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How Important is Temperament? The Relationship Between Coping Styles, Early Maladaptive Schemas and Social Anxiety

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Abstract

Young's schema theory provides a theoretical framework that relates temperament, coping styles and Early Maladaptive Schemas to social anxiety and Social Anxiety Disorder (SAD). The current study explored the relationship between these variables in a sample of 360 non-clinical adults. Results indicated that individuals higher in social anxiety display higher levels of schemas themed around *Disconnection and Rejection* than individuals low in social anxiety. Temperament appears to influence the type of coping style some individuals adopt with more introverted individuals utilising more avoidant strategies. Nevertheless, neuroticism appears to have a stronger relationship with *Disconnection and Rejection* schemas than coping strategies linked to either avoiding or overcompensating for stressors. Path analysis was used to test three models of the data based on the relationships proposed by Young and colleagues. Results provide preliminary evidence that the impact of maladaptive schemas on coping strategies is stronger than the influence of coping strategies on such schemas. The implications of the findings for both theory and treatment concerning social anxiety and SAD are discussed, along with suggestions for future research.

Key words: Social Anxiety, early maladaptive schemas, temperament, coping styles, Schema therapy.

Novelty and Significance

What is already known about the topic?

- Individuals higher in social anxiety show higher levels of schemas associated with *Disconnection and Rejection*.

What this paper adds?

- First study examining the pathways theorised by Young regarding temperament, coping strategies, early maladaptive schemas and social anxiety.
- Some support for Young and colleagues' Schema Therapy model, with important limitations to consider.
- Young's belief that temperament is more influential in determining patients' coping styles (i.e. avoidance and overcompensation) than their schemas appears problematic given that temperament, particularly neuroticism, appeared to have a stronger relationship with *Disconnection and Rejection* schemas than coping strategies.

Social anxiety disorder (SAD) is a condition characterised by a persistent fear of social or performance situations, fear of negative evaluation and the avoidance of situations which may trigger such fears (American Psychiatric Association [APA], 2000). SAD is currently the most common anxiety disorder and the third most common psychiatric disorder (Brook & Schmidt, 2008) with a poor rate of spontaneous remission (Bruce *et al*., 2005). Although a large body of research on social anxiety and SAD exists, a better understanding of the origins of such fears is needed. Accordingly, research has begun to focus upon the role that various types of knowledge structures

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(i.e. schemas) play in social anxiety's aetiology. A relevant framework is provided by Young (1999) and colleagues (Young, Klosko & Weishaar, 2003) in their theory of the development and impact of maladaptive schemas. According to Young *et al*. (2003), emotional temperament is considered "especially important" (p. 11) in the development of such schemas and is "one of the main factors" that determine individuals' coping styles (p. 35). However, despite the wide-spread clinical utilisation of Schema Therapy for various disorders, including chronic anxiety, limited research has been carried out on the pathways theorised by Young's schema model and its viability when treating individuals with social anxiety and SAD.

Integrating the work of Beck (1967) and others (e.g., Ainsworth & Bowlby, 1991), Young (1999) elaborated upon the concept of cognitive schemas, hypothesising that maladaptive schemas develop during childhood or adolescence primarily as a result of 'toxic' childhood experiences (i.e. unmet emotional needs). Young (1999) conceptualised Early Maladaptive Schemas (EMSs), as self-defeating emotional and cognitive patterns regarding oneself and one's relationships with others which: (i) begin during childhood or adolescence; (ii) are dysfunctional to a significant degree, and; (iii) are elaborated upon throughout one's lifetime (p. 9). Based upon clinical experience, Young (1999) originally categorised 18 primary EMSs into five broad domains of unmet emotional needs: 1. *Disconnection and Rejection*, 2. *Impaired Autonomy and Performance*, 3. *Impaired Limits*, 4. *Other-Directedness*, and 5. *Overvigilance and Inhibition*. According to Young's schema theory, EMSs play a causal role in the development of psychopathology.

An earlier study conducted by Mairet, Boag, Wong, Warburton, and Rapee (in preparation) indicated that Australian individuals higher in social anxiety show higher scores for EMSs, particularly those related to Domain 1: *Disconnection and Rejection*. This domain comprises five EMSs that originate from a child's early environment providing inadequate safety, security and emotional nurturance. The key schemas relate to: abandonment/instability, involving the persistent fear that significant others will leave; mistrust/abuse, involving the expectation that significant others will be abusive, manipulative or humiliating; emotional deprivation, involving the expectation that significant others will not meet one's needs for emotional support; defectiveness/shame, involving a persistent sense that one is defective, inferior or unlovable, and; social isolation/alienation, involving a strong sense of isolation from the rest of the world or of being different from others.

These findings are largely consistent with past research. For instance, Hinrichsen, Waller, and Emanuelli (2004) examined the EMSs associated with social anxiety and agoraphobia in individuals with eating disorders. Multiple regression analyses revealed that abandonment and emotional inhibition schemas explained 25.9% of the variance in data, suggesting that females with eating disorders with high comorbid social anxiety have both a fear of losing significant others and are emotionally inhibited in order to avoid disapproval. Given that this study was conducted in a sample of females with eating disorders, further studies examining the schematic structure of individuals with social anxiety were necessary.

In a study involving socially anxious individuals, Pinto-Gouveia, Castilho, Galhardo and Cunha (2006) found that individuals with social phobia scored significantly higher

than non-phobic individuals on measures for most EMSs. Moreover, socially anxious individuals scored higher than a mixed anxiety group (including individuals with panic disorder and obsessive-compulsive disorder) for schemas related to emotional deprivation, mistrust/abuse, social isolation/alienation, defectiveness/shame, failure, social undesirability/defectiveness, subjugation and dependence which primarily relate to the *Disconnection and Rejection* domain. This finding suggests that individuals with social anxiety do not expect that their needs for stable, trustworthy, nurturing and empathic relationships will be met in a predictable manner compared to individuals with other forms of anxiety. A study conducted by Calvete and Orue (2008) using a non-clinical university sample also indicated that social anxiety is mainly related to schemas themed around abandonment, failure and emotional inhibition, suggesting that individuals high on social anxiety harbour a fear that significant others may leave them, that they will inevitably fail or are inadequate and need to hide their true feelings to avoid disapproval by others.

