in the center of the lower third of the screen and participants will be required to quickly press the correct key to continue, which also serves to remind them of the appropriate categorization (Rudman, 2011).

After 1500ms without a response, the program also prompted participants with “Please respond faster!” displayed in the central lower third of the screen. The SC-IAT was programmed using version 3.06 of the Inquisit scripting engine (Millisecond Software, 2012).

The implicit attitude towards belonging was assessed by the associational strength exhibited between belongingness words and positive-valence category. Participants sort belongingness-themed words (i.e., *accepted, belong, included, connected*), along with both positive and negative valence words (as previously noted). Potential belongingness exemplars (i.e. target words used in the SC-IAT) were chosen based on their use in previous research (Aspden et al., 2011) or in theoretical writings on belongingness (Baumeister & Leary, 1995), and by consulting a thesaurus for belongingness-related words. An increased latency between the time it takes to categorize belongingness-themed words and negative-valence words with one keypress compared to the time it takes to categorize belongingness-themed together with positive-themed words is indicative of a positive preference for belongingness.

Implicit concern over mistakes was conceptualized as an overly strong association between error-related stimuli words (e.g., *mistake, incorrect, error, and wrong*) and negatively valenced stimuli words (as previously noted). Potential exemplars were chosen by examining explicit perfectionism measures and by consulting a thesaurus for mistake-related words. A tendency to react faster in categorizing both error-related and negative valenced words can be conceptualized as an implicit tendency to view mistakes and flaws as negative.

Exemplars were validated by generating a pool of potential exemplars that are representative of making mistakes and of belongingness. Twenty undergraduate volunteers were provided with brief definitions of “mistakes and errors” and “belongingness.” 18 potential exemplars were presented for each category and volunteers rated each exemplar on a 10-point scale based on how representative it was of the target category given the definition. The four top-

rated exemplars for each category were used in the SC-IATs (for each category, the top four exemplars had z-score ratings of at least .86, with three out of four exemplars rated at least one standard deviation higher than the mean rating).

To derive quantitative indicators of overall implicit belongingness motivation and perfectionism, a modified version of the D scoring algorithm was used (Greenwald et al., 2003). This is calculated by taking the difference in average reaction time when sorting positive words and target words with the same keypress (i.e., participants press the letter 'E' for positive/belonging words and 'I' for negative words) versus the average reaction time when negative words and target words are sorted with the same keypresses (i.e., 'E' for positive words and 'I' for negative/belonging) which is then divided by the pooled standard deviation of all test block latencies. This scoring algorithm is an improvement over the original IAT scoring and has been shown to be more resistant to practice effects and intentional manipulation (Cai, Sriram & Greenwald, 2004).

As the SC-IAT measures used in this study have not been used in any other research, reliability and validity evidence is reported from the current sample. Internal consistency was assessed by split-half correlational analyses between D scores calculated for one-half (odd vs. even) of the individual trials to D scores calculated for the other half (24 trials each). Spearman-Brown corrected split-half reliability at baseline was .76 for the Mistakes SC-IAT and .65 for the Belonging SC-IAT. This is within the acceptable range of past SC-IAT measures (Karpinski & Steinman, 2006). Test-retest correlations across the two measurement points were low, at .28 ( $p < .05$ ) for Mistakes, and .26 ( $p < .05$ ) for Belonging.

The pattern of correlations with other study measures was examined to determine the validity of SC-IATs. No correlations that would indicate criterion-related validity (i.e., correlations with the need to belong scale or rejection sensitivity for the Belonging SC-IAT,

perfectionism measures for the Mistakes SC-IAT) were statistically significant at baseline, however, PSP and PCI were weakly correlated ( $r_s = .22$  and  $.26$  respectively,  $p < .05$ ) with the post-Cyberball Mistakes SC-IAT. The two SC-IATs were also not correlated at baseline or post-Cyberball, but oddly the baseline Mistakes SC-IAT was correlated with post-Cyberball Belonging SC-IAT ( $r = .38$ ,  $p < .001$ ).

While the SC-IATs do demonstrate some stability internally and across time, there is scant evidence to support the validity of inferences based on their scores. The correlations observed between the mistakes SC-IAT and the two perfectionism dimensions are hopeful indicators of validity, but it remains difficult to explain why this is only seen post-exclusion. Although it is relatively common for implicit measures not to correlate with parallel explicit measures, there is little else that can further establish validity in the study. Therefore, analyses with the SC-IATs should be interpreted with significant caution and further work will be needed to fully understand what is being measured by these SC-IATs.

### **Manipulation Checks (Sample One and Two)**

To test whether the Cyberball paradigm actually effected an exclusion experience, participants in both studies were asked a series of questions designed to determine their perception of the experience. In keeping with similar past research (Zadro, Williams & Richardson, 2004) participants were asked to report what percentage of throws were directed at them, to rate what extent they were included by the other participants during the game (on a nine point scale anchored by *included* and *excluded*), and to indicate if they had previously heard of or played Cyberball (yes/no/unsure). Finally, participants were asked to rate the degree to which they believed that they were playing the Cyberball game with other participants (also from zero to nine anchored by *not at all* and *completely*).

## Experimental Procedure

Participants completed each study in two sessions separated by an average of nine days ( $SD = 3.22$ ). When participants arrived for the first session they were informed that they would be participating in a study that aims to test the effects of personality on visualization.

Specifically, they were told the following:

Our research here involves studying the impact of personality on visualization. Participation will involve first completing some screening questionnaires as we are interested only in people who obtain a certain range of scores on these measures. If you are invited to participate further, you will be asked to return in one week to complete a computer based visualization task with two other participants over the internet and then complete additional questionnaires and measures.

This was a necessary deception in order to provide a premise for the procedure and to ensure responses to the Cyberball game were as genuine as possible. Consent was obtained before any measures were administered. Participants were compensated for participating in the initial session regardless of whether they were excluded from participating in the second session (on the basis of the screening measures described previously). All participants received a written debriefing summary and an information sheet identifying available mental health resources once their participation was complete.

**Time one procedure.** In the first session, participants completed paper-based versions of screening measures for depression and anxiety and then completed a demographics questionnaire, all perfectionism measures, and three covariate personality measures via computer based questionnaires. When participants finished the screening measures these were hand scored by a trained research assistant to determine eligibility. Participants were excluded from the second session of the study if they obtained a score above the midpoint of the moderate range of depression or anxiety severity on the Beck Depression Inventory (BDI-II) or the Beck Anxiety Inventory (BAI) respectively (i.e., a score of 24 on the BDI-II or a score of 21 on the BAI; Beck

et al., 1996; Beck et al., 1988). Participants were also excluded by a score greater than one on item nine of the BDI-II indicating current suicidal ideation.

Participants who were screened out were told that we were only looking for individuals who scored in a certain range on the initial measures; no other information was provided unless asked. They were awarded credit for their initial participation, fully debriefed as to the nature of the study, provided with a list of community mental health resources, and excused from further participation. Participants who were not excluded were randomly assigned to one of the two Cyberball conditions: social inclusion or social exclusion. These participants were asked to return for a second session to play the “visualization” Cyberball game; the social nature of the game was re-iterated and emphasized at this time.

**Time two procedure.** Immediately upon arrival at the second session, participants were asked by a trained research assistant (or the researcher) if their name was either Jeff or Sara, depending on the gender of the participant. This was to enhance the deception that other players were indeed expected by the researcher, as these were the names of the computer controlled players that participants would soon encounter in the Cyberball game. Similarly purposed statements were made by the experimenter at times during the experiment to enhance believability. The participant was then brought to a separate room in order to complete the study.

The Cyberball social exclusion paradigm was developed by Williams, Cheung and Choi (2000) and was originally completed through a web browser. More recent versions have been developed for use with Millisecond’s Inquisit 3.06 (2012) software. The paradigm was administered by informing participants that they will be playing a game of electronic catch over the internet with two other participants who are located in a separate area of the lab. Participants were instructed to visualize the environment, the other players, and the action as clearly as possible in their minds while playing, but that they must keep their eyes open during the game.

They were also instructed to turn their cell phones off during their participation. The duration of the game was approximately five minutes.

In order to control for baseline affect and cognitions, participants completed the dependent measures immediately before and after the Cyberball manipulation. Although this presents the possibility of practice effects, especially with regard to thought-listing and implicit association test measures, both types of measures have been used in pre-post experimental designs in the past (e.g. Bluemke et al., 2010; Cullen, 1968; Grzegorek, 2002; Rudman & Lee, 2002) with little evidence of detrimental effects. After participants completed their respective baseline measures, the Cyberball paradigm begins by asking them to type their first name into a small window on screen. After a brief pause, ostensibly waiting for the other participants to complete their respective questionnaires, the player is shown the main Cyberball screen. The players are arranged graphically in an inverted triangle formation in the middle of the screen. Two small animated humanoid characters representing the other players are in the center of the screen with the false participants' names (Jeff and Sara) underneath, and at the bottom of the screen is a cartoon hand representing the actual participant. The animated characters mimic throwing the ball as it is passed between players. The game involves no actual skill, no specific action is required on behalf of the participant to catch the ball, and passing the ball involves merely clicking on one of the other participants' icons with the mouse to pass the ball.

During the game, participants who were assigned to the inclusion condition were passed the ball by the other two computer-controlled players approximately two-thirds of the total passes, so that the other players appear to be passing the ball to the participant even more frequently than to each other. In the exclusion condition, participants were passed the ball four times by the computer-controlled players in the first few moments of the game, and then were not passed the ball again. Immediately after the game, participants completed three distractor

questions (to help continue the deception post-Cyberball, these questions asked participants about aspects of the visualization process), their respective post-Cyberball criterion measures and several experimental manipulation checks. At the end of the study each participant was fully debriefed as to the true nature of the study. Particular attention was paid to explaining the false nature of the Cyberball game and participants' arbitrary assignment to either condition, the reason for the deception, and the benefit of their participation.

**Order of measures.** In the affective outcomes sample there are no obvious theoretical reasons to present the affective measures in any particular order aside from presenting the VAS scales immediately after Cyberball and at the end of the experiment. The initial VAS scales were measured first in a randomized order, and all affective Likert scale measures were subsequently presented in a randomized order to protect against any unforeseen order effects. For the cognitive outcomes sample several factors must be considered in determining the order of measures. Some research suggests that IAT scores are generally not susceptible to order effect bias from previously administered self-report measures, nor do they seem to exert an influence over subsequent self-report measures (Hoffman, Gawronski, Gschwender, Le & Schmitt, 2005; Nosek, Greenwald & Banaji, 2005). However, an earlier study by Bosson and colleagues (2000) found that explicit measures completed prior to an IAT can affect subsequent responses on implicit measures. Karpinski & Steinman (2006) suggest that to be conservative implicit measures should always be presented before explicit measures. It is also possible that the content of the self-report measures could prime individuals in their responses on the open-ended thought listing and self-concept measures. Given this, participants first completed the open-ended thought listing and self-concept measures, then the IATs, and then the self-report Likert scale instruments. Within each set of instruments, the individual order of administration was randomized.



## Results

### Data Preparation

Both samples were prepared for analysis prior to testing the main hypotheses in accordance with guidelines set out by Tabachnik & Fidell (2013). Missing data was assessed and addressed, descriptive statistics and correlational analyses were examined, and statistical assumptions were examined prior to testing study hypotheses using a hierarchical moderated multiple regression framework.

### Experimental Manipulation Checks

In order to determine the effectiveness of the Cyberball paradigm, at the end of the experiment participants were asked what percentage of throws were directed at them in the Cyberball game, how much they felt the other players included or excluded them in the game (from zero to nine, with higher scores indicating greater exclusion), and how much they believed they were actually playing with other players (from zero to nine with higher scores indicating greater belief). In the affective outcomes sample, participants in the exclusion group reported that an average of 11% ( $SD = 6.49$ ) of the throws were directed to them while the inclusion group reported an average of 46% ( $SD = 18.68$ ). This difference was statistically significant and very large,  $t(80.52) = -13.60$ ,  $p = .00$ ,  $d = -2.34$ , 95% C. I. for  $d = [-2.81, -1.84]$ . Participants in the exclusion condition also felt more excluded ( $M = 7.68$ ,  $SD = 1.08$ ) compared to the inclusion condition ( $M = 3.13$ ,  $SD = 2.00$ ) and this difference was also significant and large,  $t(100.55) = 15.54$ ,  $p = .00$ ,  $d = 2.83$ , 95% C. I. for  $d = [2.32, 3.38]$ . Participants in the exclusion condition rated their belief that they were playing with other people as lower than the participants in the inclusion condition. The mean believability rating was 3.33 ( $SD = 2.78$ ) in the exclusion group and 5.27 ( $SD = 2.84$ ) in the inclusion group. This was a statistically significant medium-sized effect,  $t(122) = -3.80$ ,  $p = .00$ ,  $d = -.69$ , 95% C.I. for  $d = [-1.05, -.32]$ .

Similar results were observed in the cognitive outcomes sample. Reported percentage of throws received in the exclusion condition was an average of 15% ( $SD = 11.84$ ) compared to 42% ( $SD = 15.32$ ),  $t(148) = -11.94$ ,  $p = .00$ ,  $d = -1.95$ , 95% C.I. for  $d = [-1.55, -2.33]$ , average reported exclusion was again higher in the exclusion condition ( $M = 7.16$ ,  $SD = 1.30$ ) than the inclusion condition ( $M = 3.75$ ,  $SD = 1.97$ ) and this difference was again significant and very large,  $t(127.76) = 12.52$ ,  $p = .00$ ,  $d = 2.04$ , 95% C. I. for  $d = [1.64, 2.43]$ . Finally, believability ratings were again higher in the inclusion condition with a mean of 5.04 ( $SD = 3.25$ ) compared to 2.49 ( $SD = 2.60$ ) in the exclusion condition,  $t(139) = -5.15$ ,  $p = .00$ ,  $d = -1.02$ , 95% C. I. for  $d = [-1.36, -.66]$ . Overall, participants in both samples felt more excluded and received less throws in the exclusion condition, suggesting the Cyberball paradigm was implemented effectively. However, participants assigned to the exclusion condition found the social premise of the game less believable.

### Sample One Results

**Missing data.** In the affective outcomes sample, 126 participants completed all of the time one (T1) personality and screening measures, pre-Cyberball (baseline) and post-Cyberball (criterion) measures. However, due to a software error, two participants did not provide an experiment believability rating and 12 participants did not complete the final set of visual analogue scales and the other experimental manipulation check questions (i.e., percentage of throws, level of exclusion, and purpose and hypothesis of study).

**Descriptive statistics and zero-order correlations.** Means, standard deviations and coefficients alpha for T1 perfectionism measures and covariates are shown in Table 1, while descriptives for baseline (pre-Cyberball) and criterion measures are shown in Table 2. The means of all perfectionism dimensions were within range of similar samples (e.g., Frost et al., 1990;

Hewitt & Flett, 1991a; Hewitt et al., 2003) and demonstrated acceptable to excellent (Nunally, 1978) levels of internal consistency.

Intercorrelations among all predictor variables as well as a dummy-coded condition variable (0 = Inclusion, 1 = Exclusion) are shown in Table 3. Perfectionism dimension intercorrelations are consistent with past research (Frost et al., 1993; Hewitt & Flett, 1991a; Hewitt et al., 2003). None of the predictor variables were correlated with condition, suggesting no evidence of baseline group differences or that group assignment was dependent on any of the predictors. In contrast, Table 4 shows how each criterion measure correlates with perfectionism and dummy-coded condition. Almost all affective criterion variables were moderately positively correlated with condition; the only exception was state guilt.

This provides an initial indication that individuals in the exclusion condition experienced increases in several different types of negative affect, especially given the lack of correlation with condition at baseline. Perfectionism dimensions, particularly nondisplay of imperfection, automatic perfectionism cognitions, and concern over mistakes, were also correlated moderately strongly with the affective outcome measures in expected directions, suggesting that individuals who score highly on these perfectionism dimensions are more likely to report experiencing a variety of negative emotions irrespective of Cyberball condition. Overall, these correlational findings support the use of multiple regression analysis as an appropriate analytic strategy to test the current hypotheses.

**Main effects of social exclusion on affective experience (testing H1).** Between-group mean differences were examined for the affective outcome variables both at baseline and post-Cyberball by conducting individual t-tests with multi-stage Bonferroni correction. Results are described in Table 5. No differences were detected at baseline between the inclusion and exclusion group, whereas significant differences were found after playing Cyberball. Post-

Cyberball levels of state anger, shame, loneliness, introjection, and anaclitic affect were all significantly higher in the exclusion group, while guilt was not significantly different between the two conditions. The magnitude of the statistically significant differences as measured by Cohen's  $d$  ranged from medium to large (as per Cohen, 1992) and averaged .70. The largest effect was found for anaclitic or rejected affect, whereas loneliness demonstrated the smallest significant effect. This suggests that social exclusion has a strong negative emotional impact evidenced by increases in state levels of shame, anger, loneliness, rejection, and self-criticism after being excluded in Cyberball. In the following section, multiple regression analyses examine the unique contribution of experimental condition in predicting post-Cyberball affect controlling for baseline affect, as well as testing the moderational effect of perfectionism.

#### **Hierarchical multiple regression analyses (testing H2-3).**

***Restricting the sample and variable transformations.*** Participants were excluded from the regression-based hypothesis testing if they reported having previously played or heard of the Cyberball paradigm, or if they reported zero belief in the social premise of the Cyberball game (i.e., the belief that they were actually playing with other participants). Eight participants were excluded for having heard of Cyberball, while another seven reported actually playing Cyberball. Finally, an additional ten participants were excluded solely on the basis of their reported lack of belief. These 25 participants were excluded from all subsequent regression analyses for a final sample of  $n = 101$ . No mean differences on any variables of interest were detected between participants excluded and included from the regression analyses and excluded participants were distributed approximately equally across the two conditions (i.e., 48% were assigned to the inclusion condition).

For each regression model, predictor and criterion variables were examined for outliers and univariate normality (Tabachnik & Fidell, 2013). Moderate to severe skew and kurtosis was

noted in the distributions of the affective variables both at baseline and post-Cyberball. A logarithmic (base 10) transformation was applied to the scores on all baseline and post-Cyberball affective variable scores. For most variables, skew and kurtosis was substantially reduced in the distributions of the transformed variables, however the STAXI-2 state anger subscale still demonstrated significant positive skew after transformation, and no other transformations were able to reduce the skew to acceptable levels.

For each test of moderation (i.e., testing the main effects of condition and each perfectionism dimension and the interaction between the two predicting each outcome variable) a hierarchical multiple regression model was constructed. The log-transformed baseline affect measure was entered in the first step, and the dummy-coded condition and respective perfectionism dimension in the second step. In the third step of the model the interaction term (calculated by multiplying the condition term with the respective perfectionism dimension score for each participant) was included in the model. Each continuous variable was mean-centered prior to analysis to aid with coefficient interpretation (Hayes, 2013). Preliminary models were constructed to examine residuals for homoscedasticity, normality and independence, as well as to identify any multivariate outliers. Any multivariate outliers with excessive Mahalanobis distances as per Tabachnik & Fidell (2013) were excluded and the analysis was re-run. A multistage Bonferroni correction was applied to significance tests at the individual predictor level with nominal alpha set at .05 (Larzelere & Mulaik, 1977). For statistical tests of the interaction terms, alpha was relaxed to .10 in accordance with recommendations by Pedhazur (1982) and Ellis (2010) to guard against type II error, given the difficulty associated with detecting interaction effects (McLelland & Judd, 1993).

***Conditional effects of perfectionism on post-Cyberball affect.*** Regression results for the affective outcomes sample are presented in Table 6. The table is organized by labeled panels

specifying each DV tested. Only the interaction terms are reported in the table, while significant main effects, if any, are reported in the text. Unstandardized coefficients (as recommended by Hayes, 2013), 95% confidence intervals, and  $p$ -values for individual predictors are reported for each interaction term. Model statistics are also reported in Table 6, with adjusted  $R^2$  for the overall model and  $\Delta R^2$  for the addition of the interaction term along with  $\Delta F$  and omnibus tests of significance. All models were significant overall. For models with significant interaction terms (bolded in the table for emphasis), simple slope analyses were performed (Aiken & West, 1991; Hayes, 2013) and are reported statistically in Table 7. When examination of the simple slopes revealed at least one statistically significant simple slope, the results were plotted graphically in Figures 2 through 9. Although a significant interaction term indicates that there is a statistically significant difference in the relationship between the perfectionism predictor and the criterion for participants who were included versus those who were excluded, our a priori hypotheses are primarily concerned with tests of significance for the simple slope in the exclusion condition.

*Anaclitic and introjective affect.* Regression models for anaclitic affect indicated that overall, dummy-coded condition and log-transformed baseline anaclitic affect were the only significant individual predictors of post-Cyberball log-transformed anaclitic affect. The average proportion of variance uniquely explained by experimental condition (i.e., the squared semi-partial correlation;  $sr^2$ ) was .22 across all models predicting anaclitic affect compared to baseline affect (average  $sr^2 = .27$ ).

In terms of interaction effects, models with nondisclosure of imperfection and concern over mistakes had statistically significant interaction terms (see Table 6) and both had one significant simple slope (Table 7).<sup>2</sup> Figure 2 shows the slopes for the relationship between perfectionism and post-Cyberball affect in each experimental condition for the model including

nondisclosure of imperfection. It suggests that as nondisclosure increases in the inclusion condition, log-transformed anaclitic affect decreases, suggesting nondisclosure may confer a sensitivity to social inclusion. In contrast, Figure 3 shows that as concern over mistakes increases, anaclitic affect increases in the exclusion condition, while the slope in the inclusion condition is nonsignificant. This suggests that individuals who are preoccupied with avoiding mistakes react to social exclusion with higher levels of anaclitic affect and do not seem to experience reductions in anaclitic affect after social inclusion.

A similar pattern emerged when looking at participant's reported introjective affect as a function of perfectionism and experimental condition. Condition and baseline affect were the only significant individual predictors. Condition contributed an average of .12 to the overall variance explained by the model, and baseline introjective affect contributed .32. Models with nondisplay of imperfection, nondisclosure of imperfection, and concern over mistakes had significant interaction terms.<sup>3</sup> Plotting the simple slopes for nondisplay of imperfection and concern over mistakes (Figures 4 and 5) revealed significant increases in introjective affect in the exclusion condition as these dimensions of perfectionism increased. Tests of the simple slopes for nondisclosure were nonsignificant. Concern over mistakes and nondisplay of imperfection both seem to amplify introjective affect in response to social exclusion.

*Shame and guilt.* Hierarchical multiple regression models predicting shame were all statistically significant, and again baseline affect and experimental condition emerged as the only significant individual predictors. Condition contributed an average of .17 to the overall variance explained, whereas baseline shame added .47. The models with perfectionistic cognitions and concern over mistakes had significant interaction terms.<sup>4</sup> Both simple slopes were nonsignificant for perfectionistic cognitions, but the exclusion slope was significant for concern over mistakes. Figure 6 illustrates that as concern over mistakes increases in the exclusion condition, shame also

increases. This is consistent with expectations that individuals who are overly concerned with mistakes experience more shame when socially excluded.

All regression models predicting post-Cyberball guilt were statistically significant overall, with baseline guilt contributing most strongly to  $R^2$  (average  $sr^2 = .44$ ). Experimental condition contributed less to overall  $R^2$  than in any other model (average  $sr^2 = .04$ ). This suggests that exclusion via Cyberball predicts changes in reported guilt-levels less strongly than it predicts other emotions. The interaction term for other-oriented perfectionism was significant and the simple slope in the inclusion condition was significantly different from zero.<sup>5</sup> The simple slope analysis is somewhat difficult to interpret substantively, but seems to suggest that as other-oriented perfectionism increases in the inclusion condition, guilt increases. Another way to interpret the plotted slopes in Figure 7 is that at high levels of other-oriented perfectionism, participants in the inclusion and exclusion group have similar levels of guilt on average, whereas at low levels of other-oriented perfectionism, post-Cyberball guilt levels are higher on average in the exclusion condition.

*Anger.* Overall, models predicting post-Cyberball anger were statistically significant, with experimental condition explaining the most variance in each regression model (average  $sr^2 = .19$ ) compared to baseline angry affect (average  $sr^2 = .15$ ). Both baseline anger and condition were the only statistically significant individual predictors in all models. Nondisplay of imperfection and concern over mistakes had significant interaction terms and each had a significant simple slope in the exclusion condition.<sup>6</sup> Figures 8 and 9 seem to suggest that individuals high on nondisplay and concern over mistakes are likely to react with increased anger in response to social exclusion.

*Loneliness.* Overall models predicting loneliness were all significant, but only condition and baseline loneliness were significant unique predictors. Baseline loneliness contributed more



to the overall explained variance (average  $sr^2 = .53$ ) than condition (average  $sr^2 = .13$ ). None of the interaction terms or perfectionism dimensions were significant predictors. These results suggest that while being excluded does predict increases in loneliness controlling for baseline affect, perfectionism does not appear to moderate this effect.

***Chronicity of affect.*** In order to test whether perfectionism impacts the change in negative affect over time after being excluded, regression models were constructed for each perfectionism dimension of interest testing for a three-way interaction between perfectionism, experimental condition, and post-Cyberball affect predicting variance in affect measured at the end of the experiment. If perfectionism impacts change in affect over time, we would expect to find a conditional effect of perfectionism on the relationship between post-Cyberball negative affect and negative affect as measured at the end of the experiment (an average of ten minutes later). To increase reliability in the regression models, the five VAS affect measures that showed the strongest effects in response to Cyberball (anger, shame, rejection, loneliness, self-critical affect) were combined to create an overall indicator of Cyberball-induced negative affect.<sup>7</sup> As per Table 8, the individual VAS scales are all moderately to strongly intercorrelated, suggesting they could be appropriately combined as an overall indicator of negative affect. The average coefficient alpha of this aggregate measure across all time points (i.e., pre-Cyberball, post-Cyberball, end of experiment) was .81. Interestingly, a paired  $t$ -test for post-Cyberball and follow-up negative affect was nonsignificant [ $t(113) = -.43, p = .67$ ], suggesting individuals had not necessarily “recovered” from their experience by the end of the experiment.

For each regression model, the main effect predictors (i.e., perfectionism, dummy coded condition, post-Cyberball negative affect) were entered in the first step of the model. Each two-way interaction term (perfectionism x condition, perfectionism x post-Cyberball negative affect, and negative affect x condition) was entered in the second step, followed by the three-way

interaction term (perfectionism x negative affect x condition) in the final step. All regression analyses are summarized in Table 9, but only the three-way interaction terms are reported along with overall model statistics and significance tests.

All regression models were statistically significant overall, with main effects of baseline and post-Cyberball affect the only significant individual predictors of negative affect at follow-up. The three-way interaction term for perfectionistic personal standards was significant<sup>8</sup> and so simple slope analyses were conducted to probe the interaction. Slopes of the relationship between post-Cyberball and follow-up negative affect were calculated for high, low, and mid-levels of perfectionistic personal standards (set as  $\pm 1$  *SD* and the mean respectively) in each condition. Results are described statistically in Table 10 and plotted graphically in Figure 10. All but the  $+1$  *SD* slope in the exclusion condition were significantly different from zero. The nature of the interaction is such that individuals who reported higher levels of negative affect post-Cyberball in the inclusion condition had higher levels of negative affect at follow-up the more they endorsed perfectionistic personal standards. In the exclusion condition, perfectionistic individuals had higher levels of negative affect at follow-up compared to non-perfectionistic individuals, but only if they reported lower levels of negative affect after playing Cyberball. At high levels of post-Cyberball negative affect in the exclusion condition, perfectionism ceased to have an effect. One interpretation of these results is that perfectionistic personal standards seems to predict the chronicity of negative affect under non-threatening conditions, but does not do so in response to highly aversive social exclusion experiences.

