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**The Mediational Effect of Self-Regulatory Capacity on the Relationship Between  
Temperament, Childhood Invalidation and Interpersonal Functioning: Testing a New  
Neuro-Regulatory Model.**

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## **Index**

Abstract	2-3
Introduction	4-12
Method	13-17
Results	18-27
Discussion	27-42
References	43-52
Dissemination Statement	53
Appendix A: Expanded Introduction	54-58
Appendix B: Expanded Method	59-82
Appendix C: Expanded Results	83-89
Appendix D: Expanded Discussion	90-93
Appendix E: Recruitment Poster and Emails	94-99
Appendix F: Research Questionnaire	100-126
Appendix G: Ethical Approval Form	127-128
Appendix H: Instructions to Authors	129-130

# **The Mediation Effect of Self-Regulatory Capacity on the Relationship Between Temperament, Childhood Invalidation and Interpersonal Functioning: Testing a New Neuro-Regulatory Model.**

## **Abstract**

Based on existing theories of personality and socio-emotional functioning (e.g. Clark, 2005; Lynch, Hempel & Clark, in press) a new model is proposed and tested. The model hypothesises that (i) temperament (reward and threat sensitivity) and childhood invalidation predict problems with interpersonal functioning, (ii) this effect is mediated by self-regulatory capacity; where self-regulatory capacity comprises self-control (ranging from emotional over-control to emotional under-control) and flexible control and (iii) self-regulatory capacity itself has a quadratic relationship with interpersonal functioning. A UK community sample (n= 512) completed a self-report survey, measuring each of the aforementioned latent variables. Structural equation modelling (SEM) was used to determine the goodness-of-fit of this and variations of this model. SEM identified that a non-mediation model provided the best fit ( $\chi^2=49.403$ ,  $p < 0.001$ ; CFI=0.98; RMSEA=0.056). Good-fit was obtained for a model including flexible control as a partial mediator ( $\chi^2=269.06$ ,  $p < 0.001$ ; CFI=0.956; RMSEA=0.081) and adequate-fit for a model including over-control as a partial mediator ( $\chi^2= 91.744$ ,  $p < 0.001$ , CFI=0.932; RMSEA= 0.096). Correlation analyses suggested that over-control and under-control correlated positively with interpersonal problems. Results from SEM provided promising initial evidence for the mediating role of self-regulatory capacity, particularly for the flexible control component. Correlation analyses provided support for the non-linear relationship between self-regulatory capacity and interpersonal functioning, whereby extreme over-control or extreme under-control is associated with

interpersonal problems. Findings have implications for identifying mechanisms of change for therapeutic approaches to emotion dysregulation and for understanding the over-controlled population, which has previously been overlooked.

**Key words:** socio-emotional functioning; threat and reward sensitivity; self-regulatory capacity; personality; childhood invalidation

## **Introduction**

### **Background**

To date, several temperamental and neuro-psychological theories currently account for personality and individual differences in interpersonal functioning (e.g. McNaughton & Gray, 2000; Clark, 2005; Porges, 1995). Within these theories and associated empirical studies, temperament, an invalidating childhood environment and capacity to self-regulate emotional and behavioural responses (self-regulatory capacity; SRC) have been reliably shown to influence psychopathology, in particular socio-emotional functioning.

Difficulties with emotion regulation and interpersonal functioning characterise the majority of axis I and II mental health difficulties. Therefore, it is important that clinically useful models are developed to identify causal factors and pathways for such difficulties and to explain how individual differences emerge. This will allow for identification of mechanisms for therapeutic change and for interventions to be better tailored to the individual, both of which will improve treatment effectiveness. However, a number of limitations exist within current theories and their application to clinical practice and this has highlighted the need for a new integrated model of personality and socio-emotional functioning. The key theories which have influenced development of the new model are outlined below.

### **Gray's Reinforcement Sensitivity Theory (RST).**

Gray's (1970) RST, revised by McNaughton and Gray (2000), is a neuro-psychological theory of personality, comprising three systems of emotion, (i) Fight-Flight-Freeze System

(FFFS) sensitive to aversive/threatening stimuli, (ii) Behavioural Activation System (BAS) sensitive to appetitive/rewarding stimuli and (iii) Behavioural Inhibition System (BIS) activated by goal conflict between FFFS and BAS. Individuals vary in sensitivity to each system and each system manifests as a different style of behaviour (Carver & White, 1994). In this way individual differences can arise. For example, individuals more sensitive to rewarding stimuli tend to be higher in BAS and display approach and impulsive behaviours (Gray, 1970).

### **Clark's Temperamental Model.**

Clark (2005) proposed a temperamental three-system approach (akin to RST), aimed to link personality and psychopathology. The theory comprises two motivational constructs of positive affectivity (PA) and negative affectivity (NA), and a third non-affective construct, disinhibition versus constraint (DvC). PA mediates responses to appetitive stimuli and is characterised by reward and sensation seeking; PA is correlated with BAS (Sagarra et al., 2007). NA, correlated with FFFS, mediates responses to aversive/fear-related stimuli resulting in escape and avoidance (Sagarra et al., 2007). The third construct, DvC, is a non-affective construct and proposed to be related to BIS, it plays a 'gate keeper' role in the degree to which incoming stimuli are subjected to inhibitory influence.

### **Block and Block's (1980) ego-control and ego resiliency.**

Both the above theories identified a regulatory component in their theories. The role of this regulatory construct in personality and socio-emotional functioning can be best understood from Block and Block's (1980) investigations which identified two constructs involved in

emotion regulation: ego-control and ego resiliency. Ego control is the tendency to either inhibit or disinhibit emotion and impulse; it ranges from individuals who highly inhibit emotional responses i.e. emotional over-control (OC) to those who highly disinhibit emotional responses i.e. emotional under-control (UC). Ego resiliency is an individual's capacity to respond flexibly and adaptively to environmental stimuli. Combining these two constructs into one regulatory component can account for how individuals characteristically deal with threatening or rewarding stimuli, i.e. whether they over-control, under-control or flexibly control their emotional response.

### **Personality types and socio-emotional functioning.**

Block and Block's (1980) theory of personality suggests that individual differences in characteristic style of emotion regulation result in three personality types: overcontrollers, undercontrollers and resilients. Overcontrollers (characterised by OC) are low in ego resiliency and high in ego-control and therefore over-regulate/control their responses to incoming stimuli. Undercontrollers (characterised by UC) are low in ego resiliency, low in ego-control and under-regulate their responses to incoming stimuli. In these contrasting ways, both overcontrollers and undercontrollers are poor at emotional and behavioural self-regulation. Resilients are high in ego resiliency and have moderate levels of ego control; high ego resiliency means that resilients are able to flexibly self-regulate their level of emotional and behavioural control. These three personality types have become known as ARC types, an acronym coined by Costa et al., (2002) which refers to the names of the lead researchers in the particular field of personality research (Asendorpf et al., 2001; Caspi & Silva, 1995; Robins et al., 1996). ARC types have been reliably replicated in many research studies.

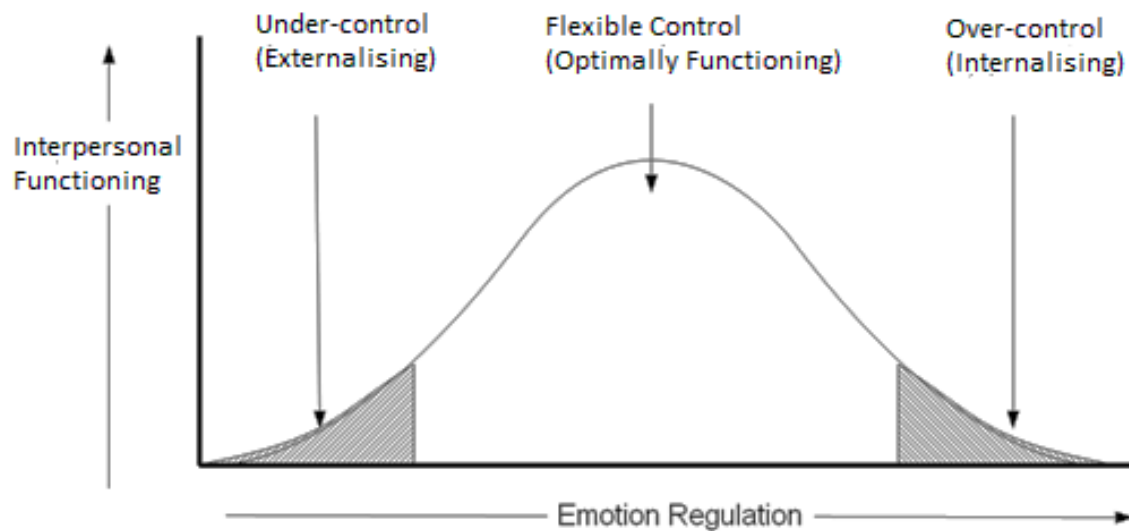
Emotional and behavioural OC results in three core deficits (i) deficits in the expression and experience of emotion, manifesting as heightened distress tolerance by minimising physical/emotional distress and masking inner feelings (ii) deficits in interpersonal functioning manifesting as avoidant/distant style of relating and (iii) deficit in receptivity and openness manifesting as risk aversion and avoidance of criticism. UC results in deficits in the same domains as OC but with different manifestations such as inability to tolerate distress, marked reactivity of mood, instable and intense interpersonal relationships, sensation/reward seeking and impulsivity. Resilients are receptive and open to environmental stimuli which suggest behavioural change is needed for optimal functioning for example resilient will strive for perfection except when it is counterproductive and obey rules except when it is better to break them, such as in an emergency (Lynch et al., in prep). Resilients do not experience deficits in the aforementioned domains.

Individual differences in emotion regulation style predict the quality of interpersonal functioning (Eisenberg & Fabes, 1992 cited in Letzring et al, 2004). Undercontrollers are characterised by externalising interpersonal tendencies such as impulsivity and aggression and prone to externalising disorders such as antisocial and borderline personality disorder (PD) (Caspi, 2000; Eisenberg et al., 2000; Krueger, 1999) and aggression (Hershorn & Rosenbaum, 1991). Overcontrollers are characterised by internalising interpersonal tendencies such as withdrawal and introversion (Asendorpf et al., 2001) and prone to internalising disorders such as depression, social phobia (Caspi, 2000) and Cluster A PD (Thompson- Brenner et al., 2008). These findings suggest that both overcontrollers and undercontrollers experience deficits in emotion regulation (Calkins & Fox, 2002) and are socially impaired (Caspi & Silva, 1995). Resilients, who flexibly control their emotions, are mostly free of psychopathology (Robins et al., 1996) and tend to have better interpersonal



functioning than either overcontrollers or undercontrollers (Claes et al., 2006). This pattern of findings is represented in Figure 1.

Figure 1. Relationship Between Emotion Regulation and Interpersonal Functioning



The aforementioned findings suggest that emotion regulation and interpersonal functioning have a quadratic relationship; such that too little or too much control/regulation results in interpersonal problems. This contrasts with some studies which have found high emotional control is an adaptive personality style (e.g. Metcalfe & Mischel, 1999; Mischel et al., 1988; Tangney et al., 2004).

## **Childhood invalidation.**

Unlike prior models, the new model aims to account for the effect of temperament (nature) and childhood environment (nurture) on interpersonal functioning; where prior models have tended not to include a nurture component. The focus here is on childhood invalidation.

Childhood invalidation has been found to be associated with psychopathologies, such as PD symptoms (Tyrka et al., 2009), depression, difficulties regulating mood and post-traumatic stress (commonly characterised by hyperarousal to threat and avoidance responses; Cloitre et al., 2005) and poor interpersonal functioning (Davis & Petretic-Jackson, 2000).

In addition, individuals with a validating childhood have been rated as having higher ego resiliency (Weinfield, 1999) which suggests an association exists between an individual's childhood environment and their SRC. Both genetic and environmental factors influence variation in virtually all human characteristics (Turkheimer, 2000) and Donnellan and Robins (2010) predict a complex interaction of childhood environment and biologically based temperamental systems may channel an individual into one of the three ARC personality types: overcontrollers, undercontrollers and resilient. The way these two factors might interact to develop personality has not been explored or tested.

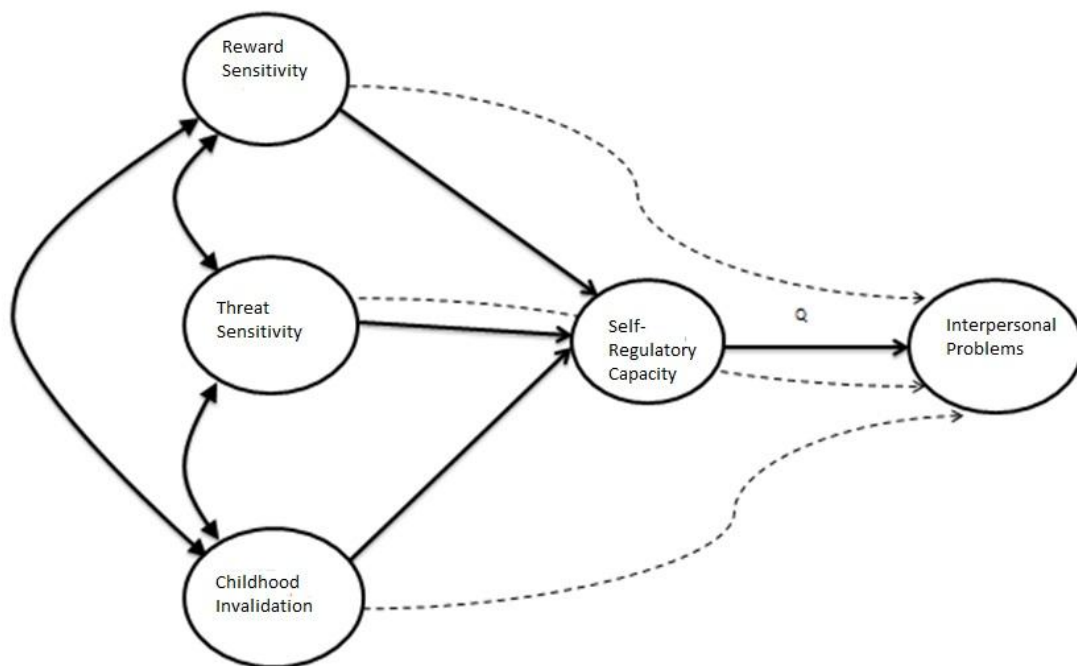
## **The Present Study**

The above theories currently account for personality and socio-emotional functioning, however, a number of key issues highlight the need for a new integrated theory. As the conceptualisation of PD in the Diagnostic and Statistical Manual of Mental Disorders-V moves from categorical to dimensional (American Psychiatric Association, 2012), a new

theory which allows for a dimensional approach to PD (from UC PD to OC PD) will be needed. PD research has tended to focus on Cluster B, UC PD (for example Borderline and Antisocial PD; Clark, 2005), despite strong evidence that Cluster A, OC PD are associated with poor treatment responses (Fournier et al., 2008) e.g. treatment-resistant depression. The new model will allow for better understanding of the OC population and unlike existing theories, link this to clinical practice. Few studies have investigated the combined effects of temperament and childhood invalidation on emotional and interpersonal functioning, despite this being highlighted as a limitation of existing theories (Corr, 2004) and although the ARC personality types have been widely researched, little is known about their developmental origins (Hart et al., 2003). The mediating effect of individual differences in SRC has often been overlooked in such research (Bijttebier et al., 2009). Historically, theories have assumed linear relationships between emotion regulation and interpersonal functioning; this does not account for evidence supporting a quadratic relationship (e.g. Eisenberg et al., 2000). To date, SEM has rarely been used to test causal relationships between the latent variables identified in the field.

The new neuro-regulatory model (Figure 2) aims to integrate and take into account the aforementioned issues and integrate the above theories, which describe similar constructs. The new model proposes that the effects of the latent constructs of reward sensitivity (akin to BAS/PA), threat sensitivity (akin to FFFS/NA) and childhood invalidation on interpersonal problems are mediated by SRC (akin to BIS/DvC). The effect of SRC (comprising self-control (akin to ego-control) and flexible control (akin to ego resiliency)) itself on interpersonal problems is quadratic. The model accounts for individual differences in these constructs, such as suggesting that UC is characterised by high sensitivity to reward and threat and OC by high sensitivity to threat.

Figure 2. The New Neuro-Regulatory Model of Interpersonal and Emotional Functioning



*Note.* Dashed lines indicate direct pathways between exogenous variables and interpersonal problems. Single headed arrows indicate direction of effect. Double headed arrows indicate co variance relationship. ‘Q’ indicates quadratic relationship.

The predicted effects within the new model can also be underpinned by theories relating neuro-regulation to personality and socio-emotional functioning such as Porges’s Polyvagal Theory (1995). The present study relies on self-report measures of constructs, which do not directly test the neuro-regulatory component of the model (this was not within the scope of the study) and therefore does not make specific predictions about neuro-regulation of constructs. The interested reader is referred to Appendix A for a review of polyvagal theory and an explanation of the neuro-regulatory component of the new model. Future studies will include performance and biobehavioural measures which will better capture neuro-regulatory predictions derived from the model.

## Hypotheses

### *Primary hypotheses.*

1. Higher levels of threat sensitivity, reward sensitivity and childhood invalidation predict more interpersonal problems.
2. SRC (self-control and flexible control) mediates the effect of reward sensitivity, threat sensitivity and childhood invalidation on interpersonal problems.

### *Secondary hypotheses (testing the quadratic relationship).*

3. Extreme<sup>1</sup> levels of self-control, either high OC or high UC, result in increased interpersonal problems
4. High levels of flexible control results in decreased interpersonal problems

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<sup>1</sup> Extreme levels of self-control characterise those individuals at the extreme ends of the self-control dimension and who are more likely to exhibit the characteristic behaviours associated with each of the two personality types (over- and under-control).

## Method

### Participants

The UK community sample comprised 512 participants (95 male and 414 female) recruited via social networking sites, Exeter University participant database and other UK university Psychology departments. Participant age ranged from 18 to 73 (mean = 23.5 years, SD =9.4). Although females outweighed males there were no gender differences relating to age ( $t(507) = -0.574$ ),  $p > 0.05$ ), marital status ( $\chi^2 = 4.198$ ,  $df = 5$ ,  $p > 0.05$ ), education ( $\chi^2 = 2.487$ ,  $df = 5$ ,  $p > 0.05$ ), income ( $\chi^2 = 1.779$ ,  $df = 5$ ,  $p > 0.05$ ) or ethnicity ( $\chi^2 = 27.765$ ,  $df = 19$ ,  $p > 0.05$ ).

### Measures

The online questionnaire contained measures which have been previously validated in the literature. All measures can be found in Appendix F. Further details about measures and subscales can be found in Appendix B.

- *Urgency-Premeditation-Perseverance-Sensation seeking* (UPPS; Whiteside & Lynam, 2001). A 46 item self-report measure designed to assess measures of impulsivity: urgency, (lack of) premeditation, (lack of) perseverance and sensation seeking. A Cronbach's alpha score of 0.87 was found for this scale in this study.
- *NEO-Five Factor Inventory* (NEO-FFI; McCrae & Costa, 2004). A 60 item self-report measure of five factors of personality (Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism). A Cronbach's alpha score of 0.91 was found for this scale in this study.

- *The Invalidating Childhood Environment Scale* (ICES; Mountford et al., 2007). A 14 item self-report measure of childhood environment. Items focus on specific maternal and paternal behaviours during the individual's childhood. A Cronbach's alpha score of 0.92 was found for this scale in this study.
  
- *Personal Need for Structure* (PNS; Thompson et al., 1992 cited in Neuberg & Newsom, 1993). A 12 item self-report measure of an individual's desire for structure. A Cronbach's alpha score of 0.87 was found for this scale in this study.
  
- *Ego Undercontrol Scale* (EUC; Block & Block, unpublished cited in Letzring et al., 2004). A 37 item self-report measure of an individual's level of self-control, specifically their under-control. A Cronbach's alpha score of 0.84 was found for this scale in this study.
  
- *Ego Resiliency Scale* (EUR; Block & Kremen, 1996). A 14 item self-report measure of an individual's level of flexible control. A Cronbach's alpha score of 0.77 was found for this scale in this study.
  
- *The Inventory of Interpersonal Problems-25* (IIP-25; Kim & Pilkonis, 1999). A 25 item self-report measure of an individual's interpersonal style, in particular their interpersonal difficulties and commonly considered and regularly used as an index of personality dysfunction and PD. A Cronbach's alpha score of 0.91 was found for this scale in this study.

- *The Relationship Scales Questionnaire* (RSQ; Griffin & Bartholomew, 1994). A 30 item self-report measure of adult attachment styles: secure, dismissive, fearful and preoccupied. A Cronbach's alpha score of 0.74 was found for this scale in this study.

Each latent variable in the model was measured using between two and four indicator variables from the above list. These are summarised in Table 1.

Table 1

Latent variables and their corresponding indicator variables

Latent	Indicator Variable	How indicators relate to latent variables
Reward Sensitivity	UPPS Sensation Seeking NEO-FFI Extraversion	Positive affect (akin to reward sensitivity) has been shown to be correlated with NEO-FFI Extraversion and UPPS-Sensation Seeking (Sharma et al., in press).
Threat Sensitivity	UPPS (Lack of) Urgency NEO-FFI Neuroticism	Negative affect (akin to threat sensitivity) has been shown to be correlated with NEO-FFI Neuroticism and UPPS-Urgency (Sharma et al., in press)
Childhood Invalidation	ICES mother subscale ICES father subscale	Linehan (1993) identified particular parental behaviours result in an invalidating childhood environment. This scale was developed to capture these behaviours and therefore identify the level of invalidation this individual experienced in childhood.
Self-Regulatory Capacity	EUC (to measure undercontrol) UPPS (lack of) Premeditation (to measure undercontrol) PNS (to measure overcontrol) ER (to measure flexible	EUC and ER were developed by Block and Block (1980) to measure ego-undercontrol and ego resiliency respectively and so were selected to indicate undercontrol and flexible control.  UPPS-Lack of premeditation was correlated with a lack of Disinhibition versus Constraint (akin to SRC; Smith et al., 2007) and so was selected to indicate Undercontrol.



control)

A need for structure was identified by Neuberg et al. (1993) as an avoidant strategy, typical of overcontrollers, and so the PNS was selected to indicate overcontrol.

Interpersonal  
Problems

IIP-25

RSQ-Subscales (secure<sup>a</sup>,  
fearful, dismissive and  
preoccupied)

IIP-25 items focus on measuring functioning in social groups and the RSQ focuses on intimate interpersonal relationships. Both of these are often impaired in axis I and II disorders and so in combination they capture the latent construct of interpersonal problems.

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*Note.* UPPS = Urgency, Premeditation, Perseverance, Sensation Seeking; NEO-FFI = NEO Five Factor Inventory; ICES = Invalidating Childhood Environment Scale; EUC = Ego Undercontrol Scale; PNS = Personal Need for Structure; ER = Ego Resiliency Scale; IIP-25 = Inventory of Interpersonal Problems; RSQ = Relationship Scales Questionnaire.

<sup>a</sup>RSQ-Secure was reverse scored so that high scores indicated an insecure style of relating to others.

## Design

The study used a cross-sectional design to examine the mediational role of self-regulatory capacity on the effect of the continuous exogenous variables of reward sensitivity, threat sensitivity and childhood invalidation on the endogenous outcome variable of interpersonal problems.

## Procedure

Participants were given a link to a website containing questionnaire items. Data was collected over a nine month period during 2011. On entering the website and before completion of the measures, participants were provided with information about the study which outlined the purpose of the study, what they would be required to do were they to decide to take part, remuneration and contact details of the research team and ethics committee (Appendix F). Upon consenting to the study participants provided their demographic details. Following completion, participants were presented with debrief information about wider aims of the

study and contact details were they to find themselves distressed as a result of completing the study.