More recently, Calvete, Orue and Hankin (2013) conducted a large longitudinal study involving 1052 non-clinical adolescents to assess whether EMSs predict anxious automatic thoughts and to see whether such thoughts act as mediators between schemas and prospective changes in social anxiety symptoms. Results suggested that schemas predict more surface-level anxious thoughts and these in turn perpetuate the schemas themselves. This bidirectional relationship was evident for schemas in the *Disconnection and Rejection* domain and for negative automatic thoughts regarding self-concept. Additionally, it was found that schemas from the *Other-directedness* domain play a key role in the development and maintenance of social anxiety.

Taken together, these studies support the supposition that individuals higher on social anxiety experience higher levels of EMSs, particularly those relating to the domain of *Disconnection and Rejection*.

From a theoretical perspective, the examination of the relationship between temperament and EMSs is significant because temperament is considered to be an important vulnerability factor in the formation of EMSs (Young *et al*., 2003). According to proponents of Schema Therapy, an individual's emotional temperament interacts with 'toxic' childhood experiences to influence the formation and maintenance of EMSs (Young *et al*., 2003). While the terms "temperament" and "personality" are used interchangeably by Young *et al*. (2003), there is an emphasis on the influence of biological precursors with the proposition that each child appears to have a distinct temperament or personality from birth that provides the basic foundations for how s/he interacts with the world. Nevertheless, while temperament is an important factor that may influence what a child is exposed to and how the child responds to his or her environment, Young *et al*. (2003) further propose that an extremely favourable or aversive early environment can override a child's emotional temperament. For example, a loving family environment may encourage a shy child to be more sociable or a rejecting environment may leave a sociable child more inhibited. Moreover, a person's temperament may be protective against the formation of EMSs (Young *et al*., 2003).

While the distinction between "temperament" and "personality" is often obscure (see Piekkola, 2011), when considering the emotional temperament variables that Young *et al*. (2003) relate to EMS development, the personality variables of introversion

and neuroticism in adults appear to be the antecedents most closely related to the temperament constructs of inhibition to the unfamiliar (Kagan, Reznick & Snidman, 1988) and negative affectivity, respectively found in children (Rothbart, Ahadi & Evans, 2000). For the purposes of this paper, neuroticism is defined as the general tendency of an individual to experience unpleasant emotions, while introversion is defined as tendency and preference for fewer social interactions (McCrae *et al*., 2000). The basic traits of introversion (the inverse of extroversion) and neuroticism have been components in the majority of prominent trait models, including the Big Five and Big Three and are subsequently referred to as the Big Two (Clark & Watson, 1999). Additionally, these factors are highly robust traits that remain somewhat stable over time (Molfese & Molfese, 2000), have a substantial genetic component (Clark & Watson, 1999), and numerous studies have found that they correlate highly with social anxiety and SAD (Kashdan, 2002; Levinson, Langer & Rodebaugh, 2011; Naragon-Gainey & Watson, 2011; Norton, Cox, Hewitt & McLeod, 1997; Schmidt & Riniolo, 1999; Watson, Gamez & Simms, 2005).

While some findings have shown significant correlations between EMSs and high neuroticism within child, adolescent and adult samples (Muris, 2006; Sava, 2009; Thimm, 2010), and also high introversion in an adult sample (Thimm, 2010), the relationship between temperament, coping styles and EMSs are yet unknown.

According to Young *et al*. (2003), temperament is an important factor in determining the type of coping mechanisms an individual adopts when schemas trigger distressing thoughts, feelings and emotions. In fact, it has been suggested that "temperament probably plays a greater role in determining patients' coping styles than it does in determining their schemas" (Young *et al*., 2003, p. 35). Maladaptive coping styles develop at a young age in order to adapt to schemas that are often associated with intense or painful emotions. Unlike untreated schemas, however, an individual's coping style does not remain stable and he or she may use various coping styles to cope with the same schema in different situations or at different stages of his or her life. Furthermore, the assessment of coping styles/responses and EMSs is clinically important given that Young and colleagues propose that "eliminating maladaptive coping responses permanently is almost impossible without changing the schemas that drive them" (Young *et al*., 2003, p. 37).

Similar to the anxiety literature which proposes three basic responses to threat (freeze, flight and fight) the three coping styles postulated by Young (1999) and colleagues (Young *et al*., 2003) are surrender, avoidance and overcompensation, respectively. These coping styles are expressed through coping responses which are the specific behaviours or strategies employed by the individual (Young *et al*., 2003). While schema surrender occurs when an individual accepts that a schema is true, schema avoidance occurs when an individual tries not to activate schemas on either a conscious or unconscious level and schema overcompensation is when an individual attempts to fight the schema by thinking, feeling and behaving as though the opposite of the schema were true (Young *et al*., 2003).

Avoidance has been a component of prominent social anxiety models such as those proposed by Rapee and Heimberg (1997) as well as Clark and Wells (1995).

Clinical evidence and research suggests that individuals with social anxiety regularly avoid social situations or use safety behaviours, such as drinking excessive amounts of alcohol, in order to cope with anxiety provoking situations (Morrison & Heimberg, 2013). In fact, recent research suggests that safety behaviours can be classified into subtypes; avoidance safety behaviours, such as low self-disclosure and avoiding eye contact and impression-management safety behaviours (Plasencia, Alden, & Taylor, 2011). Moreover, most cognitive-behavioural treatments for social anxiety specifically address individuals' avoidance strategies and apply exposure hierarchies to events or situations that are avoided.

Young (1999) suggests that individuals use cognitive (avoiding thinking about something), emotional (blocking or numbing feelings), behavioural (utilising escape behaviours, such as drinking alcohol) and/or somatic (experiencing physical symptoms) means to avoid the thoughts, feelings and emotions associated with EMSs. While these avoidance styles are potentially beneficial in the short-term because they can reduce the likelihood of a schema being activated, they often serve to maintain the schema because it has not been disconfirmed (Young, 1999). In order to assess schema avoidance, Young and Rygh (1994) developed the *Young-Rygh Avoidance Inventory* (YRAI). However, while the YRAI is frequently used as a clinical tool to identify and assess individuals' use of avoidance strategies, the clinical utility and psychometric properties of this scale have been tested in only limited domains, such as samples with eating disorders (Luck, Waller, Meyer, Ussher, & Lacey, 2005; Sheffield *et al*., 2009; Spranger, Waller, & Bryant-Waugh, 2001) or substance abuse issues (e.g., Brotchie, Hanes, Wendon, & Waller, 2007).