**Summary of results for sample one.** To summarize, Cyberball seems to be an effective social exclusion paradigm and being excluded in Cyberball appears to generate a fairly powerful affective response. Specifically, being assigned to the exclusion condition predicted increased guilt, shame, anger, loneliness, anaclitic and introjective affect after controlling for baseline

levels of affect prior to playing Cyberball. Of particular relevance to the main study hypotheses, nondisplay of imperfections and concern over mistakes seems to amplify the level of shame, anger, and anacletic and introjective affect experienced after being excluded in Cyberball. In contrast, nondisclosure of imperfection appears to confer some sensitivity to social inclusion experiences resulting in reduced introjective and anacletic affect. Finally, perfectionism does not appear to prolong negative affect experienced after being excluded, however high levels of perfectionistic personal standards seems to predict chronic negative affect more generally.

### **Sample Two Results**

**Missing data.** In the cognitive outcomes study, the same procedures for handling missing data in the affective study were applied. Three participants had single items missing on the BDI-II and seven participants were missing one item on the BAI. These were replaced with the item-mean. Nine participants were missing believability ratings at the end of the experiment.

**Descriptive statistics and zero-order correlations.** Means, standard deviations and coefficients alpha for time one perfectionism measures and personality and mood covariates are shown in Table 11, while descriptives for baseline and criterion measures are shown in Tables 12 and 13 respectively. The means of all perfectionism dimensions were within range of similar samples (e.g., Frost et al., 1990; Hewitt & Flett, 1991a; Hewitt et al., 2003) and with the exception of other-oriented perfectionism, which was slightly below Nunally's (1978) threshold of .70, all measures demonstrated acceptable to excellent levels of internal consistency.

The means of the baseline self-report cognitive measures were compared to previously published student norms where available<sup>9</sup> and were within normal limits (Cross, Bacon & Morris, 2000; Cutrona & Russell, 1987; Heatherton & Polivy, 1991). Mean levels of all perfectionism scales, all of the personality covariates and most of the baseline self-reported, implicit, and open-ended cognitive measures were also equivalent across both experimental

groups. Three observed exceptions were that, at baseline, individuals in the exclusion group scored slightly lower overall on the RISC scale, mean difference = -2.60,  $t(148) = -1.98$ ,  $p = .05$ ,  $d = -.32$ , 95% C. I. for  $d = [-.64, .00]$  and the SPS, mean difference = -1.73,  $t(148) = -2.16$ ,  $p = .03$ ,  $d = -.34$ , 95% C. I. for  $d = [-.67, -.03]$ . In contrast, the average valid D score on the Mistakes SC-IAT was higher in the exclusion group, mean difference = .13,  $t(148) = 2.36$ ,  $p = .02$ ,  $d = .48$ , 95% C. I. for  $d = [-.87, -.07]$ . It is also worth noting that the group means for the Belonging SC-IAT were marginally significantly different ( $p = .07$ ). Overall, these results suggests that on average at baseline, those in the exclusion group perceived themselves as less interdependent and felt less socially supported than those in the inclusion group, although the magnitude of the difference was small. In addition, participants in the exclusion group appear to have had a stronger baseline association between mistakes and negativity.

Intercorrelations among all predictor variables as well as the dummy-coded condition variable (0 = Inclusion, 1 = Exclusion) are shown in Table 14. Perfectionism dimensions again correlated in expected ways given past correlational findings. Perfectionism dimensions and covariates were also correlated in expected ways with increased baseline negative automatic thoughts and perfectionistic thoughts, as well as reduced perceived social support, and reduced social self-esteem. Only Baseline RISC and the Mistakes SC-IAT were even weakly correlated with the Condition variable, most likely reflecting the two between-group differences at baseline described previously.

Table 15 shows how each (post-Cyberball) cognitive criterion measure correlates with perfectionism and the dummy-coded experimental condition variable. Results were similar to the baseline measures, with state perfectionistic thoughts most strongly positively correlated with all of the perfectionism dimensions. Negative automatic thoughts, perceived social support, and social self-esteem all correlated in expected directions primarily with the interpersonal

dimensions of perfectionism. The only cognitive criterion measure correlated significantly with condition was the Mistakes SC-IAT such that individuals in the exclusion condition again had higher scores on average than in the inclusion condition.

**Main effects of social exclusion on cognitive experience (testing H4, H6).** Table 16 reports statistics from *t*-tests for mean differences between inclusion and exclusion groups on each criterion variable. Only one variable demonstrated a statistically significant difference; participants in the exclusion condition had a higher average proportion of negatively-toned thoughts about others in the thought listing task after playing Cyberball. The effect approached a moderate-level of magnitude (Cohen, 1992). It is entirely possible that the higher SC-IAT means are due to the pre-existing baseline group differences rather than the effect of the Cyberball paradigm. Multiple regression analyses controlling for baseline levels on these measures will help to rule out this possibility.

**Hierarchical multiple regression analyses (testing H5, H7-8).**

***Restricting the sample and variable transformations.*** Participants were excluded in the regression-based hypothesis testing if they reported having played or heard of the Cyberball paradigm, or if they reported zero belief in the social premise of the Cyberball game (i.e., that they were actually playing with other participants). Sixteen participants were excluded for having heard of Cyberball, while another six reported actually having played Cyberball. Finally, an additional 24 participants were excluded solely on the basis of their reported lack of belief. These 46 participants were excluded from all subsequent regression analyses for a final sample  $n = 104$ . The individuals who were not included in the final analyses did differ significantly on several study variables. Specifically, participants excluded from the regression analyses had higher mean levels of automatic negative thoughts, perfectionistic thoughts, and concern over mistakes; they had lower mean levels of social self-esteem. These differences were small

(absolute  $d$ 's from .37 to .44). Excluded participants were distributed equally across the two experimental conditions.

In the SC-IAT analyses, one additional participant was excluded on the basis of having previously completed an IAT in a prior experiment, in addition to individuals who were excluded on the basis of excessive latency scores or errors in their SC-IAT responses (some individuals therefore had invalid scores for the baseline test, whereas others had invalid scores for the post-Cyberball test, and some had invalid scores on both, leaving a final valid  $n$  for Belonging = 52 and for Mistakes = 50). Individuals who had invalid scores for the baseline Belonging SC-IAT had slightly higher levels of other-oriented perfectionism, mean difference = 3.90,  $t(148) = 2.68$ ,  $p = .01$ ,  $d = .46$ , 95% C. I. for  $d = [.12, .79]$  but no other significant differences on demographic or other study variables. No differences were found for the Mistakes SC-IAT.

For each regression model, predictor and criterion variables were examined for outliers and univariate normality (Tabachnik & Fidell, 2013). For the Likert measures, only the baseline and post-Cyberball ATQ demonstrated skewness and kurtosis that deviated significantly from normality. Moderate to severe skew and kurtosis was also noted in the distributions of all of the open-ended thought-listing variables. This was reduced with logarithmic (base 10) transformations.

As in the affective sample, a hierarchical multiple regression model was constructed for each test of moderation. The baseline cognitive measure of interest was entered in the first step and the dummy-coded condition and respective perfectionism dimension in the second step. In the third step of the model the interaction term was included in the model. Each continuous variable was mean-centered prior to analysis to aid with coefficient interpretation (Hayes, 2013). Preliminary models were constructed to examine residuals for homoscedasticity, normality, linearity and independence, as well as to identify any multivariate outliers. Any multivariate

outliers with excessive Mahalanobis distances as per Tabachnik & Fidell (2013) were excluded and the analysis was re-run.

*Conditional effects of perfectionism on post-Cyberball cognitions.* Regression results for the cognitive outcomes sample are presented in Table 17 and are presented in a similar fashion to results for the affective outcomes sample. Dependent measures, both Likert questionnaires and open-ended coded responses, have been grouped and reported in terms of thoughts about one's self, thoughts about others, and thoughts about the self in relation to others. Simple slope analyses for significant interaction terms are presented in Table 18, and where at least one slope was statistically significant, plotted graphically in Figures 11 through 16.

*Thoughts about self.* Several of the criterion variables predicted relate to negative thoughts and attitudes regarding one's self. These include negative automatic thoughts as measured by the ATQ, perfectionistic thoughts as measured by the S-PCI, as well as negative thoughts coded as self-related from the thought-listing task. The results of these regression models are discussed together for thematic clarity. Models predicting automatic negative thoughts as measured by log-transformed ATQ are described in Table 17. All models were statistically significant overall but the only significant unique predictor was baseline automatic negative thoughts (average  $sr^2 = .55$ ). Neither the dummy-coded condition variable, perfectionism traits, or interaction terms significantly explained any additional variance over and above participants' pre-Cyberball ATQ scores.

Models predicting perfectionistic thoughts (i.e., thoughts about the self that relate to attempts to be perfect or avoid mistakes) were also constructed and examined. Using the state version of the perfectionistic cognitions inventory as the criterion variable, all of the regression models were significant, and concern over mistakes and socially prescribed perfectionism were significant main effect predictors<sup>10</sup> but otherwise baseline state perfectionistic thoughts was the

only unique predictor (average  $sr^2 = .59$ ). The interaction between concern over mistakes and condition predicting post-Cyberball perfectionistic thoughts was significant and the simple slope in the inclusion condition was significantly different from zero. The slope (see Figure 11) indicated concern over mistakes predicted perfectionistic thoughts in the inclusion condition, but not in the exclusion condition.<sup>11</sup>

With regard to negative self-related thoughts coded from the thought listing task, the proportion of thoughts that were coded as negative and self-related at baseline explained the greatest amount of variance in the criterion (average  $sr^2 = .09$ ), while condition was only a statistically significant predictor in the model including concern over mistakes (average  $sr^2 = .05$ ). However, several significant interaction terms were observed.<sup>12</sup> Perfectionistic self-presentation, nondisplay of imperfection, and concern over mistakes interacted with the experimental condition such that in the exclusion condition, as perfectionism increased, the (log-transformed) proportion of post-Cyberball negative thoughts involving the self also increased (See Figures 12, 13, and 14). The slopes in the exclusion condition were positive and statistically significant, while the slopes in the inclusion condition were nonsignificant. These results suggest that being excluded in Cyberball does not necessarily predict increased negative thoughts about one's self, but that individuals who are overly concerned with making mistakes or with presenting themselves as perfect to others, express more negative thoughts relating to themselves when they are excluded.

*Thoughts about others.* None of the regression models predicting post-Cyberball negative thoughts about others (as coded from the thought-listing task) were statistically significant overall and no significant individual predictors emerged. However, it is worth noting that the condition variable was the strongest predictor in each model (average  $sr^2 = .05$ ).



*Thoughts about self in relation to others.* Another set of attitudes, beliefs and thoughts that were measured and coded for relate to individuals' concept of themselves in relation to other people. This includes how much social support participants perceive themselves to have, how they evaluate themselves compared to others, and how relationally interdependent they perceive themselves to be. The models predicting perceived social support were statistically significant overall, but the only individual predictor that explained a statistically significant amount of variance was baseline perceived social support (average  $sr^2 = .67$ ). Nondisplay of imperfection had a significant interaction term, but neither simple slope was significant. For state social self-esteem, perfectionistic personal standards ( $B = .34, p = .01, sr^2 = .02$ ) and concern over mistakes ( $B = -.33, p < .001, sr^2 = .03$ ) were significant main effect predictors predicting increased and decreased self-esteem respectively, with baseline self-esteem being the only other significant predictor in the models (average  $sr^2 = .56$ ). These results suggests exclusion by Cyberball does not predict changes in subjective social support or social self-esteem nor does perfectionism moderate this relationship.<sup>13</sup>

With regards to individual's interdependence, this was measured by the Relational Interdependence Self-Construal (RISC) scale and by coding for allocentric content from open-ended responses made on the Twenty Statement Test. All models predicting post-Cyberball RISC scores were statistically significant, with baseline RISC the only significant individual predictor (average  $sr^2 = .64$ ). Although condition was not a significant predictor on its own, it interacted with several dimensions of perfectionism. Specifically, other-oriented perfectionism, perfectionistic self-promotion, nondisclosure of imperfections, perfectionistic cognitions, and concern over mistakes all had a conditional effect on relational interdependence as a function of experimental condition. Tests of the simple slopes were nonsignificant for all but perfectionistic cognitions and concern over mistakes, which both had significant negative simple slopes in the

exclusion condition, suggesting relational interdependence decreases as a function of perfectionism in response to social exclusion. Perfectionistic self-promotion demonstrated a similar trend but the simple slope was marginally significant ( $p = .066$ ). These results were not replicated when using the proportion of allocentric responses from the Twenty Statements Test as the criterion. Only baseline allocentric responses was a significant predictor (average  $sr^2 = .14$ ), although models were significant overall.<sup>14</sup> In all, these results suggest that individuals who are perfectionistic alter their level of interdependent self-concept in response to social exclusion, particularly those who promote themselves as perfect, have frequent thoughts about being perfect, or are overly concerned about mistakes. However, this effect is only detected using an explicit questionnaire measure of relational interdependence.

*Implicit reactions.* Regression analyses for both the belonging and mistakes implicit measures were challenged by small sample sizes due to a lack of participants completing the SC-IATs in a valid manner (i.e., without excessive categorization errors and/or latencies  $>10000\text{ms}$  or  $<300\text{ms}$ ).<sup>15</sup> Pairing order and baseline D-score were the only covariates, but the sample size is still considered small for such analyses (Green, 1991; Tabachnik & Fidell, 2013). The predictive models for the Belonging SC-IAT were significant overall, but only the initial pairing variable (i.e., which pair block, compatible or incompatible, was presented first in the SC-IAT) was a significant main effect predictor (average  $sr^2 = .12$ ). None of the other individual predictors were significant, and although other-oriented perfectionism and perfectionistic cognitions had significant interaction terms, simple slope analyses were nonsignificant. Not all models predicting post-Cyberball Mistakes SC-IAT D-scores were significant overall, and those that were had no unique significant predictors. It is difficult to draw reliable inferences given the sample size issue, but it appears that being included or excluded in Cyberball does not exert a main effect with respect to positive and negative associations with the concepts of belonging and

mistakes at an implicit level. In addition, perfectionism does not appear to moderate this relationship.<sup>16</sup>

**Summary of results for sample two.** Overall, results for the cognitive outcomes sample suggest that being excluded in Cyberball has little effect on the types of cognitions people experience. The most relevant findings regarding the moderational effects of perfectionism dimensions are that in response to social exclusion, perfectionism seems to moderate the proportion of negative self-related thoughts and the degree to which participants construed themselves as interdependent. These results, along with the affective outcomes and their overall connection to the perfectionism and social exclusion literature, will be discussed in the following section.

## **Discussion**

The current study tested the hypothesized moderational effects of perfectionism on a proposed set of affective and cognitive reactions to social exclusion using two university student samples. It was hypothesized that being excluded in Cyberball would generate increased feelings of rejection, shame, anger, and loneliness relative to individuals who were included in a game of Cyberball (H1), and that perfectionism would not only amplify (H2), but also extend (H3) the duration of experienced affect. It was also hypothesized that social exclusion would have effects at a cognitive level, increasing negative thoughts about self and others, and reducing self-esteem, perceived support, and interdependent self-construal (H4). We expected perfectionism to amplify these effects and also to increase the saliency of perfectionistic thoughts after being excluded (H5). We also expected exclusion to have an effect at implicit levels on attitudes towards belonging (H6), for perfectionism to moderate this effect (H7), and for perfectionists to experience a strengthening of an implicit negative attitude towards mistakes after exclusion (H8). A summary and discussion of our findings within a theoretical context of perfectionism as an interpersonal vulnerability factor rooted in early attachment follows. Clinical implications of the findings, limitations of the current study, and avenues for further research are also acknowledged and addressed.

### **Reactions to Social Exclusion and Moderational Influence of Perfectionism**

In support of H1, participants in the exclusion group felt more anacritically rejected, introjectively self-critical, ashamed, angry, and lonely on average after playing Cyberball compared to the inclusion group, and regression analyses controlling for baseline affect and several other factors showed Cyberball condition predicted an increase in all measured emotions. This is consistent with past research showing that people respond to social exclusion with a

negative emotional response (Gerber & Wheeler, 2009; cf. Blackhart et al., 2009), but also that this response can be examined in terms of discrete and specific emotions.

Strong support was also found for H2, in that perfectionism seems to act as a potent moderator of this experience, amplifying feelings of rejection and self-criticism, anger, and shame when socially excluded. The increased anacletic and introjectively themed affect in response to exclusion for those who are concerned about mistakes is a powerful illustration of how feeling disconnected leads to negative affective states that involve both our connection to others, and our sense of self. The increased shame not only supports the social self preservation model of reactions to exclusion (Kemeny et al., 2004) but suggests that for perfectionists, exclusion activates an awareness of the flawed self (Hewitt et al., in press), triggering global feelings of inadequacy (Tangney, 2002). The increased anger for individuals high on nondisplay of imperfections and concern over mistakes can be interpreted as a reaction to a frustrated need or perceived transgression by others (Averill, 1983; Shaver, Schwartz, Kirson, and O'Connor, 1987) but may also reflect an increase in self-directed anger after being excluded, in keeping with Horney's (1945/1966) description of a self-directed rage after failing to meet exceedingly harsh standards for behaviour, or as a narcissistic rage (Kohut, 1972; also humiliated fury, Lewis, 1972) in response to exposure of underlying vulnerability and a sense of being flawed and unworthy of love. Overall, it is clear social exclusion invokes a more profoundly unpleasant affective experience for perfectionists, although this effect does not seem to last any longer than usual (i.e., H3 was unsupported).

Support for hypothesized explicit cognitive reactions as main effects of exclusion (H4) was less strong. Between group mean differences suggested higher levels of other-related negative thoughts and implicit attitudes for those in the exclusion group, but these findings were not sustained when controlling for baseline differences in the regression models. Partial support

was found for a moderating effect of perfectionism (H5), in that exclusion predicted an increase in the proportion of spontaneously reported negative self-related thoughts and a decrease in relational interdependence for several dimensions of perfectionism. An increase in negative self-related thoughts is consistent with psychobiological models of social exclusion and its relation to depression (Slavich et al., 2010). In this model, negative self-referential cognitions are thought to provoke neural responses that trigger inflammation and stress responses that in turn lead to depression, hinting at potential biological pathways to explore in the well-established link between perfectionism and depression. Our findings for relational interdependence were actually the opposite to what was originally predicted by H5, but can be understood in light of two theoretical models of interdependence regulation. The self-expansion model (Aron & Aron, 1986; Aron, Aron & Norman, 2001) predicts social exclusion results in a contraction of the self in relation to other people, given expansion of the self-concept to include other people is a basic motivation thwarted by exclusion. However, this does not explain why no main effect of social exclusion was found or how perfectionism might be implicated. In contrast, the risk regulation model of interdependence (Murray, Holmes and Collins, 2006) posits when people perceive a risk of being rejected by others (appraisal), powerful emotions are generated (signaling) that provoke a reduction in our dependent relationship with that person (regulation). Perfectionism could conceivably confer a sensitivity to all aspects of the model, given associations with rejection sensitivity (Flett, Besser & Hewitt, 2014), emotional dysregulation (Aldea & Rice, 2006), and in light of the current findings that show perfectionistic cognitions and concern over mistakes predicting downregulation of interdependence after exclusion. In sum, although social exclusion does not seem to reliably predict changes in experience at a cognitive level in the current study, perfectionism does predict unique changes in how people think of themselves generally and in relation to others after being socially excluded.

Finally, little was found with regard to changes in implicit attitudes regarding mistakes and belonging after social exclusion (H6-8); however, significant interaction terms for other-oriented perfectionism and perfectionistic cognitions predicting implicit positive attitudes toward belonging suggest that future studies may yet find evidence of the impact of perfectionism at implicit levels of awareness under different conditions or with a larger sample size. Given the SC-IATs used in this study were newly developed and exploratory it is exciting to see results even hint at potential findings. However this needs to be qualified by a lack of strong evidence supporting the validity of the new measures beyond the general support of implicit association tests as robust methods for assessing implicit attitudes (Greenwald, Poehlman, Uhlmann, Banaji, 2009; Rudman, 2008).

The overall experience of amplified affect in response to social exclusion can all be interpreted within the context of perfectionism as an attempt to cope with an underlying sense of self as fundamentally flawed and unworthy of love (Hewitt et al., in press). The increased negative self-related thoughts for perfectionistic individuals who were excluded in the cognitive reactions sample also supports this conceptualization. The particular expression of this sensitivity seems to differ depending on how perfectionism is experienced and expressed. Therefore it makes sense to examine our results in terms of each of the measured dimensions of perfectionism.

Concern over mistakes seems to confer the most sweeping vulnerability, both affectively and cognitively, in response to social exclusion. It might seem surprising that what appears to be an intrapersonal attitudinal dimension of perfectionistic personality would demonstrate the strongest and far-reaching effects in response to exclusion, but a close examination of the scale indicates that half of the items reflect concern over the *interpersonal* ramifications of mistakes (e.g., “if I do not do well all the time, people will not respect me”, “people will probably think

less of me if I make a mistake”) and past research has shown that this aspect of perfectionism is associated with beliefs about being judged harshly by others for making mistakes and a fear of disclosing or making mistakes in the presence of others (Frost, Turcotte et al., 1995; Frost, Trepanier et al., 1997). It is perhaps also unsurprising then, that nondisplay of imperfection would also be a potent moderator of reactions to social exclusion, predicting increased self-critical affect and anger, as well as negative self-related thoughts when excluded. These results also indicate that there are important distinctions between concern over displaying versus disclosing imperfections, in that nondisplay confers vulnerability to exclusion, whereas nondisclosure confers a sensitivity to inclusion.

Although clearly the interpersonal aspects of perfectionism have strong effects on reactions to exclusion, our findings suggest the conceptual boundaries between interpersonal and intrapersonal aspects of perfectionism may not be as clear as previously thought. Nowhere is this better illustrated in the current study than the finding that perfectionistic cognitions, an ostensibly intrapersonal aspect of perfectionism, moderates relational interdependence, a wholly interpersonal outcome, in response to social exclusion. Perhaps more important than the interpersonal/intrapersonal distinction, is that it seems to be the cognitive concerns and self-presentational aspects of the Comprehensive Model of Perfectionistic Behaviour that confer the most vulnerability to social exclusion, whereas less can be inferred about the trait dimensions of perfectionism, as limited significant effects were found for these dimensions.

We also note that our findings and interpretation remained largely the same after controlling for several relevant covariates as main effects (see footnotes). As a follow-up analysis, the interactive effect of neuroticism and experimental condition was also tested. In the affective sample, most of the interactions observed with perfectionism dimensions were not significant when neuroticism was the interactive predictor. The only exception was shame, in



which neuroticism showed a similar relationship to concern over mistakes (predicting increased shame in response to exclusion). However, when the concern over mistakes interaction term was also included in the regression equation, neither was significant. This suggests that the interactive relationship observed for both concern over mistakes and neuroticism can be attributed to shared, but not unique, variance between the two traits. The other affective reactions observed for perfectionism dimensions do not appear to be due to an interactive effect of neuroticism.

When similar tests were run in the cognitive sample, the neuroticism interaction term predicted increased negative self-related thoughts and reduced interdependence much like perfectionistic self-promotion, nondisplay, and concern over mistakes. When the perfectionism by condition interaction terms were also included, the neuroticism interaction was no longer significant, while the interactions with concern over mistakes remained significant, even when accounting for variance attributable to the neuroticism interaction. This suggests that, with regards to the observed cognitive outcomes, some of the interactive relationships with perfectionism may be due to shared variance with neuroticism, although concern over mistakes seems to predict additional unique variance in cognitive outcomes when exposed to a social exclusion stressor.

### **Social Exclusion, Perfectionistic Social Disconnection, and Diathesis-Stress**

The observed moderational effect of perfectionism on the affective and cognitive reactions to social exclusion fits well what we would expect given the Perfectionism Social Disconnection Model and suggests social connection and threats to that connection are important experiences for perfectionists generally. If exclusion is prolonged and repeated, it can perhaps explain the link between perfectionism and various forms of psychopathology and distress.

The finding that nondisclosure of imperfection predicts reduced rejected (anaclitic) affect when socially included is not necessarily in conflict with the PSDM but could reflect a parallel process that involves a sensitivity to inclusion. Given their overarching concern with social acceptance, it is not unreasonable to suggest some perfectionistic individuals might react with reduced negative affect in response to inclusion feedback. For nondisclosure of imperfection, the lack of an amplified negative response to social exclusion might also be indicative of a more dismissive attachment style. Chen and colleagues (2015) found nondisclosure was the only self-presentational facet that was not predicted by preoccupied attachment and a need to belong. In their study, nondisclosure of imperfections also had the strongest correlation with a dismissing attachment style ( $r = .34, p < .01$ ). Individuals whose perfectionism is expressed in this way may have adopted a defensive rejection of relationships as a way of coping with their underlying feelings that they are unworthy of love and acceptance, which provides short-term protection against exclusion experiences.

Our findings can also be interpreted in terms of interpersonal diathesis-stress, in that perfectionism does seem to act as a vulnerability factor in the face of social exclusion. One way to interpret these findings in light of the PSDM then is that the underlying objective and subjective social disconnection that perfectionists generate and perceive acts as the diathesis that predisposes perfectionistic individuals to vulnerability in the face of social stress. This is not only because perfectionists' interpersonal sensitivity predisposes them to perceive rejection more readily, but because perfectionists are already experiencing significant feelings of disconnection they are less able to weather social stressors. This is underpinned by early attachment experiences leaving perfectionists with unmet acceptance and belongingness needs and negative internal working models of self and others (Hewitt et al., in press).

Our findings that perfectionists experience greater increases in feelings of self-dislike and criticism (i.e., introjective affect and negatively toned thoughts involving the self) after being excluded emphasizes the importance of including self-criticism in the PSDM by Hewitt and colleagues (in press). Self-criticism not only arises in response to social disconnection, it is in and of itself a powerful disconnecting force, not only from others (Hewitt et al., in press; Shahar, 2015) but from the self. This fits with perfectionists' sense of self-alienation (a disconnection from one's self) that Hewitt and colleagues describe. The tragedy of this is that social disconnection and self-alienation are both likely to foster a reverberatory process that generates further criticism of the self and further perfectionistic behaviour (e.g., Path D, Figure 1; also Shahar, 2015; Hewitt et al., in press).

Previous research also supports an increase in negative self-evaluation following rejection experiences. Campos, Besser & Blatt (2013) found that recalled parental rejection was linked to suicidality through self-criticism and Kopala-Sibley, Zuroff, Leybman and Hope (2013) found that overt peer victimization and relational victimization both predicted self-criticism, with relational victimization predicting self-criticism related to inadequacy or a flawed sense of self. Negative thoughts about the self can be interpreted as a form of self-criticism, which fits with the characterization of perfectionistic personality as intensely self-critical (Blatt, 1995; Frost et al., 1990; Hewitt & Flett, 1991a; Pacht, 1984). Bautista and Hope (2015) also found that individuals who were socially anxious responded to negative social feedback online with increased self-focused negative thoughts. Whelton and Greenberg (2005) found that after recalling a negative life experience and its impact, individuals scoring highly on the self-criticism scale of the Depressive Experiences Questionnaire (Blatt, D'Afflitti & Quinlan, 1976) expressed more coded emotional indicators of self-contempt and self-disgust when reporting self-critical thoughts, suggesting a vulnerability to more intense self-critical affect in response to negative life

experiences. This could explain why perfectionists experience increased self-critical affect in response to exclusion, given the propensity towards self-criticism that accompanies an irrational urge to avoid imperfection at all costs.

Self-criticism and self-dislike has long been held by some to be a central component of perfectionism (e.g., Dunkley et al., 2003) and others have even suggested that perfectionism is equated with self-criticism (Shahar, 2015). We might argue that behaviourally, self-criticism is an expression of perfectionism, but the Comprehensive Model of Perfectionistic Behaviour suggests that perfectionism also involves other behaviours beyond criticizing and castigating the self. For instance, individuals may compulsively try to promote themselves to others as perfect and conceal imperfections, which is reflective of a narcissistic personality style and an underlying vulnerable sense of self (Dimaggio & Attina, 2012; Ronningstam, 2011; Sherry et al., 2014; Sherry et al., 2007).