### **Data Analysis.**

The data was analysed using SPSS for Windows Version 19 and AMOS for Windows version 19. Measures which included reverse scoring items were re-coded so that higher values were representative of higher levels of the latent variables. There were 16 instances of missing data which represented less than 0.5% of participants and these were removed from the analysis.

### ***Structural Equation Modelling.***

Kline (2005) recommends a number of assumptions are met prior to model testing, such as the assumption of univariate normality, the assumption of linearity and homoscedasticity, the assumption of multicollinearity and the assumption of relative variances. These were tested and where unmet, corrections were made so that no assumptions were violated (see Appendix B for more details).

Several models were tested using SEM. Three indices of fit are reported for each proposed model. The traditional test of statistical significance for SEM evaluations is the chi-square goodness of fit index (GFI); superior fit is evidenced by lower values of GFI. Attainment of a non-significant GFI indicates that the difference between the estimated and obtained variance-covariance matrices is not significantly different from zero, meaning that the model fits the data well. As chi-square is very sensitive to a large sample size it was decided that GFI would be combined with adjusted fit indices which are less sensitive to sample size. Those selected were the comparative fit index (CFI) and root-mean-square error of

approximation (RMSEA). CFI indicates the degree to which the model is superior to a null model, which specifies no covariance between variables. For these indices, the metric ranges between 0 and 1; higher values indicate better fit. Though this index does not have an associated significance test, values exceeding 0.9 are judged to represent adequate fit of the model to the data (Hu & Bentler, 1995). RMSEA is a measure of the proportion of variance not accounted for by the model, with values of 0.06 or less indicative of a good-fitting model (Hu & Bentler, 1995) and values larger than 0.10 indicative of a poor-fitting model (Browne & Cudeck, 1993).

### *Analysis Strategy*

To test whether high levels of threat sensitivity, reward sensitivity and childhood invalidation predict interpersonal problems a non-mediation model will be set up and the beta weights of these relationships will be examined. To test whether SRC mediates these relationships a series of nested models, containing the variables which make up SRC, will be set up. These will include flexible control, OC, and UC as mediators; overall model fit and indirect effects will be examined. To test whether OC and UC predict more interpersonal problems and flexible control predicts less interpersonal problems, correlations and the beta weights from the relevant nested models will be examined.

## Results

### Descriptive Analyses

Means, standard deviations and correlations among the assessed variables are shown in Table 2.

Table 2

Means, Standard Deviations and Correlations of variables in Structural Equation Models.

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Extraversion	3.95	0.64	.												
2. Sen. Seeking	2.29	0.67	-.34*	.											
3. Neuroticism	3.53	1.06	-.34*	.14*	.										
4. Urgency	2.61	0.64	.14*	.01	-.53*	.									
5. ICES Mother <sup>a</sup>	0.53	0.34	-.24*	.05	.23*	-.23*	.								
6. ICES Father <sup>a</sup>	0.59	0.36	-.23*	.06	.29*	-.25*	.68*	.							
7. ER	2.97	0.40	.56*	-.45*	-.38*	.26*	-.16*	-.24*	.						
8. EUC	2.51	0.35	.17*	-.40*	.14*	-.52*	.17*	.17*	.17*	.					

9.	UPPS Premed.	2.98	0.51	-.22*	.30*	.10*	.28*	.00	.01	-.14*	-.53*	.				
10.	PNS	3.57	0.85	-.32*	.41*	.35*	-.05	.10*	.10*	-.45*	-.40*	.52*	.			
11.	RSQ-Fearful <sup>b</sup>	2.90	1.03	-.32*	.03	.41*	-.31*	.28*	.33*	-.26*	.12*	.13*	.23*	.		
12.	RSQ-Secure <sup>b</sup>	2.98	0.76	-.40*	.15*	.45*	-.26*	.23*	.27*	-.43*	.01	.10*	.24*	.57*	.	
13.	IIP <sup>b</sup>	1.40	0.68	-.41*	.11*	.65*	-.51*	.30*	.31*	-.44*	.14*	.09*	.32*	.50*	.52*	.

*Note.* Extraversion = NEO-FFI Extraversion; Sen. Seeking = UPPS Sensation Seeking; Neuroticism = NEO-FFI Neuroticism; Urgency = UPPS Urgency; ICES = Invalidating Childhood Environment Scale; ER = Ego Resiliency Scale; EUC = Ego Undercontrol Scale; UPPS premed. = UPPS Lack of Premeditation; PNS = personal need for structure; RSQ = Relationship Scales Questionnaire; IIP = Inventory of Interpersonal Problems.

N = 512. Higher scores indicate higher levels of each variable.

<sup>a</sup> Higher scores indicate higher levels of invalidation

<sup>b</sup> Higher scores indicate poorer interpersonal functioning (i.e. an increased fearful and insecure style of relating to others).

\* $p < 0.05$  (two tailed).

Cronbach's alpha values were calculated to examine the internal reliability of indicator variables (values found in Appendix C). All measures were found to have high internal reliability and Cronbach's alpha values ranged from 0.74-0.91.

## Correlation Analyses

Bivariate (pearsons) correlation analyses were carried out on all variables to examine their inter-relationships (Table 2). As can be seen from Table 2 almost all variables are correlated with each other; this could be due to the large sample size. The most notable correlations are outlined below.

Childhood invalidation was positively correlated with interpersonal problems ( $r = 0.31$ ,  $p < 0.001$ ). Extraversion was negatively correlated with interpersonal problems ( $r = -.41$ ,  $p <$

0.001) and sensation seeking was positively correlated with interpersonal problems ( $r = 0.11$ ,  $p < 0.05$ ). Neuroticism was positively correlated ( $r = 0.65$ ,  $p < 0.001$ ) and urgency negatively correlated ( $r = -0.51$ ,  $p < 0.001$ ) with interpersonal problems. Flexible control was negatively correlated with interpersonal problems ( $r = -0.44$ ,  $p < 0.001$ ) whereas UC ( $r = 0.14$ ,  $p < 0.001$ ) and OC ( $r = 0.32$ ,  $p < 0.001$ ) were both positively correlated with interpersonal problems. Childhood invalidation was negatively correlated with Extraversion ( $r = -0.24$ ,  $p < 0.001$ ) and positively correlated with Neuroticism ( $r = 0.29$ ,  $p < 0.001$ ).

Sensation seeking was positively correlated with OC ( $r = 0.41$ ,  $p < 0.001$ ) and UC ( $r = -0.41$ ,  $p < 0.001$ ) and negatively correlated with flexible control ( $r = -0.45$ ,  $p < 0.001$ ). Extraversion was positively ( $r = 0.56$ ,  $p < 0.001$ ) and neuroticism negatively correlated ( $r = -0.45$ ,  $p < 0.001$ ) with flexible control. Childhood invalidation was positively correlated with OC ( $r = 0.10$ ,  $p < 0.05$ ) and UC ( $r = 0.17$ ,  $p < 0.05$ ) and negatively correlated with flexible control ( $r = -0.24$ ,  $p < 0.05$ ).

## **Structural Equation Modelling**

### ***Non-mediation model.***

A model which did not include any measures of SRC was tested to examine the direct effects of temperament (threat and reward sensitivity) and childhood invalidation on interpersonal problems. The model is presented in Figure 3. Confirmatory Factor Analysis (CFA) indicated that all observed variables were adequate indicators of the latent variables (all factor loadings were  $> 0.05$ ) with the exception of RSQ-dismissive and RSQ-preoccupied and so these two subscales were removed from all subsequent analyses. An independence (or null) model, in

which all parameters are set to zero, was tested. The reliable goodness-of-fit test results showed that this model did not fit the data well (GFI=1537.920,  $df=36$ ,  $p < 0.001$ ; CFI=0.001; RMSEA=0.286). The non-SRC model was found to be a better fit of the data, with the exception of GFI, the remaining indices suggested a good fit between the estimated and observed data (GFI=49.403,  $df=19$ ,  $p < 0.001$ ; CFI=0.98; RMSEA=0.056). Although the fit of the model was adequate, the significant chi-square suggested that it could be improved. All estimated parameters were reliable at  $p < 0.05$ . Threat and reward sensitivity and childhood invalidation together explained 88% of the variance in interpersonal problems.

*Total Effects.* The model predicts that for every one SD increase in threat sensitivity there is a 0.83 SD increase in interpersonal problems, while for every one SD increase in reward sensitivity there is a 0.16 SD decrease in interpersonal problems and for every one SD increase in childhood invalidation there is a 0.11 SD increase in interpersonal problems. Therefore, this model suggests that higher levels of threat sensitivity and childhood invalidation and less reward sensitivity directly predict more interpersonal problems, in line with hypothesis 1.

Figure 3. Non-Mediation Model

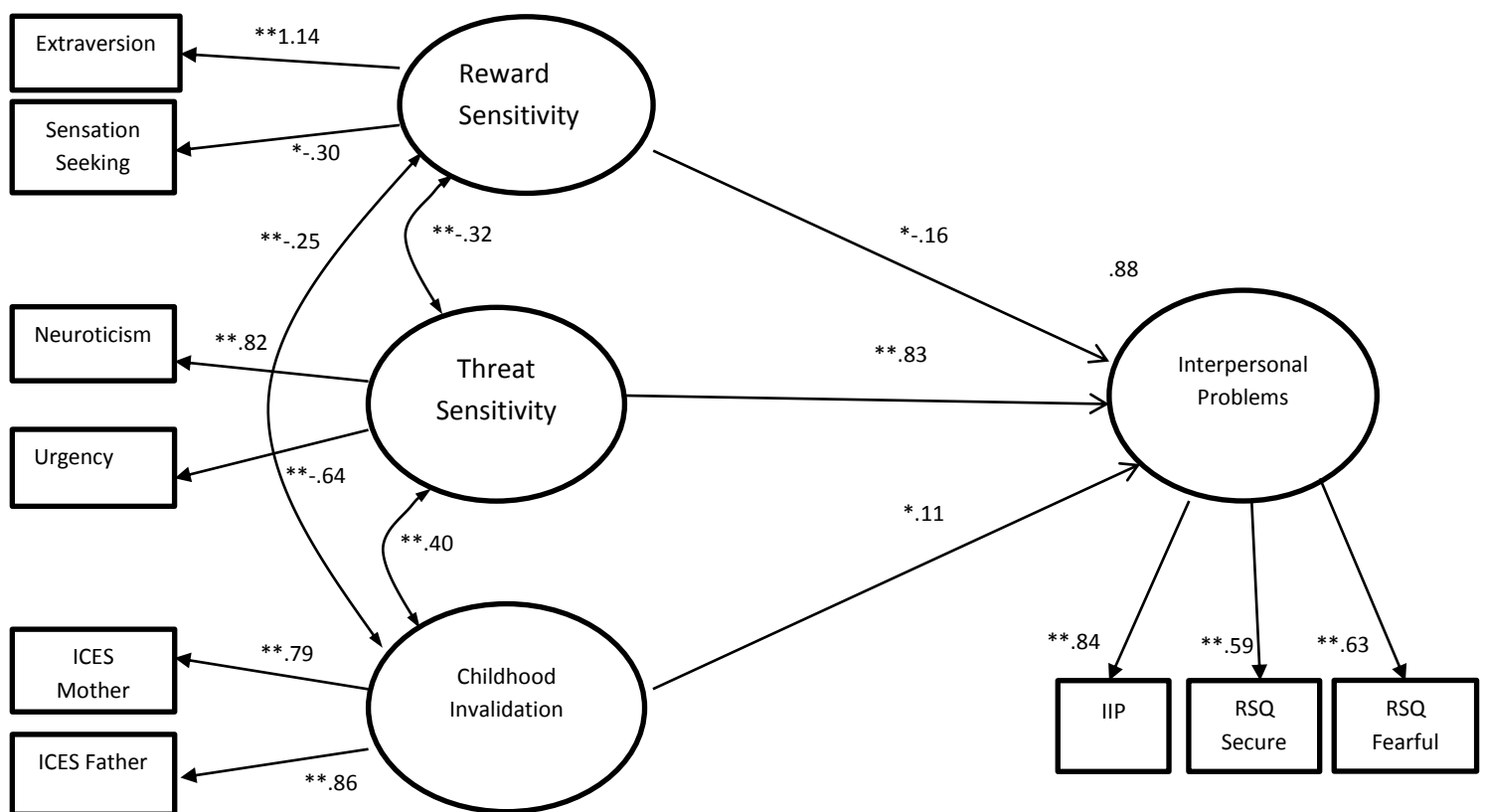


Figure 3. Structural equation solution for the non-mediation model. Note. \* =  $p < 0.005$ , \*\* =  $p < 0.001$ .

### *Test of mediating effects.*

Although a good-fit was found between the observed data and the non-mediation model, the study is interested in the mediating effect of individual differences in SRC and so nested models were run to examine this.

Nested models compare two models where both models contain the same variables but one has parameter constraints, meaning that the relationships are set to 0. For each potential mediator two models were set up (model A and model B) and their goodness-of-fit compared. Model A contained the mediator with a path from mediator to dependant variable (interpersonal problems) but no path from exogenous variables to the mediator, while the other model, model B, contained the mediator with paths from the exogenous variables to the mediator and from the mediator to interpersonal problems. Bootstrapping allowed for investigation of the indirect effects within the mediation models.

Nested models were estimated to investigate the mediational effect of SRC (comprising flexible control, OC and UC), flexible control, OC, UC and any combination these. CFA indicated that all observed variables were adequate indicators of the latent variables (all factor loadings were  $> 0.05$ ). Table 4 summarises the goodness-of-fit indices for the



hypothesised mediation models. All mediation models were a significantly better fit than no mediation at  $p < 0.01$  using the chi-square difference statistic. Adjusted fit indices were examined to determine the overall goodness-of-fit of the different mediators.

Table 3  
Goodness-of-fit indices for the mediation models

Mediator		CFI	RMSEA	Chi Square (DF)	Chi Square difference	Significance of Chi Square difference
SRC	Model A	0.691	0.171	889.458 (56)	127.725	$p < 0.01$
	Model B	0.737	0.162	761.823 (53)		
Flexible control	Model A	0.811	0.158	373.597 (27)	269.065	$p < 0.01$
	Model B	0.956*	0.081*	104.532 (24)		
OC and UC	Model A	0.707	0.172	729.068 (45)	402.863	$p < 0.01$
	Model B	0.880	0.119	319.205 (39)		
OC	Model A	0.883	0.119	222.902 (27)	91.744	$p < 0.01$
	Model B	0.932*	0.096*	138.158 (24)		
UC	Model A	0.812	0.146	416.398 (35)	144.541	$p < 0.01$
	Model B	0.881	0.121	271.857 (32)		

*Note.* Model A = no mediation. Model B = mediation  
SCR = Self-Regulatory Capacity; ER = Ego Resiliency; OC = Over-Control; UC = Under-Control  
Significant fit index is indicated by \*.

### *Self-regulatory capacity.*

Linear modelling of SRC as a mediator resulted in poor fit, which was consistent with hypothesis 3, that SRC does not have a linear relationship with interpersonal problems and suggests that it is necessary to test quadratic relationships in self-control. Despite a poor fit, reward sensitivity, threat sensitivity, childhood invalidation and SRC together explained 91% of the variance in interpersonal problems (Appendix C). The quadratic relationship was

examined by deconstructing SRC into its component parts of flexible control, UC and OC and testing whether any or a combination of these as a mediator provided a good fit for the observed data.

*Flexible control (measured by ego resiliency).*

Adjusted fit indices indicated that flexible control was a good mediator of the effect of threat and reward sensitivity and childhood invalidation on interpersonal problems. All estimated parameters were reliable, with four exceptions as can be seen in Figure 4. The non-significant pathways were the effects of childhood invalidation and threat sensitivity on flexible control and of childhood invalidation and flexible control on interpersonal problems. Threat and reward sensitivity and childhood invalidation explained 71% of the variance in flexible control. Reward sensitivity, threat sensitivity, childhood invalidation and flexible control together explain 92% of the variance in interpersonal problems.

*Total Effects.* One SD increase in flexible control leads to 0.18 SD decrease in interpersonal problems although this was not significant. A SD increase in reward sensitivity leads to 0.09 increase in interpersonal problems whereas one SD increase in threat sensitivity leads to a 0.83 SD decrease in interpersonal problems and one SD increase in childhood invalidation leads to a 0.12 SD increase in interpersonal problems.

*Indirect Effects.* One SD increase in reward sensitivity lead to a 0.126 SD decrease in interpersonal problems in addition to any direct (unmediated) effect. A SD increase in threat sensitivity lead to a 0.018 decrease in interpersonal problems and a SD increase in childhood invalidation lead to a 0.010 increase in interpersonal problems. The percentile bootstrap method for indirect effects indicated that all indirect effects were non-significant at  $p > 0.05$ .

Figure 4. Flexible Control Model

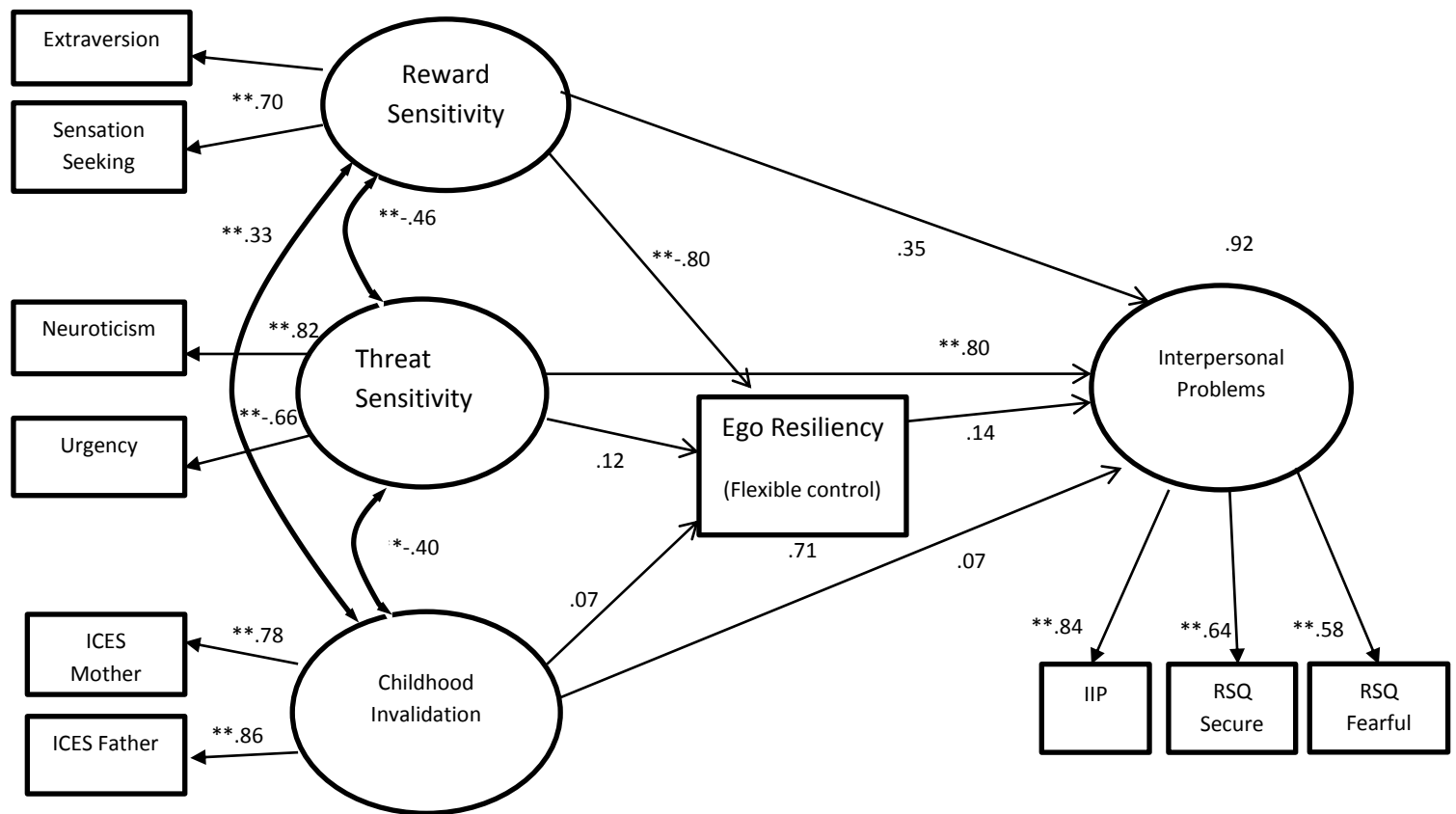


Figure 4. Structural equation solution for the flexible control mediation model. Note. \* =  $p < 0.05$ , \*\* =  $p < 0.001$ .

#### *Examination of indirect effects for flexible control mediation.*

Flexible control as a mediator provided the best fit of the data from all the mediation models tested; therefore this model was explored further. Parameters were constrained within nested models to determine which pathway(s) (between the exogenous variables and interpersonal problems) were significantly mediated by flexible control. Table 4 summarises the goodness-of-fit indices for each of the nested models.

Table 4

Flexible Control mediation of pathways between exogenous variables and interpersonal problems

Exogenous variable mediated by flexible control	CFI	RMSEA	GFI (df)	<i>P</i> value
Reward Sensitivity	0.955*	0.079*	108.059 (26)	0.001
Threat Sensitivity	0.884	0.126	237.955 (26)	0.001
Childhood Invalidation	0.831	0.153	335.877 (26)	0.001

*Note.* Significant fit index is indicated by \*.

A good fit was found when flexible control mediated the relationship between reward sensitivity and interpersonal problems. The regression weight of reward sensitivity on interpersonal problems was  $\beta=0.29$  with no mediation and  $\beta=0.62$  with mediation, which suggests that reward sensitivity may indirectly predict interpersonal problems when mediated by flexible control. A poorer fit was found when flexible control mediated the relationship between threat sensitivity and interpersonal problems and childhood invalidation and interpersonal problems. Regression weights remained relatively constant with or without mediation for these two pathways (Appendix C).

*Over-control (measured by PNS).*

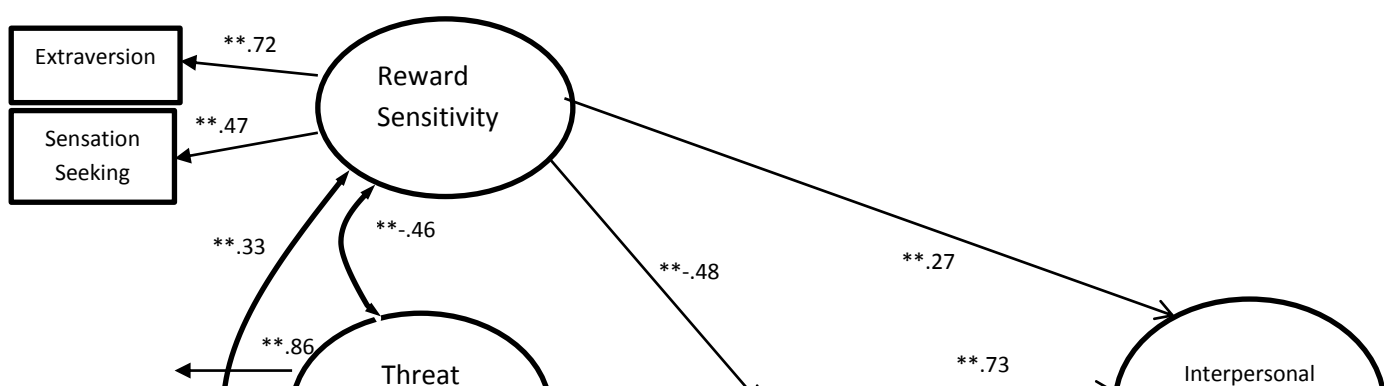
OC was an adequate mediator of reward sensitivity, threat sensitivity and childhood invalidation on interpersonal problems. All parameters were reliable with two exceptions as

can be seen in Figure 5. The non-significant pathways were OC and childhood invalidation on problems with interpersonal functioning. Threat and reward sensitivity and childhood invalidation explain 30% of the variance in OC. Threat and reward sensitivity, childhood invalidation and OC together explain 88% of variance in interpersonal problems.