While avoidance is associated with social anxiety, clinical observations also support the use of overcompensation strategies by socially anxious individuals. For example, a core component of SAD is a fear of negative evaluation (Hudson & Rapee, 2000). As such, individuals with SAD display a tendency to focus selectively upon evidence of failure and be excessively self-critical (Clark & Wells, 1995). In order to avoid the fear of failure, individuals with the disorder often set unrealistically high standards for themselves (Clark & Wells, 1995) and may use perfectionistic self-presentation to compensate for perceived inadequacies (e.g., Jain & Sudhir, 2010).

According to Young *et al*. (2003), schema overcompensation can be seen as an attempt by the individual to challenge EMSs; but also as a response that is often excessive and ends up perpetuating the schema. For instance, an individual who felt as though they were worthless as a child may attempt to be perfect as an adult. To assess overcompensation strategies Young developed the *Young Compensation Inventory* (Young, 1998). Endorsing the item "I am a highly critical person", for instance, may indicate overcompensation for a defectiveness/shame schema. While Young's (1999) original model proposes that schema overcompensation is a single construct, recent research within eating disordered and non-clinical populations suggests the possibility of three sub-constructs: *individuality* (avoidance of emotional activation through independence and rebellion against society), *personal control* (avoidance of emotional activation through controlling the self) and *social control* (avoiding emotional activation through the control of others) (see Luck *et al*., 2005). Similarly to the YRAI, however, there

is a paucity of studies assessing the psychometric properties of the YCI, particularly outside the realm of eating disorders (e.g., Luck *et al*., 2005; Sheffield *et al*., 2009) and substance abuse (e.g., Brotchie, Hanes, Wendon & Waller, 2006).

Young *et al*., (2003) suggest that temperament interacts with both coping styles and EMSs in the development of psychopathologies. However, to date, no research has tested this claim. Subsequently, it is unclear whether temperament does, in fact, play a greater role in determining patients' coping styles than it does in determining their EMSs, as Young suggests, and whether or not there is a relationship between coping styles and EMSs.

Given the above considerations, the aim of this study was to test the pathways proposed in Young's Schema Therapy model in order to provide a greater understanding of how risk factors for psychopathologies (e.g., temperament, coping style and EMSs) relate to each other and to social anxiety. In particular, this study aimed to examine whether temperament affects the type of coping styles people use and whether it affects individuals' coping styles more than EMSs likely linked to social anxiety, such as those from the *Disconnection and Rejection* domain. These findings may then assist in identifying possible areas for intervention and the individuals who are most likely to benefit from such interventions.

Guided by schema theory, it was hypothesised that (i) individuals high on social anxiety will display more schemas associated with *Disconnection and Rejection* than individuals low on social anxiety; (ii) introversion and neuroticism will have a stronger relationship with avoidance than overcompensation coping strategies; and (iii) introversion and neuroticism will have a stronger relationship with coping responses than schemas associated with *Disconnection and Rejection*. This was tested via structural equation modelling. Based upon Young's schema theory (1999; 2003), three models (see Figures 2, 3 and 4) assessing the relationship between temperament (specifically introversion and neuroticism), coping strategies, *Disconnection and Rejection* schemas and social anxiety were created to test these relationships. Finally, the relationship between coping response and *Disconnection and Rejection* schemas was also examined.

METHOD

Participants

A non-clinical sample was chosen given that research indicates that social anxiety exists along a continuum (e.g., Tillfors, Furmark, Eskelius, & Freddrikson, 2004) and numerous other studies assessing temperament factors associated with social anxiety have been conducted with non-clinical samples (e.g., Kashdan, 2002; Norton, Cox, Hewitt & McLeod, 1997). Participants included 360 undergraduate and postgraduate psychology students recruited from an Australian university. Participants received course credit for their participation or had a chance to win a gift voucher. Of this sample, 255 were female and 105 were male. Approximately 76% of the sample were between 17 and 20 years old with the other 24% being fairly evenly distributed from 21 through 25+ years of age, with a sample mean age of 20.68 (*SD*= 5.7). To compliment a previous study

by the authors (in preparation) examining cross-cultural variations in EMSs and social anxiety, in order to reduce cultural variability the inclusion criteria applied by Hong and Woody (2007) to Korean and Euro-Canadian samples were utilised. As a result, participants who considered themselves as either of Australian descent or at least third generation Australian and who both speak and read English as a first language were invited to participate while participants who had spent more than 7 years in total in a non-Western country were excluded. Based on these criteria, all of the participants reported that they identified themselves as being of Australian decent, with 90% being born in Australia and 10% being born in another country.

Instruments

Social Interaction and Anxiety Scale (SIAS) and *Social Phobia Scale* (SPS). The SIAS and SPS (Mattick & Clarke, 1998) are two companion self-report measures used to assess social anxiety fears. While the SIAS examines fears of more general social interaction, such as speaking with individuals in authority or mixing in a group and making friends, the SPS examines fears of being scrutinised doing routine activities, such as writing, drinking and eating. Each scale contains 20 items rated on a 5 point Likert scale ranging from 0 ("not at all characteristic or true of me") to 4 ("extremely characteristic of true of me"). Within a community sample, Mattick and Clarke (1998) reported that the SIAS and SPS each have coefficient alphas of .90. The SIAS and SPS displayed excellent reliability in the present study, with coefficient alphas of .93 and .94, respectively.

Young Schema Questionnaire-Short Form (YSQ-S3). The YSQ-S3 (Young, 2005) is a 90 item self-report inventory consisting of items related to 18 separate schemas. These schemas are thought to cluster into 5 domains 1. *Disconnection and Rejection*, 2. *Impaired Autonomy and Performance*, 3. *Impaired Limits*, 4. *Other-Directedness*, and 5. *Overvigilance and Inhibition*. For the purposes of this study, the authors focused on the five schemas thought to cluster into the *Disconnection and Rejection* domain. These included schemas related to abandonment, mistrust/abuse, emotional deprivation, defectiveness/shame and social isolation. There are five items per schema subscale. Responses range from 1 ("completely untrue of me") to 6 ("describes me perfectly") with higher scores reflecting a participant's greater endorsement of beliefs linked to a particular EMS (e.g., "I don't fit in"). Although several items have minor changes in wording, the content and number of items from this domain have remained the same between the YSQ-S3 and its predecessor the YSQ-S2 which has been assessed more robustly for its psychometric properties. The YSQ-S2 which includes 15 of the 18 YSQ-S3 schema subscales exhibits good to excellent reliability, with coefficient alphas ranging between .76 and .93 (Welburn *et al*., 2002). The YSQ-S3 displayed good reliability in the present study, with coefficient alphas ranging from .86 (*emotional deprivation*) to .89 (*defectiveness/shame*) at the subscale level and a coefficient alpha of .94 at the domain level.