This finding can also be interpreted in the context that at its core perfectionism involves efforts to repair an internal sense of self as fundamentally flawed (Hewitt et al., in press). Self-criticism can perhaps then be seen as a strategy perfectionists deploy to motivate the self towards perfection (Gilbert et al., 2006). It may be that for perfectionists, exclusion activates a focus on the underlying flawed sense of self, which in turn potentiates negative self-talk in an effort to repair, improve and ultimately perfect the self. Another possibility, to be discussed in the upcoming section on attachment, is that anxiously attached individuals experience heightened saliency of negative self-views in response to stress as an affect regulation strategy.

Unfortunately this strategy has highly deleterious effects on wellbeing. The intervening role of self-criticism in the link between perfectionism and psychopathology is well established (Alden, Ryder & Mellings, 2002; Dunkley et al., 2003; James, Verplanken & Rimes, 2015; Parker & Crawford, 2009; Sherry et al., 2012). Dunkley and colleagues have published

numerous studies on the role of self-criticism as a mediator and moderator of the relationship between perfectionism and distress (Dunkley, Blankstein, Masheb & Grilo, 2006; Dunkley, Zuroff & Blankstein, 2003). To Dunkley and many others, self-criticism is so much an inherent part of perfectionism that the term “self-critical” has been appended to perfectionism when discussing certain aspects of the construct. Self-criticism is thought to play an important role in the development and treatment of psychopathology, both generally (Shahar, 2015) and in the context of the Perfectionism Social Disconnection Model (Hewitt et al., in press). Hewitt and colleagues (in press) discuss the role of self-criticism as an intervening mediator in the relationship between objective and subjective social disconnection and distress, psychopathology, and unhealthy coping behaviours. Sherry and colleagues (2012) describe an observed link between perfectionistic attitudes and hazardous drinking in undergraduates as an extension of the social disconnection model. They posit that perfectionists may engage in unhealthy drinking behaviour to quash intense and unrelenting self-criticism, which when unsuccessful, leads to additional distress and depressive symptoms. Self-criticism plays a role in observed relationships between perfectionism and depression (Gilbert, Durrant & McEwan, 2006), social anxiety (Alden, Ryder & Mellings, 2002), and eating disorders (James, Verplanken & Rimes, 2015). It also predicts poorer response to treatment generally (Parker & Crawford, 2009). The maladaptive self-critical aspect of perfectionistic personality is important in understanding the current findings, because like compulsively trying to be or appear perfect, it is a way of coping with an undeveloped and fundamentally flawed sense of self that arises in the context of unmet early attachment needs (Hewitt et al., in press; Horney, 1937; 1950). This likely spurs some of the disproportional negative affect and thoughts in response to social exclusion because it calls attention to perfectionists’ fundamental sense of unworthiness and defectiveness.

## **Perfectionism, Attachment, and Social Exclusion**

The current findings also highlight the importance of early attachment in understanding how perfectionism increases vulnerability to social exclusion. The PSDM implies that the reason we see perfectionism moderating responses to social exclusion is that it reflects an activation of early attachment difficulties stemming from chronic misattunement experiences between child and caregiver, either through purposeful neglect (e.g., abuse; Flett et al., 2002), coincidental neglect (e.g., parental psychopathology; Besser & Priel, 2005; Lefkovich, Baji & Rigo, 2014) or both (e.g., Ostler, 2015). This misattunement is interpreted as a rejection of the self as unlovable, which becomes internalized along with negative self-conscious affect and negative expectancies about the capability of others to provide security and warmth in relationships.

Different types of insecure attachment styles predict different responses to stress, which can aid interpretation of the current findings. It is particularly useful to look at attachment as underpinned by two dimensions of anxiety and avoidance (Bartholomew, 1990; Bartholomew & Horowitz, 1991). Insecurely attached individuals experience either deactivation or hyperactivation of the attachment system in response to stress and threat (Mikulincer & Florian, 1998). Avoidant individuals de-activate the attachment drive, suppress negative affect and resist the impulse to seek support, because they have learned that attachment figures are unlikely to attend to their comfort and security needs. In contrast, individuals who are high on attachment anxiety but low on avoidance experience a hyperactivation of the attachment system in response to stress which promotes an overfocusing on negative affect, driving them to continue to seek out their attachment figure. They are likely to perceive stressors as threatening, irreversible, and uncontrollable compared to securely attached individuals (Mikulincer & Florian, 1998). This has been associated with emotional dysregulation in later life that can lead to psychopathology and interpersonal problems (Mikulincer, Gillath & Shaver, 2002; Wei, Vogel, Ku & Zakalik, 2005).

Perfectionism dimensions that are underpinned primarily by a dismissive, avoidant attachment style (e.g., low on anxiety, high on avoidance) may not experience the same degree of distress in response to social exclusion as those dimensions underpinned by an anxious-ambivalent style. This may explain why nondisclosure of imperfection and other-oriented perfectionism did not predict amplified affective or cognitive reactions in response to social exclusion. Chen and colleagues (2015) found that nondisclosure of imperfection had the strongest correlation with fearful and dismissive attachment insecurity (a way of describing avoidant attachment with and without attendant anxiety respectively; Bartholomew, 1990) and was not correlated significantly with a need to belong, as most other dimensions and facets were. In Chen and colleagues' study, other-oriented perfectionism was the only other perfectionism dimension not associated with a need to belong that also had very low correlations with all three insecure attachment styles.

In contrast, perfectionism dimensions underpinned by a high anxiety, low avoidance (or preoccupied) attachment style are likely to predict an amplified response to social exclusion. Recent research that used an experiential sampling methodology to measure individuals in their daily lives supports the theory that anxious attachment is associated with hyperactivation of the attachment system that is expressed as heightened negative affect, stress, and reactivity to interpersonal cues (e.g., social rejection, but even neutral cues; see Mikulincer, Gillath & Shaver, 2002). Mikulincer (1998) suggests that individuals with an anxious-ambivalent attachment style are likely to increase the saliency of negative self-views as an affect regulation strategy designed to help in the pursuit of others' affection (Shaver, Collins, & Clark, 1996). This might also explain the increase in negatively toned self-related thought content relative to (presumably more securely attached) excluded nonperfectionists.

Some research has looked at how attachment styles moderate reactions to social exclusion, although the focus so far has been on social pain reactions and sensitivity (DeWall, Masten, Powell, Combs, Schurtz & Eisenberger, 2012; Frias & Shaver, 2014; see also Maxwell, Spielmann, Joel & MacDonald, 2013 for a theoretical discussion of attachment styles in social exclusion research). DeWall and colleagues (2012) found attachment anxiety upregulated neural responses to social exclusion while attachment avoidance downregulated the same areas. Frias and Shaver (2014) also found that attachment anxiety increased pain sensitivity after exclusion in both men and women, although for women the effect was only found when attachment avoidance was also high. In studies that more closely match the aims of the current research, Hermann, Skulborstad and Wirth (2014) primed securely and insecurely attached individuals with reminders of either a relationship where they were accepted unconditionally or a neutral relationship prior to playing a Cyberball game. Securely attached individuals who were excluded after being primed with unconditional acceptance reported lower levels of negative mood and thwarted needs than those who received a neutral prime or were insecurely attached, while McDonald and Donnellan (2012) did not find a significant interaction between Cyberball condition and attachment anxiety or avoidance in a large sample. Finally, in partial support of the idea that avoidant individuals may be less vulnerable to exclusion, Yaakobi and Williams (2015) found that avoidant individuals were less distressed by exclusion, but also more distressed by inclusion. The current state of understanding based on this research is clearly equivocal, future studies should continue to explore whether attachment style, like perfectionism, moderates a diverse range of affective and cognitive reactions to Cyberball exclusion. This research should then be expanded by testing if and how different dimensions of perfectionism mediate the moderational effect of attachment on reactions to exclusion (i.e., mediated moderation; Hayes, 2013). This, along with prior findings that perfectionism mediates the relationship between



attachment insecurity and social disconnection (Chen et al., 2012), would provide strong support for the developmental model of perfectionism and the PSDM put forward by Hewitt and colleagues (in press).

### **Unexpected and Null Findings**

Overall, the findings of the current study support perfectionistic vulnerability to social exclusion and the PSDM; however, there are some findings that were unexpected or inconsistent with expectations. For example, it is not clear why other-oriented perfectionism would predict increased guilt in response to social inclusion, especially since other-oriented perfectionism is typically thought to be unrelated to the self-conscious emotions (Tangney, 2002). The interaction may also have little to do with other-oriented perfectionism at all, since the pattern of the interaction shows the largest differences in guilt between the inclusion and exclusion group at the lowest levels of perfectionism, it may instead be reflective of personality processes associated with, but not identical to low-levels of other oriented perfectionism, rather than reflective of other-oriented perfectionism itself. It is also entirely possible that the interaction is a statistical artifact given the large number of analyses. Replication of this effect in a second independent sample will be necessary before any reliable conclusions can begin to be drawn.

It is also surprising that none of the dimensions of perfectionism moderated the amount of loneliness reported after social exclusion, although generally speaking participants who were excluded reported greater loneliness than those who were included. It is possible that loneliness is not moderated by perfectionism at all, although this is contrary to what would be expected based on the perfectionism social disconnection model (Hewitt et al., 2006; Hewitt, Flett & Mikail, in press). Instead, it may be that loneliness is less of a reflexive emotional response to social exclusion. Although excluded individuals did report feeling more lonely, the effect was smaller compared to other measured emotions. It could take more time for loneliness to set in,

and therefore more time for perfectionism to moderate the loneliness response. The ongoing self-critical ruminative processes perfectionists engage in that increase a sense of disconnection from others could play a role, but would take more time to have an effect (Nepon et al., 2011).

One of the strongest effects moderated by perfectionism at the cognitive level was an increase in the number of negative self-related thoughts measured by thought-listing, but not by the questionnaire measure (ATQ). It is worth considering why these measurement methods would produce discrepant results. Perhaps the coding system used for the open-ended measures was more broadly inclusive of negative self-related thoughts, including negative thoughts, worries, or expectations about the self in the future (e.g., “What if I fail the course?”), negative thoughts about the self (e.g., “I wish I was smarter”), and references to negative self-states and unmet needs (e.g., “I was annoyed”, “lonely, oh, so lonely”, “I need to figure out my life”). Another possibility is that the thought-listing technique is more susceptible to influence from affect states than questionnaire measures. Ellis, Siebert & Herbert (1990) found that individuals who underwent a depressed mood induction listed significantly more unfavourable thoughts than controls. Future replicatory research efforts should include a measure of negative affect to test if the relationships observed here still hold when affect is controlled. It is interesting (but probably coincidental) that the opposite was found for measures of relational interdependence, with the open-ended measures showing the nonsignificant results. Overall, this highlights how measurement methods can impact findings when assessing individual differences in internal cognitive reactions (e.g., Heinrichs & Hofmann, 2005).

### **Clinical Implications**

Given perfectionism’s known associations with so many DSM-5 disorders, from the personality disorders (Sherry et al., 2007) to unipolar depression (Hewitt & Flett, 1991b), social anxiety (Alden, Bieling & Wallace, 1994), anorexia nervosa (Bastiani et al., 1995), bulimia

nervosa (Joiner, Heatherton, Rudd & Schmidt, 1997), and obsessive compulsive disorder (Chik, Whittal & O'Neil, 2008), and its conceptualization as a transdiagnostic process variable (Egan, Wade, & Shafran, 2012), it is important to consider how the current findings might inform clinical practice. Since perfectionism cuts across so many disorders, and the Perfectionism Social Disconnection Model has already been discussed as a model for how this psychopathology might develop, this section will focus on how perfectionists' vulnerability to exclusion experiences could impact a clinical variable that cuts across almost all forms of treatment: the therapeutic alliance.

The importance of the therapeutic alliance in predicting variance in psychotherapy outcomes has been well established (Ackerman & Hilsenroth, 2001; Bordin, 1979; Falkenstrom, Granstrom & Holmqvist, 2013; Horvath & Luborsky, 1993; Kivlighan, Marmarosh & Hilsenroth, 2014; Klee, Abeles & Muller, 1990; Luborsky et al., 1980; Sharf, Primavera & Diener, 2010; Swift & Greenberg, 2015; Xu & Tracey, 2015) and perfectionists' amplified reactivity to rejection could both interfere with treatment and be a relevant focus of treatment itself. After showing that perfectionism predicted poorer outcomes in a large treatment study (Blatt, Quinlan, Pilkonis & Shea, 1995) a follow-up study by Zuroff and colleagues (2000) found that poorer outcomes for perfectionists were mediated by perfectionists' difficulties in developing a trusting therapeutic alliance. This was largely driven by the patient's perceptions and ratings of alliance, not the therapist's, suggesting perfectionists are prone to feel less connected to their therapist and take longer to build strong working relationships compared to nonperfectionists. Clinicians need to be sensitive and aware of perfectionist's tendency to experience powerful emotions in response to even slight cues of rejection, especially early in treatment. Clinicians also ought to be sensitive to potential crises that may emerge in therapy as a result of minor or major social rejection or exclusion experiences in patients' lives as well. The

degree of perceived satisfaction with outside relationships has been shown to moderate the negative impact of perfectionism on treatment outcomes for depression, although most especially at moderate levels of perfectionism (Shahar, Blatt & Zuroff, 2007).

Other research has established that individuals high in perfectionistic self-presentation (particularly those who have difficulties disclosing imperfections) found the experience of a clinical interview physiologically arousing (threatening), felt that they “performed” more poorly in the interview, and believed that the interviewer had higher expectations for their “performance” than they could deliver (Hewitt et al., 2008). Sadly, these patients were rated less likeable by the interviewer as well, suggesting it may be more challenging for clinicians to channel Rogerian qualities of warmth and empathy with some perfectionistic patients. Therefore, clinicians should be prepared to address countertransference issues and ruptures in the therapeutic relationship. Ruptures may also occur more frequently with some perfectionistic individuals because of their insecure attachment style (Diener & Monroe, 2011; Eames & Roth, 2000).

Treating perfectionistic patients in group therapy settings may present problems for patients and clinicians if group leaders are not trained or aware of how perfectionistic behaviour can impact the group therapeutic process. As a group analogue of therapeutic alliance, group cohesion is defined broadly as the bond that each group member feels for other members and towards the group leaders (Tasca, 2014) and is an important predictor of group therapy outcomes (Burlingame, McClendon & Alonso, 2011). The current findings would suggest that perfectionism is likely to predict disproportionate affective and cognitive reactions to even subtle interpersonal cues of exclusion even when not purposeful that may affect the cohesion that that individual feels (e.g., two group members talking casually before group starts while another sits quietly, interpreting not being immediately included in the conversation as an implicit rejection

by their group members). Links to aggressive behaviour from social exclusion literature (e.g., Twenge et al., 2001) and the expression of hostility from extant perfectionism literature (Habke & Flynn, 2002; Haring, Hewitt & Flett, 2003; Macedo et al., 2015; Wiebe & McCabe, 2002) would support the idea that feeling excluded would have objective negative effects on group cohesion as well.

That being said, group therapy is an excellent milieu for perfectionistic individuals to work through their interpersonal insecurities and understand the impact of their perfectionistic behaviour in their relationships in the context of the group, and short-term psychodynamic group therapy has been shown to be effective in reducing perfectionism and distress (Hewitt et al., 2015). However, skills based groups are less likely to be useful because they do not address the underlying causes of the perfectionistic behaviour (Tasca et al., 2006). With that in mind however, one important skill to foster in bolstering resilience to social exclusion may be the use of self-compassion. Self-compassion, conceptualized as a willingness to accept oneself unconditionally, tends to be lacking in perfectionists (Flett et al., 2003; Hewitt et al., in press; Scott, 2007) and independently has been shown to buffer the effects of social exclusion via Cyberball (VanDellen, Allen & Campbell, 2013) suggesting it may be useful for perfectionists to try to develop self-compassion as they go through the process of uncovering the origins of their perfectionistic behaviour.

Perfectionists' increased sensitivity and vulnerability to rejection may pose challenges for both patient and therapist in both individual and group treatment modalities. However, skilled clinicians who are aware of the interpersonal underpinnings of perfectionism and how it can impact the therapeutic process can help perfectionists reduce their perfectionistic behaviour and learn to function in healthier, more adaptive ways (Hewitt et al., in press; Hewitt et al., 2015).

## Limitations of the Current Study

One of the main limitations in many studies, including the current project, is the lack of true random sampling from a general population, which threatens external validity. We recruited both samples from our population of interest using a research participation pool and a paid research participation mailing list at a single university. This affects our ability to generalize the current findings to the broader population. In addition, because we screened individuals who reported currently experiencing more than moderate levels of anxiety and depressive symptoms, it is possible we also eliminated individuals who were particularly perfectionistic, given its association with psychopathology. It seems we may have also eliminated some perfectionistic individuals in the cognitive outcomes sample on the basis of their low believability in the social premise of the Cyberball game. In some ways this can be interpreted as conducting a stronger test of our hypotheses, since we found many expected effects even though some of the most perfectionistic individuals may have been excluded.

The interpretation of the current findings is also limited by the paradigm we chose to use. Cyberball is an extremely robust and well-validated paradigm for inducing a mild exclusion experience with no known long-lasting effects. However, this may limit comparison to in vivo exclusion experiences and more severe laboratory exclusion paradigms like the Yale Interpersonal Stressor (Stroud, Tanofsky-Kraff, Wiffley & Salovey, 2012) and the Future-Alone paradigm (Twenge et al., 2003). We also used a control condition that is considered an “overinclusion” condition (De Paniflis, Riva, Preti, Cabrino & Marchesi, 2015; Niedeggen, Sarauli, Cacciola & Weschke, 2014; van Beest & Williams, 2006; Williams, Cheung & Choi, 2000) which means significant interactions must be interpreted in terms of exclusion relative to participants being passed the ball more than would be expected in an egalitarian game of catch between three people (e.g., 62% versus 33% of the ball tosses). The use of standard inclusion and

‘do-nothing’ controls in future studies would provide more information about an absolute reaction to social exclusion. There is however room for debate about what constitutes an inclusion experience and where lines should definitively be drawn to differentiate overinclusion and inclusion control conditions.

Finally, our choice of measures and the way participants responded to them might have affected our results. First, we developed two single-category implicit measures of attitudes towards mistakes and belonging, but had difficulty establishing strong evidence of their validity. These measures also had somewhat unusual rates of exclusion on the basis of excessive errors ultimately resulting in a less than ideal sample size for testing the study hypotheses. Further research will be needed to increase confidence in the validity of these measures and to replicate our results using larger samples where responding will hopefully be more accurate. Second, two of our measures, the Relational Interdependence Self-Construal scale (Cross, Bacon & Morris, 2000) and the combined subscales of the Social Provisions Scale (Cutrona & Russell, 1987) used in the cognitive outcomes sample were not necessarily designed as state measures, although our findings with the RISC suggests it can be sensitive to change in response to Cyberball exclusion. It may be our lack of findings with regard to perceived social support were due to the sensitivity of the measure to detect state changes over short periods of time. Third, many of the negative affect variables demonstrated significant skew necessitating log-transformations. The state anger subscale measured with the STAXI-2 remained significantly skewed after a variety of transformations, although log-transformation did reduce the skew somewhat. This may have exerted some bias on parameter estimates in the regression models predicting state anger and thus these should be interpreted with some caution.

Although there are limits to the generalizability of our study findings as discussed above, It is worth noting that these findings are reported in contrast to previous literature that suggest

personality has only a limited immediate moderating effect on commonly measured reactions to social exclusion. McDonald & Donnelan (2012) tested a variety of personality moderators and concluded that Cyberball was a strong situation (e.g. Monson, Hesley & Chernick, 1982) that is resistant to moderation by personality factors. The current findings are therefore an important contribution to the general social exclusion (by Cyberball) literature and a testament to the power of perfectionism to effect changes in how people experience exclusion, a strong situation that is thought to be uniformly aversive and unpleasant.

### **Directions for Future Research**

We have already considered several important avenues for future research in the course of our discussion. To summarize them here briefly, they include efforts to refine methods and measures in testing the relationship between perfectionism and vulnerability to social exclusion, to expand current knowledge to include more distal antecedents like attachment styles and behavioural consequents like aggressive retaliatory and prosocial reparative behaviours and whether perfectionism moderates these outcomes in addition to internal reactions, and finally to enhance granularity in how perfectionism moderates reactions to social exclusion by testing the role of intervening explanatory variables and mechanisms like pathological self-criticism. We might also try to establish a temporal sequence of emotional and cognitive reactions, and if there is a specific emotional or cognitive cascade that perfectionists experience in response to social exclusion that differs from nonperfectionistic individuals.

### **Conclusion**

The current study demonstrated how perfectionism, a multidimensional maladaptive personality style rooted in early relational experiences, predisposes individuals to experience the already aversive experience of exclusion even more intensely. We have shown how, especially for perfectionists concerned with making mistakes and avoiding displays of imperfection, social



exclusion generates powerful emotions of rejection, self-dislike, shame, and anger and has an impact on the thoughts we have, and the way we conceptualize ourselves in relation to others. These findings help explain how perfectionists end up experiencing significant mental distress and disorder in the face of interpersonal rejection in their everyday lives. It also offers ways that perfectionism might impact therapeutic alliance in individual therapy and group treatment, further exacerbating some individuals' distress. We also found that nondisclosure of imperfection seems to confer a sensitivity to inclusion that suggests some perfectionists are capable of responding positively to being included in social situations, although this must be considered in light of the amplified negative reactions to exclusion, given most dimensions of perfectionism, although unique, are at least moderately intercorrelated. We hope this study demonstrates the importance of continuing to expand our understanding of the interpersonal underpinnings and vulnerabilities of perfectionistic personality and behaviour.

### Footnotes

1. As noted in the introduction, although our primary interest lies in perfectionism as it exists naturally in individuals (i.e., as unique but intercorrelated dimensions that also share variance with other aspects of personality), it is important to consider the possibility that shared variance with other personality and mood constructs may completely account for the current findings. Moderate correlations between the interpersonal perfectionism dimensions and the covariate measures, and between covariate measures and baseline cognitive and affective measures suggest these are appropriate covariates to consider in our secondary analyses (see Tables 4 and 14). Results were generally identical to our primary analyses with some exceptions discussed as necessary in footnotes to follow. One caveat for the interpretation of these secondary analyses is that some of the covariate measures (e.g., a need to belong and rejection sensitivity) have been conceptualized as core aspects of perfectionistic personality (Hewitt et al., in press), and therefore it is difficult to say with certainty what remains of the perfectionism construct when these components are partialled out. A second caveat is that small normative differences were observed on several of the covariate measures in both samples when compared to previously published means (Leary et al., 2013; Srivastava et al., 2003; Borden et al., 1991; Creamer, Foran & Bell, 1995; Osman, Downs et al., 1997; Osman, Kopper et al., 1997; and Romero-Canyas et al., 2010) suggesting the samples may be slightly different from typical populations in terms of average levels. All of the covariates had acceptable levels of internal consistency (see Tables 1 and 13) except for rejection sensitivity in the affective sample, which was slightly below the threshold set by Nunally (1978).

2. In the covariate models predicting anacletic affect, self-oriented perfectionism had a significant interaction term but simple slopes were nonsignificant.

3. In the introjective affect covariate models, perfectionistic self-promotion and nondisplay of imperfection also had significant interaction terms but tests of the simple slopes were nonsignificant, whereas nondisclosure had a significant negative slope in the inclusion condition that was nonsignificant in the main analyses ( $p = .08$ ).

4. Concern over mistakes and nondisplay of imperfection had significant interaction terms in the covariate models but perfectionistic cognitions did not. Simple slopes were nonsignificant.

5. Self-oriented perfectionism and personal standards had significant interaction terms but nonsignificant simple slopes in the covariate models. Personal standards demonstrated a marginal trend ( $p = .051$ ) towards reduced guilt in the exclusion condition. It is unclear what, if anything, this means.

6. Perfectionistic cognitions also had a significant interaction in the covariate model but simple slopes were nonsignificant.

7. As an additional method of potentially streamlining our reported findings and reducing the number of analyses conducted, we also conducted a principal components analysis on the pre-Cyberball Likert measures to see if any could be meaningfully combined. Results of this analysis suggested the extraction of a single factor explaining 61.35% of total variance (the eigenvalue for this factor was 3.681 with remaining eigenvalues of .79, .66, .50, .24, and .14). Since this

would eliminate all useful discrimination between emotions in our analyses testing the specific affective reactions to exclusion, we conducted our primary analyses with the original (log-transformed) scales. When the aggregated negative affect factor was used as the dependent variable, concern over mistakes and nondisplay of imperfection interacted with condition in a manner consistent with the primary analyses. Perfectionistic cognitions, in contrast, predicted only reduced negative affect in the inclusion condition. We also explored the possibility of an aggregated factor in the cognitive sample, but a factor analysis revealed complex loadings of the dependent variables across three factors (with Eigenvalues of 2.68, 1.40, 1.20 explaining 66.03% of variance) without obviously meaningful interpretations.

8. No three-way interactions were significant when covariates were included in the models, but this test may have been underpowered with five additional predictors.

9. The state PCI does not have published descriptive statistics beyond its reliability in the only other study in which it has been used (Besser et al., 2008). The means of implicit and open-ended measures were not compared to past studies because they were either developed specifically for this study or customized for the study. However, the means for the SC-IAT measures were generally within range of what is expected for implicit association measures (Karpinski & Steinman, 2006).

10. In moderated multiple regression with a binary categorical moderator, the main effect of the interacting predictor is interpreted as the effect with the moderator held constant at 0. In this case this means that the regression weights specify the relationship between perfectionism traits and state perfectionistic thoughts in the inclusion condition. For socially prescribed perfectionism, the unstandardized regression coefficient was .22 ( $p = .015$ ), for concern over mistakes it was .62 ( $p = .002$ ).

11. Although neither simple slope was significant when probed, socially prescribed perfectionism demonstrated the same pattern as concern over mistakes in the covariate models, whereas the interaction term for concern over mistakes was nonsignificant.

12. No differences in the covariate models.

13. The interaction term with nondisplay was nonsignificant in the covariate model predicting social support. In contrast, in the covariate model predicting social self-esteem, concern over mistakes was significant and the slope in the inclusion condition was positive and significant. Given the main effect seen in the primary analysis this may be a main effect masquerading as an interaction due to random intergroup differences.

14. Aside from other-oriented perfectionism, the same perfectionism dimensions had significant interaction terms in the covariate models, however, only the simple slope for nondisclosure of imperfection was statistically different from zero in the inclusion condition although slopes for concern over mistakes and perfectionistic cognitions were marginally significant ( $p = .057$  and  $.051$  respectively). With the allocentric responses as a criterion, none of the regression models were statistically significant in the covariate models; there were no other differences.

15. This was further challenged by the pre/post experimental design, as participants may have validly completed an SC-IAT at one time point but not the other and were therefore excluded due to listwise deletion in the analysis. After our experimentwise exclusion criteria was applied, 23 further participants (22%) were excluded for invalid scores on both pre- and post-Cyberball SC-IATs. For the belonging SC-IAT, 12 participants (12%) were excluded for invalid scores on the pre-test, while 16 participants (15%) were excluded because they had valid scores only on the post-Cyberball measure. For the mistakes SC-IAT, 26 participants (25%) were excluded for invalid scores at both time points, 19 (18%) had invalid scores on the pre-test and 8 (8%) had invalid scores on the post-Cyberball measure. Although error rates are typically higher for SC-IATs compared to IATs (Karpinski & Steinman, 2006) our across-the-board average error rate of 19% is still higher than is typically reported.

16. The interaction term for other-oriented perfectionism was nonsignificant, but otherwise results paralleled the original analyses for both implicit measures.

## Tables

**Table 1**

*Means, Standard Deviations, and Internal Consistency of T1 Perfectionism and Covariate Measures for Sample One (Affective Outcomes).*

Measure	Mean	SD	$\alpha$
Self-Report Perfectionism Measures			
SOP	67.43	14.26	.90
OOP	58.22	11.20	.75
SPP	53.70	11.07	.81
PSP	41.63	10.25	.88
NDP	44.25	10.12	.86
NDC	22.88	6.27	.75
PCI	42.36	18.31	.93
CM	23.52	6.10	.84
PS	23.48	4.73	.80
Personality and Mood Covariates			
N	22.90	6.08	.82
NBS	35.73	5.48	.76
RSQ	8.61	3.31	.66
BDI-II	8.66	5.38	.80
BAI	7.44	4.98	.78

*Note.* The following labels were used T1 = Time 1. SOP = Self-Oriented Perfectionism, OOP = Other-Oriented Perfectionism, SPP = Socially Prescribed Perfectionism, PSP = Perfectionistic Self-Promotion, NDP = Nondisplay of Imperfection, NDC = Nondisclosure of Imperfection, PCI = Perfectionism Cognitions Inventory, CM = Concern over Mistakes, PS = Personal Standards.