*Total Effects.* One SD increase in OC leads to 0.02 SD decrease in interpersonal problems, one SD increase in reward sensitivity leads to 0.45 increase in interpersonal problems, one SD increase in threat sensitivity leads to a 1.07 SD decrease in interpersonal problems and one SD increase in childhood invalidation leads to a 0.21 SD increase in interpersonal problems.

*Indirect Effects.* One SD increase in reward sensitivity lead to a 0.013 SD increase in interpersonal problems in addition to any direct (unmediated) effect. A SD increase in threat sensitivity lead to 0.005 decrease in interpersonal problems and a SD increase in childhood invalidation lead to a 0.003 increase in interpersonal problems. The percentile bootstrap method for indirect effects indicated that all indirect effects were non-significant at  $p > 0.05$ .

Figure 5. Over-Control Model





*Figure 5.* Structural equation solution for the OC mediation model. *Note* \* =  $p < 0.05$ , \*\* =  $p < 0.001$ .

Other mediation models did not provide adequate fit. Figures for the other models can be found in Appendix C.

## Discussion

### Personality prototypes

For the most part, results supported prior research regarding the three personality prototypes: overcontrolled, undercontrolled, resilient/flexibly controlled. Overcontrollers were low in flexible control with a tendency towards premeditation. Undercontrollers demonstrated low urgency, premeditation and reduced need for structure. Both overcontrollers and undercontrollers were high on neuroticism indicating high sensitivity to threat, low on extraversion indicating low sensitivity to reward and more likely to have had invalidating childhoods. Both OC and UC presented as having interpersonal problems with a fearful and insecure style of relating. In contrast resilients were high on extraversion, low on sensation seeking and neuroticism and had less of a need for structure; resilients tended to experience less childhood invalidation, less interpersonal problems and did not have fearful or insecure styles of relating to others.

Not all results were consistent with prior thinking, such as reward sensitivity (indicated by extraversion and sensation seeking) which was expected, but not shown here to be, high in undercontrollers. Although sensation seeking correlated negatively with flexible control, extraversion was positively associated with flexible control. It is possible that extraversion is not a good measure of threat sensitivity or that introversion and extraversion do not define or distinguish OC and UC. Extraversion could be a positive trait that allows an individual to relate well to others whereas neuroticism (high for both OC and UC) is a negative trait associated with poor interpersonal functioning; results suggest that although present in both personality types, neuroticism is higher in OC.

### **Non-mediation model**

Results from SEM supported hypothesis 1, that temperament (reward and threat sensitivity) and childhood invalidation predict interpersonal problems. Threat sensitivity was the strongest predictor of interpersonal problems; supporting hypothesis 5, that individuals with high sensitivity to threat experience more interpersonal problems. Individuals who experienced higher levels of childhood invalidation also experienced more interpersonal problems though this was not as strong a predictor as threat sensitivity. The model also suggests that individuals with low reward sensitivity experience more interpersonal problems; this was inconsistent with hypothesis 2, although again was not a strong predictor. Covariance estimates indicated that individuals who experienced higher levels of childhood invalidation tended to have lower sensitivity to reward and higher sensitivity to threat. These associations are supported by correlation analyses.

Factor loadings were all significant at  $p < 0.001$  with one exception; therefore latent variables accounted for a significant amount of the variance in the measures, suggesting measures were all good indicators. UPPS Sensation Seeking, although significant at  $p < 0.05$ , only loaded on reward sensitivity as  $-0.30$ , this may mean that it was not a good indicator of the construct, which could limit accurate estimation of the measurement, and therefore structural model, particularly for this pathway. Moreover, examination of the relationship between reward sensitivity and interpersonal problems through correlation analysis indicated an inconsistency between indicator variables for reward sensitivity. UPPS-SS was found to have a positive association with interpersonal problems, whereas NEO-E was found to have a negative association. This conflicting result could explain the small beta coefficient for the overall relationship, the two measures may have been measuring slightly different constructs which have opposite effects on interpersonal functioning, rather than both measuring reward sensitivity. This possibility is consistent with the negative factor loading of UPPS-SS on



reward sensitivity and the positive factor loading of NEO-E on reward sensitivity and may explain why heightened reward sensitivity was not found for UC. However, their polarity did not differ on other hypothesised models. This highlights the need for careful selection of measures.

The results are consistent with research demonstrating that individuals with high threat sensitivity are prone to interpersonal problems. In particular, the results suggest that individuals with high sensitivity to threat have fearful and insecure interpersonal relationships. Individuals with high threat sensitivity are more sensitive to aversive stimuli and respond with avoidance/escape behaviours. In interpersonal situations, these individuals are more likely to appraise situations as threatening/aversive and tend to withdraw from or avoid interpersonal situations, resulting in more interpersonal problems (Sagarra et al., 2007) with a fearful and insecure style of relating; this avoidance does not allow individuals the opportunity to disconfirm threat and reinforces the tendency to appraise situations as threatening. Items from the measures of problems with interpersonal functioning such as RSQ-Fearful and IIP-25 tended to tap into internalising, rather than externalising problems, which could explain why the relationship between reward sensitivity and interpersonal problems is not strong.

Individuals who experienced high childhood invalidation were more likely to experience interpersonal problems; this was found for both OC and UC. OC were slightly more fearful and insecure in their relationships than UC. Children develop their internal working model, i.e. what they conclude about the world, from their interactions with caregivers (Bowlby, 1969). Invalidating caregivers are likely to result in a child concluding that the world is not a safe place, preventing the individual from learning how to accurately risk assess the world.

As adults, these individuals are likely to have either become more sensitive to risk and so restrict their emotional response and withdraw to keep themselves safe, with a tendency towards internalising disorders (OC), or have stopped risk assessing after living in an unpredictable or chaotic environment where risk assessment is impossible; these individuals are likely to be impulsive, under-regulate their emotional response and have a tendency towards externalising disorders (UC) (Dozier et al., 1999).

Attachment research is useful for informing hypotheses about which childhood environments lead to the development of particular personalities. Consistent with findings from Cooper et al. (1998) the present study found that secure individuals were more likely to fall into the resilient category than OC or UC and overcontrollers were more likely to have a fearful/avoidant style of relating. Cooper et al. (1998) found that undercontrollers were more likely to be anxious-ambivalent in their attachment style; however this style was not measured in the present study. Donnellan and Robins (2010) suggest a complex interaction exists between an individual's temperament and their childhood environment which may channel them into one of the three personality prototypes. It is likely an UC individual experienced a family environment which reinforced impulsive, risky behaviours coupled with dramatic displays of emotions; in contrast UC family environment would reinforce risk avoidance, following rules, appearing in control etc. These particular family environments interact with an individual's temperament (which might be genetically similar to the same caregivers who reinforce particular styles of self-control) preventing the individual from learning flexible responding.

It was not possible to draw specific conclusions about this from the present study as only a covariance relationship was predicted and the childhood invalidation measure did not

distinguish between types of invalidation; this would be an interesting development to the study, particularly as different types of childhood maltreatment have been identified as predisposing OC and UC (Kim et al., 2009) and results from the present study indicate that attachment style is a good indicator of interpersonal functioning as RSQ scales were positively correlated with IIP-25.

### **Mediation Models**

SEM generally models linear relationships therefore the hypothesised quadratic relationship was instead examined through linear modelling of SRC in its component parts (flexible control, OC and UC). This provided interesting preliminary findings. Two mediation models were deemed to be adequate fit of the data; flexible control and OC. Flexible control provided the best fit of all mediators tested.

#### **Flexible control.**

The flexible control model provided some initial support for the hypothesis that flexible control mediates the relationship between temperament and childhood invalidation with interpersonal problems.

The model investigating a mediation effect of flexible control on the relationship between reward sensitivity and interpersonal problems provided a good fit, suggesting that the relationship between an individual's sensitivity to reward and their interpersonal functioning may be partially explained by their capacity to flexibly control their responses to rewarding stimuli. Examination of regression weights indicated that flexible control was a partial, rather

than full mediator, as regression weights for the direct effects did not become zero (Appendix C). However, the pathway between flexible control and interpersonal problems and the indirect effect of reward sensitivity on interpersonal problems via flexible control were both non-significant which does not statistically support mediation. It was further hypothesised that flexible control would mediate the effect of threat sensitivity and childhood invalidation on interpersonal problems but exploration of individual parameters did not support this.

Nevertheless, correlation analysis identified that increased flexible control was associated with decreased interpersonal problems; although it is not possible to infer causality, this is consistent with hypothesis 4. In addition, although not significant in the structural model, correlations indicated that increased childhood invalidation, reward sensitivity and threat sensitivity were associated with less flexible control. Correlation findings are consistent with literature suggesting that individuals high in flexible control (resilients) tend to have better interpersonal functioning, i.e. fewer interpersonal problems (Muris et al., 2008). Individuals high in flexible control have also been found to have higher vagal tone (Porges, 1995; Thayer et al., 1996) allowing for more flexibility in their physiological, expressive and emotional behaviours.

### **Self-control (UC and OC).**

UC as a mediator did not provide an adequate fit with the observed data; this is particularly interesting given the predominance of attention in the literature to UC compared with OC, perhaps because the characteristic behaviours associated with UC tend to draw more attention than those associated with OC.

The OC-mediation model provided adequate fit. Findings indicated that the effect of both an individual's temperament and childhood invalidation on their interpersonal functioning could be partially mediated by their need for order and structure (measured by the PNS), which is a salient feature of OC. However, the pathway between OC and interpersonal problems and all indirect effects were not significant and so statistical support for mediation is limited.

Correlations demonstrated that increased OC and UC were associated with more interpersonal problems. Although causality cannot be inferred, this supports hypothesis 3, that too much or too little self-control is associated with maladaptive interpersonal functioning. Although these findings are consistent with a quadratic relationship between SRC and interpersonal problems, it is not possible to identify whether this is due to a quadratic relationship or whether OC and UC make separate contributions to interpersonal functioning.

## **Mediation**

As discussed, for both the overcontrol and flexible control models indirect effects and the pathways from the mediator to interpersonal problems were not significant, limiting the support for mediation. As SEM is a two-step process this could be due to the measurement or the structural model. Flexible control and OC were only measured by one indicator and were therefore not latent variables; including other indicators that load highly on flexible control and OC, to render them latent variables, thereby decreasing error proneness, may strengthen the measurement model.

## General Discussion

Overall, SEM demonstrated that a non-SRC model provided the best estimation of the observed data, although as this model was not nested with the mediation models, a direct comparison cannot be made. The flexible control model accounted for the most variation in interpersonal problems and provided the best fit of all mediation models. Although indirect effects were not significant one SD increase in reward sensitivity lead to a 0.126 SD decrease in interpersonal problems, in addition to an unmediated effect. The observed data suggested that threat sensitivity was better modelled as having a direct effect on interpersonal problems rather than through a mediation pathway; suggesting that higher sensitivity to threat predicts more interpersonal problems.

Total effects of threat sensitivity on interpersonal problems were higher than those for reward sensitivity across all models, suggesting that although reward sensitivity is important in relationships, threat sensitivity has a greater influence. This is consistent with the developed thinking of the research team that good interpersonal functioning demands flexible control *and* openness/receptivity (Lynch et al., in prep). OC individuals, who are highly threat sensitive, are regularly in a defensive (fight/flight) state and so their facial expressions tend to be frozen or defensive and avoidant; this, coupled with a family environment that encourages masking inner feelings, results in OC individuals being perceived as lacking in openness, which results in impaired social connectedness and therefore impaired interpersonal functioning. This is supported by studies which have demonstrated that suppressing emotional expression is associated with impaired social closeness (e.g. Strivastava et al., 2009).

Correlations supported the association of the three ARC personality types (OC, UC and resilient) with differing levels of interpersonal problems; whereby resilient (high flexible control) experienced less interpersonal problems and both OC (high self-control) and UC (low self-control) were associated with more interpersonal problems. When modelled, these pathways were not found to be significant and so causality cannot be inferred at present.

Correlation results are consistent with the suggestion that it is possible to have too much self-control, i.e. either OC or UC are associated with interpersonal problems, yes impossible to have too much self-regulation (flexible control). Non-significant indirect effects and pathways between mediators and interpersonal problems as tested here, using these measures, limits statistical support for mediation. The good-fit of flexible control, adequate fit of OC and high percentage of variance in interpersonal problems accounted for suggests that the components contribute significantly to interpersonal problems but their relationships to each other need further examination. The limitations explored below provide useful feedback for strengthening measurement and structural design for further model testing.

### **Theoretical implications**

The study provides support for theories which suggest that too much self-control is maladaptive (e.g. Eisenberg et al., 2000). The study suggests that too little (UC) or too much (OC) self-control is associated with interpersonal problems, while flexible self-control is associated with less interpersonal problems and therefore the relationship between SRC and interpersonal functioning is better understood as quadratic. This contrasts with and challenges previous theories that have suggested a linear relationship.

Findings provide support for the dimensional conceptualisation of personality whereby individuals fall on a spectrum of self-control from lesser to greater resemblance of each personality type (OC, UC, flexible control). This conceptualisation is supported by the normal distribution of indicator variables and correlation relationships. This informs clinicians which type of treatment approach may be most effective and allows for the possibility that personality traits support more fine-grained treatment adjustments. Findings highlight the need for theories of individual differences and psychopathology to consider possible mediating factors so that specific pathways and influences are fully understood allowing for better formulation and treatment planning.

The study supports inclusion of biologically based temperamental systems and childhood environment in theories of interpersonal functioning and emotion regulation. Modelling suggested a covariance relationship exists between childhood invalidation and temperament and further research is needed to understand their complex interaction.

### **Clinical implications**

The association between high-self-control and interpersonal problems has implications for clinical practice. Individuals classed as ‘treatment-resistant’ or as having ‘treatment-resistant depression’ have been shown to fall into the OC personality type (Fournier et al., 2008). Improved understanding of why and how OC individuals experience interpersonal problems and identification of protective factors (such as flexible control) will allow therapeutic approaches to be better tailored to the population. At present, therapies such as Dialectical



Behaviour Therapy (DBT; Linehan, 1993) teach emotion regulation skills; there is a clear gap for a skills-based therapy for emotional over-control. Development of therapeutic approaches which target the specific mechanisms of OC, for example learning to tolerate the distress associated with a need for structure or a need to avoid threat and relaxing facial expression to increase openness/receptivity (Lynch et al., in prep), could potentially render a treatment-resistant population, treatable. Moreover, there are implications for ensuring that undercontrollers are not taught to restrict or over-control their emotions, as this too is maladaptive.

Findings suggest that flexible control may act as a protective factor for interpersonal problems, particularly for those high in reward sensitivity; this could offer another suggestion for therapy. Individuals who flexibly inhibit or disinhibit their emotional response (depending on which would be most adaptive for that situation), experience less interpersonal problems; suggesting emotional flexibility rather than self-control is the key to successful interpersonal functioning. Treatment approaches such as Acceptance and Commitment Therapy (Hayes et al., 2006) and DBT for emotionally overcontrolled individuals (Lynch et al., in prep) involve teaching emotional flexibility as a mechanism for change.

### **Limitations of the present study**

The methodology adopted in this study raises some potential limitations. SEM relies on observed variables and reliability of modelling is improved when more observed variables are used for each latent variable. Flexible control and OC were each only measured with one indicator; this may have limited model fit and could provide an explanation for the non-significant effects of flexible control and OC on interpersonal problems. In addition, OC was only measured and defined by personal need for structure (which is just one facet of OC), it wasn't possible to include other indicators as aside from the PNS, current measures of self-control do not assess the problems associated with OC, just UC.

Additionally, this study only used self-report measures as indicators, which in turn may have limited measurement of variables. Self-report measures presuppose that individuals are accurate reporters of their own functioning and personality and can be subject to response biases such as socially desirable responding (Huang et al., 1998). The latter is particularly important as recruitment included the social networking site 'Facebook'; therefore some participants may have known the researcher personally. Despite every effort to maintain and assure participants of confidentiality, this may have biased participants' responses. Further bias may have been added from the decision to remove participants who failed to complete entire measures. This was particularly pertinent for the ICES as some participants did not answer for both parents, most commonly the father scale. Their removal resulted in only participants who were brought up with two parents being included in the study. This could have significant implications given that fathers have been shown to have a unique role in child socio-emotional development (Allen & Daly, 2007).

Other limitations include a reliance on correlation analyses where SEM did not find significant pathways. Although it was possible to draw conclusions about inter-relations of

variables from these, it was not possible to infer causality. Moreover, due to a large sample size the majority of correlations were significant despite many  $r$  values indicating that the associations were actually small in strength.

The appropriateness of NEO-FFI to measure threat and reward sensitivity was queried. The constructs may not be measured well via self-report due to their neuro-regulatory nature; a psychophysiological measure might be a better indicator to test their predicted effects. In addition, the measurement of threat sensitivity was limited by 'UPPS-Urgency' as it seemed to tap into impulsivity rather than sensitivity to threatening stimuli in the environment.

The hypothesised model aims to explain individual differences in psychopathology; however, as recruitment was from a community sample and clinical background was not assessed, it is not possible to determine how many participants met clinical threshold for psychopathologies. Although interestingly mean IIP-25 score was 1.4 ( $SD=0.68$ ) where 1.6 indicates clinical threshold (Kim & Pilkonis, 1999). All SRC variables were normally distributed, suggesting that there *were* participants who were more over- and under-controlled than the average; nevertheless, convenience samples tend to under-represent OC and UC (Donnellan & Robins, 2010). This may limit hypothesised effects and reduce model fit. The community sample may explain why the effect of childhood invalidation on interpersonal problems was smaller than temperamental affectivity. Rather than concluding that childhood environment has little or no effect on socio-emotional functioning, it is possible that few participants experienced invalidating childhoods. This possibility is supported by the non-normal distribution and small SDs of both childhood invalidation scales. Combining clinical data with community data may provide a more representative distribution of childhood

invalidation and psychopathologies, allowing for better modelling of these constructs and greater external validity and generalisability.

## **Future research**

Testing hypothesised models with clinical and non-clinical data would allow for a better representation of the three personality types (overcontrollers, undercontrollers and resilient) and increase external validity. Moreover, it would allow for more theoretical and clinical implications to be drawn. To further increase the reliability of the data, self-report measures could be combined with psychophysiological and biobehavioural measures for each latent variable.

Quadratic SEM analyses would allow for the mediational role of SRC and its quadratic relationship with interpersonal problems to be modelled and tested more parsimoniously. Furthermore, the measurement of SRC itself would be improved by developing an indicator that measures OC and UC on the same dimension and incorporating this as an additional indicator of SRC.

## **Conclusion**

A new model of personality and socio-emotional functioning was presented and tested, which integrated existing models and addressed limitations in the literature. Results suggest that an individuals' emotional and behavioural response tendency is important for interpersonal functioning. The study demonstrates that a tendency towards either extreme over-control or under-control results in interpersonal problems, and the ability to flexibly control results in better interpersonal functioning. Little statistical support was found for the mediating role of self-regulatory capacity on the effect of temperament and family environment on interpersonal functioning. The findings have theoretical and clinical implications for the field of personality and interpersonal problems and particularly for understanding and treating over-control. The study provides useful information regarding the new model and encourages further model testing to improve validity and reliability and further understand relations between variables.

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## **Research Dissemination**



Results from the present study have been presented at an international think tank on emotional over-control and anorexia in France. An abstract has been accepted for the British Association for Behavioural and Cognitive Psychotherapies 2012 Conference in Leeds and an abstract has been submitted for the Association of Behavioural and Cognitive Therapies 2012 Conference in National Harbor, MD, USA. Both abstracts are based on results from the present study. The manuscript will be prepared and submitted for publication.

## **Appendix A: Expanded Introduction**

Although not tested in the present study, the model constructs can be examined through neuro-regulation. The material relevant to this aspect of the model is presented here.

### **Porges's Polyvagal Theory**

Porges's Polyvagal theory (1995; 2001, 2007) is the primary physiology theory which proposes to account for the neuro-regulation of emotional and interpersonal functioning. The theory proposes that neuroception (risk assessment of the environment to determine whether it is safe, dangerous or life threatening) elicits particular physiological states; each state supports different types of behaviour. An environment perceived as safe results in increased activation of the myelinated vagus nerve by the ventral vagal complex of the parasympathetic nervous system (PNS-VVC), which inhibits the sympathetic nervous system (SNS) resulting in calm states and allows for social communication and engagement; this has been termed the social engagement system (SES; Porges, 2001). An environment perceived as unsafe results in activation of one of the defensive systems: mobilisation system or immobilisation system. Dangerous environments activate SNS and result in fight or flight behaviours i.e. mobilisation and life-threatening environments activate the unmyelinated vagus of the dorsovagal complex of the PNS (PNS-DVC) and result in freeze behaviours such as feigning death e.g. immobilisation. Both the mobilisation and immobilisation systems are incompatible with the SES; for the SES to work the defensive systems must be inhibited (this is akin to the role of BIS/DvC, which inhibit approach/avoidance behaviours and increase regulatory behaviours).

The PNS-VVC acts like a ‘vagal break’ by which rapid inhibition or disinhibition of vagal tone/activity to the heart (and therefore SNS activity) can rapidly calm or mobilise an individual respectively, depending on which behaviour is most environmentally adaptive. This may account for flexible control, as individuals who have difficulty regulating their vagal break have difficulty in responding appropriately to their environment; in fact deficits in vagal break regulation may be causal in problems with social engagement (Porges et al., 1995) and low impact of the myelinated vagus on the heart is associated with social and emotional regulation difficulties and psychiatric disorders (Porges et al., 2007).

Vagal withdrawal (reduced vagal/PNS-VVC activity and therefore increased SNS activity), activates the mobilisation system and has been linked to depression (Carney et al., 1995), anxiety (Thayer et al., 1996) and aggression (Mezzacappa et al., 1997) suggesting that a lack of vagal tone/activity characterises both internalising and externalising disorders.

### **Neuro-regulatory components of the new model**

The new neuro-regulatory model (Lynch, Hempel and Clark, in press), informed by Porges’s Polyvagal Theory (1995) posits that the Autonomic Nervous System (ANS) comprising the SNS and PNS has a significant role in the neuro-regulation of personality and socio-emotional functioning.

The model suggests that there are five neuroceptive tendencies (perception of the environment), which are safe, novel, threatening, rewarding, overwhelmingly rewarding/threatening. How the environment is perceived determines the degree to which the

ANS is activated and the corresponding behaviours. For example when an individual perceives the environment as safe, the PNS-VVC is activated and as described by Porges (2001) this innervates cranial nerves which control muscles of the face, neck, middle ear and vocal cords allowing the individual to be socially engaged and communicate effectively with others.

When there is threat or reward in the environment the PNS-VVC withdraws and the SNS is activated; this facilitates fight/flight and approach behaviours respectively (Beauchaine, 2001; McNaughton & Gray, 2000; Porges, 2001). If threat or reward is perceived by an individual as overwhelming and inescapable, the SNS withdraws and the dorsal vagal complex of the PNS (PNS-DVC) is activated. The PNS-DVC facilitates behaviours that conserve metabolic resources when SNS response tendencies (fight/flight/approach) are ineffective, such as immobilisation, numbing, lowered pain threshold and fainting (Porges, 1995). The new model proposes that actual behavioural responses depend on the degree to which a person yields to or inhibits these ANS-mediated responses. This suggests that a person's characteristic style of self-control (over-control, under-control or flexible control i.e. their SRC) may mediate neuroceptive and response tendencies. In addition, the model suggests that both an individual's SRC (as the study predicted) and their neuroceptive tendencies are influenced by an interaction between their temperament and childhood family environment.