Young-Rygh Avoidance Inventory (YRAI). The YRAI (Young & Rygh, 1994) contains 40 items that assess schema avoidance. In a study of bulimic and non-clinical women, Spranger, Waller and Bryant-Waugh (2001) coded items according to the type of avoidance used and found the YRAI to be best represented by two scales (*cognitive/emotional* [CE] avoidance made up of 18 items and *behavioural/somatic* [BS] avoidance made up of 13 items), each with good levels of concurrent validity and acceptable levels of

internal consistency. Each item is rated on a 6 point Likert scale from 1 ("completely untrue of me") to 6 ("describes me perfectly") with higher scores indicative of greater avoidance. Previous research has found that the internal consistency for these scales is acceptable within eating disordered samples (total scale alpha= .79, BS= .65 and CE=.78; Spranger *et al*., 2001) and moderate within non-clinical samples (0.52-0.67; Sheffield *et al*., 2009). The YRAI displayed adequate reliability in the present study, with a coefficient alpha of .76 for the CE subscale and .74 for the BS subscale.

Young Compensation Inventory (YCI). The YCI (Young, 1998) contains 48 items assessing various methods used for schema compensation. Each item is rated on a 6 point Likert scale from 1 ("completely untrue of me") to 6 ("describes me perfectly") with higher scores suggesting greater use of compensation strategies. Three subscales have arisen in previous studies (*individuality* with 10 items, *social control* with 19 items and *personal control* with 4 items). Each factor has good psychometric properties within eating disordered and non-eating disordered individuals (see Luck *et al*., 2005). Previous research has found acceptable levels of internal consistency on each of the scales with coefficient alphas ranging above .70 in a non-clinical sample (Sheffield *et al*., 2009). The YCI displayed adequate to good reliability in the present study, with a coefficient alpha of .62 for *personal control*, .78 for *individuality* and .90 for *social control*.

Temperament. Ten items from the *Extroversion* subscale of the Big Five Domain were utilised (Goldberg *et al*., 2006). The five items reflecting extroversion (e.g., "I am the life of the party") were reverse scored to match the five items reflecting introversion (e.g., "I do not like to draw attention to myself"). Each item is rated on a 5 point Likert scale from 1 ("very inaccurate") to 5 ("very accurate"). The coefficient alpha for this scale has been calculated at .87 (Goldberg *et al*., 2006). The introversion scale displayed good reliability in the present study, with a coefficient alpha of .89.

Ten items from the *Neuroticism* subscale of the Neuroticism, Extroversion, Openness to Experience Personality Inventory were utilised (Goldberg *et al*., 2006). The five items reflecting low neuroticism (e.g., "I am not easily bothered by things") were reverse scored to match the five items reflecting high neuroticism (e.g., "I have frequent mood swings"). Each item is rated on a 5 point Likert scale from 1 ("very inaccurate") to 5 ("very accurate") with higher scores reflecting greater neuroticism. The coefficient alpha for this scale has been calculated at .86 (Goldberg *et al*., 2006). The neuroticism scale displayed good reliability in the study, with a coefficient alpha of .85.

Procedure

The institution's Human Ethics Committee Ethics of Macquarie University granted approval for the current research to take place. Participants completed a demographics questionnaire and then completed the SIAS, SPS, *Disconnection and Rejection* domain of the YSQ-S3, YCI, YRAI and two temperament scales individually online. Participants were then presented with an Information Form and thanked for their participation.

RESULTS

Descriptive statistics for the study variables are presented in Table 1. All means were within the expected range for a nonclinical sample. Skewness statistics for the SIAS, SPS and YSQ-S3 *Disconnection and Rejection* schemas exceeded the recommended cut

Table 1. Descriptive statistics for all variables (*N*= 360).

Variables	Minimum	Maximum	Mean	*SD*
YRAI Behavioural/Somatic	1.00	5.00	2.46	.70
YRAI Cognitive/Emotional	1.06	5.44	3.05	.62
YRAI Total	1.48	4.58	2.80	.54
YCI Social Control	1.26	5.63	2.80	.79
YCI Individuality	1.30	5.60	3.00	.80
YCI Personal Control	1.00	6.00	3.90	.98
YCI Total	1.67	5.27	3.00	.65
Introversion	1.00	5.00	2.57	.81
Neuroticism	1.00	5.00	2.69	.76
YSQ-S3: Domain 1	1.00	5.60	2.14	.84
SIAS Total	2.00	79.00	23.23	14.32
SPS Total	0.00	64.00	15.23	13.70

off of two times the standard error (Tabachnick & Fidell, 2001). These variables were transformed using a square root transformation prior to subsequent analyses.

Path analysis was used to compare models of predicted relationships between variables and to assess the comparative strength of these relationships. Coffman and MacCallum (2005) have suggested that the use of latent variable models can overcome the biasing effects of measurement error in path analysis models so latent variables were used to represent introversion, neuroticism, overcompensation, avoidance, *Disconnection and Rejection* schemas and social anxiety. Before exploring the paths within the model as a whole, the fit of the measurement model for each of the latent variables was analysed in order to achieve the most parsimonious structural models to compare. The models were tested via structural equation modelling (SEM) using Analysis of Moment Structures (AMOS v21.0). Paths between the observed variables and their error terms were constrained to one for all models.