**Table 2**

*Means, Standard Deviations and Internal Consistency of T2 Baseline and Criterion Measures for Sample One (Affective Outcomes)*

Measure	Mean	SD	$\alpha$
Baseline (Pre-Cyberball) Affect			
STAXI-2 Anger	6.25	1.83	.76
SSGS Shame	7.77	3.27	.81
SSGS Guilt	9.62	4.28	.85
LRS Loneliness	68.34	28.46	.98
AIM Introjective Affect	17.81	9.43	.91
AIM Anaclitic Affect	17.00	9.15	.91
Post-Cyberball Affect			
STAXI-2 Anger	6.77	2.71	.87
SSGS Shame	8.00	3.55	.81
SSGS Guilt	8.18	4.06	.89
LRS Loneliness	66.51	29.60	.98
AIM Introjective Affect	16.26	8.96	.92
AIM Anaclitic Affect	16.82	9.93	.94

*Note.*  $n = 126$ . The following labels were used: T2 = Time Two, STAXI-2 = State/Trait Anger Expression Inventory, SSGS = State Shame and Guilt Scale, LRS = Loneliness Rating Scale, AIM = Anaclitic and Introjective Mood Adjectives.

**Table 3***Zero-Order Intercorrelations for all Predictor Variables in Sample One (Affective Outcomes).*

Predictor	COND	SOP	OOP	SPP	PSP	NDP	NDC	PCI	PS	CM
COND	1	--	--	--	--	--	--	--	--	--
SOP	-.09	1	--	--	--	--	--	--	--	--
OOP	-.16	<b>.51**</b>	1	--	--	--	--	--	--	--
SPP	-.05	<b>.42**</b>	<b>.33**</b>	1	--	--	--	--	--	--
PSP	.03	<b>.55**</b>	<b>.36**</b>	<b>.56**</b>	1	--	--	--	--	--
NDP	.01	<b>.33**</b>	.25**	<b>.60**</b>	<b>.69**</b>	1	--	--	--	--
NDC	.09	.27*	.17	<b>.58**</b>	<b>.59**</b>	<b>.62**</b>	1	--	--	--
PCI	.03	<b>.62**</b>	.31**	<b>.48**</b>	<b>.55**</b>	<b>.48**</b>	<b>.39**</b>	1	--	--
PS	-.11	<b>.72**</b>	<b>.42**</b>	<b>.26**</b>	<b>.38**</b>	.17	.04	<b>.50**</b>	1	--
CM	.00	<b>.41**</b>	.25**	<b>.56**</b>	<b>.56**</b>	<b>.61**</b>	<b>.56**</b>	<b>.54**</b>	<b>.35**</b>	1
N	-.04	.15	.11	.23*	.17	<b>.38**</b>	.25**	.31**	.09	<b>.40**</b>
NBS	-.02	.09	.14	.17	<b>.36**</b>	<b>.40**</b>	.15	<b>.32**</b>	.14	<b>.33**</b>
RSQ	-.08	-.02	-.07	.25**	.04	<b>.35**</b>	<b>.37**</b>	.08	-.09	<b>.35**</b>
BDI-II	-.02	.05	.10	<b>.32**</b>	.22*	<b>.34**</b>	<b>.42**</b>	<b>.39**</b>	.05	<b>.44**</b>
BAI	-.07	.25*	.16	.26**	.21*	.22*	.18*	<b>.38**</b>	.16	.21*
STAXI-2	-.06	.20*	.17	.23*	.23*	.24	.18*	.24*	.14	.23*
SSGS-S	.00	.12	-.02	<b>.37**</b>	.29*	<b>.44**</b>	<b>.36**</b>	<b>.40**</b>	.12	<b>.54**</b>
SSGS-G	-.05	.18*	.07	.27*	.23*	<b>.35**</b>	<b>.32**</b>	<b>.39**</b>	.16	<b>.38**</b>
LRS	-.06	.21*	.09	.20*	.20*	.30**	.23*	.28*	.22*	<b>.34**</b>
AIM-I	.02	.23*	.01	<b>.34**</b>	.24*	<b>.42**</b>	<b>.41**</b>	<b>.47**</b>	.20*	<b>.59**</b>
AIM-A	-.02	.20*	.06	<b>.38**</b>	.29*	<b>.45**</b>	<b>.40**</b>	<b>.44**</b>	.15	<b>.59**</b>

Predictor	N	NBS	RSQ	BDI-II	BAI	STAXI-2	SSGS-S	SSGS-G
COND	--	--	--	--	--	--	--	--
SOP	--	--	--	--	--	--	--	--
OOP	--	--	--	--	--	--	--	--
SPP	--	--	--	--	--	--	--	--
PSP	--	--	--	--	--	--	--	--
NDP	--	--	--	--	--	--	--	--
NDC	--	--	--	--	--	--	--	--
PCI	--	--	--	--	--	--	--	--
PS	--	--	--	--	--	--	--	--
CM	--	--	--	--	--	--	--	--
N	1	--	--	--	--	--	--	--
NBS	<b>.38**</b>	1	--	--	--	--	--	--
RSQ	<b>.39**</b>	.02	1	--	--	--	--	--
BDI-II	<b>.52**</b>	.26*	.25**	1	--	--	--	--
BAI	.30**	.19*	-.06	<b>.50**</b>	1	--	--	--
STAXI-2	.10	.00	.12	.20*	.13	1	--	--
SSGS-S	<b>.41**</b>	.21*	<b>.33**</b>	<b>.43**</b>	.19*	<b>.46**</b>	1	--
SSGS-G	<b>.35**</b>	.25*	.24*	<b>.37**</b>	.27*	<b>.38**</b>	<b>.64**</b>	1
LRS	.20*	.28*	.12	.22*	.26*	.26*	<b>.53**</b>	<b>.37*</b>
AIM-I	<b>.36**</b>	.15	<b>.34**</b>	<b>.48**</b>	<b>.33**</b>	<b>.40**</b>	<b>.76**</b>	<b>.63**</b>
AIM-A	<b>.40**</b>	.24*	<b>.32**</b>	<b>.53**</b>	<b>.38**</b>	<b>.32**</b>	<b>.75**</b>	<b>.52**</b>



Predictor	LRS	AIM-I	AIM-A
COND	--	--	--
SOP	--	--	--
OOP	--	--	--
SPP	--	--	--
PSP	--	--	--
NDP	--	--	--
NDC	--	--	--
PCI	--	--	--
PS	--	--	--
CM	--	--	--
N	--	--	--
NBS	--	--	--
RSQ	--	--	--
BDI-II	--	--	--
BAI	--	--	--
STAXI-2	--	--	--
SSGS-S	--	--	--
SSGS-G	--	--	--
LRS	1	--	--
AIM-I	<b>.44**</b>	1	--
AIM-A	<b>.50**</b>	<b>.84**</b>	1

*Note.*  $n = 126$ . The following labels were used: COND = Dummy-coded experimental condition variable (0 = Included, 1 = Excluded), SOP = Self-Oriented Perfectionism, OOP = Other-Oriented Perfectionism, SPP = Socially Prescribed Perfectionism, PSP = Perfectionistic Self-Promotion, NDP = Nondisplay of Imperfection, NDC = Nondisclosure of Imperfection, PCI = Perfectionism Cognitions Inventory, PS = Personal Standards, CM = Concern over Mistakes, N = Neuroticism, NBS = Need to Belong Scale, RSQ = Rejection Sensitivity Questionnaire, BDI-II = Beck Depression Inventory II, BAI = Beck Anxiety Inventory, STAXI-2 = State/Trait Anger Expression

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Inventory 2 State Anger, SSGS-S = State Shame and Guilt Scale – Shame, SSGS-G = State Shame and Guilt Scale – Guilt, LRS = Loneliness Rating Scale, AIM-I = Anaclitic and Introjective Mood – Introjective, AIM-A = Anaclitic and Introjective Mood – Anaclitic.

\*  $p < .05$ , \*\*  $p < .001$ , boldface correlations are significant after Bonferroni correction.

**Table 4**

*Zero-Order Correlations between Post-Cyberball Criterion Variables, Perfectionism Dimensions, and Dummy Coded Experimental Condition Variable for Sample One (Affective Outcomes).*

Criterion	SOP	OOP	SPP	PSP	NDP	NDC	PCI	PS	CM	COND
AIM-A	.13	-.02	.12	.23*	<b>.34**</b>	.22*	.23*	.10	<b>.42**</b>	<b>.42**</b>
AIM-I	.26*	.03	.18*	.24*	<b>.35**</b>	.23*	<b>.36**</b>	.24*	<b>.46**</b>	<b>.31**</b>
SSGS-S	.05	-.11	.20*	.20*	<b>.39**</b>	.26*	<b>.30**</b>	.02	<b>.44**</b>	<b>.33**</b>
SSGS-G	.16	.12	.23*	.20*	<b>.36**</b>	.27**	<b>.31**</b>	.10	<b>.39**</b>	.12
STAXI-2	.09	.02	.17	.18*	.27*	.11	.18*	.04	.19*	<b>.32**</b>
LRS	.18*	.02	.16	.23*	<b>.36**</b>	.21*	<b>.31**</b>	.19*	<b>.38**</b>	<b>.28*</b>

*Note.*  $n = 126$ . The following labels were used: SOP = Self-Oriented Perfectionism, OOP = Other-Oriented Perfectionism, SPP = Socially-Prescribed Perfectionism, PSP = Perfectionistic Self-Promotion, NDP = Nondisplay of Imperfection, NDC = Nondisclosure of Imperfection, PCI = Perfectionistic Cognitions Inventory, PS = Personal Standards, CM = Concern over Mistakes, COND = Dummy-Coded Experimental Condition (0 = Included, 1 = Excluded), AIM-A = Anaclitic and Introjective Mood – Anaclitic, AIM-I = Anaclitic and Introjective Mood – Introjective, SSGS-S = State Shame and Guilt Scale – Shame, SSGS-G = State Shame and Guilt Scale – Guilt, STAXI-2 = State-Trait Anger Expression Inventory 2 – State Anger Scale, LRS = Loneliness Rating Scale. \* $p < .05$ , \*\* $p < .001$ , boldface correlations are significant after Bonferroni correction ( $\alpha = .05$ ).

**Table 5**

*T-Test and Effect Sizes for Mean Differences in Post-Cyberball Outcome Variables between Social Exclusion and Inclusion Groups, Sample One (Affective Outcomes).*

	Mean Difference	<i>t</i> -test			Cohen's <i>d</i>	
		<i>df</i>	<i>t</i>	<i>p</i>	<i>d</i>	95% C. I. for <i>d</i>
Post-Cyberball Affect						
AIM Anacritic	-8.29	83.59	-4.80	<b>.000</b>	.91	.54, 1.27
AIM Introjective	-5.54	89.80	-3.43	<b>.001</b>	.65	.28, 1.00
SSGS Shame	-2.32	90.86	-3.66	<b>.000</b>	.69	.32, 1.05
SSGS Guilt	-1.00	124	-1.38	.172	.25	-.11, .60
STAXI-2 Anger	-1.76	96.85	-3.67	<b>.000</b>	.68	.32, 1.04
LRS Loneliness	-16.52	124	-3.22	<b>.002</b>	.58	.22, .93

*Note.* The following labels were used: STAXI-2 = State-Trait Anger Expression Inventory 2, SSGS = State Shame and Guilt Scale, LRS = Loneliness Rating Scale, AIM = Anacritic and Introjective Mood Adjectives. *dfs* that do not equal  $n - 2$  were calculated on the basis of a significant test for inequality of variances across groups (Levene's test,  $p < .05$ ). Boldface *p*-values are statistically significant after Bonferroni correction ( $\alpha = .05$ ).

**Table 6**

*Hierarchical Regression Model Summaries and Unstandardized Regression Weights for the Perfectionism by Condition Interaction Terms Predicting Sample One (Affective Outcomes).*

	B [95% C.I.]	<i>p</i>	Adj. $R^2$ ( $\Delta R^2$ )	$F$ ( $\Delta F$ )	<i>df</i>
DV: Anaclitic Affect (AIM-A <sup>a</sup> )					
SOPxCondition	.000 [-.005, .005]	.93	.53*** (.00)	28.37 (.01)	4, 94
OOPxCondition	-.001 [-.006, .005]	.78	.50*** (.00)	26.08 (.08)	4, 95
SPPxCondition	-.001 [-.007, .005]	.73	.53*** (.00)	28.51 (.12)	4, 95
PSPxCondition	.002 [-.005, .009]	.52	.51*** (.00)	26.33 (.41)	4, 95
NDPxCondition	.004 [-.002, .010]	.23	.51*** (.01)	26.79 (1.49)	4, 95
<b>NDCxCondition</b>	.009 [-.002, .020] <sup>†</sup>	.09	.53*** (.01) <sup>†</sup>	29.10 (2.88)	4, 94
PCIxCondition	.001 [-.002, .005]	.50	.51*** (.00)	27.15 (.45)	4, 95
<b>CMxCondition</b>	.024 [.012, .036]***	.00	.53*** (.07)***	28.00 (15.01)	4, 93
PSxCondition	.005 [-.008, .019]	.45	.51*** (.00)	26.76 (.57)	4, 95
DV: Introjective Affect (AIM-I <sup>a</sup> )					
SOPxCondition	.002 [-.002, .006]	.28	.56*** (.01)	32.69 (1.21)	4, 96
OOPxCondition	-.001 [-.005, .004]	.83	.55*** (.00)	32.09 (.05)	4, 96
SPPxCondition	.000 [-.005, .005]	.90	.54*** (.00)	30.73 (.02)	4, 96
PSPxCondition	.004 [-.002, .010]	.22	.55*** (.01)	31.51 (1.51)	4, 96
<b>NDPxCondition</b>	.005 [-.001, .010] <sup>†</sup>	.08	.55*** (.01) <sup>†</sup>	32.92 (3.07)	4, 96
<b>NDCxCondition</b>	.010 [.001, .020] <sup>*</sup>	.03	.57*** (.02) <sup>*</sup>	33.95 (4.66)	4, 95
PCIxCondition	.002 [-.001, .005]	.24	.55*** (.01)	31.40 (1.40)	4, 96
<b>CMxCondition</b>	.021 [.011, .032]***	.00	.55*** (.08)***	30.35 (16.10)	4, 93
PSxCondition	.004 [-.007, .016]	.45	.56*** (.00)	32.46 (.57)	4, 96
DV: Shame (SSGS-S <sup>a</sup> )					
SOPxCondition	.000 [-.003, .002]	.74	.69*** (.00)	55.72 (.12)	4, 96
OOPxCondition	-.003 [-.006, .001]	.12	.69*** (.01)	56.87 (2.43)	4, 96
SPPxCondition	.000 [-.004, .003]	.79	.69*** (.00)	55.52 (.07)	4, 96
PSPxCondition	.000 [-.004, .005]	.85	.69*** (.00)	55.42 (.04)	4, 96
NDPxCondition	.003 [-.001, .007]	.14	.69*** (.01)	57.24 (2.25)	4, 96

Predictor	B [95% C.I.]	<i>p</i>	Adj. $R^2$ ( $\Delta R^2$ )	<i>F</i> ( $\Delta F$ )	<i>df</i>
DV: Shame (SSGS-S <sup>a</sup> ) cont.					
NDCxCondition	.001 [-.006, .008]	.70	.69*** (.00)	56.74 (.15)	4, 95
<b>PCIxCondition</b>	.002 [ .000, .004] <sup>†</sup>	.10	.69*** (.01) <sup>†</sup>	57.51 (2.85)	4, 96
<b>CMxCondition</b>	.010 [ .002, .018] <sup>*</sup>	.02	.65*** (.02) <sup>*</sup>	46.78 (6.13)	4, 93
PSxCondition	-.002 [-.010, .007]	.68	.69*** (.00)	55.41 (.17)	4, 96
DV: Guilt (SSGS-G <sup>a</sup> )					
SOPxCondition	-.003 [-.007, .001]	.13	.54*** (.01)	30.70 (2.40)	4, 96
<b>OOPxCondition</b>	-.005 [-.009, .000] <sup>*</sup>	.04	.56*** (.02) <sup>*</sup>	33.33 (4.59)	4, 96
SPPxCondition	-.001 [-.006, .004]	.61	.53*** (.00)	29.58 (.26)	4, 96
PSPxCondition	-.003 [-.009, .002]	.27	.54*** (.01)	30.06 (1.23)	4, 96
NDPxCondition	.002 [-.004, .007]	.56	.54*** (.00)	30.75 (.34)	4, 96
NDCxCondition	.005 [-.005, .014]	.32	.53*** (.01)	28.78 (1.02)	4, 95
PCIxCondition	-.002 [-.005, .001]	.26	.54*** (.01)	30.13 (1.31)	4, 96
CMxCondition	.001 [-.009, .011]	.80	.52*** (.00)	27.38 (.07)	4, 94
PSxCondition	-.009 [-.020, .002]	.13	.55*** (.01)	30.92 (2.40)	4, 96
DV: Anger (STAXI-F <sup>a</sup> )					
SOPxCondition	-.002 [-.005, .002]	.38	.32*** (.01)	12.47 (.01)	4, 94
OOPxCondition	-.003 [-.007, .001]	.12	.33*** (.02)	13.13 (2.54)	4, 94
SPPxCondition	.001 [-.003, .005]	.62	.32*** (.00)	12.36 (.25)	4, 94
PSPxCondition	-.002 [-.006, .003]	.51	.32*** (.00)	12.35 (.43)	4, 94
<b>NDPxCondition</b>	.004 [ .000, .008] <sup>†</sup>	.07	.31*** (.02) <sup>†</sup>	11.95 (3.33)	4, 93
NDCxCondition	-.001 [-.009, .007]	.83	.27*** (.00)	10.07 (.05)	4, 92
PCIxCondition	.002 [-.001, .004]	.22	.32*** (.01)	12.76 (1.55)	4, 94
<b>CMxCondition</b>	.011 [ .003, .019] <sup>**</sup>	.01	.39*** (.05) <sup>**</sup>	16.17 (7.69)	4, 93
PSxCondition	.001 [-.009, .010]	.85	.32*** (.00)	12.30 (.04)	4, 94
DV: Loneliness (LRS <sup>a</sup> )					
SOPxCondition	.000 [-.003, .003]	.96	.70*** (.00)	58.86 (.00)	4, 96
OOPxCondition	-.001 [-.005, .002]	.41	.70*** (.00)	59.30 (.68)	4, 96
SPPxCondition	-.001 [-.004, .003]	.68	.70*** (.00)	58.90 (.17)	4, 96

Predictor	B [95% C.I.]	<i>p</i>	Adj. $R^2$ ( $\Delta R^2$ )	$F$ ( $\Delta F$ )	<i>df</i>
DV: Loneliness (LRS <sup>a</sup> ) cont.					
PSPxCondition	-.001 [-.005, .003]	.58	.70 <sup>***</sup> (.00)	59.09 (.31)	4, 96
NDPxCondition	.000 [-.004, .003]	.80	.71 <sup>***</sup> (.00)	61.70 (.07)	4, 96
NDCxCondition	.001 [-.006, .008]	.84	.70 <sup>***</sup> (.00)	58.11 (.04)	4, 95
PCIxCondition	.000 [-.002, .002]	.94	.70 <sup>***</sup> (.00)	59.23 (.01)	4, 96
CMxCondition	.006 [-.002, .014]	.15	.67 <sup>***</sup> (.01)	50.66 (2.09)	4, 93
PSxCondition	.002 [-.006, .010]	.61	.70 <sup>***</sup> (.00)	58.95 (.26)	4, 96

*Note.* Each complete hierarchical regression model included the following variables: Baseline affect was entered as a covariate in step one, the perfectionism variable of interest and a dummy-coded condition variable (0 = inclusion, 1 = exclusion) were entered in step two as main effects, followed by the interaction term in step three.  $\Delta R^2$  and  $\Delta F$  refer to the change in variance explained by the inclusion of the interaction term in the model, *p*-values for  $\Delta F$  are equivalent to the *p*-value for the interaction term listed in the table. All continuous predictors were mean-centered prior to analysis. The following abbreviations were used: SOP = Self-Oriented Perfectionism, OOP = Other-Oriented Perfectionism, SPP = Socially Prescribed Perfectionism, PSP = Perfectionistic Self-Promotion, NDP = Nondisplay of Imperfections, NDC = Nondisclosure of Imperfections, PCI = Perfectionistic Cognitions, CM = Concern over Mistakes, PS = Personal Standards, AIM-A = Anaclitic and Introjective Mood Adjectives – Anaclitic, AIM-I = Anaclitic and Introjective Mood Adjectives – Introjective, SSGS-S = State Shame and Guilt Scale – Shame, SSGS-G = State Shame and Guilt Scale – Guilt, STAXI-F = State-Trait Anger Expression Inventory – Angry Feelings, LRS = Loneliness Rating Scale. a. Indicates variable was log-transformed prior to analysis.

†*p* ≤ .10, \**p* < .05, \*\**p* < .01, \*\*\**p* < .001.

**Table 7**

*Simple Slope Analyses for Significant Perfectionism x Condition Interactions Predicting Post-Cyberball Affective Outcomes Controlling for and Baseline (Pre-Cyberball) Affect.*

Condition	B	95% CI	<i>t</i>	<i>p</i>
DV: Anacritic Affect (AIM-A <sup>a</sup> )				
NDC x Condition				
Inclusion	-.008*	-.015, -.001	-2.34	.02
Exclusion	.003	-.004, .011	.86	.39
CM x Condition				
Inclusion	-.003	-.009, .003	-1.02	.31
Exclusion	.015**	.006, .026	3.24	<.01
DV: Introjective Affect (AIM-I <sup>a</sup> )				
NDP x Condition				
Inclusion	-.001	-.004, .003	-.34	.73
Exclusion	.004*	.000, .008	2.04	.04
NDC x Condition				
Inclusion	-.006	-.013, -.001	-1.76	.08
Exclusion	.004	-.003, .010	1.21	.23
CM x Condition				
Inclusion	-.003	-.008, .002	-1.09	.28
Exclusion	.018***	.009, .028	3.74	<.001
DV: Shame (SSGS-S <sup>a</sup> )				
PCI x Condition				
Inclusion	-.001	-.002, .000	-1.48	.14
Exclusion	.001	-.001, .003	.97	.34
CM x Condition				
Inclusion	-.001	-.005, .003	-.285	.78
Exclusion	.009*	.002, .017	2.54	.01



Condition	B	95% CI	<i>t</i>	<i>p</i>
DV: Guilt (SSGS-G <sup>a</sup> )				
OOP x Condition				
Inclusion	.004*	.001, .007	2.62	.01
Exclusion	-.001	-.004, .002	-.61	.55
DV: Anger (STAXI-F <sup>a</sup> )				
NDP x Condition				
Inclusion	.000	-.003, .002	-.26	.79
Exclusion	.004*	.000, .007	2.17	.03
CM x Condition				
Inclusion	.000	-.004, .004	.17	.86
Exclusion	.011**	.004, .019	3.16	<.01

*Note.* The following labels were used: NDC = Nondisclosure of Imperfection, CM = Concern over Mistakes, NDP = Nondisplay of Imperfection, PCI = Perfectionistic Cognitions, OOP = Other-Oriented Perfectionism. AIM-A = Anaclitic and Introjective Mood Adjectives- Anaclitic, AIM-I = Anaclitic and Introjective Mood Adjectives – Introjective, SSGS-S = State Shame and Guilt Scale – Guilt, SSGS-G = State Shame and Guilt Scale – Guilt, STAXI-F = State/Trait Anger Expression Inventory – Feelings. Baseline affect is included as a covariate set at its mean.

a. indicates that variable was log-transformed.

\*  $p < .05$ , \*\* $p < .01$ , \*  $p < .001$ .

**Table 8**

*Intercorrelations among VAS Affect Ratings and experimental condition Pre- and Post-Cyberball (Sample One)*

	VAS Anger	VAS Shame	VAS Lonely	VAS Rejected	VAS Self-Critical	COND
VAS Anger	1	<b>.50**</b>	<b>.56**</b>	<b>.64**</b>	<b>.44**</b>	<b>.42**</b>
VAS Shame	<b>.50**</b>	1	<b>.42**</b>	<b>.51**</b>	<b>.51**</b>	<b>.22*</b>
VAS Lonely	<b>.41**</b>	<b>.38**</b>	1	<b>.73**</b>	<b>.38**</b>	<b>.43**</b>
VAS Rejected	<b>.29**</b>	<b>.41**</b>	<b>.62**</b>	1	<b>.41**</b>	<b>.54**</b>
VAS Self-Critical	<b>.37**</b>	<b>.39**</b>	<b>.40**</b>	<b>.44**</b>	1	<b>.22*</b>
COND	.05	.06	.02	.05	.13	1

*Note.*  $n = 126$ . Pre-Cyberball correlations appear below the diagonal, post-Cyberball correlations appear above the diagonal. The following labels are used: VAS = Visual Analogue Scale, COND = Dummy-coded experimental condition variable (0 = Inclusion condition, 1 = Exclusion condition).

\*  $p < .05$ , \*\*  $p < .001$ , boldface correlations are significant after multistage Bonferroni correction.

**Table 9**

*Hierarchical Regression Model Summaries and Unstandardized Regression Weights for the Three-way Perfectionism by Log-Transformed Post-Cyberball Negative Affect by Condition Interaction Terms predicting Log-Transformed Negative Affect at Follow-Up.*

	B [95% C.I.]	<i>p</i>	Adj. $R^2$ ( $\Delta R^2$ )	<i>F</i> ( $\Delta F$ )	<i>df</i>
SOPxNAxCondition	-.024 [-.062, .014]	.21	.65*** (.01)	24.10 (1.60)	7, 81
OOPxNAxCondition	-.023 [-.054, .008]	.14	.64*** (.01)	23.71 (2.25)	7, 81
SPPxNAxCondition	-.014 [-.076, .047]	.64	.63*** (.00)	22.36 (.22)	7, 81
PSPxNAxCondition	-.018 [-.084, .048]	.59	.63*** (.00)	22.45 (.29)	7, 81
NDPxNAxCondition	-.030 [-.099, .039]	.39	.63*** (.00)	22.28 (.76)	7, 81
NDCxNAxCondition	-.054 [-.172, .064]	.36	.63*** (.00)	22.29 (.84)	7, 81
PCIxNAxCondition	-.009 [-.040, .021]	.54	.63*** (.00)	22.40 (.38)	7, 81
CMxNAxCondition	-.049 [-.156, .058]	.37	.64*** (.00)	22.88 (.82)	7, 81
<b>PSxNAxCondition</b>	-.099 [-.189, -.001]*	.03	.68*** (.02)*	27.75 (4.76)	7, 81

*Note.* The following abbreviations were used: Adj. = Adjusted, SOP = self-oriented perfectionism, OOP = other-oriented perfectionism, SPP = socially prescribed perfectionism, PSP = perfectionistic self-promotion, NDP = nondisplay of imperfections, NDC = nondisclosure of imperfections, PCI = perfectionistic cognitions, CM = concern over mistakes, PS = personal standards, NA = negative affect For each three-way interaction test the following hierarchical multiple regression model was constructed: Baseline NA, post-Cyberball NA, dummy coded condition (0 = inclusion 1 = exclusion), and each perfectionism dimension alone was entered into the model at step one. In step two, all two-way interaction combinations were entered in the model: perfectionism x condition, perfectionism x post-Cyberball NA, and post-Cyberball NA x Condition. In the final step, the three-way perfectionism x NA x condition interaction term was entered. All continuous predictors were mean-centered prior to analysis. Significant interaction terms are bolded for emphasis.