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## **Appendix B: Expanded Method**

<b>Index</b>	<b>Page</b>
B1. Participants	61-64
B1.1. Inclusion criteria	61
B1.2 Recruitment Strategy	61-62
B1.3. Socio-demographics	62-64
B1.3.1. Marital status	62
B1.3.2. Level of education	63
B1.3.3. Ethnicity	63
B1.3.4. Income (socioeconomic status)	64
B2 Measures	64-68
B2.1. Demographic Questionnaire	64
B2.2. Urgency-Premeditation-Perseverance-Sensation seeking Behaviour Scale	64-65
B2.3. NEO-Five Factor Inventory	65
B2.4. The Invalidating Childhood Environment Scale	66
B2.5. Personal Need for Structure questionnaire	66
B2.6. Ego Undercontrol Scale	66-67
B2.7. Ego Resiliency Scale	67
B2.8. The Inventory of Interpersonal Problems	67
B2.9. The Relationship Scales Questionnaire	68
B3 Procedure	71-73
B3.1. Data Collection Procedure	71-72
B3.2. Remuneration procedure:	72-73
B4 Data analysis	73-81

B4.1. Data Screening	73-75
B4.1.1. Generating observed variable scores	73
B4.1.2. Testing the assumptions of SEM	74-75
B4.2. Histograms	76-81
B4.2.1. UPPS Sensation Seeking	76
B4.2.2. NEO-FFI Extraversion	76
B4.2.3. UPPS Urgency	76
B4.2.4. NEO-FFI Neuroticism	77
B4.2.5. ICES mother (untransformed)	77
B4.2.6. ICES father (untransformed)	77
B4.2.7. EUR	78
B4.2.8. EUC	78
B4.2.9. PNS	78
B4.2.10. UPPS Premeditation	79
B4.2.11. IIP	79
B4.2.12. RSQ- Fearful	79
B4.2.13 RSQ-Secure	80
B4.2.13. Transformed variables	80
B4.2.13.1. ICES mother (log)	80
B4.2.13.2. ICES father (log)	80
B4.3. Box Plots	81
B4.4. Exploratory analysis strategy	81



## **B1. Participants**

### **B1.1. Inclusion Criteria.**

- i. Be able to read and comprehend written English language
- ii. Be at least 18 years old

### **B1. 2. Recruitment strategy.**

A range of methods were used to recruit respondents.

- i. A poster (Appendix E1) including a brief outline of the study and researchers with removable slips containing contact details and the website address for the questionnaire was posted in The University of Exeter Psychology Department.
- ii. All Psychology undergraduate students at The University of Exeter were sent an email (Appendix E2.1) informing them of the details of the study and containing the website address.
- iii. All students signed up to the Exeter University Participant database were sent an email (Appendix E2.3) informing them of the details of the study and the website address.
- iv. A page was created on the social networking site 'Facebook' and the invitation to participate and share the link was given to individuals who were linked to the researcher on 'Facebook' (Appendix E3).
- v. An email (Appendix E2.2) was sent to administrators of approximately 150 UK Psychology departments who featured on the Times Good Universities Guide 2011 and whose details were readily available on the department website. The email gave a brief outline of the study and asked whether information containing details of the

study, the link to the website and researcher contact details could be forwarded to students in their department. It was not possible to ascertain which universities forwarded the information on and which didn't.

Each method provided potential participants with a link to the questionnaire (<http://survey.ex.ac.uk/index.php?sid=1&lang=en>) and contact details for the research team. It was indicated that further information could be found by accessing the link before deciding to participate in the study. The link was deactivated when the number of complete responses reached over 500 as agreed from prior sample size discussions and indicated in the study proposal.

### **B1.3. Sociodemographic information.**

#### **B1.3.1. Table 6**

##### **Numbers and Frequency for Marital Status**

Marital Status	Number (N)	Frequency (%)
Living with partner/married	46	9
Divorced	6	1
Separated	16	3
Intimate relationship not living together	96	19
Single/unmarried	296	58
Undisclosed	20	4

B1.3.2. Table 7

Numbers and Frequency for Level of Education

Educational Level	Number (N)	Frequency (%)
Finished school at 16	6	1
Finished school at 18	7	1
Attending university	396	77
Completed university	62	12
Completed postgraduate	40	8
Other	1	0.2
Undisclosed	0	0

B1.3.3. Table 8

Numbers and Frequency for Ethnicity

Ethnicity	Number (N)	Frequency (%)
White	99	19.3
White British	155	30.3
English	116	22.7
Scottish	5	1.0

Welsh	10	2.0
Irish	8	1.5
Mixed	8	1.5
White and Black Caribbean	4	1.0
White and Black African	5	1.5
White and Asian	4	1.5
Asian, British Asian	21	4.0
Indian	17	3.0
Pakistan	5	1.0
Bangladesh	6	1.0
Black, British Black	14	3.0
Caribbean	1	0.5
African	5	1.0
Chinese	19	4.0
Middle Eastern/North African	2	0.5
Other	6	1.5
Undisclosed	0	0

B1.3.4.Table 9

Numbers and Frequency for Income (Socioeconomic status)

Income	Number (N)	Frequency (%)
£0-£5,000	83	16
£5,001-£10,000	40	8
£10,0001-£20,000	78	15

£20,001-£30,000	90	18
£30,001-£50,000	104	20
More than £50,001	106	21
Undisclosed	11	2

## **B2. Measures**

### **B2.1. Demographics.**

Participants completed a short, non-standardised self-report form to obtain gender, age, ethnicity, marital status, educational level and estimated household/parental income (Appendix F). This information ensured that the study is not biased by social economic status, gender etc. (Appendix B). Additionally sociodemographic variables could be included in the modelling process if alternative models are tested in future.

### **B2.2. Urgency-Premeditation-Perseverance-Sensation seeking Behaviour Scale (UPPS; Whiteside & Lynam, 2001).**

This 46 item self-report questionnaire was designed to assess the extant measures of impulsivity: urgency, (lack of) premeditation, (lack of) perseverance and sensation seeking. (Appendix F). The scale uses a 1 (strongly agree) to 4 (disagree strongly) response format. Overall mean and factor scores can be obtained and the questionnaire contains a mixture of positive and negatively worded items. Each item corresponds to one factor. The present study used three scales from this measure: the urgency subscale contained 12 positively and

negatively worded items which were used to measure threat sensitivity, the sensation seeking subscale contained 12 negatively worded items which were used to measure reward sensitivity and the lack of premeditation subscale which contained 11 positively worded items was used to measure SRC. A Chronbach's alpha value of 0.87 was obtained for this measure. Urgency measures an individual's tendency to act rashly when in a negative mood. Lack of premeditation measures an individual's inability to anticipate the future consequences of actions. Lack of perseverance measures an inability to follow through on a task. Sensation-seeking measures the experience of positive feelings towards risk actions.

### **B2.3. NEO-Five Factor Inventory (NEO-FFI; McCrae & Costa, 2004).**

This measure is a 60 item self-report questionnaire that measures five factors of personality (Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism). The present study used the Extraversion and Neuroticism subscales. Each of these subscales contained 12 positively and negatively worded items and participants provided ratings on a five-point Likert-type scale ranging from 1 (strongly agree) to 5 (strongly disagree) (Appendix F) such that high scores indicated higher traits of Neuroticism or Extraversion. The Extraversion subscale was used to measure reward sensitivity and the Neuroticism subscale was used to measure threat sensitivity. A Chronbach's alpha value of 0.91 was obtained for Extraversion and 0.67 for Neuroticism.

### **B2.4. The Invalidating Childhood Environment Scale (ICES; Mountford, Corstophine, Tomlinson & Waller, 2007).**

This measure is a self-report questionnaire that measures childhood environment. Ten positively worded items ask for information on specific maternal and paternal parenting behaviours. Participants provide one response for mother and one response for father and a separate overall score for each parent was obtained and these were used as measures of childhood invalidation, where high scores were indicative of more invalidation during childhood. Participants provided rating on a Likert-type scale ranging from 1 (never) to 5 (all the time) (Appendix F). A Chronbach's alpha value of 0.92 was obtained for this measure.

**B2.5. Personal Need for Structure (PNS; Thompson, Naccarato & Parker, 1992 cited in Neuberg & Newsom, 1993).**

To measure SRC and in particular the over-controlled personality type the PNS was used. This is 12 item self-report questionnaire measuring an individual's desire for simple structure with positively and negatively worded items. Participants provided ratings on a six-point Likert-type scale ranging from 1 (strongly disagree) to 6 (strongly agree, such that higher scores indicated greater need for structure. (Appendix F). A Chronbach's alpha value of 0.87 was obtained for this measure.

**B2.6. Ego Undercontrol Scale (EUC; Block & Block, unpublished cited in Letzring et al., 2005).**

A measure of an individual's level of self-control (Block and Block cited in Letzring et al., 2005) the EUC is a 37 item self-report questionnaire containing positively and negatively worded items. Participants provided ratings on a four-point Likert-type scale ranging from 1 (strongly disagree) to 4 (strongly agree) such that higher scores indicated increased levels of

under-control. The study used this measure as an observed variable for SRC (Appendix F). A Chronbach's alpha value of 0.84 was obtained for this measure.

#### **B2.7. Ego Resiliency Scale (EUR; Block & Kremen, 1996).**

The EUR is a 14 item self-report questionnaire that measures an individual's level of flexible control (Appendix F) and was used in this study as a measure of SRC. It contained positively worded questions for which participants rated their answer on a four-point Likert-type scale ranging from 1 (strongly disagree) to 4 (strongly agree) such that high scores indicated high flexibility. A Chronbach's alpha value of 0.77 was obtained for this measure.

#### **B2.8. The Inventory of Interpersonal Problems-25 (IIP-25; Kim & Pilkonis, 1999).**

The IIP is a measure of social functioning containing 25 positively worded items about interpersonal style and interpersonal difficulties. Participants provided ratings on a five-point Likert scale ranging from 1 (not at all) to 5 (extremely) such that high scores indicated good/unimpaired social functioning. An overall mean score was calculated for each participant. (Appendix F). A Chronbach's alpha value of 0.91 was obtained for this measure.

#### **B2.9. The Relationship Scales Questionnaire (RSQ; Griffin & Bartholomew, 1994).**



A measure of adult attachment style the RSQ is a 30 item self-report questionnaire that contains positively and negatively worded items and this study used the RSQ as an observed measure of problems with interpersonal functioning (Appendix F). Participants provided ratings on a five-point Likert-type scale ranging from 1 (not at all like me) to 5 (very much like me) such that high scores indicated impaired interpersonal functioning. Four sub scale scores are generated rather than an overall mean score; these are secure, dismissive, fearful and preoccupied. CFA indicated that secure and fearful were acceptable indicators (factor loadings of above 0.5) and so these were both used as indicators of problems in interpersonal functioning. To ease interpretation, scores on the secure domain were reversed so that high scores indicated impaired interpersonal functioning. Chronbach's alpha values of 0.74 were obtained for the domains of this measure. Individuals scoring as 'secure' find it easy to be close and intimate with others, they can depend on others and are dependable; they tend to have a positive view of self and others. Individuals scoring as 'preoccupied' seek high levels of intimacy to the point of being over-dependant on others and fearing being alone. 'Dismissive' individuals are highly dependent, they don't desire close relationships and avoid attachment relationships. Individuals scoring as 'fearful' desire close relationships but simultaneously fear emotional closeness and feel uncomfortable with it.

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### **B3 Procedures**

#### **B3.1. Data Collection Procedure.**

The questionnaire was programmed in 'limesurvey' and responses were processed by means of scripts written in limesurvey.

The invitation email and poster invited participants to follow a link to an online site where they could read the on screen information sheet which explained the purpose of the study (appendix F) for more information and should they wish to, take part in the study. The link was (<http://survey.ex.ac.uk/index.php?sid=1&lang=en>).

After participants had read the information sheet they were asked to read a participant consent sheet on screen (Appendix F) and indicate they had read and understood the information sheet and consented to the study. Participants were asked to indicate whether they wished to receive course credits or be entered for the prize draw as remuneration for completing the study. They were asked to provide an email address so that they could be contacted were they to win the prize draw.

Each measure, presented on a separate screen, was preceded by instructions and followed by a button that said 'next'. Measures were presented in the following order: Demographics, UPPS, NEO-FFI N and E, ICES, PNS, EUC, EUR, RSQ, IIP-25, and participants indicated their result by using the computer mouse to click the box against the answer they wished to use. If participants decided not to answer a question or missed one out accidentally, this did not prevent them from continuing the study.

After the questionnaires had been completed, participants were presented with an online debrief sheet (Appendix F) and had to indicate, with a mouse click that they had read it. This

indication was also an indication to the researcher that the participant had completed the study and was therefore eligible for course credits or the prize drawn, depending on which one the participant had chosen. There were 13 screens in total.

Participant answers were automatically stored by the online programme. Once the link had been deactivated, the programme had a function which allowed the data to be exported to SPSS ready for data cleaning and analysis.

### **B3.2. Remuneration procedure.**

Prior to completing the questionnaire part of the study, participants indicated whether they would like to receive course credits or entry into the prize draw following completion of the study. Course credits were only available for first year undergraduates at The University of Exeter and this was made clear to participants.

Following deactivation of the study all participants who had indicated that they wished to receive course credits were emailed by the researcher to arrange a time to meet and have their course credit form signed.

All other participants who completed the study were entered into a prize draw. Each participant had a participant number attached to them and a random number generator was used to randomly select 5 participants to receive: 1 x £50 Amazon Voucher (1<sup>st</sup> prize) 1x £25 Amazon Voucher (2<sup>nd</sup> prize) and 3 x £10 Amazon Voucher (3<sup>rd</sup> prize). Winners of these prizes were contacted by email and asked for their acceptance of this prize. An e-voucher for

each prize amount was sent to the participants. Confirmation of the receipt of this voucher was given by participants.

## **B4 Data analysis**

### **B4.1. Data Screening.**

The data was exported from the online programme to IBM SPSS Statistics data editor version 19.

#### ***B4.1.1. Generating observed variable scores.***

Syntax codes were written to generate total and mean factor scores in accordance with the recommended scoring guidelines for each measure. Total subscale scores for each participant for NEO Extraversion and NEO Neuroticism were generated by summing responses for individual items for each participant. Mean scores for each participant were generated for PNS, IIP, EUC and EUR by averaging scores across the items for each measure. Mean subscale scores were generated for each participant for ICES mother, ICES father, RSQ-fearful, RSQ-Secure, UPPS sensation seeking, UPPS lack of premeditation and UPPS urgency by averaging scores across items which corresponded to that subscale. The syntax was written to include reverse coding of negatively worded items. To ease interpretation RSQ-Secure items were all reversed so that high scores indicated insecurity i.e. impaired interpersonal functioning.

#### ***B4.1.2. Testing the assumptions of Structural Equation Modelling.***

Following generation of Chronbach's alpha scores for the variables (Table 11), data was examined to test whether the assumptions required for SEM were met as recommended by Kline (2005).

- i. *Assumption of Multivariate normality*: histograms were computed for each variable to enable examination of the distributions of responses and ensure that they did not violate the assumption of univariate normality (B4.2.). In addition, skew and kurtosis scores were calculated for each variable (Table 10).

Table 10  
Skew and Kurtosis values for each observed variable

Manifest Variable	Skew	Kurtosis
UPPS Sensation seeking	0.263	-0.541
NEO-FFI E	-0.068	-0.597
UPPS Urgency	-0.194	-0.315
NEO-FFI N	0.165	-0.808
ICES mother	1.712	3.559
ICES father	-1.228	1.349
EUR	-0.125	0.143
EUC	-0.087	0.112
PNS	-0.180	-0.058
UPPS premeditation	-0.339	-0.102
IIP-25	0.193	-0.640
RSQ-Fearful	0.051	-0.889
RSQ-Secure	0.027	0.186

ICES mother (log)	0.738	0.203
ICES father (log)	0.439	-0.484

*Note.* UPPS = Urgency, Premeditation, Perseverance, Sensation Seeking; NEO-FFI = NEO Five Factor Inventory; ICES = Invalidating Childhood Environment Scale; EUC = Ego Undercontrol Scale; PNS = Personal Need for Structure; ER = Ego Resiliency Scale; IIP-25 = Inventory of Interpersonal Problems; RSQ = Relationship Scales Questionnaire

The heuristic used was that variables were deemed to be significantly different from normal if the skew and/or kurtosis statistic was less than -1.96 or greater than +1.96 (Field, 2009). Visual inspection of the histograms and specific scores for skew and kurtosis identified that ICES mother and ICES father were not normally distributed and so the scores for these variables were transformed with a logarithmic transformation. This transformation was chosen because variables were positively skewed (Field, 2009). Transformed values were used in subsequent analyses.

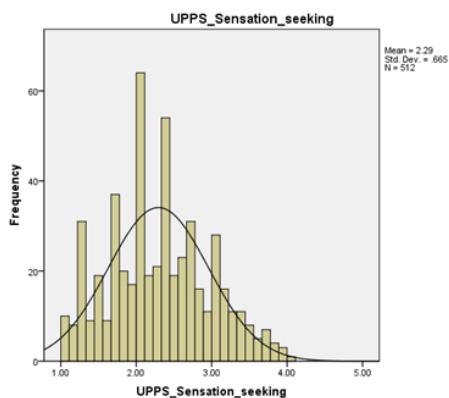
- ii. *Assumption of Linearity and homoscedasticity:* All bivariate scatterplots were linear and homoscedastic. This was tested by running scatterplots on the regression of two variables for each relationship predicted by the model.
- iii. *Removal of outliers:* box plots were used to identify outliers (Appendix B4.3). Outlier scores (n= 20) were examined and deemed not to be extreme or an error and so were included in the analysis.
- iv. *Removal of missing data:* there were only 16 instances of missing data. Participants who had not completed a questionnaire at any point in the study were excluded.



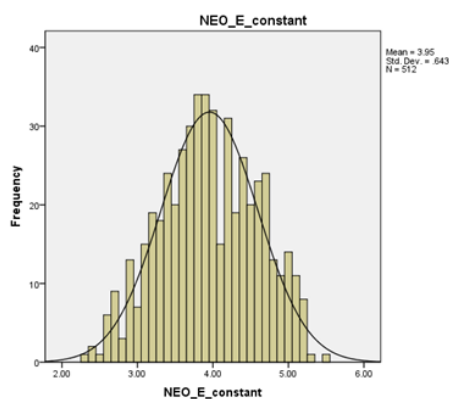
- v. *Assumption of multicollinearity*: if intercorrelations are  $> 0.85$  may not be measuring a different variable. There were no instances of multicollinearity. (appendix B4.5 for correlation matrix)
- vi. *Assumption of relative variances*: if ratio of largest to smallest variance is  $> 10$  variables will be ill-scaled. This occurred for NEO Extraversion and NEO Neuroticism and so variable scores were multiplied by a constant of 0.1 and renamed as NEO Extraversion\_constant and NEO Neuroticism\_constant.

## **B4.2. Histograms.**

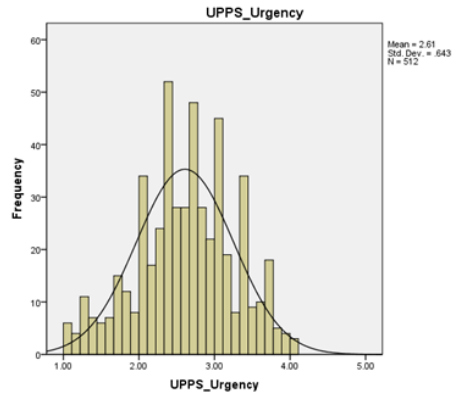
### ***B4.2.1. UPPS Sensation Seeking.***



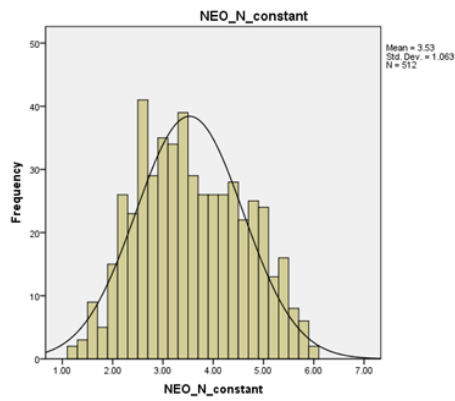
### ***B4.2.2. NEO-FFI Extraversion.***



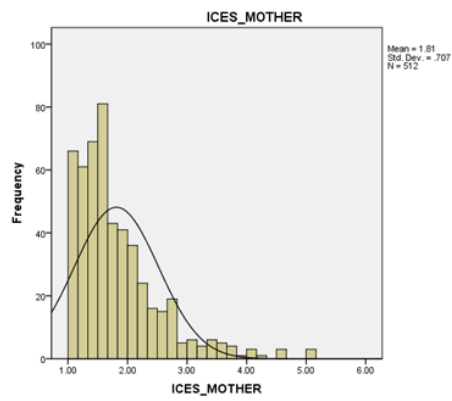
### ***B4.2.3. UPPS Urgency.***



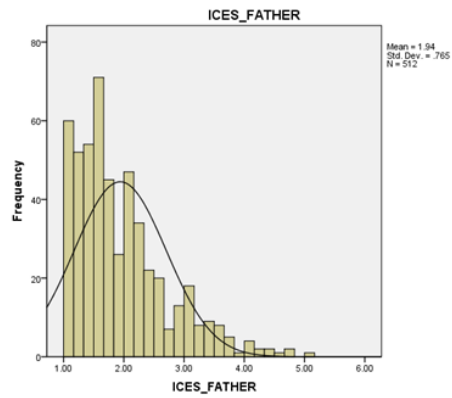
#### ***B4.2.4. NEO-FFI Neuroticism.***



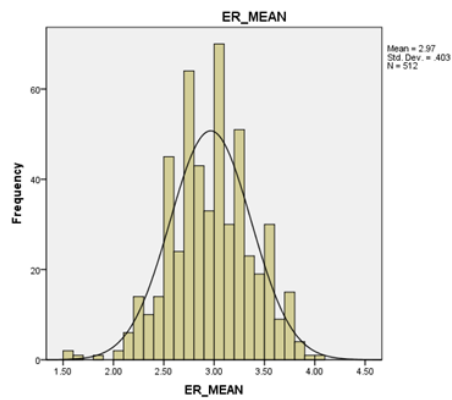
#### ***B4.2.5. ICES mother (untransformed).***



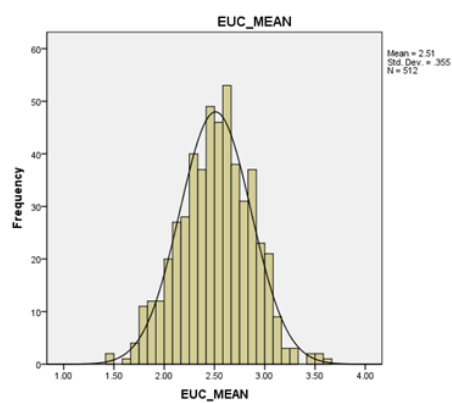
#### ***B4.2.6. ICES father (untransformed).***



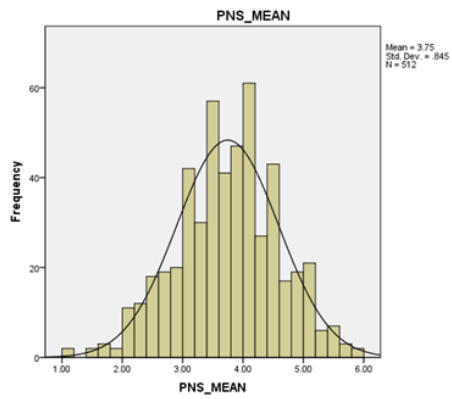
#### ***B4.2.7. Ego Resiliency Scale.***