Given that the chi-square statistic is sensitive to both skewness and sample sizes (Kenny, 2008) and that the three models being tested were not nested, other means of assessing model fit were used. Therefore, in addition to Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI), the Bayes Information Criterion (BIC) and Akaike Information Crietrion (AIC) were compared (Keith, 2006). RMSEA values of less than .05 suggest a good fit and values up to .08 represent acceptable errors of approximation (Byrne, 2001; Marsh, Hau & Wen, 2004) while CFI and TLI values at or greater than .95 are considered a good fit and .90 are considered acceptable (Kenny, 2008; Tabnick & Fidell, 2001). AIC and BIC fit statistics are often used to compare non nested latent variable models with smaller values suggesting better fit (Keith, 2006).

Temperament. Item parcels are often considered better indicators of latent variables than using total scores (see Coffman & MacCallum, 2005) as they often result in improved fit and less biased solutions when using coarsely categorised and/or non-normally distributed items (see Bandalos, 2002). Therefore, two random item parcels per variable were used as indicators of introversion and neuroticism. Temperament latent variables were allowed to covary. The fit indexes were excellent for this model of temperament [$\chi^2(1, N= 360)= .062$, $p= .803$, RMSEA= .00 (90%CI: .00; .09), CFI=1.00 and TLI= 1.00].

Social Anxiety. Three item parcels each were used to represent SIAS and SPS variables. SIAS and SPS were then represented by a social anxiety latent variable. Fit indexes for this measurement model for social anxiety were excellent [χ^2(8, N= 360)= 13.426, p= .098, RMSEA= .04 (90%CI: .00; .08), CFI= 1.00 and TLI= 1.00].

Domain 1: Disconnection and Rejection. The five subscales from Domain 1 of the YSQ-SF3 were included. Results indicated that the theoretical construct proposed by Young and colleagues was a good fit [χ^2(4, N= 360)= 6.613, p= .158, RMSEA=.04 (90%CI: .08; .16), CFI=1.00 and TLI=1.00]. The squared multiple correlations were .47 for emotional deprivation, .53 for abandonment, .55 for mistrust/abuse, .55 for social isolation and .79 for defectiveness/unlovability. This suggests that the *Disconnection and Rejection* domain accounted for between 47% and 79% of the variability in these five observed variables, indicating this construct is a strong representation of the data.

Coping response. The measurement model for avoidance and overcompensation were originally tested using the two YRAI and three YCI subscales with underlying latent variables allowed to covary. This model for coping styles resulted in a fairly poor fit [χ^2(4, N= 360)= 34.898, p <.001, RMSEA=.15 (90%CI: .10; .19), CFI= .89 and TLI= .73].

Therefore a confirmatory factor analysis (CFA) at the item level was carried out separately on overcompensation and avoidance to see whether the subscales work well within this sample. Fit indices were poor for overcompensation [χ^2(492, N= 360)= 2161.405, p <.001, RMSEA= .10 (90%CI: .09; .10), CFI= .63 and TLI= .61]. Standardised coefficients ranged from .25 to .72 for the 19 *social control* items, from .22 to .89 for the 10 *individuality* items and .35 to .87 for the 4 *personal control* items. Fit indices were also poor for avoidance [χ^2(433, N= 360)= 2095.228, p <.001, RMSEA= .10 (90%CI: .10; .11), CFI= .40 and TLI= .36]. Standardised coefficients ranged from .21 to .62 for the 18 *cognitive/emotional* items and .32 to .61 for the 13 *behavioural/ somatic* items. These results suggest that the coping response subscales suggested by Luck *et al*. (2005) did not work well within this sample.

As a result, the three YCI and two YRAI subscales were not utilised in the analysis, however items making up these subscales were used to represent a total score for overcompensation and avoidance. Five random item parcels were created for overcompensation and four for avoidance. Error terms for the latent variables were allowed to covary. The revised measurement model for coping response was adequate [χ^2(26, N= 360)= 82.142, p <.001, RMSEA=.08 (90% CI: .06; .10), CFI= .97 and TLI= .96] and was subsequently used in further analyses.

Overall Measurement Model: Correlations between the latent variables (Table 2) were ascertained from an overall measurement model (Figure 1) based upon the individual measurement models above. Model modification procedures were undertaken. As a result, introversion was allowed to covary with Domain 1's *social isolation* subscale as these variables test somewhat theoretically similar constructs. Modification indices also suggested that neuroticism and SPS covary, possibly due to similar wording of some items. The fit of the overall measurement model was adequate [χ^2(234, N= 360)= 727.108, p <.001, RMSEA= .08 (90%CI: .07; .08), CFI= .92, TLI= .91, BIC= 1115.591 and AIC= 859.108].

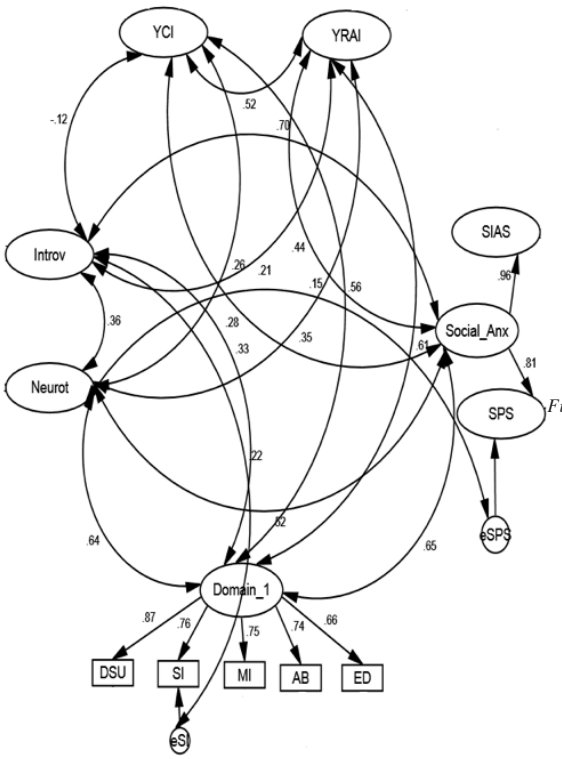

Figure 1. Covariance model presented without item parcels or error terms, except those involved in modification changes, for ease of understanding. Note: Latent models are presented without item parcels or error terms, except those involved in modification changes, for ease of understanding. Standardised coefficients for the relevant paths have been included. (Intro: introversion; Neurot: neuroticism; YCI: Young Compensation Inventory; YRAI: Young-Rygh Avoidance Inventory; Social_ Anx: social anxiety; SIAS: social interaction anxiety scale; SPS: social phobia scale; eSPS: error term for SPS; Domain_1: *Disconnection and Rejection Domain* of YSQ-S3; DSU: defectiveness/ unlovability; SI: social isolation; eSI: error term for social isolation; MI: mistrust/abuse; AB: abandonment; ED: emotional deprivation.)