\*\*\* $p < .001$ , \* $p < .05$

**Table 10**

*Simple Slopes Analysis of the Three-Way Post-Cyberball Negative Affect x Personal Standards x Condition Interaction Controlling for Baseline Negative Affect.*

	B	95% C. I.	<i>t</i>	<i>p</i>
Slopes of Post-Cyberball Affect predicting Follow-up Affect at levels of Condition and PS				
Inclusion Condition				
-1 SD PS	.473***	.231, .714	3.90	<.001
Mean PS	.749***	.571, .928	8.35	<.001
+1 SD PS	1.026***	.744, 1.308	7.24	<.001
Exclusion Condition				
-1 SD PS	.883***	.565, 1.201	5.52	<.001
Mean PS	.718**	.269, 1.168	3.18	<.01
+1 SD PS	.553	-.190, 1.296	1.48	.14

*Note.* All negative affect variables were log-transformed prior to analysis. The following abbreviations were used: PS = Personal Standards.

\*\*\*  $p < .001$ , \*\*  $p < .01$ .

**Table 11**

*Means, Standard Deviations, and Internal Consistency of T1 Perfectionism and Covariate Measures in Sample Two (Cognitive Outcomes).*

Measure	Mean	SD	$\alpha$
Perfectionism Measures			
SOP	64.91	12.59	.86
OOP	55.56	8.74	.67
SPP	52.86	11.10	.83
PSP	41.30	9.31	.83
NDP	44.43	9.82	.87
NDC	23.36	6.43	.77
PCI	41.23	17.67	.93
CM	24.02	5.88	.83
PS	23.16	4.26	.75
Personality and Mood Covariates			
N	23.58	6.35	.82
NBS	34.91	6.08	.77
RSQ	8.60	3.42	.70
BDI-II	10.01	6.16	.83
BAI	7.74	4.95	.75

*Note.*  $n = 150$ . The following labels are used: T1 = Time One, SOP = Self-Oriented Perfectionism, OOP = Other-Oriented Perfectionism, Socially Prescribed Perfectionism, PSP = Perfectionistic Self-Promotion, NDP = Nondisplay of Imperfection, NDC = Nondisclosure of Imperfection, PCI = Perfectionism Cognitions Inventory, CM = Concern over Mistakes, PS = Personal Standards, N = Neuroticism, NBS = Need to Belong Scale, RSQ = Rejection Sensitivity Questionnaire, BDI-II = Beck Depression Inventory, BAI = Beck Anxiety Inventory.

**Table 12**

*Mean, Standard Deviations and Internal Consistency of T2 Baseline Measures in Sample Two (Cognitive Outcomes).*

Baseline (Pre-Cyberball) Cognitive Variables	Mean	SD	$\alpha$
Likert-Scale Questionnaires			
ATQ Negative Automatic Thoughts	8.38	8.26	.93
SSES Social Self-Esteem	23.95	6.18	.89
S-PCI State Perfectionistic Thinking	26.14	14.33	.93
SPS Perceived Social Support	41.77	4.97	.91
RISC Relational Interdependence	57.43	8.12	.85
Open-Ended Measures <sup>a</sup>			
TLT Negative Self-Related Thoughts	.21	.20	--
TLT Negative Other-Related Thoughts	.04	.07	--
TST Allocentric Self-Statements	.28	.17	--
Implicit Measures			
SC-IAT Negative Attitude Towards Mistakes	.38	.28	--
SC-IAT Positive Attitude Towards Belonging	.42	.28	--

*Note.*  $n = 150$ . The following labels were used: T2 = Time Two, ATQ = Automatic Thoughts Questionnaire, SSES = State Self-Esteem Scale, S-PCI = Perfectionistic Cognitions Inventory (State version), SPS = Social Provisions Scale, RISC = Relational Interdependence Self-Construct, TLT = Thought Listing Task, TST = Twenty Statements Test, SC-IAT = Single Category Implicit Association Test. a. Open-ended responses are proportional to participants' number of thoughts.

**Table 13**

*Means, Standard Deviations and Internal Consistency of T2 Criterion Measures in Sample Two (Cognitive Outcomes).*

Criterion Measure	Mean	SD	$\alpha$
Likert Scale Questionnaires			
ATQ Negative Automatic Thoughts	7.94	8.50	.94
SSSE Social Self-Esteem	24.47	6.82	.91
S-PCI State Perfectionistic Thinking	24.13	15.19	.94
SPS Perceived Social Support	42.13	5.21	.91
RISC Relational Interdependence	47.42	7.41	.88
Open Ended Measures <sup>a</sup>			
TLT Negative Self-Related Thoughts	.13	.15	--
TLT Negative Other-Related Thoughts	.07	.10	--
TST Allocentric Self-Statements	.31	.21	--
Implicit Association Measures			
SC-IAT Negative Attitude Towards Mistakes	.19	.30	--
SC-IAT Positive Attitude Towards Belonging	.28	.30	--

*Note.*  $n = 150$ . The following labels were used: ATQ = Automatic Thoughts Questionnaire – Negative, SSSE = State Social Self-Esteem, S-PCI = State Perfectionistic Cognitions Inventory, SPS = Social Provisions Scale, RISC = Relational Interdependence Self-Construct, TLT = Thought Listing Task, TST = Twenty Statements Test, SC-IAT = Single Category Implicit Association Test. a. Open-ended responses are proportional to participants' number of thoughts..

**Table 14***Zero-Order Intercorrelations for all Predictor Variables in Sample Two (Cognitive Outcomes).*

Variable	COND	SOP	OOP	SPP	PSP	NDP	NDC	PCI	PS	CM
COND	1	--	--	--	--	--	--	--	--	--
SOP	-.08	1	--	--	--	--	--	--	--	--
OOP	.05	<b>.44**</b>	1	--	--	--	--	--	--	--
SPP	-.07	<b>.43**</b>	<b>.36**</b>	1	--	--	--	--	--	--
PSP	.06	<b>.49**</b>	<b>.35**</b>	<b>.57**</b>	1	--	--	--	--	--
NDP	.03	<b>.38**</b>	.21*	<b>.56**</b>	<b>.65**</b>	1	--	--	--	--
NDC	.08	<b>.33**</b>	.10	<b>.53**</b>	<b>.53**</b>	<b>.55**</b>	1	--	--	--
PCI	.08	<b>.57**</b>	<b>.32*</b>	<b>.57**</b>	<b>.64**</b>	<b>.46**</b>	<b>.47**</b>	1	--	--
PS	-.11	<b>.62**</b>	.26*	.20*	<b>.31**</b>	<b>.23*</b>	.19*	<b>.48**</b>	1	--
CM	-.03	<b>.41**</b>	.23*	<b>.62**</b>	<b>.60**</b>	<b>.66**</b>	<b>.55**</b>	<b>.60**</b>	<b>.31**</b>	1
N	-.05	.17*	.04	<b>.35**</b>	<b>.35**</b>	<b>.48**</b>	.28*	<b>.29**</b>	.19*	<b>.51**</b>
NBS	-.10	.08	.07	.27*	.27*	<b>.44**</b>	.09	.27*	.08	<b>.40**</b>
RSQ	-.02	.18*	.21*	<b>.47**</b>	<b>.47**</b>	<b>.39**</b>	<b>.38**</b>	<b>.35**</b>	.01	<b>.48**</b>
BDI-II	.02	.14	.06	<b>.45**</b>	<b>.45**</b>	<b>.43**</b>	<b>.36**</b>	<b>.36**</b>	.02	<b>.47**</b>
BAI	-.07	.19*	.16	<b>.32**</b>	<b>.32**</b>	<b>.33**</b>	.22*	<b>.31**</b>	.15	<b>.36**</b>
ATQ	.13	.23*	.19*	<b>.39**</b>	<b>.34**</b>	<b>.37**</b>	<b>.31**</b>	<b>.51**</b>	.09	<b>.56**</b>
SPS	-.16	-.06	-.05	<b>-.37**</b>	-.28*	<b>-.39**</b>	<b>-.38**</b>	-.24*	-.07	<b>-.45**</b>
SSSE	.01	-.24*	-.19*	<b>-.39**</b>	<b>-.45**</b>	<b>-.45**</b>	<b>-.29**</b>	<b>-.45**</b>	-.12	<b>-.48**</b>
RISC	.16*	.09	.14	.03	.12	-.01	-.15	.04	.08	-.08
SC-IAT-M	.23*	-.10	.09	-.02	.13	.00	.14	.15	.09	.05
SC-IAT-B	.19	-.03	-.15	-.05	.01	-.04	-.04	-.01	-.10	.00
S-PCI	.01	<b>.42**</b>	<b>.36**</b>	<b>.48**</b>	<b>.52**</b>	<b>.35**</b>	.27*	<b>.70**</b>	.28*	<b>.52**</b>
TLT-SN	.02	.15	.28*	.05	.08	.08	.02	.14	.00	.10
TLT-ON	.02	.05	.05	.00	.03	.06	.08	.04	.13	.11
TST-A	-.03	.00	.04	-.04	-.13	.04	-.06	-.08	.03	-.08



Variable	N	NBS	RSQ	BDI-II	BAI	ATQ	SPS	SSE	RISC
COND	--	--	--	--	--	--	--	--	--
SOP	--	--	--	--	--	--	--	--	--
OOP	--	--	--	--	--	--	--	--	--
SPP	--	--	--	--	--	--	--	--	--
PSP	--	--	--	--	--	--	--	--	--
NDP	--	---	--	--	--	--	--	--	--
NDC	--	--	--	--	--	--	--	--	--
PCI	--	--	--	--	--	--	--	--	--
PS	--	--	--	--	--	--	--	--	--
CM	--	--	--	--	--	--	--	--	--
N	1	--	--	--	--	--	--	--	--
NBS	<b>.49**</b>	1	--	--	--	--	--	--	--
RSQ	<b>.39**</b>	.18*	1	--	--	--	--	--	--
BDI-II	<b>.61**</b>	<b>.34**</b>	<b>.32**</b>	1	--	--	--	--	--
BAI	<b>.51**</b>	<b>.38**</b>	.24*	<b>.66**</b>	1	--	--	--	--
ATQ	<b>.38**</b>	.23*	<b>.33**</b>	<b>.42**</b>	<b>.37**</b>	1	--	--	--
SPS	<b>-.32**</b>	-.14	<b>-.36**</b>	<b>-.37**</b>	-.17*	<b>-.39**</b>	1	--	--
SSE	<b>-.41**</b>	-.24*	-.26*	<b>-.37**</b>	<b>-.33**</b>	<b>-.67**</b>	.27*	1	--
RISC	-.03	-.09	-.14	-.10	.05	-.13	<b>.40**</b>	-.14	1
SC-IAT-M	.09	-.02	.09	.11	-.02	.00	-.07	.03	.15
SC-IAT-B	-.16	-.08	.05	-.06	.03	-.05	-.08	-.04	-.02
S-PCI	.27*	.24*	<b>.29**</b>	<b>.29**</b>	.28**	<b>.72**</b>	-.23*	<b>-.68**</b>	.18*
TLT-SN	-.04	.01	.18*	.02	.08	.17*	.00	-.13	.07
TLT-ON	.08	.02	-.05	.06	.16*	.08	.03	-.14	.00
TST-A	.09	.09	-.11	.01	-.09	.02	.04	-.07	.04

Variable	SC-IAT-M	SC-IAT-B	S-PCI	TLT-SN	TLT-ON	TST-A
COND	--	--	--	--	--	--
SOP	--	--	--	--	--	--
OOP	--	--	--	--	--	--
SPP	--	--	--	--	--	--
PSP	--	--	--	--	--	--
NDP	--	--	--	--	--	--
NDC	--	--	--	--	--	--
PCI	--	--	--	--	--	--
PS	--	--	--	--	--	--
CM	--	--	--	--	--	--
N	--	--	--	--	--	--
NBS	--	--	--	--	--	--
RSQ	--	--	--	--	--	--
BDI-II	--	--	--	--	--	--
BAI	--	--	--	--	--	--
ATQ	--	--	--	--	--	--
SPS	--	--	--	--	--	--
SSSE	--	--	--	--	--	--
RISC	--	--	--	--	--	--
SC-IAT-M	1	--	--	--	--	--
SC-IAT-B	-.03	1	--	--	--	--
S-PCI	.03	-.02	1	--	--	--
TLT-SN	.06	.07	.15	1	--	--
TLT-ON	.13	-.07	.07	.01	1	--
TST-A	-.03	-.02	-.05	.01	.02	1

*Note.* The following labels are used: SOP = Self-Oriented Perfectionism, OOP = Other-Oriented Perfectionism, SPP = Socially Prescribed Perfectionism, PSP = Perfectionistic Self-Promotion, NDP = Nondisplay of Imperfection, NDC = Nondisclosure of Imperfection, PCI = Perfectionistic Cognitions Inventory, PS = Personal Standards, CM = Concern over Mistakes, N = Neuroticism, NBS = Need to Belong Scale, RSQ = Rejection Sensitivity Questionnaire, BDI-II = Beck Depression Inventory II, BAI = Beck Anxiety Inventory, ATQ-N = Automatic Thoughts Questionnaire, SPS = Social Provisions Scale, SSE = State Social Self-Esteem, SC-

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IAT-M = Single Category Implicit Association Test – Mistakes, SC-IAT-B = Single Category Implicit Association Test – Belonging, S-PCI = State Perfectionistic Cognitions Inventory, TLT-SN = Thought Listing Task – Self-Negative Thoughts, TLT-ON = Thought Listing Task Other-Negative Thoughts, TST-A = Twenty Statements Test – Allocentric Self-Concept.  $n = 150$  except for SC-IAT-B  $n = 96$  and SC-IAT-M  $n = 98$ , TST-I and TST-A  $n = 144$ .

\* $p < .05$ , \*\* $p < .001$ , boldface correlations are significant after multistage Bonferroni correction.

**Table 15**

*Zero-Order Correlations between Perfectionism Dimensions, and Dummy Coded Experimental Condition and Post-Cyberball Criterion Variables in Sample Two (Cognitive Outcomes).*

Criterion	SOP	OOP	SPP	PSP	NDP	NDC	PCI	PS	CM	COND
ATQ	.23*	.19*	<b>.40**</b>	<b>.34**</b>	<b>.33**</b>	<b>.31**</b>	<b>.52**</b>	.09	<b>.55**</b>	.09
SPS	-.06	-.05	<b>-.30**</b>	<b>-.28*</b>	<b>-.37**</b>	<b>-.38**</b>	-.26*	-.07	<b>-.47**</b>	-.16
SSSE	-.24*	-.19*	<b>-.39**</b>	<b>-.45**</b>	<b>-.47**</b>	<b>-.29**</b>	<b>-.45**</b>	-.12	<b>-.51**</b>	-.03
RISC	.07	.15	.05	.07	-.02	.13	.04	.09	-.09	-.11
SC-IAT-M	.17	.06	.13	.22*	.16	.05	.26*	.16	.13	<b>.28*</b>
SC-IAT-B	-.02	.05	.04	.13	.17	.14	.06	-.05	.12	.21*
S-PCI	<b>.42**</b>	<b>.36**</b>	<b>.48**</b>	<b>.52**</b>	<b>.35**</b>	<b>.27*</b>	<b>.70**</b>	<b>.28**</b>	<b>.52**</b>	.07
TLT-SN	.04	.06	.05	.15	.19*	.14	.03	.00	.10	.20*
TLT-ON	.09	.07	.04	.17*	.10	.08	.14	.04	.07	.23*
TST-A	.09	.07	.04	.09	.11	-.06	.09	.09	-.04	.06

*Note.*  $n = 150$  except for IAT-B  $n = 93$  and IAT-M  $n = 86$ , TST-I and TST-A  $n = 144$ . The following labels were used: SOP = Self-Oriented Perfectionism, OOP = Other-Oriented Perfectionism, SPP = Socially-Prescribed Perfectionism, PSP = Perfectionistic Self-Promotion, NDP = Nondisplay of Imperfection, NDC = Nondisclosure of Imperfection, PCI = Perfectionistic Cognitions Inventory, PS = Personal Standards, CM = Concern over Mistakes, COND = Dummy-Coded Experimental Condition (0 = Included, 1 = Excluded), ATQ = Automatic Thoughts Questionnaire, SPS = Social Provisions Scale, SSSE = State Social Self-Esteem, RISC = Relational Interdependence Self-Construct, SC-IAT-M = Single Category Implicit Association Test – Mistakes, SC-IAT – B = Single Category Implicit Association Test – Belonging, S - PCI = State Perfectionistic Cognitions Inventory, TLT-SN = Thought Listing Task – Self Negative, TLT-ON = Thought Listing Task – Other Negative, TST-A = Twenty Statements Test – Allocentric Self-Concept.

\*  $p < .05$ , \*\*  $p < .001$ , boldface correlations are significant after Bonferroni correction.

**Table 16**

*T-Test and Effect Sizes for Mean Differences in Post-Cyberball Outcome Variables between Social Exclusion and Inclusion Groups, Sample Two (Cognitive Outcomes)*

	Mean	<i>t</i> -test			Cohen's <i>d</i>	
	Difference	<i>df</i>	<i>t</i>	<i>p</i>	<i>d</i>	95% C. I.
Post-Cyberball Cognitions						
ATQ	-1.48	148	-1.07	.288	.17	-.15, .49
S-PCI	-2.21	148	-.89	.374	.15	-.18, .47
TLT-SN	-.06	130.64	-2.50	.014*	.41	.08, .73
TLT-ON	-.04	139.67	-2.82	<b>.005*</b>	.46	.13, .78
SPS	1.63	148	1.93	.056	-.32	-.64, .01
SSSE	.41	148	.37	.712	-.06	-.38, .26
RISC	1.61	148	1.34	.183	-.22	-.54, .10
TST-A	-.03	142	-.76	.449	.13	-.20, .45
SC-IAT-B	-.13	91	2.05	.043*	.43	.01, .84
SC-IAT-M	-.17	84	2.65	.010*	.57	.13, 1.00

*Note.* The following labels were used: ATQ = Automatic Thoughts Questionnaire, SPS = Social Provisions Scale, SSSE = State Social Self-Esteem, RISC = Relational Interdependence Self-Concept, SC-IAT-M = Single-Category Implicit Association Test – Mistakes, SC-IAT-B = Single-Category Implicit Association Test – Belonging, S - PCI = State Perfectionistic Cognitions Inventory, TLT-SN = Thought Listing Task – Self Negative, TLT-ON = Thought Listing Task – Other Negative, TST-A = Twenty Statements Test – Allocentric Self-Concept. Negative effect sizes mean the inclusion group mean was larger than the exclusion group mean. Boldface values are significant after Bonferroni adjustment.

**Table 17**

*Hierarchical Regression Model Summaries and Unstandardized Regression Weights for the Perfectionism by Condition Interaction Terms Sample Two (Cognitive Outcomes).*

Predictor	B [95% C.I.]	<i>p</i>	Adj. $R^2$ ( $\Delta R^2$ )	$F$ ( $\Delta F$ )	<i>df</i>
DV: Negative Thoughts (ATQ) <sup>a</sup>					
SOPxCondition	.000 [-.009, .009]	.93	.67*** (.00)	52.65 (.01)	4, 99
OOPxCondition	.004 [-.009, .017]	.53	.66*** (.00)	50.89 (.40)	4, 98
SPPxCondition	-.002 [-.011, .008]	.73	.67*** (.00)	52.75 (.12)	4, 99
PSPxCondition	.003 [-.009, .016]	.60	.67*** (.00)	53.16 (.28)	4, 99
NDPxCondition	.000 [-.012, .012]	.98	.66*** (.00)	50.69 (.00)	4, 98
NDCxCondition	.012 [-.004, .028]	.14	.67*** (.01)	54.35 (2.19)	4, 99
PCIxCondition	-.002 [-.008, .005]	.62	.69*** (.00)	52.80 (.25)	4, 99
CMxCondition	.000 [-.018, .018]	.00	.67*** (.00)	53.67 (.00)	4, 99
PSxCondition	.010 [-.015, .036]	.43	.67*** (.00)	52.80 (.64)	4, 98
DV: Perfectionistic Thoughts (S-PCI)					
SOPxCondition	-.113 [-.357, .131]	.36	.76*** (.01)	81.29 (.85)	4, 99
OOPxCondition	-.021 [-.373, .330]	.90	.75*** (.00)	76.95 (.02)	4, 98
SPPxCondition	-.202 [-.448, .043]	.11	.77*** (.01)	86.78 (2.68)	4, 99
PSPxCondition	-.144 [-.479, .191]	.40	.76*** (.00)	84.15 (.73)	4, 99
NDPxCondition	.007 [-.320, .335]	.96	.75*** (.00)	78.46 (.00)	4, 98
NDCxCondition	.013 [-.431, .457]	.95	.76*** (.00)	81.66 (.00)	4, 99
PCIxCondition	-.004 [-.173, .165]	.96	.77*** (.00)	84.69 (.00)	4, 99
<b>CMxCondition</b>	-.475 [-.996, .047] <sup>†</sup>	.07	.75*** (.01) <sup>†</sup>	78.13 (3.27)	4, 97
PSxCondition	.053 [-.653, .759]	.88	.76*** (.00)	81.27 (.02)	4, 98
DV: Negative Self-Thoughts (TLT-SN) <sup>a</sup>					
SOPxCondition	.000 [-.002, .001]	.80	.13** (.00)	4.64 (.06)	4, 98
OOPxCondition	.002 [-.001, .004]	.12	.11** (.02)	4.06 (2.24)	4, 98
SPPxCondition	.000 [-.002, .002]	.79	.09** (.00)	3.66 (.04)	4, 99
<b>PSPxCondition</b>	.003 [.000, .005] <sup>*</sup>	.03	.14*** (.04) <sup>*</sup>	5.27 (5.17)	4, 99
<b>NDPxCondition</b>	.003 [.000, .005] <sup>*</sup>	.02	.15*** (.05) <sup>*</sup>	5.54 (5.96)	4, 98

Predictor	B [95% C.I.]	<i>p</i>	Adj. $R^2$ ( $\Delta R^2$ )	$F$ ( $\Delta F$ )	<i>df</i>
DV: Negative Self-Thoughts (TLT-SN) <sup>a</sup> cont.					
NDCxCondition	.003 [.000, .006] <sup>†</sup>	.07	.13 <sup>**</sup> (.03) <sup>†</sup>	4.67 (3.36)	4, 99
PCIxCondition	.000 [-.001, .001]	.71	.14 <sup>***</sup> (.00)	5.28 (.14)	4, 98
<b>CMxCondition</b>	.004 [.001, .008] <sup>**</sup>	.01	.16 <sup>***</sup> (.06) <sup>**</sup>	5.81 (7.30)	4, 99
PSxCondition	-.001 [-.006, .004]	.73	.11 <sup>**</sup> (.00)	4.01 (.12)	4, 98
DV: Negative Other-Thoughts (TLT-ON) <sup>a</sup>					
SOPxCondition	.000 [-.001, .001]	.75	.03 (.00)	1.87 (.10)	4, 98
OOPxCondition	.000 [-.002, .001]	.71	.03 (.00)	1.75 (.14)	4, 98
SPPxCondition	-.001 [-.002, .001]	.40	.04 <sup>†</sup> (.01)	2.04 (.72)	4, 98
PSPxCondition	.000 [-.002, .001]	.70	.04 <sup>†</sup> (.00)	2.13 (.15)	4, 98
NDPxCondition	.001 [-.001, .002]	.36	.03 (.01)	1.84 (.85)	4, 97
NDCxCondition	.000 [-.002, .002]	.94	.02 (.00)	1.46 (.01)	4, 97
PCIxCondition	.000 [-.001, .001]	.52	.03 (.00)	1.90 (.42)	4, 98
CMxCondition	.001 [-.009, .011]	.80	.05 <sup>†</sup> (.02)	2.41 (2.08)	4, 98
PSxCondition	-.001 [-.004, .003]	.13	.03 (.00)	1.67 (.10)	4, 97
DV: Perceived Social Support (SPS)					
SOPxCondition	.019 [-.067, .105]	.66	.77 <sup>***</sup> (.00)	86.54 (.19)	4, 99
OOPxCondition	.097 [-.027, .220]	.13	.77 <sup>***</sup> (.01)	86.71 (2.39)	4, 98
SPPxCondition	-.042 [-.130, .046]	.35	.77 <sup>***</sup> (.00)	87.89 (.89)	4, 99
PSPxCondition	-.055 [-.176, .066]	.37	.77 <sup>***</sup> (.00)	87.26 (.82)	4, 99
<b>NDPxCondition</b>	-.103 [-.218, .011] <sup>†</sup>	.08	.77 <sup>***</sup> (.01) <sup>†</sup>	87.95 (3.22)	4, 98
NDCxCondition	-.001 [-.155, .153]	.99	.77 <sup>***</sup> (.00)	87.63 (.00)	4, 99
PCIxCondition	.025 [-.035, .086]	.41	.77 <sup>***</sup> (.00)	87.07 (.69)	4, 99
CMxCondition	.011 [-.003, .019]	.01	.78 <sup>***</sup> (.00)	89.99 (.15)	4, 99
PSxCondition	-.033 [-.204, .137]	.70	.32 <sup>***</sup> (.00)	12.30 (.04)	4, 94
DV: Social Self-Esteem (SSSE)					
SOPxCondition	.110 [-.025, .245]	.11	.66 <sup>***</sup> (.01)	50.67 (2.62)	4, 99
OOPxCondition	-.042 [-.226, .143]	.66	.65 <sup>***</sup> (.00)	49.23 (.20)	4, 99
SPPxCondition	.092 [-.045, .230]	.19	.67 <sup>***</sup> (.01)	52.09 (1.77)	4, 99

Predictor	B [95% C.I.]	<i>p</i>	Adj. $R^2$ ( $\Delta R^2$ )	$F$ ( $\Delta F$ )	<i>df</i>
DV: Social Self-Esteem (SSSE) cont.					
PSPxCondition	.099 [-.087, .286]	.29	.66*** (.00)	51.96 (1.11)	4, 99
NDPxCondition	.045 [-.137, .226]	.63	.66*** (.00)	49.81 (.24)	4, 98
NDCxCondition	.066 [-.178, .310]	.59	.65*** (.00)	49.56 (.29)	4, 99
PCIxCondition	.055 [-.039, .149]	.25	.66*** (.00)	51.10 (1.35)	4, 99
CMxCondition	.195 [-.064, .454]	.14	.69*** (.01)	57.22 (2.24)	4, 99
PSxCondition	.002 [-.006, .010]	.61	.67*** (.01)	52.34 (1.62)	4, 98
DV: Relational Interdependence (RISC)					
SOPxCondition	-.033 [-.173, .107]	.64	.68*** (.00)	54.14 (.22)	4, 98
<b>OOPxCondition</b>	-.199 [-.395, -.003]*	.05	.68*** (.01)*	54.54 (4.06)	4, 97
SPPxCondition	-.115 [-.262, .032]	.12	.68*** (.01)	53.89 (2.41)	4, 98
<b>PSPxCondition</b>	-.183 [-.378, .013] <sup>†</sup>	.07	.68*** (.01) <sup>†</sup>	55.24 (3.45)	4, 98
NDPxCondition	-.123 [-.305, .058]	.18	.67*** (.01)	53.81 (1.81)	4, 98
<b>NDCxCondition</b>	-.235 [-.496, .027] <sup>†</sup>	.08	.68*** (.01) <sup>†</sup>	54.85 (3.18)	4, 97
<b>PCIxCondition</b>	-.122 [-.215, -.028]*	.01	.71*** (.02)*	63.26 (6.69)	4, 99
<b>CMxCondition</b>	-.325 [-.600, -.050]*	.02	.69*** (.02)*	56.97 (5.50)	4, 98
PSxCondition	-.208 [-.607, .190]	.30	.69*** (.00)	58.33 (1.07)	4, 98
DV: Allocentric Self-Concept (TST-A)					
SOPxCondition	.000 [-.007, .007]	.99	.13** (.00)	4.61 (.00)	4, 92
OOPxCondition	-.004 [-.014, .006]	.42	.14** (.01)	4.90 (.66)	4, 92
SPPxCondition	.003 [-.004, .011]	.38	.14** (.01)	5.01 (.80)	4, 92
PSPxCondition	.000 [-.010, .010]	.99	.15*** (.00)	5.17 (.00)	4, 92
NDPxCondition	.002 [-.007, .011]	.65	.13** (.00)	4.67 (.20)	4, 92
NDCxCondition	-.005 [-.018, .009]	.49	.13** (.00)	4.51 (.49)	4, 92
PCIxCondition	.001 [-.004, .005]	.81	.14** (.00)	4.77 (.06)	4, 92
CMxCondition	.011 [-.004, .025]	.14	.15*** (.02)	5.08 (2.18)	4, 92
PSxCondition	-.015 [-.035, .005]	.14	.21*** (.02)	7.26 (2.20)	4, 90
DV: Implicit Belonging (SC-IAT-B)					
SOPxCondition	-.002 [-.013, .010]	.77	.13* (.00)	2.57 (.09)	5, 46