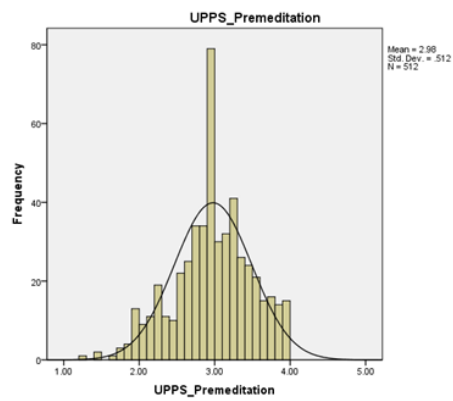
#### ***B4.2.8. Ego Undercontrol Scale.***



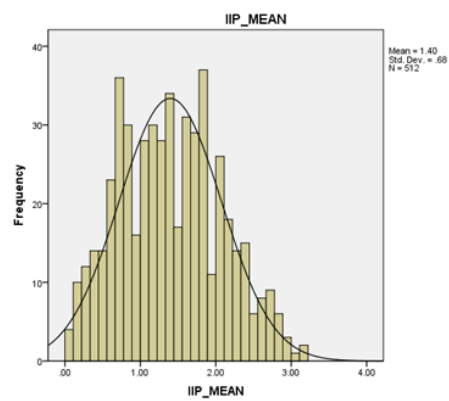
#### ***B4.2.9. Personal Need for Structure.***



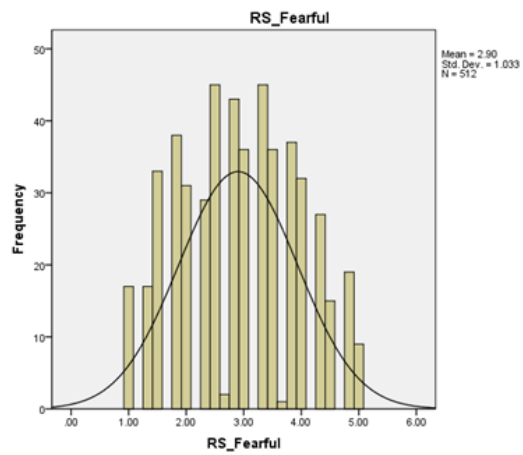
***B4.2.10. UPPS Premeditation.***



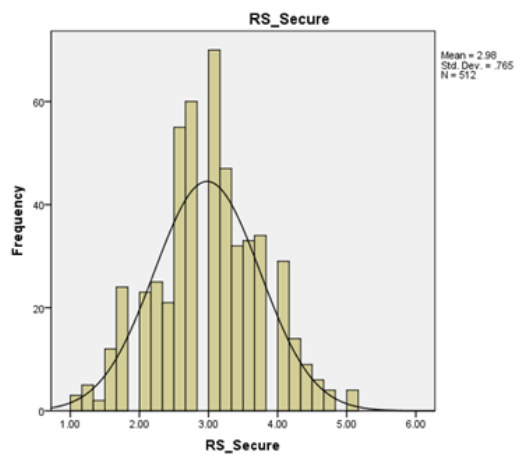
***B4.2.11. Inventory of Interpersonal Problems-25.***



#### ***B4.2.12. RSQ- Fearful.***

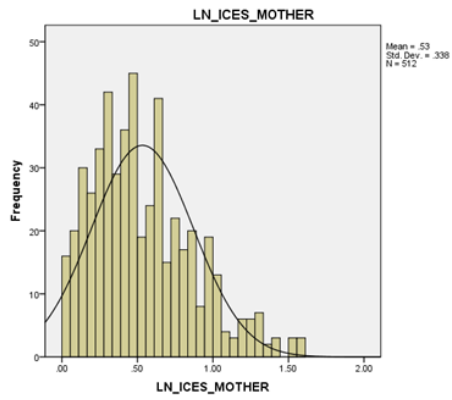


#### ***B4.2.13 RSQ-Secure***

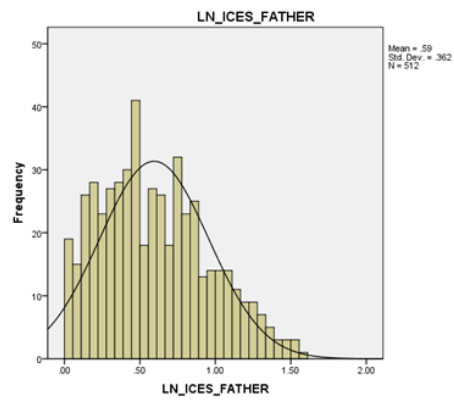


#### ***B4.2.13. Transformed variables.***

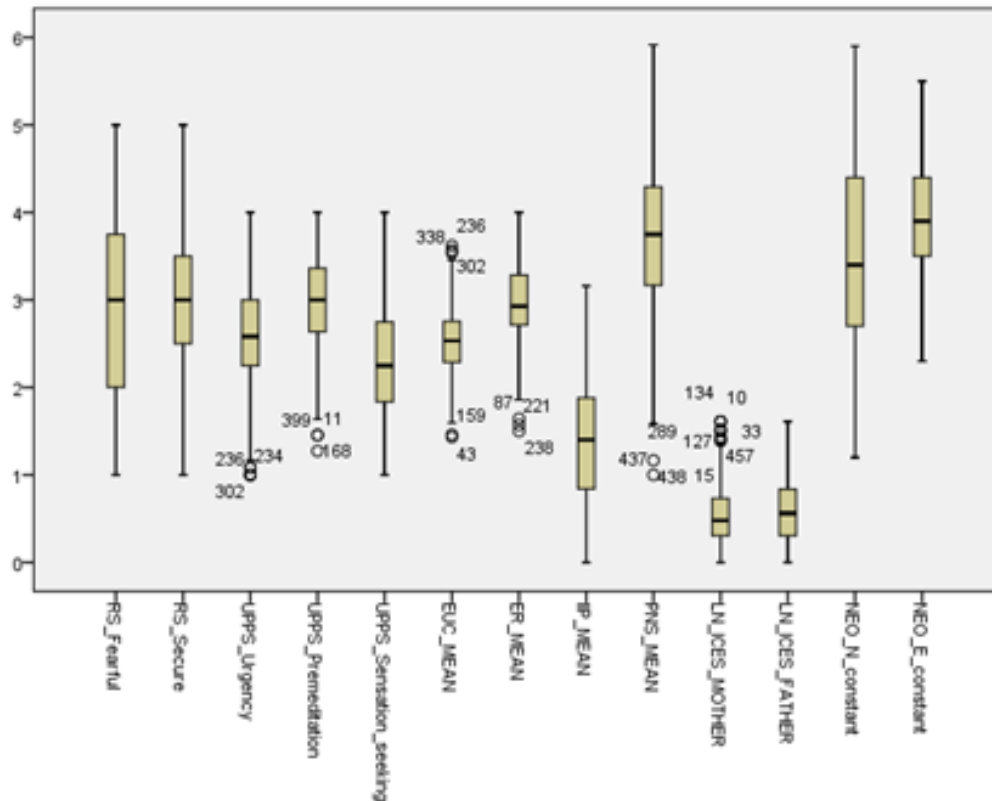
##### ***B4.2.13.1. ICES mother (log).***



#### *B4.2.13.2. ICES father (log).*



### **B. 4.3. Box Plots.**



#### B4.4. Exploratory data analysis.

Descriptive statistics were calculated and presented in the manuscript.

A full correlation matrix for all observed variables was created (Table 2). This allowed examination of the associations between variables. Particular attention was paid to correlations between the observed variables for each latent variable prior to CFA to determine whether observed variables that were proposed to measure each latent variable correlated enough to be suggestive that they could well be measuring the same construct (i.e. the latent variable). This is examined further through the CFA loadings in the SEM analysis and presented in the journal write up.

## References

Field, A. (2009). *Discovering Statistics Using SPSS* (3<sup>rd</sup> ed.), London: Sage.

Kline, R. (2005). *Principles and practice of structural equation modelling* (2<sup>nd</sup> ed.), New York: Guildford.



## Appendix C: Expanded Results

### Descriptive Statistics

#### Internal reliability estimates.

Table 11

Cronbach's Alpha values for individual measures

Indicator Variable	$\alpha$
Extraversion (NEO-FFI E)	0.91
Sensation Seeking (UPPS)	0.87
Neuroticism (NEO-FFI N)	0.67
Urgency (UPPS)	0.87
ICES Mother	0.92
ICES Father	0.93
Ego Resiliency	0.77
Ego Undercontrol	0.84
UPPS (Lack of ) Premeditation	0.87
PNS	0.87
RSQ-Fearful	0.76
RSQ-Secure	0.74
IIP	0.91

*Note.* UPPS = Urgency, Premeditation, Perseverance, Sensation Seeking; NEO-FFI = NEO Five Factor Inventory; ICES = Invalidating Childhood Environment Scale; EUC = Ego Undercontrol Scale; PNS = Personal Need for Structure; ER = Ego Resiliency Scale; IIP-25 = Inventory of Interpersonal Problems; RSQ = Relationship Scales Questionnaire

Table 11 shows that all measures showed high internal reliability, with the exception of NEO-FFI Neuroticism which found a medium internal reliability. As this measure has been widely used in personality research, it was decided that an alpha of 0.67 was sufficient and so no items were removed from the measure, however, it is possible that this measure may not have formed a reliable index of threat sensitivity.

### **Nested model analyses-test of mediating effects**

#### **Models with adequate fit.**

#### ***Regression weights for flexible control.***

Table 12

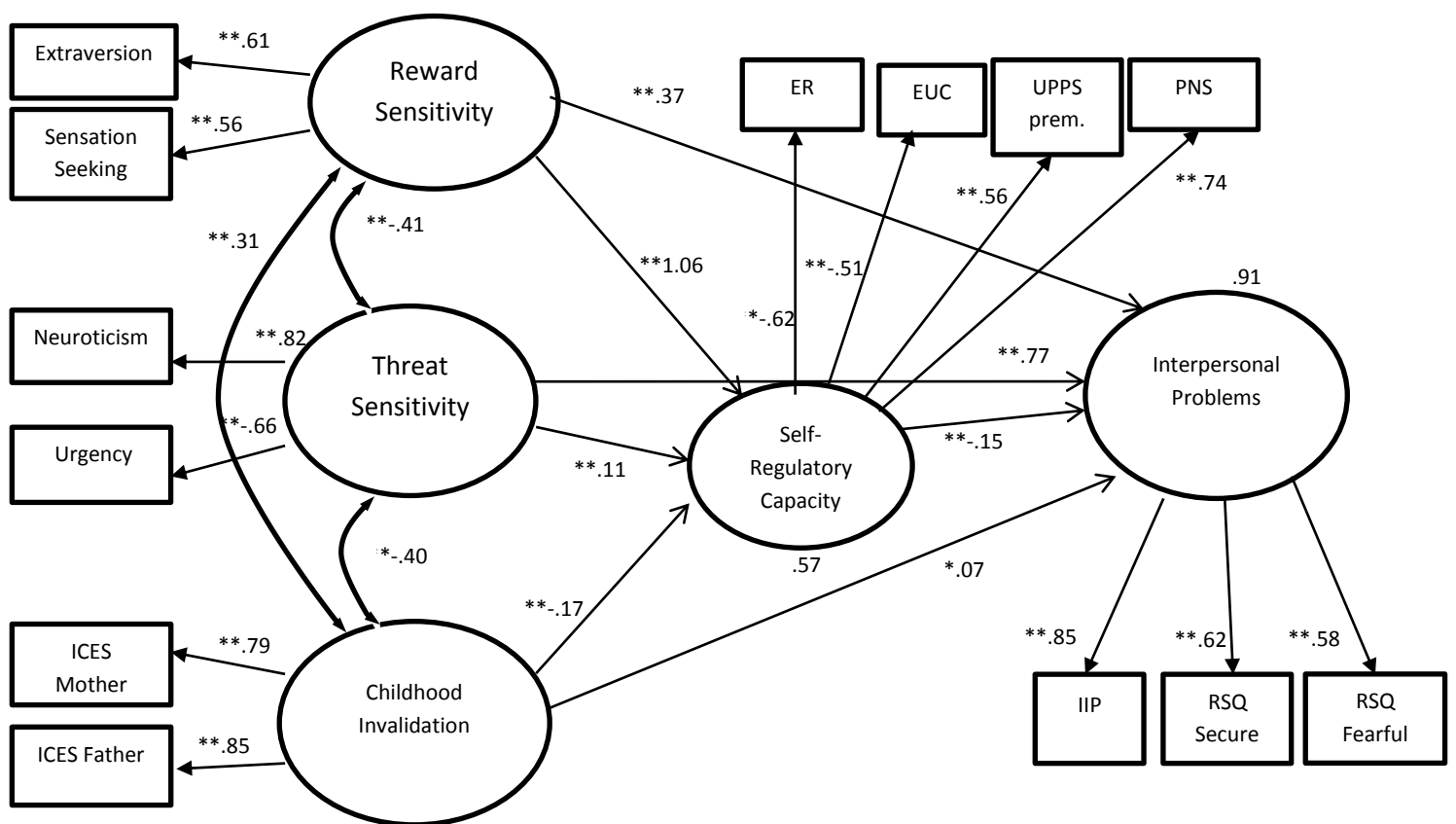
Change in regression weights with and without Flexible Control as mediator for each parameter

Parameter	Regression Weights ( $\beta$ )	
	No mediation	ER as mediator
Reward Sensitivity-Interpersonal problems	0.29	0.62
Threat Sensitivity-Interpersonal problems	-1.08	-1.10
Childhood Invalidation-Interpersonal problems	0.15	0.23

**Models with poor fit.**

*SRC as mediator.*

Figure 6. SRC Mediation Model



*Figure 6.* Structural equation solution for the SRC mediation model. *Note* \* =  $p < 0.05$ , \*\* =  $p < 0.001$ .

Mediation provided a significantly better fit than no mediation (Chi square difference (df= 3) = 127.725,  $p < 0.001$ ) however adjusted fit indices indicated that the model was a poor fit of the observed data (CFI= 0.737; RMSEA= 0.162). All estimated parameters were reliable as shown in figure 6. Threat and reward sensitivity and childhood invalidation explained 57% of the variance in SRC. Threat and reward sensitivity, childhood invalidation and SRC together accounted for 91% of the variance in interpersonal problems.

*Total Effects.* One SD increase in reward sensitivity leads to 0.21 increase in interpersonal problems, one SD increase in threat sensitivity leads to a 0.79 SD decrease in interpersonal problems and one SD increase in childhood invalidation leads to a 0.09 SD increase in interpersonal problems.

*Indirect Effects.* One SD increase in reward sensitivity lead to a 0.161 SD decrease in interpersonal problems in addition to any direct (unmediated) effect. A SD increase in threat sensitivity lead to 0.017 decrease in interpersonal problems and a SD increase in childhood invalidation lead to a 0.025 increase in interpersonal problems. The percentage bootstrap method indicated that all indirect effects were non-significant at  $p > 0.05$ .

*UC as mediator.*

Figure 7. Under-Control Mediation Model

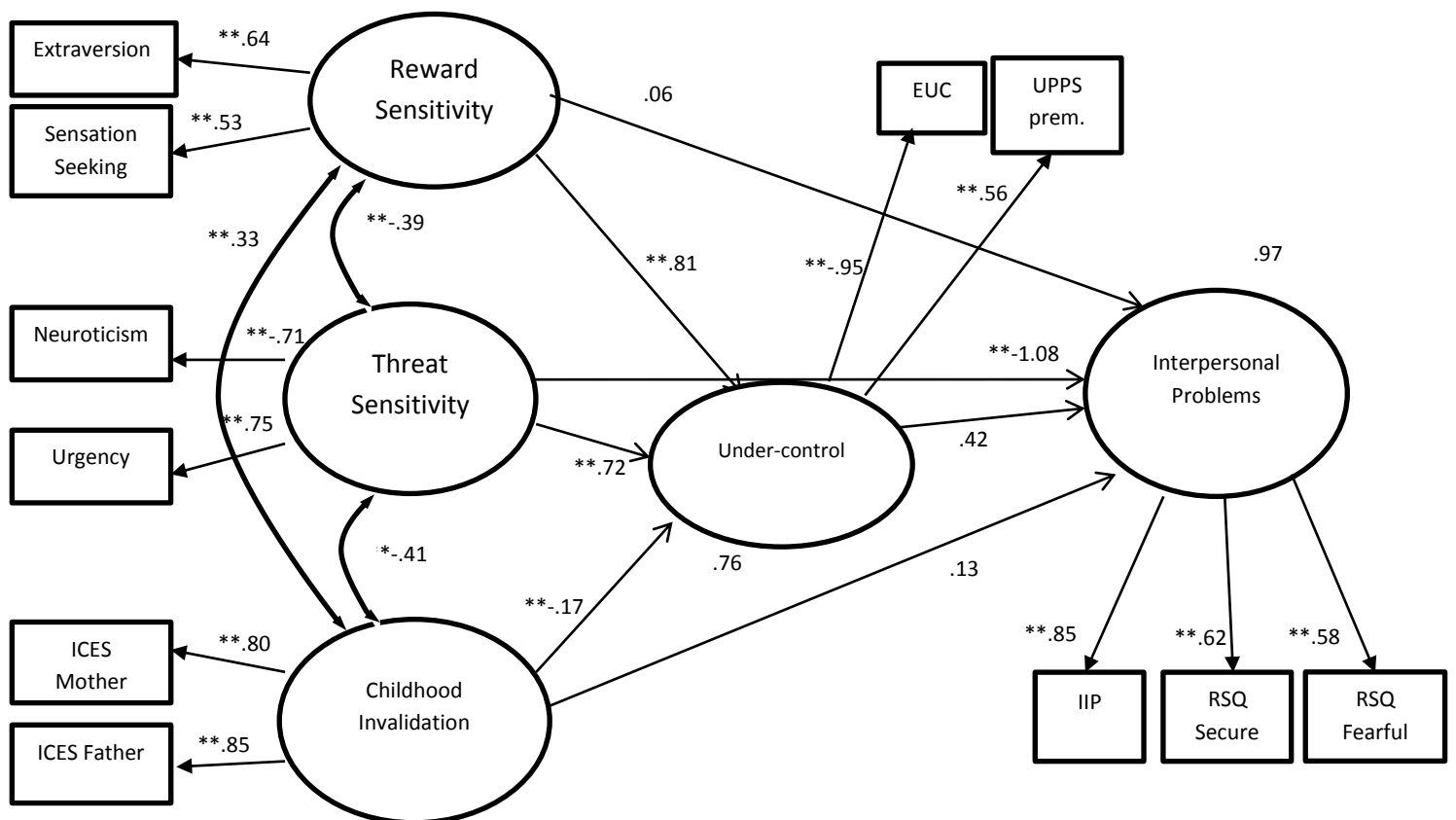


Figure 7. Structural equation solution for the UC mediation model. Note \* =  $p < 0.05$ , \*\* =  $p < 0.001$ .

Mediation provided a significantly better fit than no mediation (Chi square difference ( $df=3$ ) = 144.541,  $p < 0.001$ ) however adjusted fit indices indicated that the model was a poor fit of the observed data (CFI= 0.881; RMSEA= 0.121). All estimated parameters were reliable, with three exceptions as can be seen in figure 7. The non-significant pathways were the effect of reward sensitivity, childhood invalidation and UC on interpersonal problems. Threat and reward sensitivity and childhood invalidation explained 76% of the variance in UC. Threat and reward sensitivity, childhood invalidation and UC together explain 97% of the variance in interpersonal problems.

*Total Effects.* One SD increase in UC leads to 0.42 SD decrease in interpersonal problems, one SD increase in reward sensitivity leads to 0.29 increase in interpersonal problems, one SD increase in threat sensitivity leads to a 0.78 SD decrease in interpersonal problems and one SD increase in childhood invalidation leads to a 0.06 SD increase in interpersonal problems.

*Indirect Effects.* One SD increase in reward sensitivity lead to a 0.320 SD decrease in interpersonal problems in addition to any direct (unmediated) effect. A SD increase in threat sensitivity lead to 0.284 decrease in interpersonal problems and a SD increase in childhood invalidation lead to a 0.069 decrease in interpersonal problems. The percentage bootstrap method indicated that all indirect effects were non-significant at  $p > 0.05$ .

*OC and UC as mediators.*

Figure 8. Over-Control and Under-Control Mediation Model

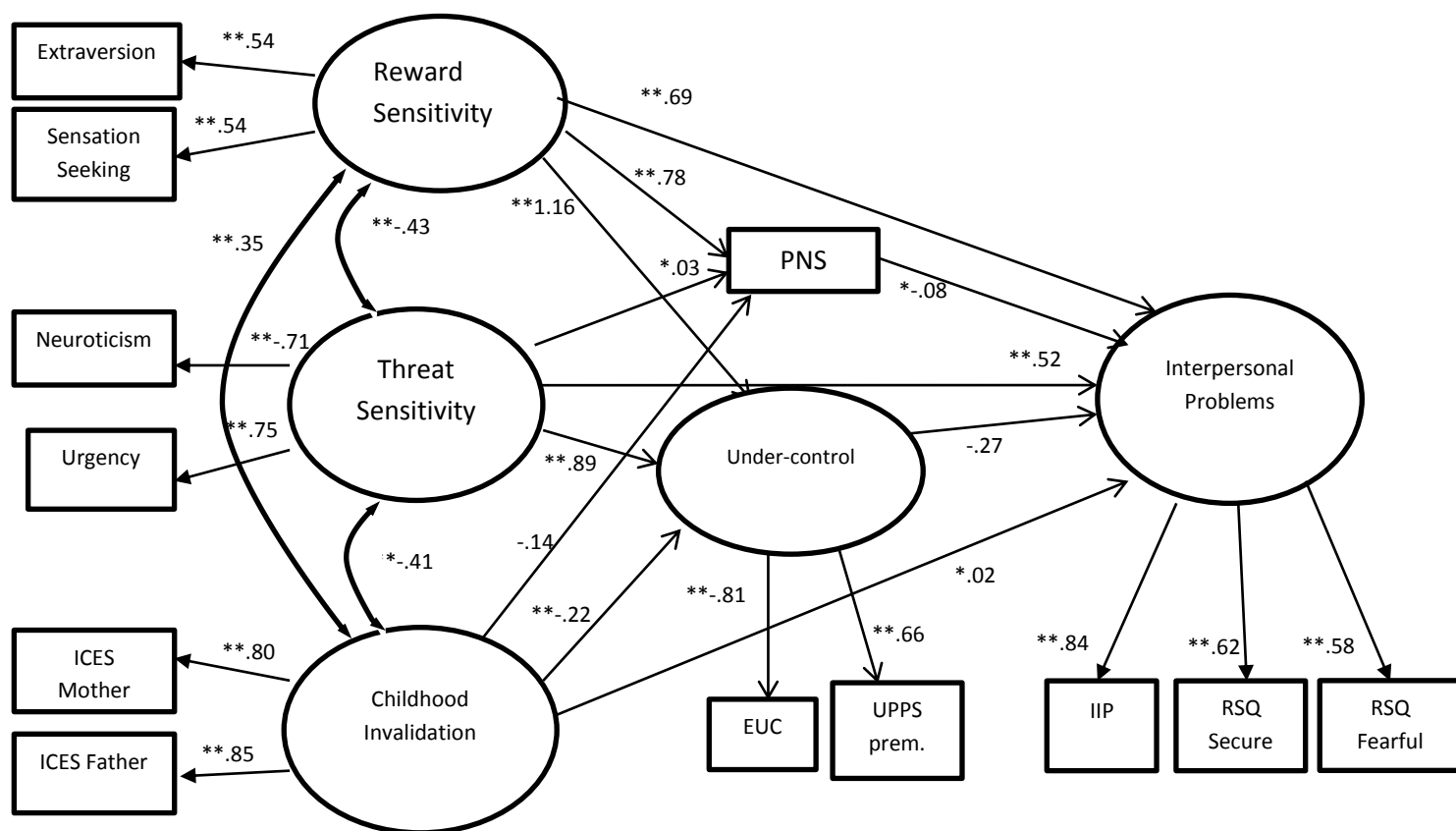


Figure 8. Structural equation solution for the OC and UC mediation model. Note \* =  $p < 0.05$ , \*\* =  $p < 0.001$ .