Table 2. Correlations among latent variables.

	1	2	3	4	5	6
1. Introversion	---					
2. Neuroticism	.36**					
3. Overcompensation	-.12	.26**				
4. Avoidance	.21**	.35**	.52**			
5. Domain 1	.33**	.64**	.56**	.61**		
6. Social Anxiety	.70**	.52**	.28**	.45**	.65**	

**p <.01

While introversion correlated strongly with social anxiety, moderately with neuroticism as well as *Disconnection and Rejection* schemas and weakly (although significantly) with avoidance, it displayed a weak non-significant negative relationship with overcompensation. Neuroticism displayed a significant weak relationship with overcompensation and a moderate to strong relationships with avoidance, *Disconnection and Rejection* schemas and social anxiety. While social anxiety displayed a significant but weak relationship with overcompensation, it had significant and strong relationships with introversion, neuroticism, avoidance and *Disconnection and Rejection* schemas.

Links between social anxiety and Disconnection and Rejection Schemas. The standardised coefficient for the relationship between *Disconnection and Rejection* and social anxiety was both positive (.65) and significant (p< .001), indicating that

individuals higher in social anxiety had stronger schemas associated with *Disconnection and Rejection* than individuals lower on social anxiety.

Links between temperament and coping strategies. Bivariate correlations suggest that introversion has a stronger relationship with avoidance than overcompensation. To test the significance of this difference, a test of differences between covariances was applied. Results indicated that more introverted individuals were significantly more likely to use avoidance as opposed to overcompensation coping strategies (z= 4.94, p<.001).

Bivariate correlations also suggest a tendency for neuroticism to be more strongly related to avoidance than overcompensation strategies, however, this difference was not significant (z= .56, p= .576).

Links between temperament and Disconnection and Rejection schemas. Bivariate correlations between introversion and the *Disconnection and Rejection* schema domain were in the predicted direction, although similar to the relationship between introversion and avoidance, the results indicated that this relationship was not significantly different (z= .84, p= .401). Introversion also had a stronger relationship with this schema domain than does overcompensation, as correlations were significantly different (z= 4.92, p <.001).

Neuroticism had a stronger relationship with *Disconnection and Rejection* schema than did avoidance, with the correlations again showing a significant difference (z= 1.96, p =.050). Similarly, neuroticism had a stronger relationship with this domain than did overcompensation (z= 4.74, p <.001).

Testing Primary Theoretical Models. *Model 1*: No paths between coping responses and *Disconnection and Rejection* schemas. The first theoretical model yielded a poor

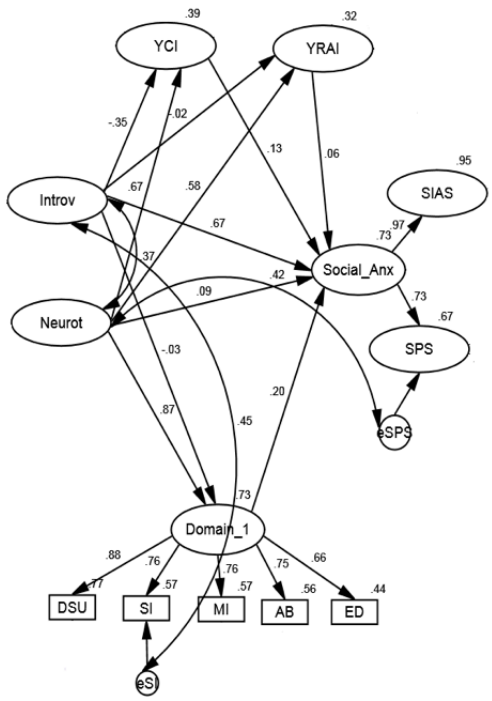

Figure 2 Model 1. No paths between coping responses and Domain 1 schemas. (Intro: introversion; Neurot: neuroticism; YCI: Young Compensation Inventory; YRAI: Young-Rygh Avoidance Inventory; Social_Anx: social anxiety; SIAS: social interaction anxiety scale; SPS: social phobia scale; eSPS: error term for SPS; Domain_1: *Disconnection and Rejection* Domain of YSQ-S3; DSU: defectiveness/unlovability; SI: social isolation; eSI: error term for social isolation; MI: mistrust/abuse; AB: abandonment; ED: emotional deprivation.)

fit [χ^2(238, *N*= 360)= 853.125, *p* <.001, RMSEA= .09 (90%CI: .08; .09), CFI= .901, TLI= .91, BIC= 1218.063 and AIC= 977.125]. The resultant estimation model (Figure 2) yielded an adequate fit [χ^2(236, *N*= 360)= 739.685, *p* <.001, RMSEA= .08(90%CI: .07; .08), CFI= .92, TLI= .91, BIC= 1116.395 and AIC= 1116.395].

Model 2: Paths from coping responses to Disconnection and Rejection schemas. A model in which overcompensation and avoidance coping responses predicted *Disconnection and Rejection* schemas was estimated (Figure 3). The fit indexes were adequate for this

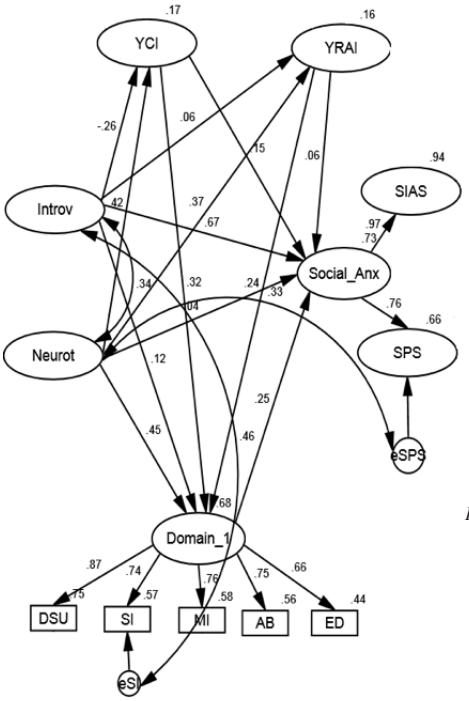

Figure 3 Model 2. Coping Response to Domain 1 schemas. (Intro: introversion; Neurot: neuroticism; YCI: Young Compensation Inventory; YRAI: Young-Rygh Avoidance Inventory; Social_ Anx: social anxiety; SIAS: social interaction anxiety scale; SPS: social phobia scale; eSPS: error term for SPS; Domain_1: *Disconnection and Rejection* Domain of YSQ-S3; DSU: defectiveness/unlovability; SI: social isolation; eSI: error term for social isolation; MI: mistrust/abuse; AB: abandonment; ED: emotional deprivation.)