Predictor	B [95% C.I.]	<i>p</i>	Adj. <i>R</i> <sup>2</sup> ( $\Delta R^2$ )	<i>F</i> ( $\Delta F$ )	<i>df</i>
DV: Implicit Belonging (SC-IAT-B) cont.					
<b>OOPxCondition</b>	-.016 [-.033, .001] <sup>†</sup>	.07	.19* (.06) <sup>†</sup>	3.40 (3.48)	5, 45
SPPxCondition	-.005 [-.017, .007]	.42	.14* (.01)	2.66 (.03)	5, 46
PSPxCondition	-.001 [-.019, .017]	.89	.13* (.00)	2.46 (.02)	5, 46
NDPxCondition	-.009 [-.026, .008]	.29	.14* (.02)	2.64 (1.14)	5, 45
NDCxCondition	.009 [-.014, .032]	.45	.13* (.01)	2.58 (.59)	5, 46
<b>PCIxCondition</b>	-.008 [-.017, .002] <sup>†</sup>	.10	.18* (.05) <sup>†</sup>	3.17 (2.78)	5, 46
CMxCondition	-.007 [-.033, .019]	.58	.13* (.01)	2.50 (.31)	5, 46
PSxCondition	.013 [-.023, .050]	.47	.14* (.01)	2.65 (.54)	5, 45
DV: Implicit Concern over Mistakes (SC-IAT-M)					
SOPxCondition	.004 [-.009, .017]	.53	.16* (.01)	2.84 (.41)	5, 44
OOPxCondition	-.004 [-.021, .014]	.41	.14* (.00)	2.61 (.18)	5, 44
SPPxCondition	-.001 [-.016, .013]	.88	.11 <sup>†</sup> (.00)	2.23 (.02)	5, 44
PSPxCondition	.008 [-.011, .028]	.39	.17* (.01)	3.05 (.74)	5, 44
NDPxCondition	.006 [-.012, .023]	.51	.16* (.01)	2.82 (.43)	5, 44
NDCxCondition	.006 [-.018, .031]	.60	.12 <sup>†</sup> (.01)	2.28 (.27)	5, 44
PCIxCondition	.001 [-.009, .011]	.80	.16* (.00)	2.83 (.07)	5, 44
CMxCondition	-.004 [-.032, .024]	.77	.11 <sup>†</sup> (.00)	2.26 (.09)	5, 44
PSxCondition	-.001 [-.042, .040]	.61	.14* (.00)	2.64 (.00)	5, 44

*Note.* Each complete hierarchical regression model included the following variables: The baseline cognitive variable was entered as a covariate in step one, the perfectionism variable and a dummy-coded condition variable (0 = inclusion, 1 = exclusion) were entered in step two as main effects, followed by the interaction term in step three. *p*-values for  $\Delta F$  are equivalent to the *p*-value for the interaction term. All continuous predictors were mean-centered prior to analysis. The following abbreviations were used: SOP = Self-Oriented Perfectionism, OOP = Other-Oriented Perfectionism, SPP = Socially Prescribed Perfectionism, PSP = Perfectionistic Self-Promotion, NDP = Nondisplay of Imperfections, NDC = Nondisclosure of Imperfections, PCI = Perfectionistic Cognitions, CM = Concern over Mistakes, PS = Personal Standards, AIM-A = Anaclitic and Introjective Mood Adjectives – Anaclitic, AIM-I = Anaclitic and Introjective Mood Adjectives – Introjective, SSGS-S = State Shame and Guilt Scale – Shame, SSGS-G = State Shame and Guilt Scale – Guilt, STAXI-F = State-Trait Anger Expression Inventory – Angry Feelings, LRS = Loneliness Rating Scale. a. Indicates variable was log-transformed prior to analysis. Significant interactions are in boldface for emphasis.

<sup>†</sup>*p* ≤ .10, \**p* < .05, \*\**p* < .01, \*\*\**p* < .001.

**Table 18**

*Simple Slope Analyses for Significant Perfectionism x Condition Interactions Predicting Post-Cyberball Cognitive Outcomes Controlling for Baseline Cognitions (Sample Two).*

Condition	B	95% CI	<i>t</i>	<i>p</i>
DV: Perfectionistic Thoughts (S-PCI)				
CM x Condition				
Inclusion	.560**	.192, .927	3.03	<.01
Exclusion	.172	-.169, .514	1.00	.32
DV: Negative Self-Related Thoughts (TLT-SN <sup>a</sup> )				
PSP x Condition				
Inclusion	-.001	-.002, .001	-.93	.35
Exclusion	.002*	.000, .004	2.18	.03
NDP x Condition				
Inclusion	-.001	-.002, .001	-.80	.42
Exclusion	.002*	.000, .004	2.59	.01
NDC x Condition				
Inclusion	-.002	-.004, .000	-1.63	.11
Exclusion	.001	-.001, .003	.86	.39
CM x Condition				
Inclusion	-.002	-.004, .001	-1.49	.14
Exclusion	.003*	.000, .005	2.28	.02
DV: Perceived Social Support (SPS)				
NDP x Condition				
Inclusion	.036	-.048, .120	-.85	.40
Exclusion	-.067	-.150, .015	1.62	.11
DV: Relational Interdependence (RISC)				
OOP x Condition				
Inclusion	.120	-.020, .260	1.70	.09
Exclusion	-.079	-.214, .057	-1.15	.25

Condition	B	95% CI	<i>t</i>	<i>p</i>
DV: Relational Interdependence (RISC) cont.				
PSP x Condition				
Inclusion	.044	-.088, .175	.66	.51
Exclusion	-.139	-.282, .004	1.93	.07
NDC x Condition				
Inclusion	.150	-.033, .334	1.62	.11
Exclusion	-.084	-.273, .105	-.88	.38
PCI x Condition				
Inclusion	.051	-.011, .114	1.63	.11
Exclusion	-.070*	-.139, .001	2.01	.05
CM x Condition				
Inclusion	.106	-.095, .307	1.04	.30
Exclusion	-.220*	-.410, -.028	2.28	.02
DV: Implicit Belonging (SC-IAT-B <sup>b</sup> )				
OOP x Condition				
Inclusion	.007	-.003, .017	1.43	.16
Exclusion	-.003	-.014, .007	-.58	.56
PCI x Condition				
Inclusion	.003	-.004, .009	.85	.40
Exclusion	-.005	-.012, .002	-1.48	.14

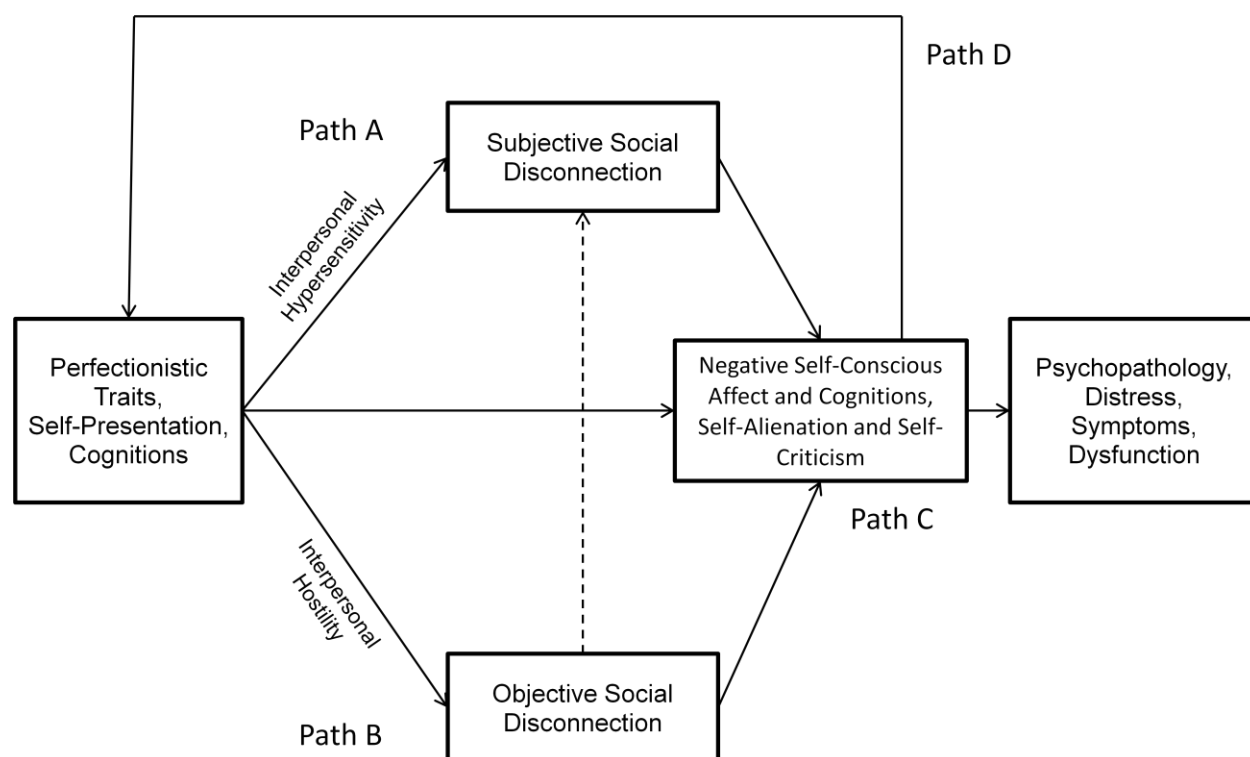
*Note.* Baseline measure of the criterion is included as a covariate set at its mean. The following labels were used: CM = Concern over Mistakes, PSP = Perfectionistic Self-Promotion, NDP = Nondisplay of Imperfection, NDC = Nondisclosure of Imperfection, PCI = Perfectionistic Cognitions, OOP = Other-Oriented Perfectionism, PCI = Perfectionistic Cognitions, S-PCI = State Perfectionistic Cognitions Inventory, TLT-SN = Thought-Listing Task – Negative Self Related Thoughts, SPS = Social Provisions Scale, RISC = Relational Interdependent Self-Construal, SC-IAT-B = Single-Category Implicit Association Test - Belonging.

a. indicates variable has been log-transformed prior to analysis.

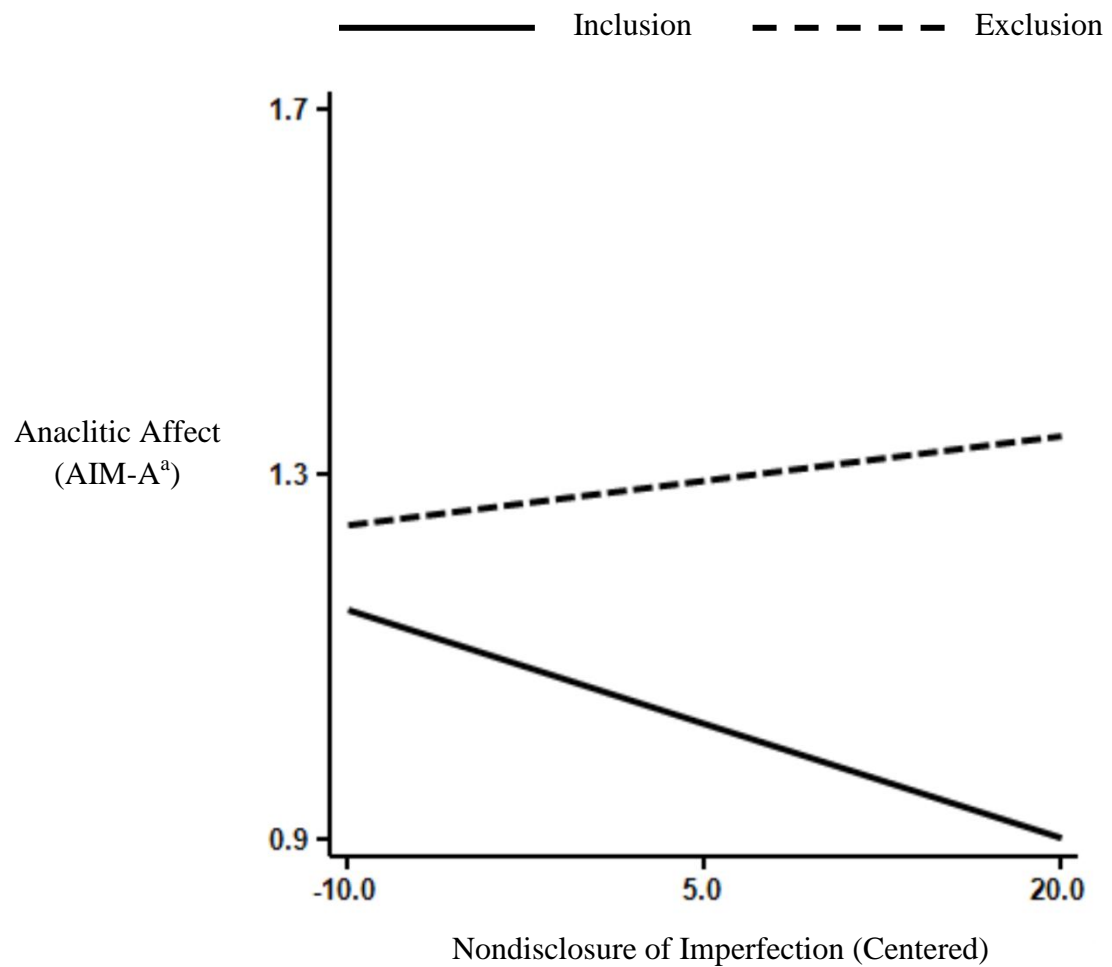
b. model also includes dummy-coded block pairing variable as a covariate.

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

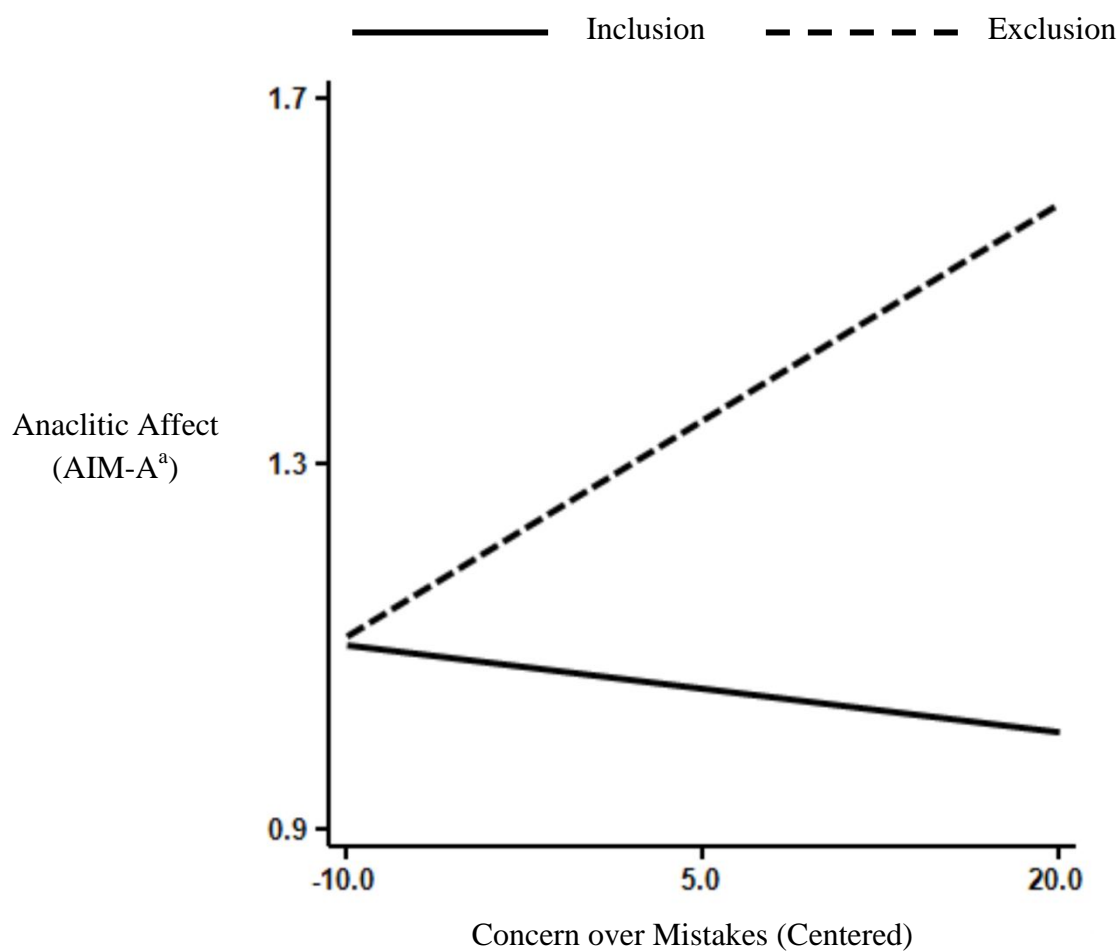
## Figures



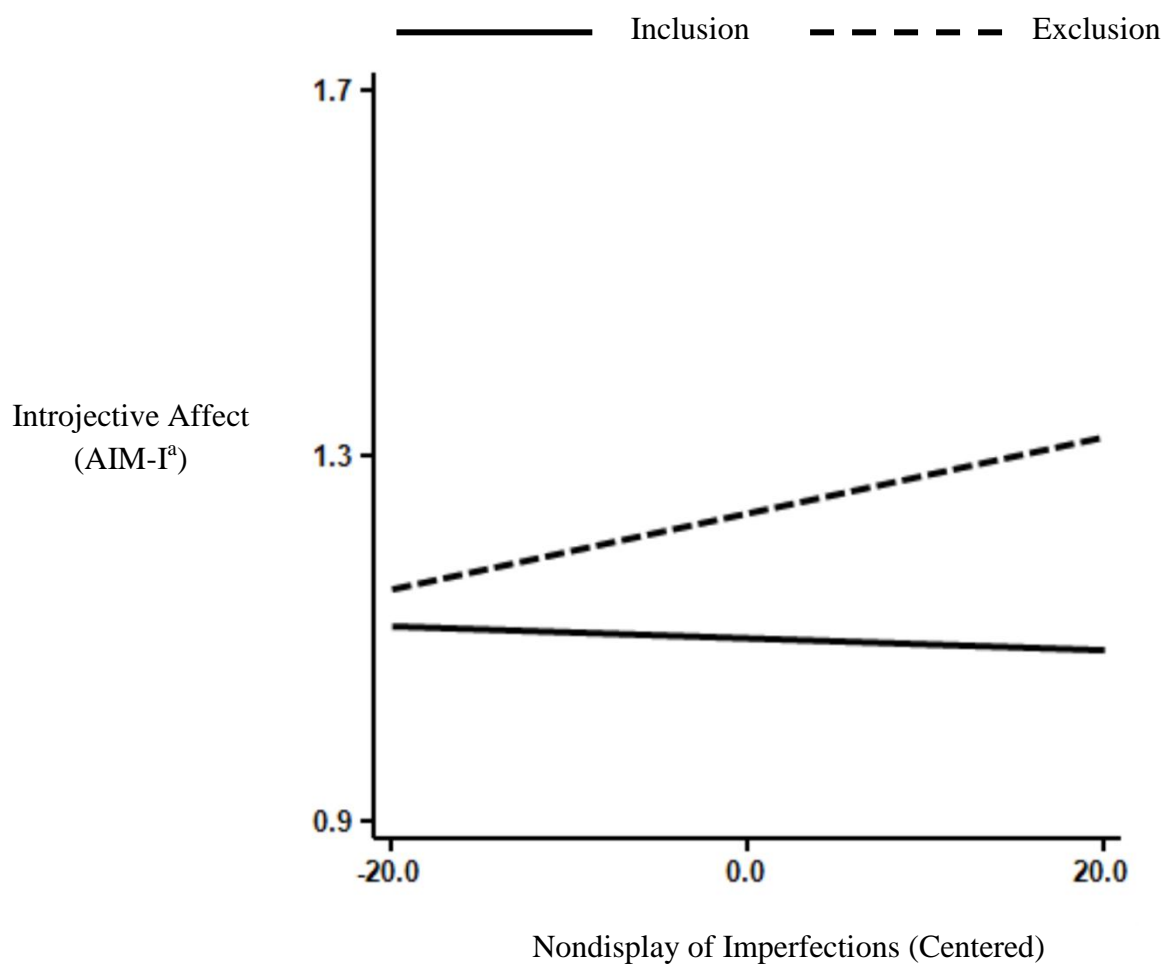
*Figure 1.* The Perfectionism Social Disconnection Model (Hewitt et al., in press). Path A = Path from perfectionism dimensions to subjective social disconnection through interpersonal sensitivity, and from subjective social disconnection to negative affect and cognitions to psychopathology and distress. Path B = Path from perfectionism dimensions to objective social disconnection through interpersonal hostility, and from objective disconnection to negative affect and cognitions to psychopathology and distress. Path C = Direct path from perfectionism to psychopathology through aversive self-states, self-alienation and self-criticism. Path D = Reverberatory process by which aversive self-states and negative emotions act to increase perfectionistic behaviour.



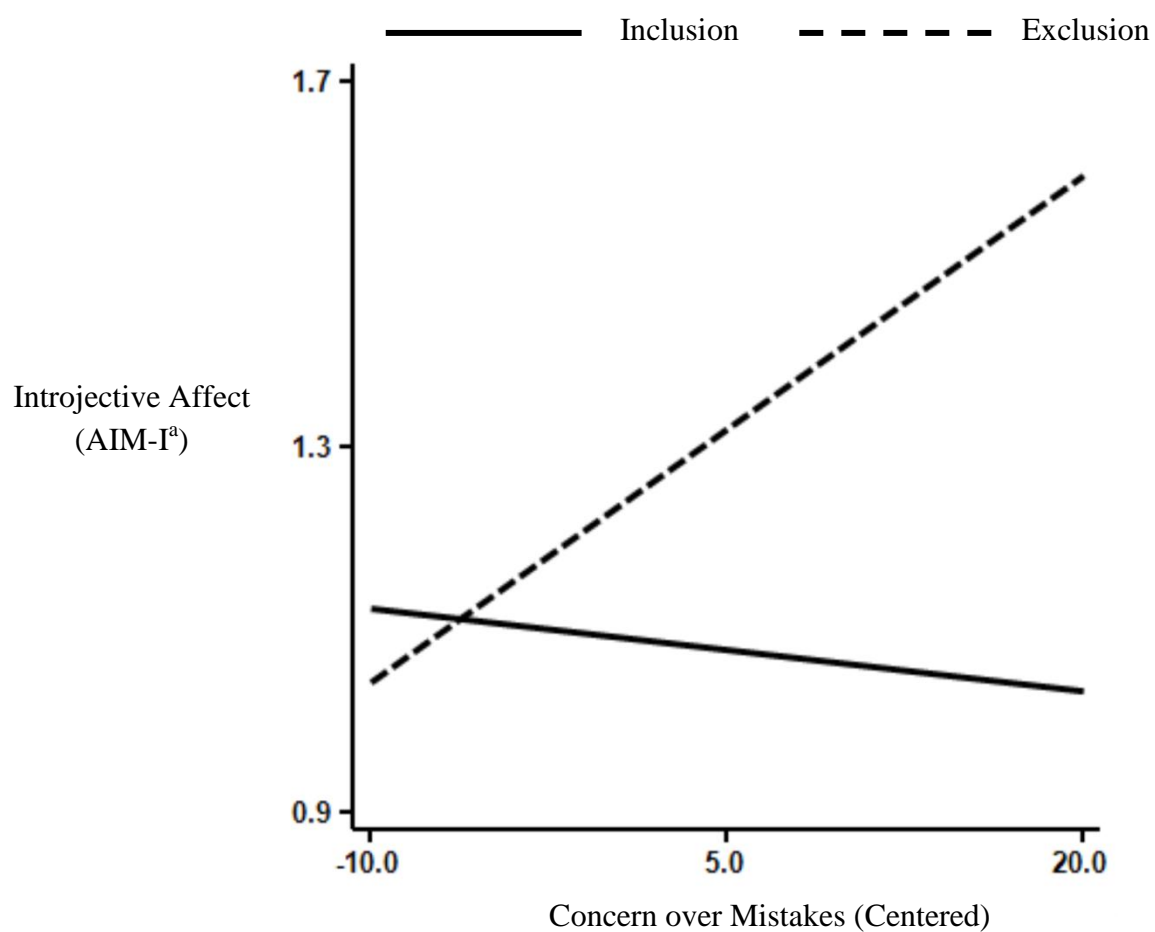
*Figure 2.* Relationship between nondisclosure of imperfection and post-Cyberball anacritic affect as a function of social inclusion/exclusion. AIM-A = Anacritic and Introjective Mood Adjectives - Anacritic. a. Indicates variable was log-transformed.



*Figure 3.* Relationship between concern over mistakes and post-Cyberball anaclitic affect as a function of social inclusion/exclusion. AIM-A = Anaclitic and Introjective Mood Adjectives – Anaclitic. a. indicates variable was log-transformed.

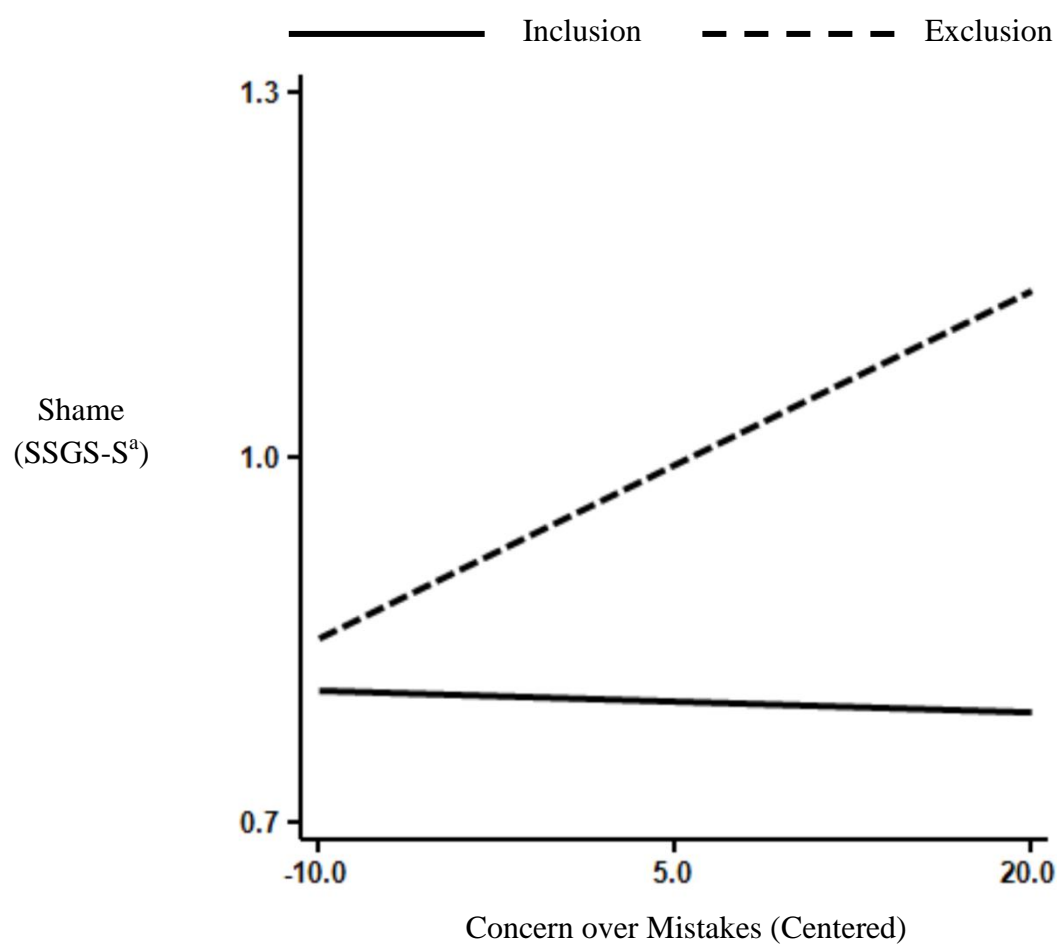


*Figure 4.* Relationship between nondisplay of imperfections and post-Cyberball introjective affect as a function of social inclusion/exclusion. AIM-I = Anacletic and Introjective Mood Adjectives - Introjective. a. indicates variable has been log-transformed.