Mediation provided a significantly better fit than no mediation (Chi square difference (df= 6) = 402.863,  $p < 0.001$ ) however adjusted fit indices indicated that the model was a poor fit of the observed data (CFI= 0.880; RMSEA= 0.119). All parameters were reliable, with one exception as can be seen in figure 9. The pathway between UC and interpersonal problems was not significant.

***Flexible control, UC and OC as mediators.***

It was not possible to estimate the model which included flexible control, UC and OC as mediators as there were too many unknown parameters and so the model was unidentified. In order to achieve identifiability it would be necessary to impose one additional constraint.



## **Appendix D. Expanded discussion**

### **Non-significant models**

#### **SRC as mediator.**

The model which included SRC as a mediator did not provide a good or adequate fit. This was not a surprising result as it was hypothesised that there is not a linear relationship between SRC and interpersonal problems. Although factor loadings for all indicators of SRC were significant, the factor loadings were smaller than those for indicators of the other latent constructs. This could be because SRC is a complex construct and the indicator variables used here measure different parts of the SRC dimension; this potentially highlights a need for better measurement of SRC. This will be important when the quadratic relationship is tested and could involve identifying additional or alternative indicators which measure SRC or developing a new measure which can be used to measure the full dimension of self-control (UC through to OC) rather than relying on separate indicators.

#### **UC as mediator.**

The model which included UC as a mediator did not provide a good or adequate fit. Although the model was not a good estimate of the data there were significant pathways between threat and reward sensitivity, Childhood invalidation and UC, which offers some evidence that there could be a relationship between temperament, childhood environment and UC. This is supported by correlation analyses which show that increased childhood invalidation is associated with increased UC. The correlations between temperament and UC were not consistent and so conclusions are difficult to draw from this.

Individuals who have grown up in an invalidating childhood environment are likely to have missed out on key opportunities for experiencing co-regulation through intersubjectivity, a process by which a child learns to self-regulate (Hughes, 2004). In adulthood, these individuals struggle to regulate their emotions, tending to be under-regulated (UC). This is consistent with the research which demonstrates this lack of co-regulation in childhood for individuals who develop BPD in adulthood (Fonagy & Luyten, 2011).

### **UC and OC (self-control) as mediator.**

The model which included OC and UC as mediators did not provide a good or adequate fit. It is possible that that was a particularly poor fit because, although normally distributed, the majority of participants did not score significantly differently from each other on these measures to identify whether extremes of self-control (high OC or high UC) did in fact predict more interpersonal problems. In fact, when examining the SDs for each of the UC and OC indicators, it can be seen that there was not as much variance in participant scores as with other measures (aside from ICES scales, which unsurprisingly and as previously discussed had small SDs). Recruitment of a clinical sample may provide more extreme scores, which will allow for better representation of the UC and OC personality types and potentially better

modelling of their relations. This is consistent with Donnellan and Robins (2010) suggestion that OC and UC tend to be under-represented in community samples.

### **Neuro-regulation**

The model did not make predictions about the neuro-regulation of constructs. However, results suggest individual differences in flexible control exist, such that some individuals have greater capacity for flexibly controlling emotional and behavioural responses than others. Porges suggests these individuals may have higher vagal tone (Porges, 1995), which indicates a more developed vagal break (the PNS-VVC). The break can be applied and removed which allows an individual to flexibly control (inhibit or disinhibit) their response to environmental stimuli depending on which response would be most adaptive in the situation. Further research using psychophysiological measures is needed to directly test this.

### **Attachment**

The model demonstrated that childhood invalidation was associated with interpersonal problems and that attachment scales were useful indicators of interpersonal functioning. It was not within the scope of the study to investigate the process by which attachment relationships result in difficulties with emotion regulation or interpersonal functioning. Current thought within the attachment field is consistent with findings from this study, that invalidating childhood environments are associated with emotion dysregulation. Children require adults to help them learn to regulate, through a process called intersubjectivity (Hughes, 2004). Intersubjectivity involves interactions between caregiver and infant through which affect from enjoyable (rewarding) and stressful (threatening) experiences is regulated;

a child learns to self-regulate through this process. Children who lack intersubjectivity, such as those brought up in chaotic and unpredictable environments, struggle to regulate their emotions as adults (Hughes, 2004), are more under-controlled and prone to externalising disorders (Fonagy & Luyten, 2011). This is consistent with supplementary analyses in the UC mediated model (Appendix C) which demonstrated that a one SD increase in childhood invalidation lead to a 0.06 SD increase in interpersonal problems when this pathway was mediated by UC.

## References

- Donnellan, M., & Robins, R. (2010). Resilient, Overcontrolled and Undercontrolled personality types: issues and controversies. *Social and Personality Psychology*, 4, 1070-1083.
- Fonagy, P., & Luyten, P. (2011). The roots of borderline personality disorder in childhood and adolescence: A review of evidence from the standpoint of a mentalization based approach. *Psyche-z Psychoanalysis*, 65, 900 - 952.
- Hughes, D. (2004). An Attachment-based treatment of maltreated children and young people. *Attachment & Human Development*, 6, 263-278.
- Porges, S. (1995). Orienting in a defensive world: Mammalian modifications of our evolutionary heritage: A Polyvagal Theory. *Psychophysiology*, 7, 301-318.

## **Appendix E: Recruitment poster and emails**

### **E1. Recruitment Poster**

# Personality and its effects on socio-emotional functioning: an online study

Do you want to be in with a chance of winning up to £50 Amazon vouchers for just 30 minutes answering questions online?

## AIM:

The purpose of the study is to investigate how individual differences in emotion regulation affect the relationship of temperament and childhood experiences on social functioning.

## WHAT DO I HAVE TO DO?

This study involves completing a number of questionnaires and will last between 30 and 45 minutes. You will be asked to complete seven questionnaires in which you will answer questions regarding your childhood, life events, impulsivity, ego-undercontrol and resiliency, interpersonal style and emotional expressiveness. Also, you will be asked to give some demographic information such as age, gender and socio-economic information.

## PRIZE DRAW

All participants who complete the study will be entered into a raffle where 1<sup>st</sup> prize is a £50 Amazon voucher, 2<sup>nd</sup> prize is a £25 Amazon voucher and 3<sup>rd</sup> prize is one of three £10 Amazon vouchers.

## HOW DO I TAKE PART?

Please visit this webpage for more information and the chance to participate:  
<http://survey.ex.ac.uk/index.php?sid=1&lang=en>

Or email Claire Nash on [cn242@exeter.ac.uk](mailto:cn242@exeter.ac.uk)

## E2. Recruitment Emails.

### E2.1. Email to Exeter Psychology students (undergraduate and postgraduate).

I am currently running an online study and looking for participants. There is a prize draw where you could win £50 Amazon Vouchers or if you are a first year psychology undergraduate you can earn course credits. More information and a link to the study is given below.

Thank you for your help,

Claire

Claire Nash  
Trainee Clinical Psychologist  
Exeter University

\*\*\*\*\*

Personality and its effects on socio-emotional functioning: an online study

Do you want to be in with a chance of winning up to £50 Amazon vouchers for just 30-45 minutes spent answering questions online?

AIM:

The purpose of the study is to investigate how individual differences in emotion regulation affect the relationship of temperament and childhood experiences on social functioning.

WHAT DO I HAVE TO DO?

This study involves completing a number of questionnaires and will last between 30 and 45 minutes. You will be asked to complete seven questionnaires in which you will answer questions regarding your childhood, life events, impulsivity, ego-undercontrol and resiliency, interpersonal style and emotional expressiveness. Also, you will be asked to give some demographic information such as age, gender and socio-economic information.

PRIZE DRAW

All participants who complete the study will be entered into a raffle where 1st prize is a £50 Amazon voucher, 2nd prize is a £25 Amazon voucher and 3rd prize is one of three £10 Amazon vouchers. Or you can opt for course/research credits on its completion if you are a first year psychology undergraduate.

HOW DO I TAKE PART?

Please visit this webpage for more information and the chance to participate:  
<http://survey.ex.ac.uk/index.php?sid=1&lang=en>

Or email Claire Nash on [cn242@exeter.ac.uk](mailto:cn242@exeter.ac.uk)

Many thanks for your help and participation,

Claire

Claire Nash  
Trainee Clinical Psychologist  
Exeter University

## **E2.2. Email to UK psychology departments.**

Dear Sir/Madam,

My name is Claire Nash, and I am a Clinical Psychology Doctoral student at the University of Exeter. At the moment I am conducting a large scale investigation on emotion regulation and personality factors, and am hoping to collect a large amount of data on this.

I am writing to you because I was hoping you would be able and willing to circulate the below email to all students in your department. We are offering the possibility of winning £50 in Amazon vouchers for those who complete the study. I would be really grateful if you could forward this to students in your department with the subject line: win £50 Amazon vouchers for answering questions online.

The study has received ethical approval from the University of Exeter School of Psychology Ethics Committee.

Thank you for your help and please do not hesitate to contact me if you require any further information,

Kind Regards,

Claire

Claire Nash  
Trainee Clinical Psychologist  
University of Exeter

\*\*\*\*\*



## Personality and its effects on socio-emotional functioning: an online study

Do you want to be in with a chance of winning up to £50 Amazon vouchers for just 30-45 minutes spent answering questions online?

### AIM:

The purpose of the study is to investigate how individual differences in emotion regulation affect the relationship of temperament and childhood experiences on social functioning.

### WHAT DO I HAVE TO DO?

This study involves completing a number of questionnaires and will last between 30 and 45 minutes. You will be asked to complete seven questionnaires in which you will answer questions regarding your childhood, life events, impulsivity, ego-undercontrol and resiliency, interpersonal style and emotional expressiveness. Also, you will be asked to give some demographic information such as age, gender and socio-economic information.

### PRIZE DRAW

All participants who complete the study will be entered into a raffle where 1st prize is a £50 Amazon voucher, 2nd prize is a £25 Amazon voucher and 3rd prize is one of three £10 Amazon vouchers.

### HOW DO I TAKE PART?

Please visit this webpage for more information and the chance to participate: <http://survey.ex.ac.uk/index.php?sid=1&lang=en>

Or email Claire Nash on [cn242@exeter.ac.uk](mailto:cn242@exeter.ac.uk)

Many thanks for your help and participation,

Claire

Claire Nash  
Trainee Clinical Psychologist  
Exeter University

**E2.3. Email to Exeter 2010/2011 participant database.**

## PERSONALITY AND ITS EFFECT ON SOCIO-EMOTIONAL FUNCTIONING: AN ONLINE STUDY

Do you want to be in with a chance of winning up to £50 AMAZON VOUCHERS for just 30-45 minutes spent answering questions online?

### AIM:

The purpose of the study is to investigate how individual differences in emotion regulation affect the relationship of temperament and childhood experiences on social functioning.

### WHAT DO I HAVE TO DO?

This study involves completing a number of questionnaires and will last between 30 and 45 minutes. You will be asked to complete seven questionnaires in which you will answer questions regarding your childhood, life events, impulsivity, ego-undercontrol and resiliency, interpersonal style and emotional expressiveness. Also, you will be asked to give some demographic information such as age, gender and socio-economic information.

### PRIZE DRAW

All participants who complete the study will be entered into a raffle where 1st prize is a £50 Amazon voucher, 2nd prize is a £25 Amazon voucher and 3rd prize is one of three £10 Amazon vouchers. Alternatively, if you are a first year Psychology student you can opt to receive research credits in place of entry into the prize draw.

### HOW DO I TAKE PART?

Please visit this webpage for more information and the chance to participate:

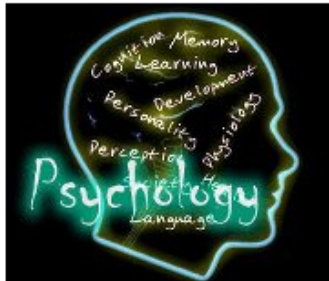
<http://survey.ex.ac.uk/index.php?sid=1&lang=en>

Or email Claire Nash on [cn242@exeter.ac.uk](mailto:cn242@exeter.ac.uk)<<mailto:cn242@exeter.ac.uk>>

You have been sent this email because you have signed up to the participant mailing list here at The University of Exeter. There is no obligation to take part in this study.

Claire Nash  
Trainee Clinical Psychologist  
Exeter University

### **E.3. Social Networking Recruitment- Facebook**



Going (14)

[Export · Report](#)

## Online Psychology Study-win £50 Amazon Vouchers!!

Public Event ·

Wednesday, October 5, 2011 at 12:00pm until Saturday, November 19, 2011 at 11:30pm

from the comfort of your own PC!

Hello!

As part of my doctorate I have to carry out a research project. I need lots and lots of participants for this so PLEASE if you have the time to do the study I would be incredibly grateful. Please pass the link onto anyone else who you think would like to participate... (so long as they can read English and are over 18)

The study is about personality and its effects on socio-emotional functioning. All answers are completely confidential (I will not match up answers to email addresses) and the project has ethical approval from Exeter University.

### AIM:

The purpose of the study is to investigate how individual differences in emotion regulation affect the relationship of temperament and childhood experiences on social functioning.

### WHAT DO YOU HAVE TO DO?

This study involves completing a number of questionnaires and will last about 30 minutes. You will be asked to complete seven questionnaires in which you will answer questions regarding your childhood, life events, impulsivity, ego-undercontrol and resiliency, interpersonal style and emotional expressiveness. Also, you will be asked to give some demographic information such as age, gender and socio-economic information.

### PRIZE DRAW

All participants who complete the study will be entered into a raffle where 1st prize is a £50 Amazon voucher, 2nd prize is a £25 Amazon voucher and 3rd prize is one of three £10 Amazon vouchers.

### HOW DO YOU TAKE PART?

Please visit this webpage for more information and the chance to participate:  
<http://survey.ex.ac.uk/index.php?sid=1&lang=en>



Or email Claire Nash on [cn242@exeter.ac.uk](mailto:cn242@exeter.ac.uk)

Many thanks for your help and participation,

Share: Post Link Photo Video

## Appendix F. Research Questionnaires

## Emotion Regulation

Thank you for participating in this survey. Please read the information carefully and give your informed consent.  
The questionnaire will take about 30-45 minutes to complete.  
*There are 36 questions in this survey.*

### **A note on privacy**

This survey is anonymous.

The record kept of your survey responses does not contain any identifying information about you unless a specific question in the survey has asked for this. If you have responded to a survey that used an identifying token to allow you to access the survey, you can rest assured that the identifying token is not kept with your responses. It is managed in a separate database, and will only be updated to indicate that you have (or haven't) completed this survey. There is no way of matching identification tokens with survey responses in this survey.

[Load unfinished survey](#)

[Next >>](#)

[Exit and clear survey](#)

## Emotion Regulation

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### **1. Information & Consent**

#### **PERSONALITY AND ITS EFFECT ON SOCIO-EMOTIONAL FUNCTIONING**

**PURPOSE OF THE STUDY** The purpose of the study is to investigate how individual differences in emotion regulation affect the relationship of temperament and childhood experiences on social functioning. The ability to properly regulate one's emotions is a key factor in the functioning of healthy interpersonal relationships, which are in turn essential for our well-being. Therefore, examining the relationships between factors such as temperament, childhood experience and emotion regulation may be beneficial with regards to improving understanding and treatment of psychological disorders which are associated with difficulties in regulating emotions and relationships, such as Borderline Personality Disorder and Treatment Resistant Depression.

**PROCEDURES** This study involves completing a number of questionnaires and will last between 30 to 45 minutes. You will be asked to complete seven questionnaires in which you will answer questions regarding your childhood, life events, impulsivity, ego-undercontrol and resiliency, interpersonal style and emotional expressiveness. Also, you will be asked to give some demographic information such as age, gender and socio-economic information.

**CONFIDENTIALITY** All information you provide is completely anonymous and will be kept strictly confidential. For example, all your information will be identified by a code only. The consent form below which requires your name will be stored separately so it cannot be matched to the other information you give. Confidentiality may be broken only when required by the law or professional guidelines for psychologists, for example when there is indication of a significant risk of harm to you or someone else.

**REMUNERATION** All participants who complete the study will be entered into a raffle where 1st prize is a £50 Amazon voucher, 2nd prize is a £25 Amazon voucher and 3rd prize is one of three £10 Amazon vouchers. Alternatively, if you are a first year Psychology student you can opt to receive research credits in place of entry into the prize draw.

**WITHDRAWAL / PREMATURE COMPLETION** Your participation in this study is completely voluntary, and if at any point throughout the study you wish to discontinue you may do so without prejudice. Although you will be asked to complete questionnaires without omitting items, if you do not wish to answer a question you may omit it.

**POTENTIAL RISKS AND ETHICAL CONSIDERATIONS** Some of the questionnaires ask about personal information that may be upsetting to you, for example certain events that may have occurred in your childhood or throughout your life. If at any point you feel too distressed to continue, remember that you are free to leave and withdraw your consent at any point. Also, although you will be asked to complete questionnaires without omitting items, if you do not wish to answer a question you may omit any questions you feel too uncomfortable answering.

**BENEFITS** There are no specific benefits to the participants in this study, apart from a chance to win a prize in the raffle or earn research credits.

**INVITATION TO ASK FURTHER QUESTIONS** If you have any question regarding the study please ask the experimenter before completing the consent form. Should you have any questions or concerns after completion of the study you can contact Claire Nash, doctoral student in clinical psychology on [cn242@exeter.ac.uk](mailto:cn242@exeter.ac.uk). Alternatively, questions or concerns about the study can be addressed to the Chair of the Ethics Committee, School of Psychology, University of Exeter.

**\* I have read and understood the consent form and Participant information. Upon selecting YES, I give my informed consent to participate in this study on personality and its effect on socio-emotional functioning.**

☐ Yes    ☐ No

**I would like to  
Choose one of the following answers**

- ☐ be entered into the prize draw
- ☐ receive course credits (\*\*EXETER PSYCHOLOGY STUDENTS ONLY\*\*)
- ☒ No answer

**Please provide your email address here (Please note: this is optional; you only have to provide this in case you wish to be entered into the prize draw or receive course credits. Your email address will not be used for any other purpose)**

[Resume later](#)

[<< Previous](#)

[Next >>](#)

[Exit and clear survey](#)

## Emotion Regulation

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### 2. Demographics

#### Gender

☐ Female ☐ Male ☒ No answer

#### Age

*Only numbers may be entered in this field*

#### Date of Birth

*Format: dd.mm.yyyy*

#### Current marital status

Check any that apply

- ☐ Married with spouse
- ☐ Living with partner
- ☐ Separated
- ☐ Divorced
- ☐ Widowed
- ☐ In an intimate relationship but not living together
- ☐ Never married

#### Highest level of education reached

Check any that apply

- ☐ Left school before 16
- ☐ Finished school at 16
- ☐ Finished school at 18
- ☐ Attended/attending university or equivalent
- ☐ Completed university of equivalent
- ☐ Completed postgraduate qualification

#### Total number of years of education completed

*Only numbers may be entered in this field*

**If the above options do not fit exactly (e.g. you left education at 16 and then returned as a mature student), please specify here**

**What is your ethnicity (please tick as many boxes as you feel apply to you)  
Check any that apply**

- ☐ White
- ☐ British (white)
- ☐ English
- ☐ Scottish
- ☐ Welsh
- ☐ Irish
- ☐ Mixed
- ☐ White & Black Caribbean
- ☐ White & Black African
- ☐ White & Asian
- ☐ Asian, Asian British, Asian English, Asian Scottish or Asian Welsh

- ☐ Indian
- ☐ Pakistani
- ☐ Bangladeshi
- ☐ Black, Black British, Black English, Black Scottish or Black Welsh
- ☐ Caribbean
- ☐ African
- ☐ Chinese
- ☐ Middle Eastern/North African
- ☐ Other:

**Salary range (please tick for combined household income (if student please answer for parental income))  
Check any that apply**

- ☐ 0-£5,000
- ☐ £5,001 - £10,000
- ☐ £10,001 - £20,000
- ☐ £20,001 - £32,000
- ☐ £32,001 - £50,000
- ☐ More than £50,000

[Resume later](#)

[<< Previous](#)

[Next >>](#)

[Exit and clear survey](#)

## Emotion Regulation

0%  100%

### 3. Urgency-Premeditation-Perseverance-Sensation seeking Scale

Read each statement carefully, and indicate how strongly you agree or disagree with it.

	Strongly Disagree	Slightly Disagree	Slightly Agree	Strongly Agree	No answer
I have a reserved and cautious attitude toward life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
My thinking is usually careful and purposeful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I am not one of those people who blurt out things without thinking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I like to stop and think things over before I do them	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I don't like to start a project until I know exactly how to proceed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I tend to value and follow a rational, ? sensible? approach to things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I usually make up my mind through careful reasoning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I am a cautious person	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Before I get into a new situation I like to find out what to expect from it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>



I usually think carefully before doing anything	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Before making up my mind, I consider all the advantages and disadvantages	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I have trouble controlling my impulses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I have trouble resisting my cravings (for food, cigarettes, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I often get involved in things I later wish I could get out of	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
When I feel bad, I will often do things I later regret in order to make myself feel better now	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
	<b>Strongly</b>	<b>Slightly</b>	<b>Slightly</b>	<b>Strongly</b>	

	<b>Disagree</b>	<b>Disagree</b>	<b>Agree</b>	<b>Agree</b>	<b>No answer</b>
Sometimes when I feel bad, I can't seem to stop what I am doing even though it is making me feel worse	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
When I am upset I often act without thinking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
When I feel rejected, I will often say things that I later regret	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
It is hard for me to resist acting on my feelings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I often make matters worse because I act without thinking when I am upset	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

In the heat of an argument, I will often say things that I later regret	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I am always able to keep my feelings under control	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Sometimes I do things on impulse that I later regret	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I generally seek new and exciting experiences and sensations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I will try anything once	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I like sports and games in which you have to choose your next move very quickly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I would enjoy water skiing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

I quite enjoy taking risks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I would enjoy parachute jumping	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I welcome new and exciting experiences and sensations, even if they are a little frightening and unconventional	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
	<b>Strongly Disagree</b>	<b>Slightly Disagree</b>	<b>Slightly Agree</b>	<b>Strongly Agree</b>	<b>No answer</b>
I would like to learn to fly an airplane	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I sometimes like doing things that are a bit frightening	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I would enjoy the sensation of skiing very fast down a high mountain slope	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

I would like to go scuba diving

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	----------------------------------

I would enjoy fast driving

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	----------------------------------

I generally like to see things through to the end

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	----------------------------------

I tend to give up easily

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	----------------------------------

Unfinished tasks really bother me

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	----------------------------------

Once I get going on something I hate to stop

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	----------------------------------

I concentrate easily

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	----------------------------------

I finish what I start

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	----------------------------------

I'm pretty good about pacing myself so as to get things done on time

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	----------------------------------

I am a productive person who always gets the job done

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	----------------------------------

Once I start a project, I almost always finish it

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	----------------------------------

There are so many little jobs that need to be done that I sometimes just ignore them all

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
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[Resume later](#)

[<< Previous](#)

[Next >>](#)

[Exit and clear survey](#)

## Emotion Regulation

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### 4. Neo Five-factor Inventory

Read each statement carefully. For each statement, choose the one response that best represents your opinion. Please respond to all of the statements.