model fit [χ^2(234, *N*= 360)= 656.702, *p* <.001, RMSEA= .07 (90%CI: .07; .08), CFI= .93, TLI= .92, BIC= 1045.185 and AIC= 788.702]. Overall, Model 2 was a better fit to the data than Model 1 suggesting that there is, in fact, a relationship between coping strategies and Domain 1: *Disconnection and Rejection* schemas.

Model 3: Paths from *Disconnection and Rejection* schemas to coping responses. Next, a reverse model in which Domain 1 schemas predicted overcompensation and avoidance coping responses was estimated. The fit indexes were identical to model 2 [χ^2(234, *N*= 360)= 656.702, *p* <.001, RMSEA= .07 (90% CI: .07; .08), CFI= .93, TLI= .92, BIC= 1045.185 and AIC= 788.702]. While the direction of causality cannot be established due to the cross sectional nature of this study, the magnitude and direction of the relationships can be inferred from the standardised beta coefficients. While the beta coefficient are .32 from overcompensation and .24 from avoidance to Domain 1 in model 2 (see Figure 3) they are .71 from Domain 1 to overcompensation and .65 to

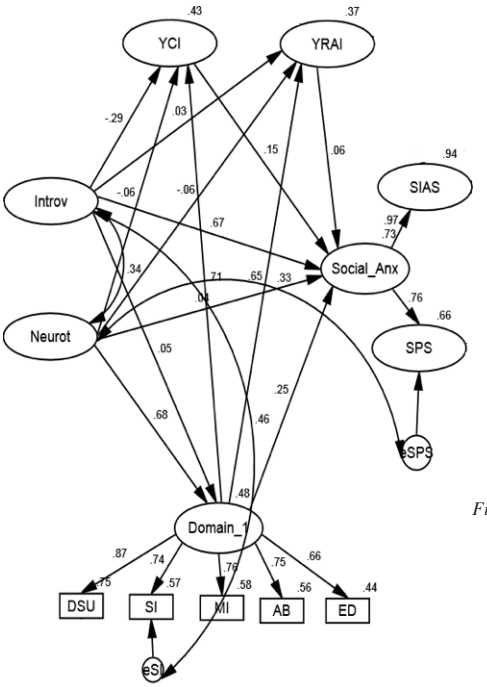

Figure 4 Model 3. Domain 1 schemas to coping response. (Intro: introversion; Neurot: neuroticism; YCI: Young Compensation Inventory; YRAI: Young-Rygh Avoidance Inventory; Social_Anx: social anxiety; SIAS: social interaction anxiety scale; SPS: social phobia scale; eSPS: error term for SPS; Domain_1: *Disconnection and Rejection* Domain of YSQ-S3; DSU: defectiveness/unlovability; SI: social isolation; eSI: error term for social isolation; MI: mistrust/abuse; AB: abandonment; ED: emotional deprivation.)

avoidance in model 3 (see Figure 4), suggesting the possibility of a stronger relationship from schemas to coping response.

A non-recursive model examining a bidirectional relationship between coping responses and schemas was tested. However it was under-identified, (i.e. there were more paths than information to estimate the paths) and was thus not solvable (Keith, 2006). Various strategies for overcoming this issue were unsuccessful.

DISCUSSION

The current study tested the pathways proposed by Young's Schema Therapy model. More specifically, the study investigated: (i) whether individuals higher in social anxiety display relatively more schemas associated with *Disconnection and Rejection* than individuals lower in social anxiety; (ii) whether temperament affects the coping strategies (i.e. avoidance or overcompensation) individuals' adopt, and; (iii) whether temperament affects individuals' coping strategies more than schemas associated with *Disconnection and Rejection*. Pathways proposed by Young's schema model were also examined in order to provide a greater understanding of how potential risk factors for social anxiety, including temperament, coping strategies and EMSs, relate to one another.

As predicted, and in line with previous research (e.g., Pinto-Gouveia *et al*., 2006), individuals higher in social anxiety showed higher levels of schemas associated with

Disconnection and Rejection than individuals lower in social anxiety. These findings appear consistent with research suggesting that individuals with social anxiety often come from an unsupportive/unaffectionate environment (emotional deprivation; Chelminski & Zimmerman, 2007), feel socially defective (defectiveness/shame; Darcy, Davila, & Beck, 2005), fear that others will abandon them (abandonment; Darcy *et al*., 2005), expect that others will hurt or humiliate them (mistrust/abuse; Gibb *et al*., 2007), and/or feel isolated from the rest of the world or different from others (social isolation; Olfson *et al*., 2000).

In addressing the relationship between temperament and coping strategies, as predicted, individuals scoring higher on introversion were significantly more likely to use avoidance as opposed to overcompensation coping strategies. This finding is in line with the diagnosis of SAD (American Psychiatric Association [APA], 2000) as well as previous models of social anxiety (e.g., Clark & Wells, 1995; Rapee & Heimberg, 1997) which indicate that socially anxious individuals tend to avoid social or performance situations and/or use avoidant safety behaviours to cope. Given the interpersonal nature of *Disconnection and Rejection* schemas, it is not surprising that socially anxious individuals try to avoid such situations in order to avoid embarrassment or rejection. In terms of clinical implications, this finding supports therapy that concentrates on individuals' avoidant coping strategies during treatment (e.g., utilising exposure hierarchies and addressing safety behaviours), particularly when they have a more introverted temperament. Contrary to predictions, however, there was no significant difference between the use of avoidant as opposed to overcompensation strategies by individuals scoring higher on neuroticism. Together, these results indicate that an individual's temperament does, in fact, influence the coping strategies people adopt and thus should be considered an important factor during both the assessment and treatment of individuals with social anxiety and SAD.