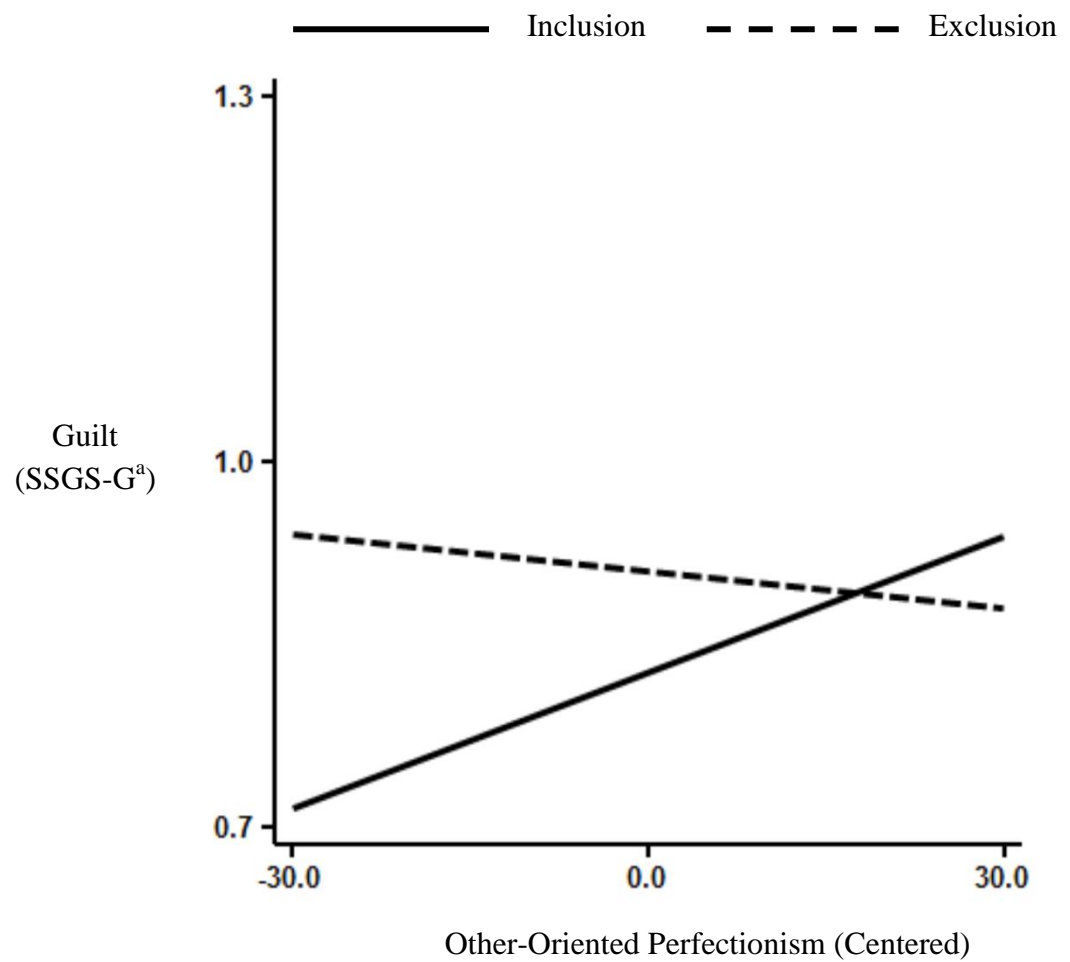


*Figure 5.* Relationship between concern over mistakes and post-Cyberball introjective affect as a function of social inclusion/exclusion. AIM-I = Anacletic and Introjective Mood Adjectives - Introjective. a. Indicates variable was log-transformed.

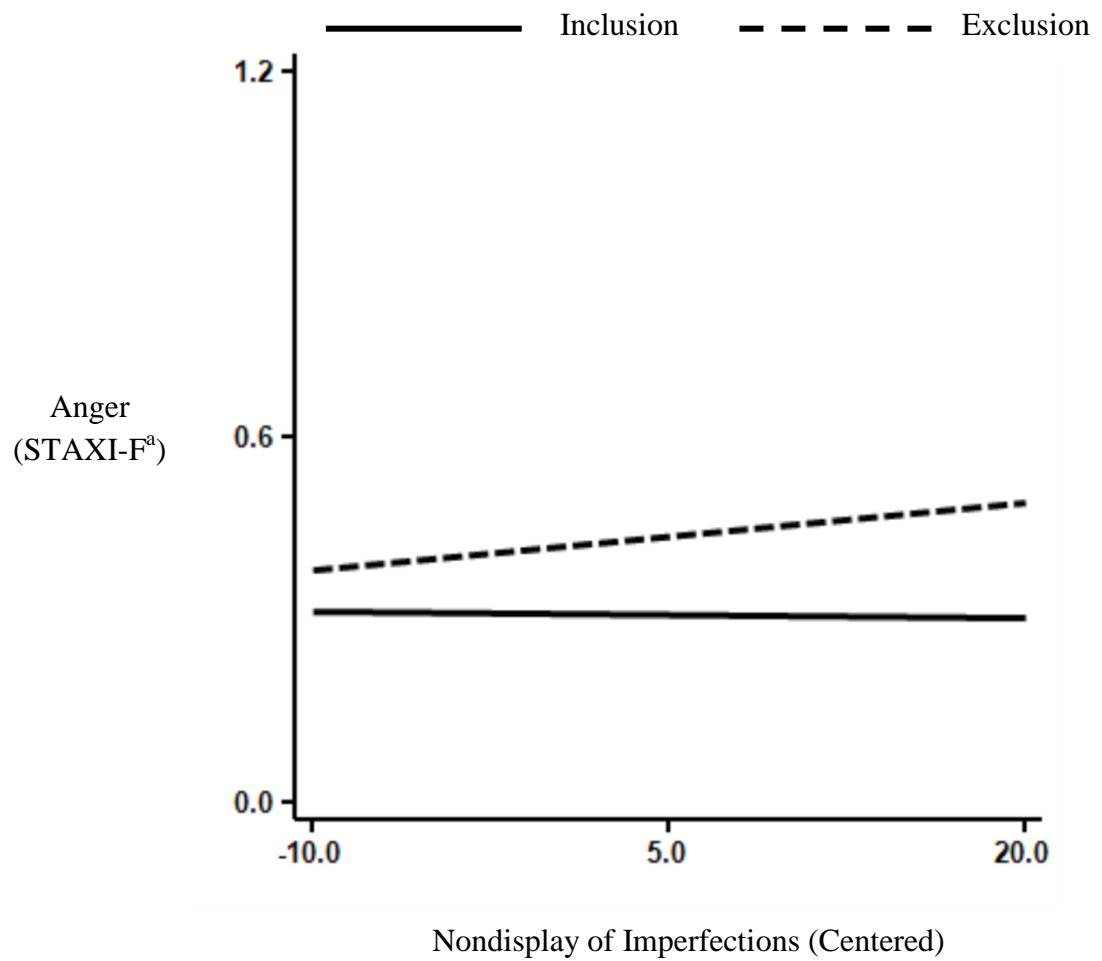




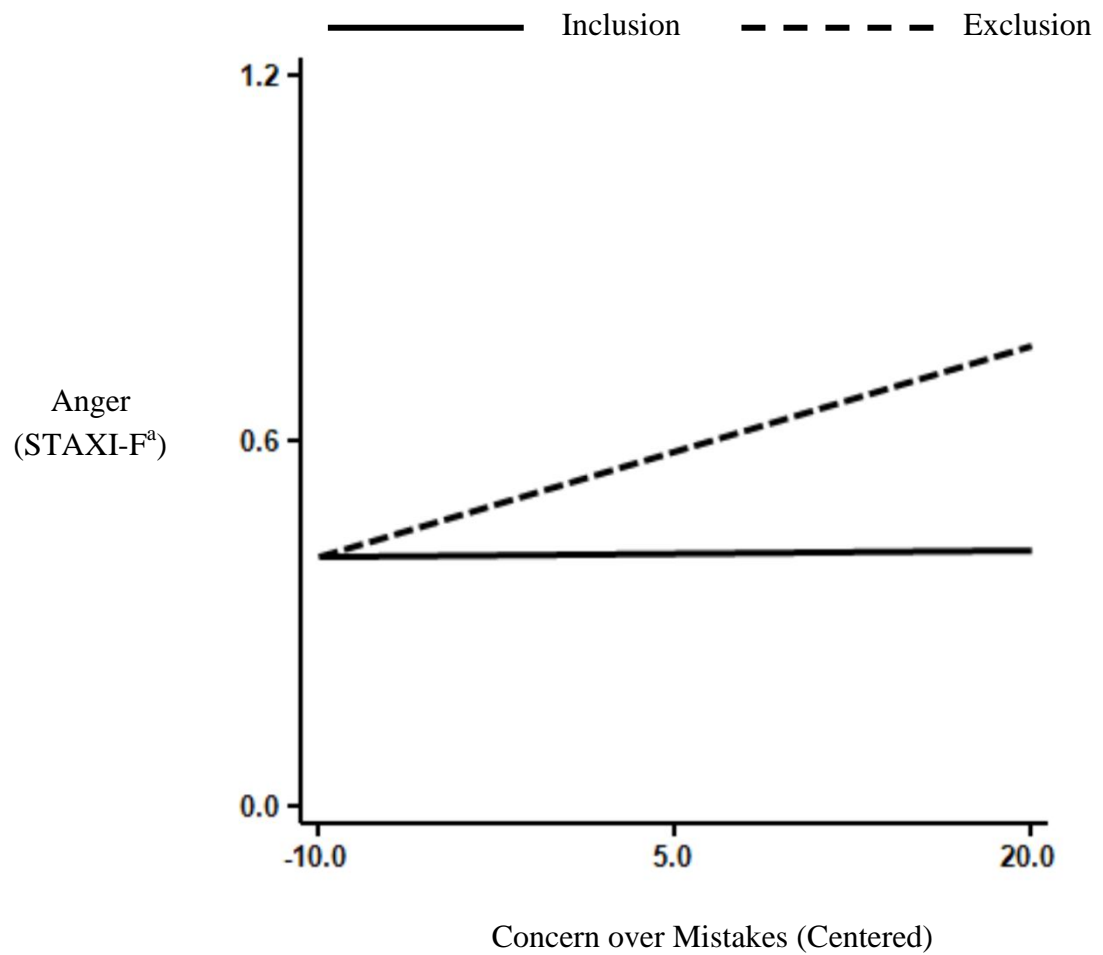
*Figure 6.* Relationship between concern over mistakes and post-Cyberball state shame as a function of social inclusion/exclusion. SSGS-S = State Shame and Guilt Scale - Shame. a. Indicates variable was log-transformed.



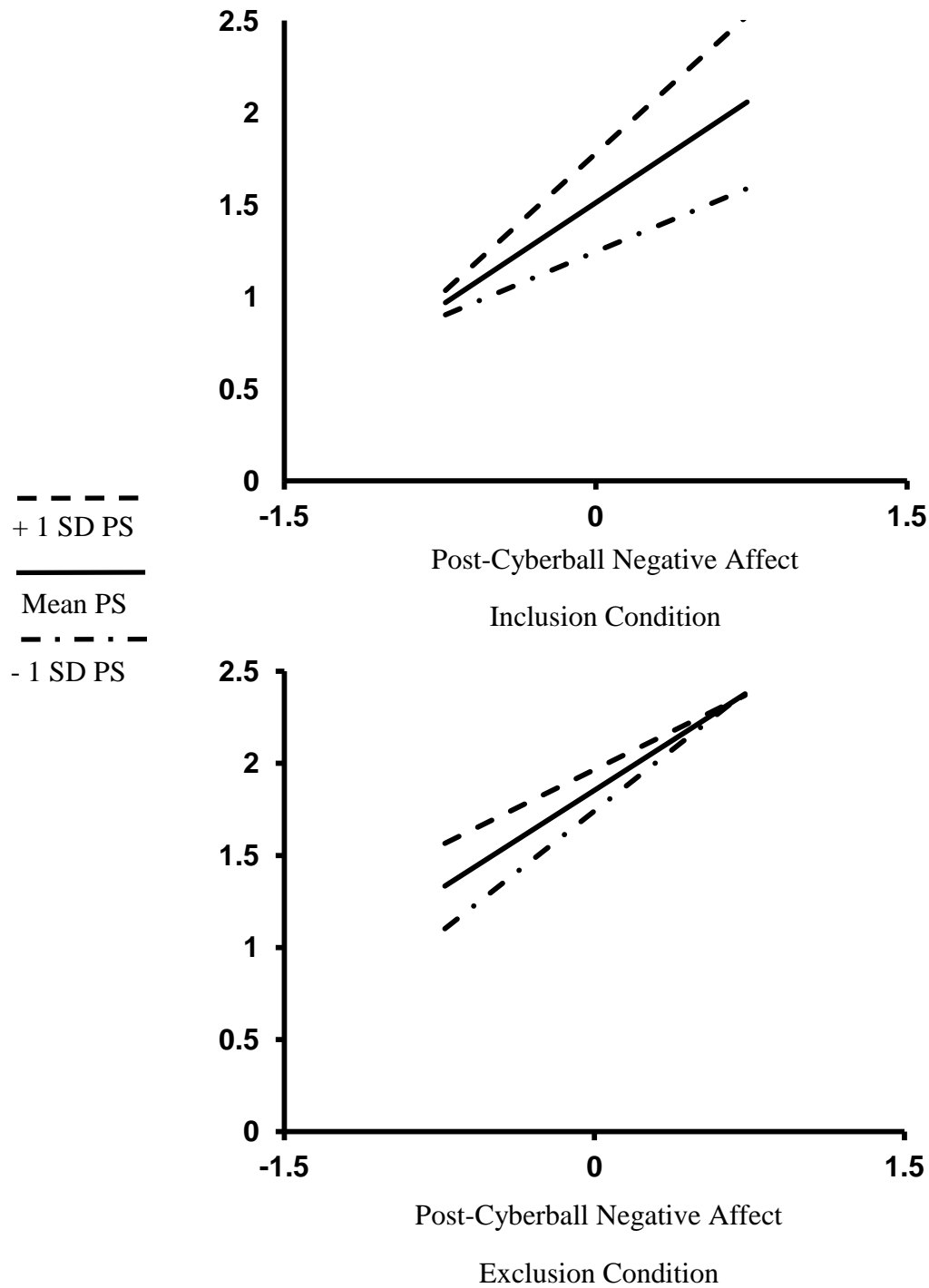
*Figure 7.* Relationship between other-oriented perfectionism and post-Cyberball state guilt as a function of social inclusion/exclusion. SSGS-G = State Shame and Guilt Scale - Guilt. a. indicates variable was log-transformed.



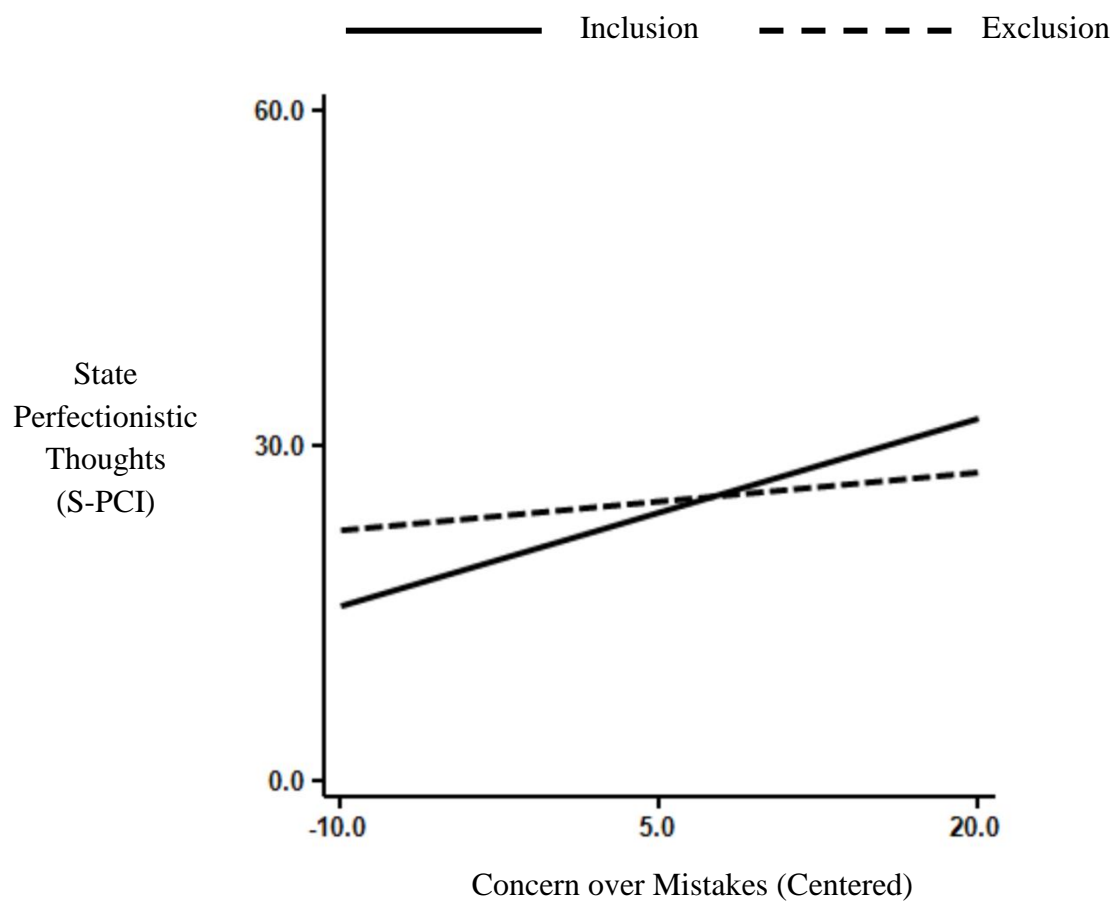
*Figure 8.* Relationship between nondisplay of imperfections and post-Cyberball state anger as a function of social inclusion/exclusion. STAXI-F = State Trait Anger Expression Inventory – Feelings. a. indicates variable has been log-transformed.



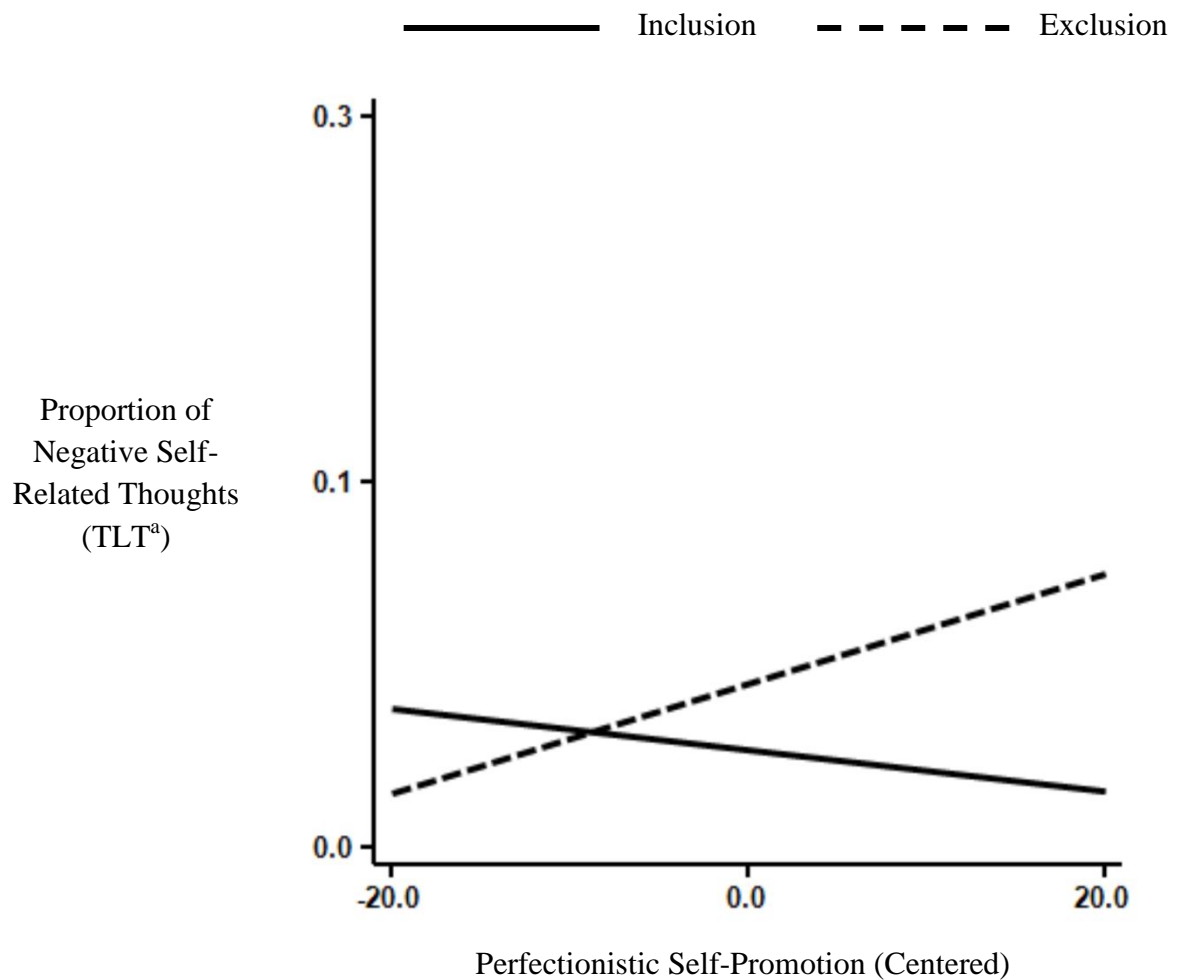
*Figure 9.* Relationship between concern over mistakes and post-Cyberball state anger as a function of social inclusion/exclusion. STAXI-F = State Trait Anger Expression Inventory - Feelings. a. indicates variable was log-transformed.



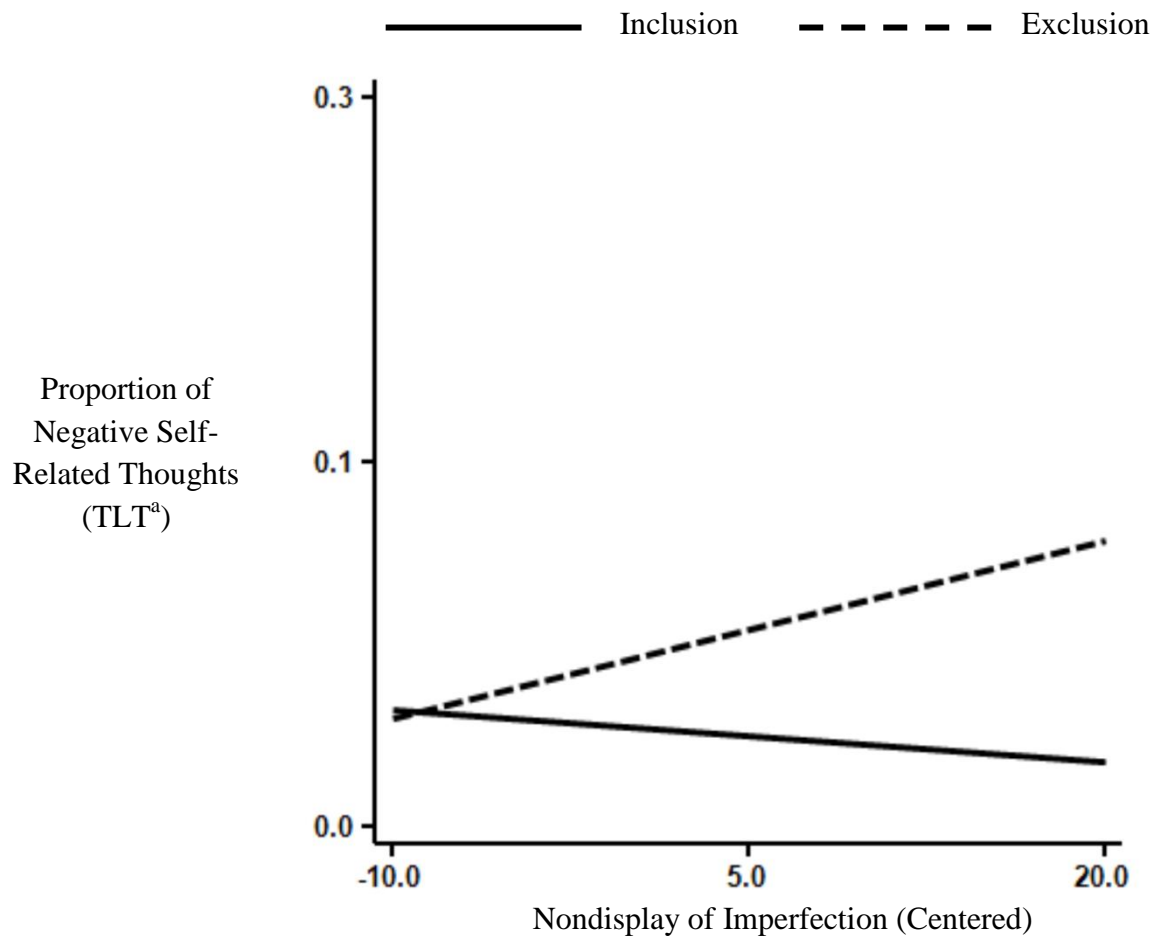
*Figure 10.* Three-way interaction plot of the relationship between negative affect post-Cyberball and at follow-up as a function of Personal Standards (PS) and social inclusion/exclusion. All negative affect variables were log-transformed



*Figure 11.* Relationship between concern over mistakes and post-Cyberball state perfectionistic thoughts as a function of social inclusion/exclusion. S-PCI = State Perfectionistic Cognitions Inventory

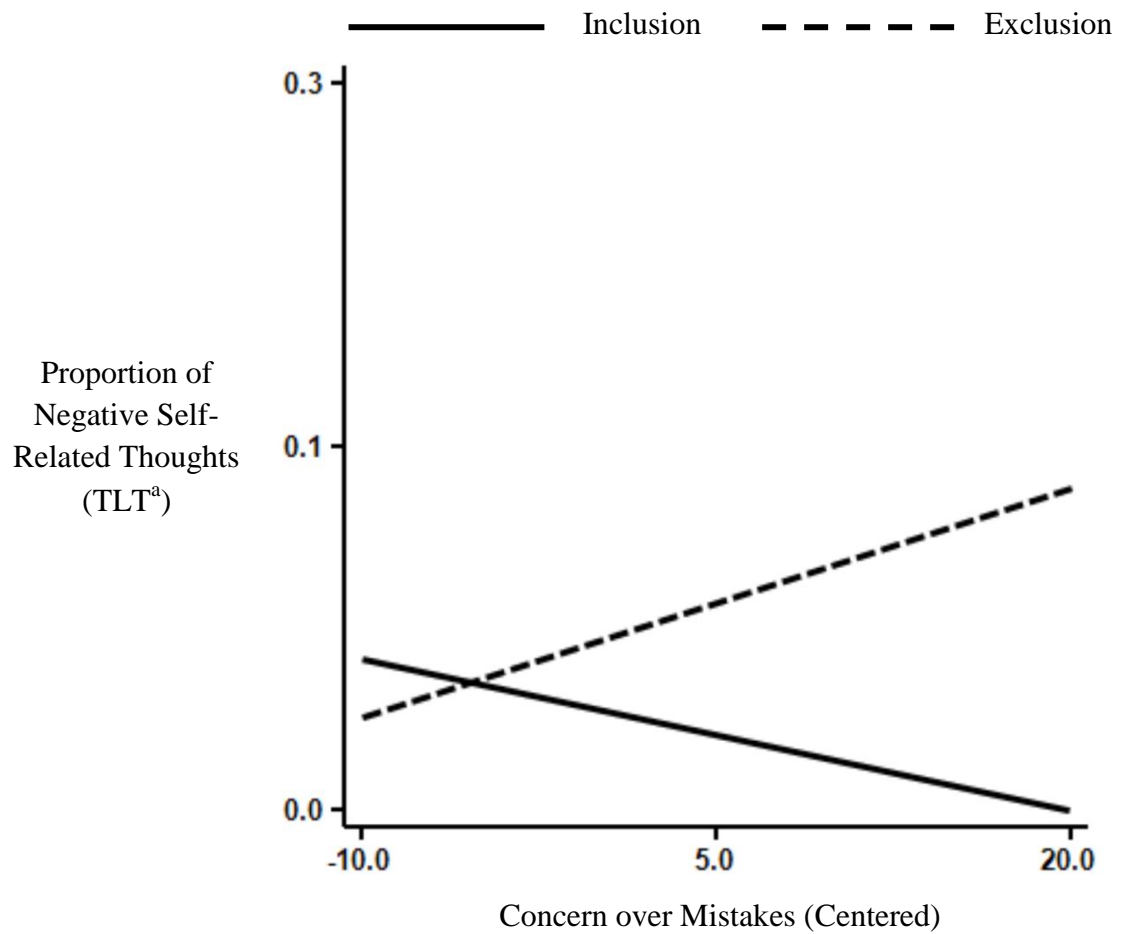


*Figure 12.* Relationship between perfectionistic self-promotion and post-Cyberball negative self-related thoughts as a function of social inclusion/exclusion. TLT = Thought-Listing Task. a. indicates variable has been log-transformed.