	Strongly Disagree	Slightly Disagree	In between	Slightly Agree	Strongly Agree	No answer
I am not a worrier	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I like to have a lot of people around me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I often feel inferior to others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I laugh easily	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
When I'm under a great deal of stress, sometimes I	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

feel like I'm going to pieces						
I don't consider myself especially "light-hearted"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I rarely feel lonely or blue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I really enjoy talking to people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I often feel tense and jittery	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I like to be where the action is	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Sometimes I feel completely worthless	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I usually prefer to do things alone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

I rarely feel fearful or anxious	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I often feel as if I'm bursting with energy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I often get angry at the way people treat me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
	<b>Strongly Disagree</b>	<b>Slightly Disagree</b>	<b>In between</b>	<b>Slightly Agree</b>	<b>Strongly Agree</b>	<b>No answer</b>
I am a cheerful, high-spirited person	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Too often, when things go wrong, I get discouraged and feel like giving up	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I am not a cheerful optimist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I am seldom sad or	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
depressed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My life is fast-paced	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I often feel helpless and want someone else to solve my problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I am a very active person	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
At times I have been so ashamed I just wanted to hide	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I would rather go my own way than be a leader of others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

[Resume later](#)
[<< Previous](#)
[Next >>](#)
[Exit and clear survey](#)

## Emotion Regulation

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**5. The Invalidating Childhood Environment Scale**  
The following questions address your experiences of how your parents responded to your emotions when you were young. For each item, please indicate how often the statement reflected your experience up to the age of 18 years. Because your parents may have been very different, please rate them separately. During my childhood.....

**My parents would become angry if I disagreed with them.**

	<b>Never</b>	<b>Rarely</b>	<b>Some of the time</b>	<b>Most of the time</b>	<b>All of the time</b>	<b>No answer</b>
Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Father	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

**When I was anxious, my parents ignored this.**

	<b>Never</b>	<b>Rarely</b>	<b>Some of the time</b>	<b>Most of the time</b>	<b>All of the time</b>	<b>No answer</b>
Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Father	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

	Never	Rarely	Some of the time	Most of the time	All of the time	No answer
Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Father	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

	Never	Rarely	Some of the time	Most of the time	All of the time	No answer
Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Father	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

	Never	Rarely	Some of the time	Most of the time	All of the time	No answer
Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Father	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

	Never	Rarely	Some of the time	Most of the time	All of the time	No answer
Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Father	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

	Never	Rarely	Some of the time	Most of the time	All of the time	No answer
Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Father	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

	Never	Rarely	Some of the time	Most of the time	All of the time	No answer
Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Father	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

	Never	Rarely	Some of the time	Most of the time	All of the time	No answer
Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Father	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

	Never	Rarely	Some of the time	Most of the time	All of the time	No answer
Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Father	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

My parents made me feel OK if I told them I didn't understand something difficult the first time.

	Never	Rarely	Some of the time	Most of the time	All of the time	No answer
Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

	Never	Rarely	Some of the time	Most of the time	All of the time	No answer
Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

	Father	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

If I was pleased because I had done well at school, my parents would say things like: Don't get too confident.

		Never	Rarely	Some of the time	Most of the time	All of the time	No answer
	Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
	Father	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

If I said I couldn't do something, my parents would say things like: You're being difficult on purpose.

		Never	Rarely	Some of the time	Most of the time	All of the time	No answer
	Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
	Father	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

My parents would understand and help me if I couldn't do something straight away.

		Never	Rarely	Some of the time	Most of the time	All of the time	No answer
	Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
	Father	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

My parents used to say things like: Talking about worries just makes them worse.

		Never	Rarely	Some of the time	Most of the time	All of the time	No answer
	Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
	Father	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

If I couldn't do something however hard I tried, my parents told me I was lazy.

		Never	Rarely	Some of the time	Most of the time	All of the time	No answer
	Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
	Father	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

**My parents would explode with anger if I made decisions without asking them first.**

	Never	Rarely	Some of the time	Most of the time	All of the time	No answer
Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Father	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

**When I was miserable, my parents asked me what was upsetting me, so that they could help me.**

	Never	Rarely	Some of the time	Most of the time	All of the time	No answer
Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Father	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

**If I couldn't solve a problem, my parents would say things like: Don't be so stupid; even an idiot could do that!**

	Never	Rarely	Some of the time	Most of the time	All of the time	No answer
Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Father	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

**When I talked about my plans for the future, my parents listened to me and encouraged me.**

	Never	Rarely	Some of the time	Most of the time	All of the time	No answer
Mother	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Father	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

[Resume later](#)

[<< Previous](#)

[Next >>](#)

[Exit and clear survey](#)



## Emotion Regulation

0%  100%

### 7. Personal Need for Structure Scale

Read each of the following statements and decide how much you agree with each according to your attitudes, beliefs, and experiences. It is important for you to realize that there are no "right" or "wrong" answers to these questions. People are different, and we are interested in how you feel.

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree	No answer
It upsets me to go into a situation without knowing what I can expect from it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I'm not bothered by things that interrupt my daily routine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I enjoy having a clear and structured mode of life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I like to have a place for everything and everything in its place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I enjoy being spontaneous	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I find that a well-ordered life with regular hours makes my life tedious	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I don't like situations that are uncertain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I hate to change my plans at the last minute	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

I hate to be with people who are unpredictable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I find that a consistent routine enables me to enjoy life more	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I enjoy the exhilaration of being in unpredictable situations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I become uncomfortable when the rules in a situation are not clear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

[Resume later](#)
[<< Previous](#)
[Next >>](#)
[Exit and clear survey](#)

**Emotion Regulation**

0%  100%

**8. Ego Undercontrol Scale**

Please rate the following statements by indicating the degree you either agree or disagree with the statement.

	Strongly Disagree	Slightly Disagree	Slightly Agree	Strongly Agree	No answer
I tend to buy things on impulse	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I become impatient when I have to wait for something	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I often say and do things on the spur of the moment, without stopping to think	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

I can remember "playing sick" to get out of something	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I have often had to take orders from someone who did not know as much as I did	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
When I get bored, I like to stir up some excitement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Some of my family have quick tempers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
People consider me a spontaneous, devil-may-care person	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I often get involved in things I later wish I could get out of	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

I have been known to do unusual things on a dare	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I have sometimes stayed away from another person because I thought I might do or say something that I might regret afterwards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I do not always tell the truth	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
My way of doing things can be misunderstood or bother others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Sometimes I rather enjoy going against the rules and doing things I	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

am not  
supposed to

At times, I am tempted to do or say something that others would think inappropriate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
	<b>Strongly Disagree</b>	<b>Slightly Disagree</b>	<b>Slightly Agree</b>	<b>Strongly Agree</b>	<b>No answer</b>
At times I have very much wanted to leave home	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I would like to be a journalist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I like to flirt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Some of my family have habits that bother and annoy me very much	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

At times I have worn myself out by undertaking too much

	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
In a group of people I would not be embarrassed to be called on to start a discussion or give an opinion about something I know well	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I would like to wear expensive clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I am against giving money to beggars	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
It is unusual for me to express strong approval or disapproval	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

of the actions  
of others

I like to stop and think things over before I do them	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I don't like to start a project until I know exactly how to proceed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I finish one activity or project before starting another	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I am steady and planful rather than unpredictable and impulsive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
On the whole, I am a cautious person	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I do not let too many things get in the way of my work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

**Strongly Disagree**   **Slightly Disagree**   **Slightly Agree**   **Strongly Agree**   **No answer**

I keep out of trouble at all costs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I consider a matter from every viewpoint before I make a decision	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I am easily downed in an argument	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I have never done anything dangerous for the fun of it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
My conduct is largely controlled by the customs of those about me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

It makes me uncomfortable to put on a stunt at a party even when others are doing the same sort of thing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I find it hard to make small talk when I meet new people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

[Resume later](#)
[<< Previous](#)
[Next >>](#)
[Exit and clear survey](#)

Emotion Regulation

0%  100%

9. Ego Resiliency Scale

Please rate the following statements on a scale of 1 = very strongly disagree and 4 = very strongly agree

	Strongly Disagree	Slightly Disagree	Slightly Agree	Strongly Agree	No answer
I am generous with my friends.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I quickly get over and recover from being startled.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I enjoy dealing with new and unusual situations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I usually succeed in making a	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

favorable  
impression on  
people.

☐ ☐ ☐ ☐ ☒

I enjoy trying  
new foods I  
have never  
tasted before.

☐ ☐ ☐ ☐ ☒

I am regarded  
as a very  
energetic  
person.

☐ ☐ ☐ ☐ ☒

I like to take  
different paths  
to familiar  
places.

☐ ☐ ☐ ☐ ☒

I am more  
curious than  
most people

☐ ☐ ☐ ☐ ☒

Most of the  
people I meet  
are likeable.

☐ ☐ ☐ ☐ ☒

I usually think  
carefully about  
something  
before acting.

☐ ☐ ☐ ☐ ☒

I like to do new  
and different  
things.

☐ ☐ ☐ ☐ ☒

My daily life is  
full of things  
that keep me  
interested.

☐ ☐ ☐ ☐ ☒

I would be  
willing to  
describe myself  
as a pretty  
"strong"  
personality.

☐ ☐ ☐ ☐ ☒

I get over my  
anger at  
someone  
reasonably  
quickly.

☐ ☐ ☐ ☐ ☒

Resume later

<< Previous

Next >>

Exit and clear survey

## Emotion Regulation

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### 10. Relationship Scales Questionnaire

Please read each of the following statements and rate the extent to which you believe each statement best describes your feelings/behaviours with regard to close relationships.

	not at all like me	somewhat like me	moderately like me	quite a bit like me	very much like me	No answer
I find it difficult to depend on other people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
It is very important to me to feel independent.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I find it easy to get emotionally close to others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I want to merge completely with another person	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I worry that I will be hurt if I allow myself to become too close to others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I am comfortable without close emotional relationships.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I am not sure that I can always depend on others to be there when I need them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I want to be completely emotionally intimate with others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>



I worry about being alone.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I am comfortable depending on other people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I often worry that romantic partners don't really love me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I find it difficult to trust others completely.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I worry about others getting too close to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I want emotionally close relationships.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I am comfortable having other people depend on me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

	not at all like me	somewhat like me	moderately like me	quite a bit like me	very much like me	No answer
I worry that others don't value me as much as I value them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
People are never there when you need them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
My desire to merge completely sometimes scares people away.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
It is very important to me to feel self-sufficient.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I am nervous when anyone gets too close to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

I often worry that romantic partners won't want to stay with me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I prefer not to have other people depend on me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I worry about being abandoned.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I am somewhat uncomfortable being close to others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I find that others are reluctant to get as close as I would like.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I prefer not to depend on others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I know that others will be there when I need them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I worry about having others not accept me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
People often want me to be closer than I feel comfortable being.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I find it relatively easy to get close to others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
<div><div>Resume later</div><div>&lt;&lt; Previous</div><div>Next &gt;&gt;</div><div>Exit and clear survey</div></div>						

## Emotion Regulation

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### 11. The Inventory of Interpersonal Problems

Here is a list of problems that people report in relating to other people. Please read the list below, and for each item, consider whether that problem has been a problem for you with respect to any significant person in your life.

It is hard for me to:

	Not at all	A little bit	Moderately	Quite a bit	Extremely	No answer
Join in on groups	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Do what another person wants me to do	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Get along with people who have authority over me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Socialize with other people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

Feel comfortable around other people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Be supportive of another person's goals in life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Accept another person's authority over me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Ignore criticism from other people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Take instructions from people who have authority over me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Be assertive without worrying about hurting the other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

Be self-confident when I am with other people

	Not at all	A little bit	Moderately	Quite a bit	Extremely	No answer
--	------------	--------------	------------	-------------	-----------	-----------

I fight with people too much	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I am too sensitive to criticism	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I get irritated or annoyed too easily	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I am too sensitive to rejection	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

I am too aggressive towards other people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I try to please other people too much	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I feel attacked by other people too much	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I worry too much about other people's reactions to me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I am influenced too much by another person's thoughts and feelings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

I worry too much about disappointing other people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I lose my temper too easily	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I argue with other people too much	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I feel embarrassed in front of other people too much	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
I feel too anxious when I am involved with another person	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

[Resume later](#)
[<< Previous](#)
[Next >>](#)
[Exit and clear survey](#)

### Emotion Regulation

0%  100%

#### 12. Debrief

The purpose of this screen is to inform you of the aims of the study you have participated in, and to give you information about potential sources of support should you think these would be helpful.

The study aimed to investigate the effect of individual differences/personality in emotion regulation and childhood experiences on social functioning in non-clinical participants.

You completed a number of questionnaires. The questionnaires were the Urgency-Premeditation-Perseverance-Sensation seeking (UPPS), NEO Five Factor Inventory (NEO-FFI; Neuroticism and Extraversion subscales), Invalidating Childhood Environment Scale (ICES), Personal Need for Structure (PNS), Ego Undercontrol Scale, Ego Resiliency Scale, Inventory of Interpersonal Problems (IIP), Relationship Scales Questionnaire (RSQ) and a demographic questionnaire. These questionnaires were used to measure your individual levels of positive and negative affect, your experiences during childhood, your tendency towards either over or under regulating emotions and your interpersonal style.

Whilst this study was not designed to induce distress, should you experience distress or upset at any point in connection with this study or with issues highlighted by it, there are a number of sources of support or advice that you may access (listed below). In addition you may contact the experimenter (details given below) to discuss any aspect of the study or your response to it.

**Thank you for your participation in this study. Your email address will be entered into the prize draw and successful participants will be contacted by the experimenter via email at the end of the study. Alternatively, if you opted to receive course credits you will be contacted by the experimenter to arrange this.**

Experimenter's contact details: Claire Nash on [cn242@exeter.ac.uk](mailto:cn242@exeter.ac.uk)

### Contacting Health Professionals

A number of health professionals are able to offer help and advice to people troubled by extreme mood states or distressing thoughts and feelings. These include:

**Your GP:** you can contact your GP to arrange an appointment, or in an emergency: most GP surgeries will connect you to an out of hours service if you call outside of office hours needing help.  
As a student you can contact **Exeter University Student Health Centre**, whether or not you are currently registered.

#### Streatham Campus

Student Health Centre, Reed Mews  
(01392) 676606

At other times during vacation contact the St Thomas Health Centre (01392) 676676

#### St Luke's Campus

Heavitree Health Practice, Heavitree Health Centre  
(01392) 211511

### Student Counselling Service.

The student counselling service is open from 9.30-13.00 and 14.00-17.00 during term time. You can call to arrange an appointment. Their contact details are:

Student Counselling Service  
Reed Hall, Hailey Wing  
Streatham Drive  
Exeter  
EX4 4PD

For further information see their web page at:  
<http://www.services.ex.ac.uk/counselling/contacting.html>

### Other sources of support/information

**Voice:** (University of Exeter) Voice is a student listening and information service run by students for students at the University of Exeter. If you are experiencing personal difficulties or are feeling sad, stressed, lost or worried and would like to talk to someone you can contact them on:

72400 (on campus) or 01392 275284 (8pm - 8am)

**Samaritans:** Samaritans provides confidential emotional support 24 hours a day. You can telephone them at any time or visit them in person between the hours given below.

24 hour helpline: 08457 909090  
Email help service: [jo@samaritans.org](mailto:jo@samaritans.org)  
Address: 10 Richmond Road, Exeter, EX4 4JA (08.00-21.30)  
website: [www.samaritans.org](http://www.samaritans.org)

\* I have read and understood the debrief

☐ Yes ☐ No

[Resume later](#)

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## Appendix G. Ethics Approval Form

2010/BS

### PSYCHOLOGY DEPARTMENT ETHICAL APPROVAL FORM

Tick one box: ☐ STAFF Project    ☒ POSTGRADUATE Project    ☐ TRACK A  
☐ UNDERGRADUATE Project    ☒ TRACK B  
☐ ROUTINE EXTENSION TO PRE-APPROVED STUDY

Title Of Project: Personality and its effects on socio-emotional functioning

Name of researcher(s): Claire Nash

Name of supervisor (for student research): Professor Thomas Lynch and Dr Roelie Hemple  
Date: Nov 2010

		YES	NO	N/A
1	Will you describe the main experimental procedures to participants in advance, so that they are informed in advance about what to expect?	y		
2	Will you tell participants that their participation is voluntary?	y		
3	Will you obtain written consent for participation?	y		
4	If the research is observational, will you ask participants for their consent to being observed?	y		
5	Will you tell participants that they may withdraw from the research at any time and for any reason?	y		
6	With questionnaires, will you give participants the option of omitting questions they do not want to answer?	y		
7	Will you tell participants that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs?	y		
8	Will you debrief participants at the end of their participation (i.e. give them a brief explanation of the study)?	y		

If you have ticked **No** to any of Q1-8, but have ticked **box A** overleaf, please give any explanation on a separate sheet. (Note: N/A = not applicable)

		YES	NO	N/A
9	Will your project involve deliberately misleading participants in any way?		N	
10	Is there a realistic risk of any participants experiencing either physical or psychological distress or discomfort? If <b>Yes</b> , give details on a separate sheet and state what you will tell them to do if they should experience any problems (e.g. who they can contact for help).	y		

If you have ticked **Yes** to 9 or 10 you should normally tick **box B** overleaf; if not, please give a full explanation on a separate sheet.

		YES	NO	N/A
11	Does your study involve work with animals? If yes, and your study is purely observational, please tick <b>box A</b> . All other studies should tick <b>box B</b> and provide supporting information.		N	
12	Do participants fall into any of the following special groups? If they do, please refer to SPS guidelines, and tick <b>box B</b> overleaf. <b>Please note that you may also need to gain satisfactory CRB clearance or equivalent for overseas participants.</b>	School children (under 18 years of age)	N	
		People with learning or communication difficulties	N	
		Patients	N	
		Those at risk of psychological distress or otherwise vulnerable	N	
		People in custody	N	
		People engaged in illegal activities (e.g. drug taking)	N	

There is an obligation on the lead researcher to bring to the attention of the Departmental Ethics Committee projects with ethical implications not clearly covered by the above checklist.


PLEASE TICK EITHER BOX A or BOX B BELOW AND PROVIDE THE DETAILS REQUIRED IN SUPPORT OF YOUR APPLICATION, THEN SIGN THE FORM.

Please tick:

<b>A.</b> I consider that this project has <b>no</b> significant ethical implications to be brought before the Departmental Ethics Committee.	
<b>In less than 150 words, provide details of the experiment including the number and type of participants, methods and tests to be used (i.e. the procedure).</b>	
This form (and any attachments) should be submitted to the Departmental Ethics committee where it will be considered by the Chair before it can be approved.	

<b>B.</b> I consider that this project <b>may</b> have ethical implications that should be brought before the Departmental Ethics Committee, and/or it will be carried out with children or other vulnerable populations.	<b>Y</b>
<b>Please provide all the further information listed below in a separate attachment.</b>	
1. Title of project.	
2. Purpose of project and its academic rationale.	
3. Brief description of methods and measurements.	
4. Participants: a) Human research: Recruitment methods, number, age, gender, exclusion/inclusion criteria.	
b) Animal research: location of study site, method of obtaining / marking / identifying subjects, handling procedures for field experiments.	
5. Consent and participant information arrangements, debriefing. (Not relevant for animal research) <b>Please attach intended information and consent forms.</b>	
6. A clear but concise statement of the ethical considerations raised by the project and how you intend to deal with them.	
7. Estimated start date and duration of project.	
This form should be submitted to the Departmental Ethics Committee for consideration. <b>If any of the above information is missing, your application will be returned to you.</b>	


I am familiar with the BPS Guidelines for ethical practices in psychological research (and have discussed them with other researchers involved in the project.)

Signed:  Print Name: Claire Nash Date: 9/11/10  
(UG/PG Researcher(s), if applicable) Email: cn242@exeter.ac.uk

Signed:  Print Name: Professor Thomas Lynch Date: 9/11/10  
(Lead Researcher or Supervisor) Email: tl248@exeter.ac.uk

#### STATEMENT OF ETHICAL APPROVAL

This project has been considered using agreed Departmental procedures and is now approved.

Signed:  Print Name: Chris Burgess Date: 16/12/10  
(Chair, Departmental Ethics Committee)



## Appendix H. Instructions to Authors

### Emotion – Instructions for Authors

*Emotion*<sup>®</sup> publishes significant contributions to the study of emotion from a wide range of theoretical traditions and research domains. The journal includes articles that advance knowledge and theory about all aspects of emotional processes, including reports of substantial empirical studies, scholarly reviews, and major theoretical articles. Submissions from all domains of emotion research are encouraged, including studies focusing on cultural, social, temperament and personality, cognitive, developmental, health, or biological variables that affect or are affected by emotional functioning. Both laboratory and field studies are appropriate for the journal, as are neuroimaging studies of emotional processes. Studies of psychopathology contributing to the understanding of the role of emotional processes in affective and behavioral disorders are also welcome. Reports of work at the animal and molecular levels will be considered if they help to elucidate fundamental mechanisms of emotion.

Most of the articles published in *Emotion* will be reports of original research, but other types of articles are acceptable.

- Case studies from either a clinical setting or a laboratory will be considered if they raise or illustrate important questions that go beyond the single case and have heuristic value.
- Articles that present or discuss theoretical formulations of emotion and related affective phenomena, or that evaluate competing theoretical perspectives on the basis of published data, may also be accepted.
- Comprehensive reviews of the empirical literature in an area of study are acceptable if they contain a meta-analysis and/or present novel theoretical or methodological perspectives.
- Comments on articles published in the journal will be considered.

Prepare manuscripts according to the *Publication Manual of the American Psychological Association* (6<sup>th</sup> edition). Manuscripts may be copyedited for bias-free language (see Chapter 3 of the *Publication Manual*).

Double-space all copy. Other formatting instructions, as well as instructions on preparing tables, figures, references, metrics, and abstracts, appear in the *Manual*.

Below are additional instructions regarding the preparation of display equations and tables.

#### Tables

---

Use Word's Insert Table function when you create tables. Using spaces or tabs in your table will create problems when the table is typeset and may result in errors.

Review APA's [Checklist for Manuscript Submission](#) before submitting your article.

## Abstract and Keywords

---

All manuscripts must include an abstract containing a maximum of 250 words typed on a separate page. After the abstract, please supply up to five keywords or brief phrases.

List references in alphabetical order. Each listed reference should be cited in text, and each text citation should be listed in the References section.

Examples of basic reference formats:

### **Journal Article:**

Herbst-Damm, K. L., & Kulik, J. A. (2005). Volunteer support, marital status, and the survival times of terminally ill patients. *Health Psychology, 24*, 225–229.

### **Authored Book:**

Mitchell, T. R., & Larson, J. R., Jr. (1987). *People in organizations: An introduction to organizational behavior* (3rd ed.). New York, NY: McGraw-Hill.

### **Chapter in an Edited Book:**

Bjork, R. A. (1989). Retrieval inhibition as an adaptive mechanism in human memory. In H. L. Roediger III & F. I. M. Craik (Eds.), *Varieties of memory & consciousness* (pp. 309–330). Hillsdale, NJ: Erlbaum.

## Ethical Principles

---

It is a violation of APA Ethical Principles to publish "as original data, data that have been previously published" (Standard 8.13).

In addition, APA Ethical Principles specify that "after research results are published, psychologists do not withhold the data on which their conclusions are based from other competent professionals who seek to verify the substantive claims through reanalysis and who intend to use such data only for that purpose, provided that the confidentiality of the participants can be protected and unless legal rights concerning proprietary data preclude their release" (Standard 8.14).

APA expects authors to adhere to these standards. Specifically, APA expects authors to have their data available throughout the editorial review process and for at least 5 years after the date of publication.

Authors are required to state in writing that they have complied with APA ethical standards in the treatment of their sample, human or animal, or to describe the details of treatment.

[Download Certification of Compliance With APA Ethical Principles Form \(PDF: 26KB\)](#)

The APA Ethics Office provides the full [Ethical Principles of Psychologists and Code of Conduct](#) electronically on their website in HTML, PDF, and Word format. You may also request a copy by [emailing](#) or calling the APA Ethics Office (202-336-5930). You may also read "Ethical Principles," December 1992, *American Psychologist*, Vol. 47, pp. 1597–1611.