As noted earlier, limited research has addressed the third research question concerning whether an individual's temperament affects their coping strategies more than the development of EMSs. Young and colleagues have suggested that "temperament probably plays a greater role in determining patients' coping styles than it does in determining their schemas" (Young *et al*., 2003, p. 35). While the results of this study indicate that the relationship between introversion and *Disconnection and Rejection* schemas may have been stronger than the relationship between introversion and avoidant coping strategies, there was not a significant difference in this sample. Contrary to predictions, there was a stronger relationship between overcompensation and EMSs in more introverted individuals, with *Disconnection and Rejection* schemas being more influential. This indicates that, while it may not be helpful treating introverted individuals' overcompensation strategies, it could be helpful to address their avoidant coping strategies, as in traditional CBT, and/or relevant *Disconnection and Rejection* schemas via Schema Therapy or Schema-Focused CBT (SF-CBT).

Contrary to predictions, and to Young *et al*.'s (2003) conjecture, there was a significantly stronger relationship between neuroticism and the *Disconnection and Rejection* schema domain than to neuroticism and avoidant or overcompensation coping strategies. These findings support past literature (e.g., Muris, 2006; Sava, 2009; Thimm, 2010) which similarly found an association between EMSs and high neuroticism. In

fact, unlike introversion, the relationship between neuroticism and *Disconnection and Rejection* EMSs was stronger than the relationship between neuroticism and social anxiety. These findings make sense given that, compared to introversion, neuroticism is associated with the general tendency to experience unpleasant emotions. Furthermore, there is significant overlap between the definition of neuroticism and features of EMSs. This raises the possibility that treating the EMSs of individuals who score higher on neuroticism via Schema Therapy or SF-CBT maybe more beneficial than concentrating therapeutic interventions on coping responses/styles as in traditional CBT.

In addition to the above findings, three models were created based on Young and colleagues' (2003) schema theory. Of particular interest was whether or not there is, in fact, a relationship between coping strategy and *Disconnection and Rejection* schemas. Path analysis indicated that models 2 and 3, in which there was a path either from coping strategy to EMSs or EMSs to coping strategy, were superior to model 1 in which there was no path. That is, this study provides preliminary evidence for Young *et al*.'s (2003) supposition that there is a relationship between coping strategy and EMSs, however no causal influences can be derived given that models 2 and 3 were equivalent due to the identical estimation of covariance matrices and the cross-sectional nature of the study. While further research is needed on the relationship between coping responses/styles and EMSs, the results indicate that there is perhaps a stronger relationship from schemas to coping response than vice versa, suggesting that individuals' EMSs influence the coping strategies they adopt. This is clinically significant, as it suggests that successful schema treatment can also bolster coping skills, an important factor in managing psychopathologies, including SAD.

These findings also need to be considered in light of Lee and Hershberger's (1990) recommendation to retain multiple models if they are not falsified by data or by a theoretical rationale "until each of them is more specifically examined by more refined theories" (p. 332). That is, while Young *et al*. (2003) suggest that temperament plays an important role in determining individuals' coping styles and EMSs, greater theoretical development is necessary regarding the relationship between these variables. Moreover, Lee and Hershberger (1990) suggest that if a researcher generates equivalent models having considered a priori rules, then two conditions that can be used to determine an optimal model are: (i) time precedence, and; (ii) mediating mechanisms. Since this is the first study, to the authors' knowledge, to examine the relationship between these variables using path analysis, whether coping strategies develop as a result of EMSs or vice versa remains to be answered. It is also possible that a bidirectional relationship between coping strategy and EMSs exists, similar to the proposed relationship in Calvete *et al*.'s (2013) longitudinal study assessing the temporal relationships among EMSs and automatic thoughts. Additionally, it is likely that other variables, such as 'toxic' parenting, exist and need to be examined. Future research would benefit from exploring such relationships longitudinally in order to address both the time precedence and mediating roles of these variables.

While the present study should be considered one of the first steps towards testing the underpinnings of Young's Schema Therapy model, several limitations need to be considered. As already noted, the cross-sectional nature of the study means that it

is unclear whether individuals' coping styles develop before or after EMSs or whether coping styles and EMSs develop as a result of social anxiety or vice versa. As a result, causal claims cannot be made and this leaves important questions to be considered by future longitudinal research. Caution is also required before generalising these findings to clinical populations given that the sample consisted exclusively of Australian non-clinical adults. Indeed, this may explain why the results failed to confirm the factor structure of the YRAI and YCI subscales, as it could be expected that coping strategies would be comparatively higher in clinical populations. Future research examining the conceptual underpinnings and psychometric properties of these scales is necessary given the widespread use of these instruments in clinical settings. In addition, given that the vast majority of schema research has been undertaken in Western cultures, future research should not only attempt to replicate but also extend upon the current study by examining these variables within non-Western cultures before generalising the findings. Finally, EMSs are, by definition, partly unconscious (Young *et al*., 2003). Although online questionnaires may have enabled socially anxious individuals to be more open about their experiences, coping styles (i.e. avoidance or overcompensation) may have influenced individuals' responses due to defence mechanisms. Therefore, future studies may benefit from using projective tests or physiological indicators in the assessment of EMSs.

This study was the first to examine the pathways theorised by Young in relation to temperament, coping strategies (i.e. avoidance and overcompensation), EMSs and social anxiety. The results of this study provided some support for Young (1999) and colleagues' (2003) Schema Therapy model, with important limitations to consider. For instance, although temperament appears to be an important factor when considering the relationship between EMSs, coping styles and social anxiety, the belief of Young *et al*. (2003) that temperament is more influential in determining patients' coping styles than their schemas appears problematic given that temperament, particularly neuroticism, appeared to have a stronger relationship with *Disconnection and Rejection* schemas than coping strategies. The findings also suggest that individuals who are more introverted and/or use avoidant coping strategies may improve more quickly undergoing traditional CBT programs where exposure to avoided cognitions, behaviours or situations is emphasised, while more neurotic individuals and/or those who have chronic social anxiety or more complex SAD may benefit from Schema Therapy or SF-CBT.

While future research needs to both replicate and extend upon the purported relationship between these variables within a clinical sample, there are nonetheless clinical implications including the importance of considering individuals' temperament, coping styles and EMSs when assessing and treating social anxiety and SAD.

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