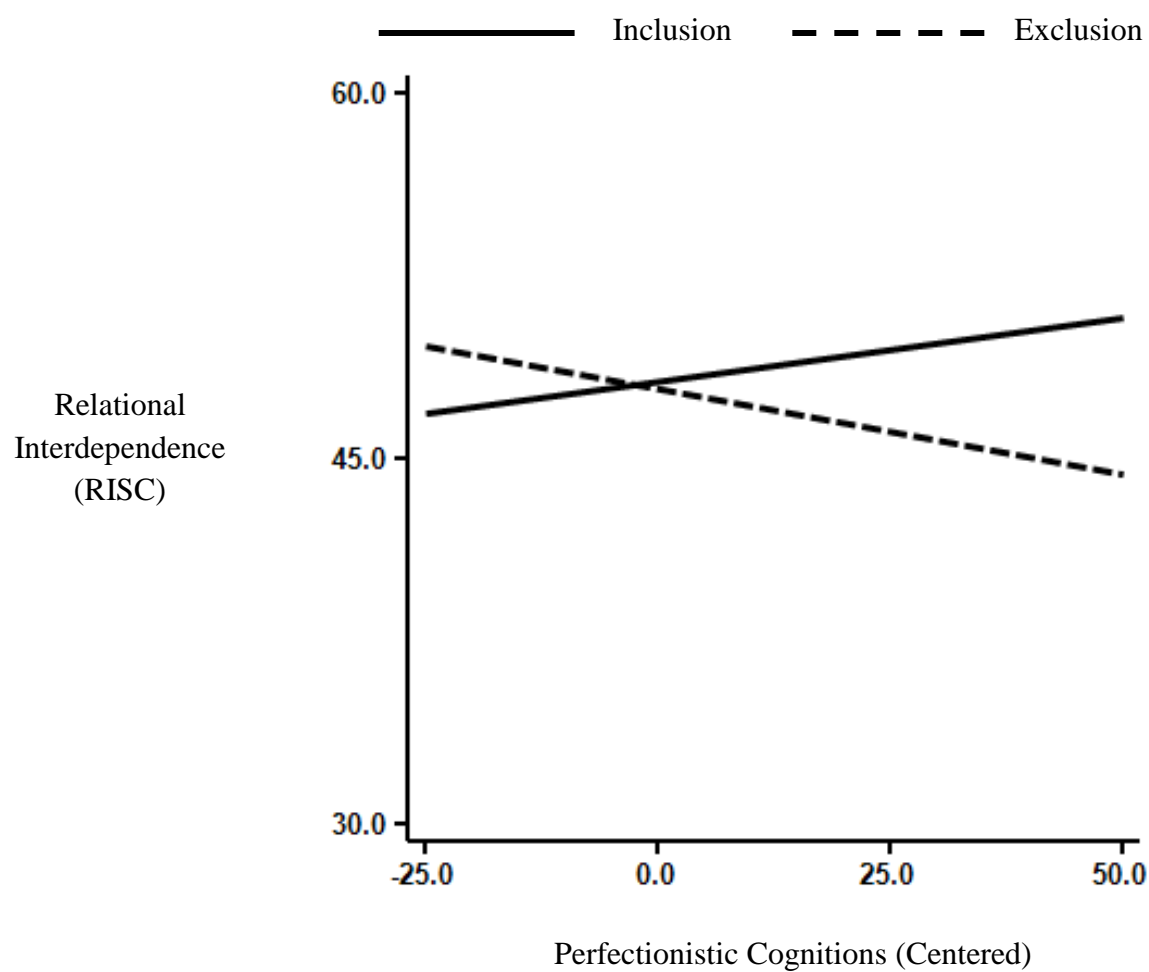


*Figure 13.* Relationship between nondisplay of imperfection and post-Cyberball negative self-related thoughts as a function of social inclusion/exclusion. TLT = Thought-Listing Task. a. indicates variable has been log-transformed.

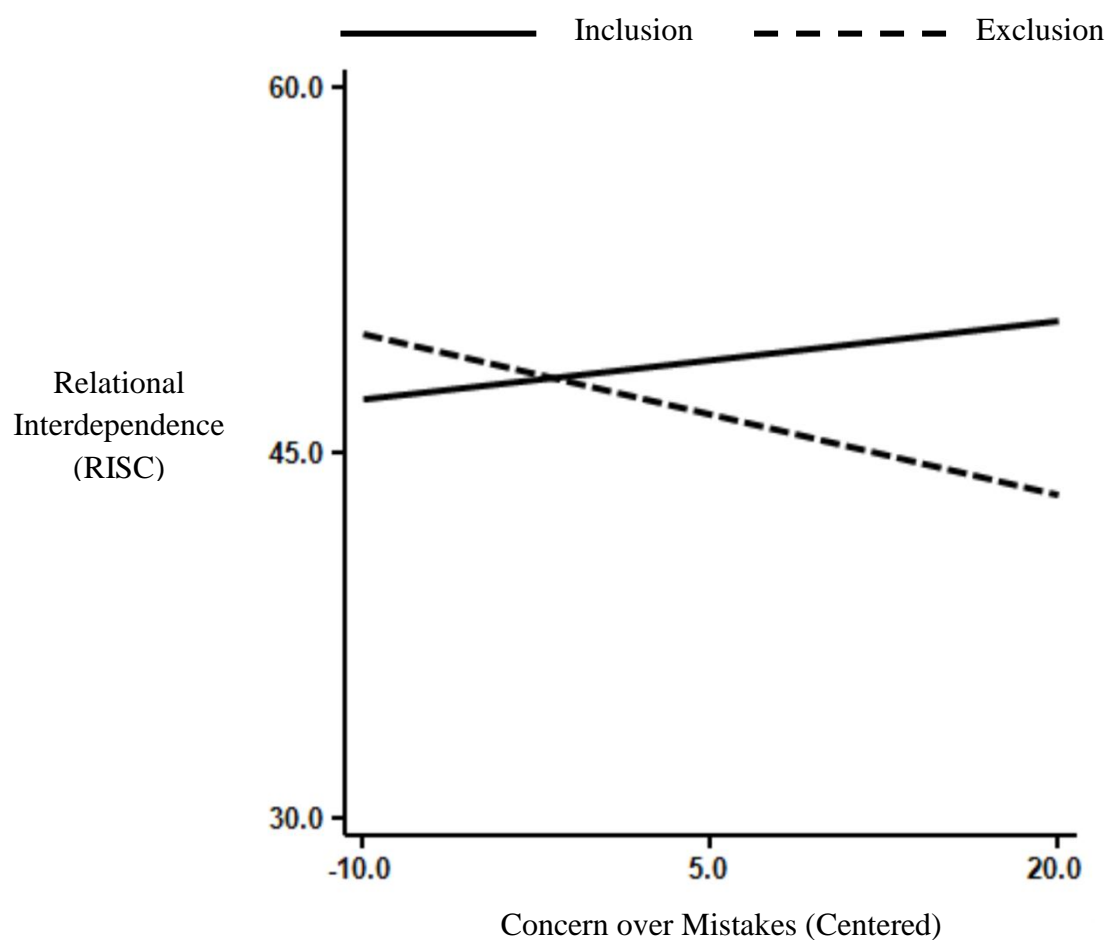




*Figure 14.* Relationship between concern over mistakes and post-Cyberball negative self-related thoughts as a function of social inclusion/exclusion. TLT = Thought-Listing Task. a. indicates variable has been log-transformed.



*Figure 15.* Relationship between perfectionistic cognitions and post-Cyberball relational interdependence as a function of social inclusion/exclusion. RISC = Relational Interdependent Self-Construal.



*Figure 16.* Relationship between concern over mistakes and post-Cyberball relational interdependence as a function of social inclusion/exclusion. RISC = Relational Interdependent Self-Construal.

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## Appendix A: Coding Manual for Open-Ended Measures

### Thought Listing Protocol

The thought listing procedure is exactly what it sounds like. Participants are asked to list their thoughts as they occur to them or as they remember them from the recent past. This is done both before and after an experimental manipulation.

Here are the BEFORE instructions that are presented to participants:

*We are now interested in the thoughts you were having during the LAST TEN MINUTES INCLUDING RIGHT NOW. Any and all thoughts are fine, simply write each down as you recall it or as it occurs to you. On the next pages, you will be presented with a form we have prepared for you to record your thoughts and ideas.*

*Simply write down the first thought in the first box, then press next to record the next thought. Please state your thoughts as concisely as possible - a phrase is sufficient.*

**IGNORE SPELLING, GRAMMAR, AND PUNCTUATION**

*You will have three minutes to record your thoughts, but don't worry about running out of time, just record as many thoughts as you can.*

*Please be completely honest and list ALL of the thoughts that you had or are having right now.*

In the coding spreadsheet, each participant thought-statement is entered into its own cell under the “Response” column, the ID number is the only participant info given to prevent any bias in coding. Each column following the thought is for coding a specific category of thought. **Each thought is to be assigned to only one category.**

Thought content will be coded according to two systems. The first was developed by Cacciopo & Petty (1981) and expanded by Fichten (1986).

Cacciopo & Petty (1981) developed a coding system for thought content that involved classifying thoughts in two dimensions. The first dimension, called the *valence*, codes the tone of the thought into positive, negative or neutral emotional tone. The second dimension, called the *referent*, classifies the thought based on who or what the thought refers to: self, task or unrelated. Fichten (1986) added an “other” category to reflect social or relational-themed thought content.

The two dimensions are combined to create eleven thought-categories and one “wastebasket” category (0): Positive-Self (S+), Negative-Self (S-), Neutral-Self (S0), Positive-Other (O+), Negative-Other (O-), Neutral-Other (O0), Positive-Task (T+), Negative-Task (T-), Neutral-Task (T0), Positive-Unrelated (U+), Negative-Unrelated (U-), Neutral-Unrelated (U0), and an Uncodable (0) category.

Each thought can be assigned to *only one category*.

General rules provide basic guidelines and decision-making rules for your coding (adapted from Fichten et al., 1987):

1. The unit of thought is a single stated idea. Sometimes punctuation will make the unit of thought evident. However the unit of thought overrides punctuation. Sometimes a thought will be carried into the next cell (on the Excel spreadsheet), code these thoughts as one thought. Other times multiple thoughts will occur within a single cell. Code these thoughts separately.
2. Sometimes a thought will not be a complete grammatical sentence. If so, imagine the fragment fitting into the frame “I am thinking that...” or “I am thinking about...” Questions can be reframed to fit “I am wondering if...” However, reframing should never alter the thematic content of the thought.
3. If a thought does not fit a positive (+) or negative (-) category, code Neutral (0). If a thought does not fit a Self (S), Other (O) or task (T) related referent, code Neutral (0).
4. Task can refer to any aspect of the experiment. Self- and other-related content must be directed towards the self or another respectively (e.g. cannot just include the word “I”).
5. When in doubt regarding category membership, code Neutral.
6. When in doubt whether a statement is one or two thoughts, treat as one thought.
7. Sometimes a thought will fit more than one referent category (e.g., I am happy I will see my friend tomorrow might be coded as S or O, while I don’t like the other players in this game might be coded as O or T). In this case use the following rules of precedence:
  - a. O codes take precedence over S and T codes
  - b. S codes take precedence over T codes.

Therefore, the thought I am happy I will see my friend tomorrow would be coded O+ while the thought I don’t like the other players in this game would be coded O-.

### Thought Category Descriptions and Examples

**Note:** Examples that were found in a pilot data set of 38 students are listed in Courier New while generated examples from theoretical expectations are in Times New Roman.

### Positive-Self (S+)

Any thought that expresses a positive judgment or emotional tone in primary reference to the self, or supports the value of the self. Examples include:

1. **Positive affect/emotion experienced by the self**
  - a. I'm excited for the debriefing<sup>1</sup>
  - b. So happy, midterms are over
2. **Positive expectations outcomes or consequences for the self**
  - a. I can't wait for the weekend
  - b. I can succeed if I try
3. **Positive characteristics about the self / acceptance of the self**
  - a. its okay to be confused i'm only 18

### Negative-Self (S-)

Any thought that expresses a negative judgment or emotional tone in primary reference to the self, also any statement that expresses doubt, questions or otherwise detracts from the value of the self.

1. **Negative affect/emotion experienced by the self**
  - a. feeling nervous
  - b. I have so much to do I'm so overwhelmed
  - c. makes me sad
  - d. I feel weird typing random things into this box
2. **Negative expectations, outcomes or need to avoid negative consequences for the self**
  - a. Will I be late for my next class? I hope not.
3. **Statements or questions expressing negative characteristics of the self , rejecting the self, questioning characteristics of the self, or doubting positive characteristics of the self.**
  - a. I don't really know who I am
  - b. Am I really a good person?
4. **Expression of an unmet personal need that does not involve others**
  - a. I am hungry
  - b. I am tired
  - c. I need to get math done
  - d. I cannot concentrate on reading my textbook.
  - e. I just need to study

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<sup>1</sup> note the presence of task-related content, but self-related content takes precedence according to general rules.

### Neutral-Self (S0)

1. **Thought content that involves the self but is not obviously positive or negative.**
  - a. Me exploring the universe
  - b. Contemplating what factors define who I am and what formed my personality

### Positive-Other (O+)

1. **Positive plans, expectations or outcomes involving others**
  - a. I can't wait to see my sister and dad!
  - b. I think I'm going to ask Cheryl to hang out with me later
  - c. I miss my sister and want to call her
2. **Positive affect directed towards or involving others**
  - a. I love spending time with my cousins, it was really nice to see them yesterday
  - b. I love my girlfriend
  - c. I like the friends that I have and there are some that I really look up to
3. **Positive characteristics of others**
  - a. My best friend is hilarious
  - b. Sarah and Jeff are nice
  - c. The experimenter running the study is cute

### Negative-Other (O-)

1. **Concern, doubt or questions about others' opinions of one's self.**
  - a. I don't think she likes me
  - b. Who am I to others?<sup>2</sup>
2. **Expressed negative characteristics of others**
  - a. My sister's husband is a jerk
  - b. Sarah with an H just sounds really bitchy
  - c. It's rude of them only to pass to each other. why aren't they passing to me?
  - d. People can be really mean, even over the internet!

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<sup>2</sup> Although overtly neutral, questioning implies doubt about self with regard to others

**3. Negative affect directed towards or involving others**

- a. I wonder if Jeff and Sarah are as bored.
- b. I want to be included too! jerks.
- c. They're kind of annoying me
- d. I dont like whoever that Sarah and Jeff people were

**4. Negative plans, expectations or outcomes involving others or unmet need involving others.**

- a. I was very upset because the guy, which I am into, shows like he likes another girl in my study group.
- b. I wish I got along better with my brother.

**Neutral-Other (O0)**

**1. Neutral statement or question about others, involving observation or speculation about others that does not involve positive or negative judgment or emotional tone.**

- a. Who is Sarah?
- b. my boyfriend what hes doing right now
- c. Why are you quacking like a duck, random person?

**Positive-Task (T+)**

**1. Statements expressing positive characteristics of the task (may be any aspect of experiment) or supporting the value of the task.**

- a. The cartoons were funny
- b. The cartoons in the previous section is cute

**2. Statements expressing enjoyment of the task without direct reference to experienced emotion.**

- a. I liked playing the Cyberball game.

**Negative-Task (T-)**

**1. Statements questioning the meaning, validity or value of the task**

- a. Is the program glitching because it really looks like its on replay or something.
- b. What is the point of the cyber game?

**2. Statements expressing negative characteristics about the task**

- a. This is a long game
- b. Looks like this game was made in the 1980s
- c. This is stupid
- d. This room is kindof creepy

**3. Statements expressing difficulty with or dislike for the task**

- a. I am really struggling to think of relevant thoughts
- b. I hated that stupid cyberball game

### **Neutral-Task (T0)**

1. **Statements or questions expressing observations about the task that do not involve positive or negative judgments**
  - a. How much time is left?
  - b. I wonder if they are actually real people

### **Unrelated-Negative (U-)**

1. **Statements or questions unrelated to others, self or task that are negative in tone**
  - a. The lunch today was bad
  - b. It is cold outside
  - c. Such a boring class today.

### **Unrelated-Positive (U+)**

1. **Statements or questions unrelated to others, self or task that are positive in tone**
  - a. The red thing on this laptop is cool
  - b. The sound of babies makes me smile
  - c. Lunch was good

### **Unrelated-Neutral (U0)**

1. **Statements or questions that do not relate to others, self or task and are not obviously positive or negative in tone**
  - a. Is haha in the dictionary?
  - b. Tim Hortons coffee
  - c. chem quiz
  - d. sandwich

### **Uncodable/Garbage (G)**

1. **Any response that is non-intelligible or is so incomplete that it cannot be coded into one of the other categories**
  - a. there are so many t
  - b. the gum im c
  - c. why is this

### **Uncertain (UNC)**

Some thoughts may be difficult to classify. They may require further analysis or discussion to correctly classify or a new category may need to be created. If you find thoughts that are

difficult to classify or you are unsure and would like to discuss them further, Use the “Uncertain” sheet to keep track of them. Code as UNC in the main worksheet, then copy and paste the thought from the list and then assign your best guess as to the category membership. **Do not reveal your hypothesis as to the category membership** before the discussion.

### Twenty Statements Test

Participants also complete the Twenty Statements Test (TST), where they complete the stem “I am...” up to twenty times within a three minute time limit.

Here are the instructions they are provided:

*Now we are going to ask you to provide different answers to one question as many times as possible within three minutes.*

*On the following pages, please give as many answers as you can to the simple question "Who am I?" Write the answers in the order they occur to you, don't worry about logic or "importance."*

*Go along fairly fast, and don't spend too much time on any one answer.*

*Write one answer in each box and press next to go on to the next box.*

### Preliminary Coding of Self-Concept versus Non Self-Concept

In this coding system, we are attempting to identify responses on the TST that reflect an individual’s self-concept as it is expressed spontaneously through the TST task, we want to eliminate responses that are not reflective of his or her perception of him or herself.

Broadly speaking, Shavelson, Hubner and Stanton (1976) describe self-concept as “a person's perception of him or herself” (p. 411). Shavelson et al describe seven features of self-concept, but the main one that is important for our purposes is that it is generally *stable* and *multifaceted*. By stable, this does not mean a person’s perception of themselves cannot be shifted or affected, but that the self-concept generally involve things that are seen as stable. That is, it does not typically involve states, like hunger that would be expected to reduce after eating, or increase while starving. In contrast, a person might perceive him or herself as a skilled artist, and that although this could change (for instance, when he fails to secure a gallery showing or is roundly criticized by an art expert), it is a characteristic rather than a state. Some responses may be tricky, for example “Alone” would be reflective of self-concept but “lonely” would not. Similarly, “poor” is self-conceptual but “broke” is not.

If you can fit the response into the sentence frame “I see myself as someone who is generally \_\_\_\_\_” then the response is likely indicative of self-concept.

### Category Descriptions and Examples

1. **Concrete or abstract characteristics that are generally stable**
  - a. teenager



- b. old
- c. 170cm tall
- d. 124 pounds
- e. kind
- f. funny
- g. smart
- h. high in empathy
- i. animal lover
- j. a child of god
- k. interested in music

## 2. Roles

- a. Father
- b. Daughter
- c. a good room-mate
- d. a soldier
- e. a student
- f. A girl

## 3. Group Membership

- a. Christian
- b. Asian

Additional notes:

For our purposes, “Warm” and “Cold” are coded as assumed interpersonal characteristics rather than temperature. Please flag any other dually-interpreted interpersonal terms for discussion.

Numbers, within a reasonably expected range (18-29), are to be interpreted as age and are therefore self-conceptual.

**Emotional states are not generally reflective of a self-concept unless they are describing a general tendency to feel a certain way** (e. g., Confused Sometimes, Often Angry, An Angry Person). **Physical characteristics generally are reflective of self concept unless they are referring to overt immediate states** (e.g., messy hair today).

**Self-concept is not:**

### 1. Immediate states or activities

- a. Hungry
- b. Tired
- c. on time
- d. late
- e. busy
- f. trying hard to do school works

### 2. A feature so specific it only applies to the person (e.g. their name)

- a. Jeff

- b. Karen
  - c. me
3. **A feature so universal it applies to everybody (or at least all participants)**
- a. A human being
  - b. An individual
  - c. A participant

**Any response that is unintelligible or does not fit within the categories above is considered not self-concept for the purposes of this coding system.**

Enter responses in the SC column.

Code any TST response that is reflective of self-concept as 1, and any TST response that is not reflective of self-concept as 0.

Leave any uncertain ones blank.

### **Coding Allocentric vs. Idiocentric Self-Concept**

These responses are also coded according to two dimensions: Positive/Negative/Neutral *idiocentric* (self-centered) and *allocentric* (relationally-centered) content (Watkins, Yau, Dahlin and Wondimu, 1997).

Just as in coding the thought-listing responses, each will be coded for positive, negative, and neutral content so that there are six total categories plus one “wastebasket” category.

If you are undecided between positive or negative, or if something could be considered both positive and negative, code as neutral. If undecided between allocentric and idiocentric, code allocentric.

Positive Idiocentric (I+)	Positive Allocentric (A+)	
Negative Idiocentric (I-)	Negative Allocentric (A-)	Neutral/Uncodable (0/G)
Neutral Idiocentric (I0)	Neutral Allocentric (A0)	

Idiocentric content includes self-statements that directly identify the self in terms of its individuality and uniqueness, (e.g. I am a soccer player), or that identify a physical or abstract characteristic (e.g. I am tall, I am smart) but without reference to a direct relationship to others. References to birthplace or country of origin are considered a personal characteristic unless the self-statement directly refers to group membership or their relationship with other people.

To qualify as allocentric, the relationship must be *specific* and *identifiable*. For example, the self-statement `student` reflects only a characteristic of the self, there is no *identifiable* group membership and is therefore idiocentric. The self-statement `international student`

identifies a group but it is not *specific* enough to qualify as allocentric. However, self-statements such as student from Iran would be allocentric.

### Category Descriptions and Examples

#### Positive Idiocentric (I+)

1. **Identify a positive physical or abstract characteristic**
  - a. Fun
  - b. Active
  - c. pretty
2. **Identify self in terms of positive comparison to others**
  - a. good at playing badminton
  - b. a lover of language

#### Negative Idiocentric (I-)

1. **Identify a negative physical or abstract characteristic or state**
  - a. stubborn
  - b. anxious
2. **Identify self in terms of negative comparison to others**
  - a. a bad speller
  - b. horrible at computers

#### Neutral Idiocentric (I0)

1. Characteristic without positive or negative value judgment overtly attached.
  - a. a girl
  - a. multifaceted
  - b. wearing shorts
  - c. sleepy
  - d. Bob

Allocentric content involves reference to the self in relation to others (e.g. “I’m a mother/sister”) or group membership (e.g., “I’m a Christian” or “I’m a Packer’s fan”) or any content that reflects “interdependence, friendship, responsiveness to others, or sensitivity to how others perceive you” (Watkins et al., 1997; p. 629)

#### Positive Allocentric (A+)

1. **Interdependence, friendship, responsiveness to others or sensitivity to how others see you.**
  - a. High in empathy
  - b. considerate of others

- c. loyal
- 2. **Reference to the self in relation to others with overt positive judgment**
  - a. a good friend
  - b. a loving mother
- 3. **Reference to group membership with overt positive judgment**
  - a. a proud Canadian
  - b. a devout Christian

#### **Negative Allocentric (A-)**

- 1. **Reference to a lack of interdependence, friendship, responsiveness to others or sensitivity to how others see you.**
  - a. rude
  - b. a misanthrope (hater of humanity)
  - c. isolated
- 2. **Reference to self in relation to others with overt negative judgment**
  - a. a bad mother
- 3. **Reference to group membership with over negative judgment**
  - a. a lousy Christian

#### **Neutral Allocentric (A0)**

- 1. **Relational role without overt positive or negative judgment**
  - a. a daughter
  - b. a mother
  - c. an immigrant
- 2. **Group Membership without overt positive or negative judgment**
  - a. Welsh
  - b. Muslim
  - c. Christian

#### **Neutral/Uncodable (0/G)**

Reserved for unintelligible responses or ones that are not codable according to the categories above. If unsure, assign a temporary hypothesis code and mark the thought for discussion. Do not share your hypothesis prior to the discussion.

#### **Uncertain (UNC)**

Just as in the thought-listing. If you are uncertain how to classify a statement, assign it to the UNC category and copy and paste it into the “Uncertain” worksheet.

## Coding Cheat Sheet

### Thought-Listing

<b>S+</b>	Positive-Self Content
<b>S-</b>	Negative-Self Content
<b>S0</b>	Neutral-Self Content
<b>O+</b>	Positive-Other Content
<b>O-</b>	Negative-Other Content
<b>O0</b>	Neutral-Other Content
<b>T+</b>	Positive-Task Content
<b>T-</b>	Negative-Task Content
<b>T0</b>	Neutral-Task Content
<b>U+</b>	Positive-Unrelated Content
<b>U-</b>	Negative-Unrelated Content
<b>U0</b>	Neutral-Unrelated Content
<b>G</b>	Garbage/Uncodable
<b>UNC</b>	Uncertain/For Discussion later

### Twenty Statements Test

<b>1</b>	Self-Concept
<b>0</b>	Not Self-Concept
<b>I+</b>	Positive Self-Related (Idiocentric) Content
<b>I-</b>	Negative Self-Related (Idiocentric) Content
<b>I0</b>	Neutral Self-Related (Idiocentric) Content
<b>A+</b>	Positive Other-Related (Allocentric) Content
<b>A-</b>	Negative Other-Related (Allocentric) Content
<b>A0</b>	Neutral Other-Related (Allocentric) Content
<b>G</b>	Garbage/Uncodable
<b>UNC</b>	Uncertain/For Discussion later