SCHOOL OF PSYCHOLOGY

DOCTORATE IN CLINICAL PSYCHOLOGY

**Literature Review**

A Critical Review of the Literature Relating Temperament, Childhood  
Invalidation and Personality to Socio-Emotional Functioning.

Claire Nash

8<sup>th</sup> May 2012

**DOCTORATE IN CLINICAL PSYCHOLOGY**

Trainee: Claire Nash

Date: 8<sup>th</sup> May 2012

Assignment/Assessment: **Literature Review**

Title:

**A Critical Review of the Literature Relating Temperament, Childhood Invalidation and Personality to Socio-Emotional Functioning.**

Total Word Count: **3997 (excluding figure, titles, abstract and appendices)**

Statement of academic probity and professional practice:

**For individual work:** "I certify that all material in this assignment / assessment which is not my own work has been identified and properly attributed. I have conducted the work in line with the BPS DCP Professional Practice Guidelines." Signed ...

A handwritten signature in purple ink, appearing to read 'Claire Nash', with a long horizontal flourish extending to the right.

## **Target Journal: Behaviour Research and Therapy**

### **GUIDE FOR AUTHORS**

.

### **INTRODUCTION**

*Behaviour Research and Therapy* encompasses all of what is commonly referred to as cognitive behaviour therapy (CBT). The focus is on the following: theoretical and experimental analyses of psychopathological processes with direct implications for prevention and treatment; the development and evaluation of empirically-supported interventions; predictors, moderators and mechanisms of behaviour change; and dissemination and implementation of evidence-based treatments to general clinical practice. In addition to traditional clinical disorders, the scope of the journal also includes

behavioural medicine. The journal will not consider manuscripts dealing primarily with measurement, psychometric analyses, and personality assessment.

### **BEFORE YOU BEGIN**

#### ***Ethics in publishing***

For information on Ethics in publishing and Ethical guidelines for journal publication see

<http://www.elsevier.com/publishingethics> and <http://www.elsevier.com/ethicalguidelines>.

#### ***Conflict of interest***

All authors are requested to disclose any actual or potential conflict of interest including any financial, personal or other relationships with other people or organizations within three years of beginning the submitted work that could inappropriately influence, or be perceived to influence, their work. See also <http://www.elsevier.com/conflictsofinterest>.

#### ***Submission declaration***

Submission of an article implies that the work described has not been published previously (except in the form of an abstract or as part of a published lecture or academic thesis), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere including electronically in the same form, in English or in any other language, without the written consent of the copyright-holder.

### ***Changes to authorship***

This policy concerns the addition, deletion, or rearrangement of author names in the authorship of accepted manuscripts:

*Before the accepted manuscript is published in an online issue:* Requests to add or remove an author, or to rearrange the author names, must be sent to the Journal Manager from the corresponding author of the accepted manuscript and must include: (a) the reason the name should be added or removed, or the author names rearranged and (b) written confirmation (e-mail, fax, letter) from all authors that they agree with the addition, removal or rearrangement. In the case of addition or removal of authors, this includes confirmation from the author being added or removed. Requests that are not sent by the corresponding author will be forwarded by the Journal Manager to the corresponding author, who  
AUTHOR INFORMATION PACK 23 Apr 2012  
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*After the accepted manuscript is published in an online issue:* Any requests to add, delete, or rearrange author names in an article published in an online issue will follow the same policies as noted above and result in a corrigendum.

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### ***Language and language services***

Please write your text in good English (American or British usage is accepted, but not a mixture of these). Authors who require information about language editing and copyediting services pre- and post-submission please visit <http://webshop.elsevier.com/languageservices> or our customer support site at <http://support.elsevier.com> for more information.

## **PREPARATION**

### ***Article structure***

#### ***Subdivision - unnumbered sections***

Divide your article into clearly defined sections. Each subsection is given a brief heading. Each heading should appear on its own separate line. Subsections should be used as much as possible when crossreferencing text: refer to the subsection by heading as opposed to simply 'the text'.

#### ***Appendices***

If there is more than one appendix, they should be identified as A, B, etc. Formulae and equations in appendices should be given separate numbering: Eq. (A.1), Eq. (A.2), etc.; in a subsequent appendix, Eq. (B.1) and so on. Similarly for tables and figures: Table A.1; Fig. A.1, etc.

### ***Essential title page information***

- **Title.** Concise and informative. Titles are often used in information-retrieval systems. Avoid abbreviations and formulae where possible.
- **Author names and affiliations.** Where the family name may be ambiguous (e.g., a double

name), please indicate this clearly. Present the authors' affiliation addresses (where the actual work was done) below the names. Indicate all affiliations with a lower-case superscript letter immediately after the author's name and in front of the appropriate address. Provide the full postal address of each affiliation, including the country name and, if available, the e-mail address of each author.

- **Corresponding author.** Clearly indicate who will handle correspondence at all stages of refereeing and publication, also post-publication. **Ensure that telephone and fax numbers (with country and area code) are provided in addition to the e-mail address and the complete postal address. Contact details must be kept up to date by the corresponding author.**

- **Present/permanent address.** If an author has moved since the work described in the article was done, or was visiting at the time, a 'Present address' (or 'Permanent address') may be indicated as a footnote to that author's name. The address at which the author actually did the work must be retained as the main, affiliation address. Superscript Arabic numerals are used for such footnotes.

### *Abstract*

A concise and factual abstract is required with a maximum length of 200 words. The abstract should state briefly the purpose of the research, the principal results and major conclusions. An abstract is often presented separately from the article, so it must be able to stand alone. For this reason, References should be avoided, but if essential, then cite the author(s) and year(s). Also, non-standard or uncommon abbreviations should be avoided, but if essential they must be defined at their first mention in the abstract itself.

### *Tables*

Number tables consecutively in accordance with their appearance in the text. Place footnotes to tables below the table body and indicate them with superscript lowercase letters. Avoid vertical rules. Be sparing in the use of tables and ensure that the data presented in tables do not duplicate results described elsewhere in the article.

### *References*

#### *Citation in text*

Please ensure that every reference cited in the text is also present in the reference list (and vice versa). Any references cited in the abstract must be given in full. Unpublished results and personal communications are not recommended in the reference list, but may be mentioned in the text. If these references are included in the reference list they should follow the standard reference style of the AUTHOR INFORMATION PACK 23 Apr 2012 [www.elsevier.com/locate/brat](http://www.elsevier.com/locate/brat) 8 journal and should include a substitution of the publication date with either 'Unpublished results' or 'Personal communication'. Citation of a reference as 'in press' implies that the item has been accepted for publication.



### *Web references*

As a minimum, the full URL should be given and the date when the reference was last accessed. Any further information, if known (DOI, author names, dates, reference to a source publication, etc.), should also be given. Web references can be listed separately (e.g., after the reference list) under a different heading if desired, or can be included in the reference list.

### *Reference style*

*Text:* Citations in the text should follow the referencing style used by the American

Psychological Association. You are referred to the Publication Manual of the American Psychological Association, Sixth Edition, ISBN 978-1-4338-0561-5, copies of which may be ordered from <http://books.apa.org/books.cfm?id=4200067> or APA Order Dept., P.O.B. 2710, Hyattsville, MD 20784, USA or APA, 3 Henrietta Street, London, WC3E 8LU, UK. Details concerning this referencing style can also be found at <http://linguistics.byu.edu/faculty/henrichsen/apa/apa01.html>.

*List:* references should be arranged first alphabetically and then further sorted chronologically if necessary. More than one reference from the same author(s) in the same year must be identified by the letters 'a', 'b', 'c', etc., placed after the year of publication.

### *Examples:*

Reference to a journal publication:

Van der Geer, J., Hanraads, J. A. J., & Lupton, R. A. (2010). The art of writing a scientific article.

*Journal of Scientific Communications*, 163, 51–59.

Reference to a book:

Strunk, W., Jr., & White, E. B. (2000). *The elements of style*. (4th ed.). New York: Longman, (Chapter 4).

Reference to a chapter in an edited book:

Mettam, G. R., & Adams, L. B. (2009). How to prepare an electronic version of your article. In B. S. Jones, & R. Z. Smith (Eds.), *Introduction to the electronic age* (pp. 281–304). New York: E-Publishing Inc.

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## **Index**

Abstract and key words	146
Introduction	147-149
Review of the theoretical and empirical literature	149-156
Limitations and Implications	156-159
Future research	159-164
Conclusion	165
References	166-177
Appendix. Review Process	178-179

# **A Critical review of the literature relating temperament and childhood invalidation to personality and socio-emotional functioning.**

## **Abstract:**

The role that individual differences in personality, temperament and childhood environment play in socio-emotional functioning has been widely researched. Several key theories have proposed to account for this relationship (such as Clark, 2005; Block & Block, 1980; McNaughton & Gray, 2000) and relate findings to axis I and axis II psychopathologies such as treatment-resistant depression and personality disorders. This review critically evaluates the personality and psychopathology literature. Particular constructs that this review identifies are temperament (threat and reward sensitivity), childhood invalidation and self-regulatory capacity (comprising self-control of emotions -ranging from emotional under-control to emotional over-control-, and self-regulation of emotions). Examination of the existing literature will identify limitations and subsequent implications of the current theoretical and empirical research and explain how this has led to the development of a model of personality and socio-emotional functioning (Lynch, et al, in press).

**Key Words:** Temperament, individual differences, Self-Regulatory Capacity, socio-emotional functioning, childhood invalidation

## **Introduction**

### **Introduction and rationale for the review**

A plethora of literature discusses the effects of temperament and childhood environment on personality and socio-emotional functioning, within which there has been particular focus on individual differences. To date, several temperamental and neuro-psychological theories currently account for personality and individual differences in interpersonal functioning (e.g. McNaughton & Gray, 2000; Clark, 2005; Porges, 1995; Block & Block, 1980). Such theories and associated empirical studies have identified key factors which are thought to influence psychopathology, and in particular socio-emotional functioning; these factors include temperament, an invalidating childhood environment, and the capacity to self-regulate emotional and behavioural responses (self-regulatory capacity; SRC).

Difficulties with emotion regulation and interpersonal functioning characterise the majority of mental health difficulties (both axis I and axis II). Therefore, it is important that clinically useful models are developed which allow for identification of mechanisms for therapeutic change. However, a number of limitations exist within the current research highlighting the need for a new integrated model of personality and socio-emotional functioning.

### **Objectives of the review**

The review aims to examine the theoretical and empirical literature relating to the relationship between temperament, childhood invalidation, SRC and interpersonal functioning. Consideration will be given to research methods and their usefulness will be discussed. The review will integrate

the literature and take the above-mentioned limitations into account to propose a new model recently developed by Lynch et al, (in press).

### **Search Methods**

Searches were conducted on Web of Science, PsycINFO and PubMed databases, using the following search terms: interpersonal functioning, emotion\* regulation, over-control\*, under-control\*, temperament\* systems, personality, self-regulatory capacity, ego-control, ego resiliency and combinations thereof. Titles were scanned to select relevant articles and their abstracts read. From these, relevant full texts were selected and read and a final selection of studies for the review was made. This selection process is outlined in the Appendix. Relevant articles included those that were theoretical and/or empirical and included one or more constructs from the proposed model. In addition, relevant articles which had been previously identified by the authors of the new model were also included. Selection of search terms involved reading these previously identified articles and determining from them which terms gave enough relevant and not too many irrelevant hits. Unfortunately it was not possible to access all articles in full text and so not all relevant studies could be reviewed; this is likely to add a bias to the review.

### **Exclusion and Inclusion Criteria**

Articles not written in English have been excluded. The review included studies with participants from any demographic including age, nationality, ethnicity etc. published between 1899 and January 2012.

## **Definition of key constructs**

### **Emotion regulation**

Akin to other studies in the field (e.g. Eisenberg et al., 2000), the present study distinguishes between emotion regulation and emotional control. Emotional self-regulation involves the ability to flexibly activate or inhibit emotion as required (Rothbart & Bates, 2006). In contrast, overcontrol refers to the tendency to be constrained and lack the ability to self-regulate, while undercontrol refers to the tendency to be disinhibited emotionally and also lack the ability to self-regulate (Block & Block, 1980).

### **Temperament**

Temperament is defined as innate individual differences in biological arousability (Rothbart, 1981). For example individuals high in the temperament 'negative affect' are more easily aroused by negative stimuli such as stress or threat whereas those high in 'positive affect' are more easily aroused by positive stimuli such as reward (Rothbart 1981; Clark, 2005).

### **Childhood invalidation**

Childhood invalidation is defined as living in an environment where one's personal experiences are not validated by caregivers and where communication of emotion is either ignored or punished (Linehan, 1993).

## **Interpersonal functioning**

A facet of psychological well-being, interpersonal functioning is defined as the ability to act wisely in human relations (Thorndike, 1929).

## **Review of the theoretical and empirical literature**

The relationship between personality and psychopathology has been of interest for hundreds of years and a number of theories and models have been developed which propose to account for the link between individual differences in personality and symptoms of psychopathology. The review identifies and explores the key theories and critically evaluates the associated research.

## **Review of the relationship between temperament, SRC and psychopathology**

Two key theories have accounted for the relationship between temperament, SRC and psychopathology: Gray's (1970) Reinforcement Sensitivity Theory (RST) revised by McNaughton and Gray (2000) and Clark's Temperamental Model (2005). Both theories propose a three-systems approach to explain individual differences in personality and behaviour.

The RST described these three systems as (i) Flight-Fight-Freeze System (FFFS), activated by aversive stimuli (the 'punishment system'); (ii) Behavioural Activation System (BAS), activated by appetitive stimuli ('reward system') and (iii) Behavioural Inhibition System (BIS), activated by goal conflict

(between BAS and FFFS) (Gray & McNaughton, 2000). Overall, empirical studies have supported the fundamental importance of reinforcement processes in personality and behaviour (e.g. Carver et al., 2000, Stable et al., 2000). However, the utility of the RST in understanding personality and socio-emotional functioning is limited by the experimental procedures used, such as heavy reliance on animal experimental data (Matthews & Gilliland, 1999) and the fact that it doesn't account for environmental factors (Corr, 2004).

Clark (2005) proposed a temperamental three system approach which aimed to link personality and psychopathology. The theory comprised two motivational systems of Negative Affectivity (NA) and Positive Affectivity (PA) and a third non-affective construct, termed Disinhibition versus Constraint (DvC). NA mediates the response to aversive stimuli and is shown to be correlated with McNaughton and Gray's (2000) FFFS system; PA mediates the response to appetitive stimuli and has been shown to be correlated with BAS (Sagarra et al., 2007). DvC has a gate-keeper role in the degree to which incoming stimuli are subjected to inhibitory influence and the degree of contextual flexibility with which an individual can gate-keep. Constraint is characterised by high emotional and behavioural inhibition while lack of constraint is characterised by disinhibition. This system is proposed to be related to BIS (Sagarra et al., 2007).

Both theories suggest that activation of each system results in different behaviour and given that individuals vary in their sensitivity and threshold to each system, the extent to which these three systems are activated and the resulting behaviour varies across individuals (Carver & White, 1994). In this way, the theories account for individual differences. For example, individuals who are more sensitive to appetitive/rewarding stimuli tend to be higher in BAS/PA and have a propensity towards approach and impulsive behaviours. Individuals more sensitive to aversive/threatening stimuli tend



to be higher in FFFS/NA and have a propensity towards withdrawal and avoidance behaviours. BIS/DvC activation results in inhibition of approach/avoidance behaviours and an increase in regulatory behaviours. High activation therefore results in good self-regulation of emotions and behaviour and low activation results in poor self-regulation i.e. either too much disinhibition (leading to approach) or too much constraint (leading to withdrawal; Clark, 2005).

Excessive activation of these systems results in extreme approach or withdrawal behaviours and often psychopathology. Empirical evidence supports this notion, for example increased BAS was found in individuals with cluster B personality disorder (PD) (Cleas et al., 2009) and increased PA in those with cluster B PD and substance misuse (Caspi, 2000; Eisenberg et al., 2000; Kreuger, 1999; Kendler et al., 2003). Increased NA was found in fearful, depressed and socially isolated individuals (Caspi, 2000). Reviewing the experimental studies relating to these two theories highlighted a paucity of research focusing on emotional and behavioural constraint compared with disinhibition.

Both Gray (1970) and Clark (2005) identified a regulatory construct in their theories: BIS/DvC. The role of this regulatory construct in personality and psychopathology is best understood from Block and Block's 1980 investigations which identified two constructs involved in self-regulation: ego control (tendency to inhibit emotion and impulse, ranging from over-control (highly inhibited or constrained individuals) to under-control (highly expressive or disinhibited individuals) and ego resiliency (capacity to respond flexibly and adaptively to environmental stimuli). Combining these two constructs into one regulatory component can account for how individuals characteristically deal with threatening or rewarding stimuli, whether they over-control, under-control or flexibly self-regulate their emotional and behavioural response.

In summary, both McNaughton and Gray (2000) and Clark (2005) have identified two temperamental systems, BIS/BAS and NA/PA, respectively, which correlate highly with each other, suggesting that they explain a common construct. Similarly, several authors have included a regulatory component in their models of personality and socio-emotional functioning, e.g. ego-control and ego resiliency (Block & Block, 1980), BIS (McNaughton & Gray, 2000), or DvC (Clark, 2005), most likely also explaining similar, if not the same, construct.

### **Review of the relationship between SRC, personality and interpersonal functioning**

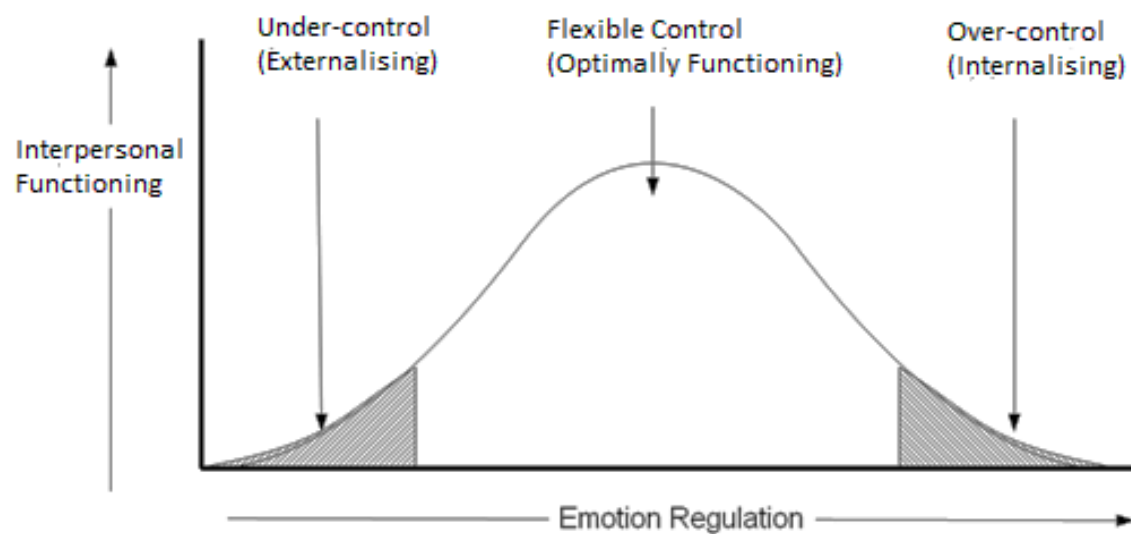
Block and Block (1980) developed a theory suggesting that individual differences in ego control and ego resiliency result in three personality types: overcontrollers, undercontrollers and resilient. Ego control and ego resiliency are independent constructs (Block & Block, 1980) which, when considered in combination, have the ability to predict an individual's characteristic style of emotion regulation (Spinrad et al., 2006). Overcontrollers are low in ego resiliency, high in ego-control and therefore over-regulate/control their responses to incoming stimuli. Undercontrollers are low in ego resiliency, low in ego-control and under-regulate their responses to incoming stimuli. In these contrasting ways, both overcontrollers and undercontrollers are poor at behavioural and emotional self-regulation. Resilient are high in ego resiliency, moderate in ego control and are able to flexibly self-regulate their level of emotional and behavioural control by being receptive and open to environmental stimuli, suggesting behavioural change is needed for optimal functioning. Individuals range from greater to lesser resemblance of the three types depending on where they fall on the ego resiliency and ego control dimensions. For example, an individual high in ego resiliency and moderate in ego control would be expected to be a resilient; however, research has demonstrated that there are

no clear boundaries between the three prototypes (Chapman & Goldberg, 2011). Therefore, an individual high in ego resiliency and slightly high in ego control will less resemble a resilient than if they were moderate in ego control.

These three personality types have become known as ARC personality types, an acronym coined by Costa et al. (2002) which reflects the lead researchers of the three key articles in the field (Asendorpf et al., 2001; Caspi & Silva, 1995; Robins et al., 1996, studies outlined below). ARC personality types are widely researched, most recently replicated by Chapman and Goldberg (2011).

Campos et al. (1989) suggest that emotion regulation is a social process occurring within the context of interpersonal relationships and interactions. In fact, individual differences in regulation predict the quality of interpersonal functioning (Eisenberg & Fabes, 1992 cited in Letzring et al, 2004). Individuals tend to fall into one of three interpersonal functioning styles: externalising, internalising and optimally functioning and these styles have been linked to each of the ARC personality types. Undercontrollers are characterised by externalising interpersonal tendencies such as impulsivity and aggression and overcontrollers are characterised by internalising interpersonal tendencies such as withdrawal and introversion (Asendorpf et al., 2001), suggesting that both overcontrollers and undercontrollers are socially impaired (Caspi & Silva, 1995). Resilients, who are flexible in their emotional control, are mostly free of psychopathology (Robins et al., 1996). This pattern of findings is represented in Figure 1.

Figure 1. Relationship Between Emotion Control and Interpersonal Functioning



*Note.* Graphic representation of the relationship between emotion control and interpersonal functioning and distribution of under-controlled and over-controlled individuals within that relationship.

The aforementioned findings suggest that emotion regulation and interpersonal functioning have a quadratic relationship; such that too little or too much control results in interpersonal problems (Eisenberg et al., 2000). This contrasts with previous studies which have found high emotional control is an adaptive personality style and under-control is maladaptive, suggesting a linear relationship between these constructs (e.g. Metcalfe & Mischel, 1999; Mischel et al., 1988; Tangney et al., 2004). Studies assuming linear relations have tended to use measures which assess problems with lack of self-control and ego resiliency and do not assess negative aspects of high self-control (e.g. Tangney et al., 2004, Letzring et al., 2004).

Nevertheless, a growing body of evidence supports the idea that as both over-control and under-control are characterised by poor self-regulation (Claes, 2006), both are maladaptive.

Undercontrollers are prone to externalising disorders such as antisocial PD, Borderline PD, conduct disorder (Caspi, 2000; Eisenberg et al., 2000; Krueger, 1999) and aggression (Hershorn & Rosenbaum, 1991; Calkins & Fox, 2002); all these are characterised, in part, by problems with interpersonal functioning. At the other end of the spectrum overcontrollers are prone to internalising disorders such as depression, social phobia (Caspi, 2000), withdrawal (Calkins & Fox, 2002) and Cluster A PD (Thompson- Brenner et al., 2008). However, some of these findings may be inconsistent with a dysregulation hypothesis of depression which suggests that undercontrol characterises depression (Siever Kenneth & Davis, 1985). Undercontrol and a failure to inhibit responses to incoming stimuli (Chaplin et al., 2005) have been demonstrated to precede depression. Feng et al (2009) differentiates between two motivational systems involved in depression (i) anger, which is associated with approach and undercontrol and (ii) sadness, which is associated with avoidance and overcontrol. This could explain the inconsistencies in the literature.

Studies have found that high effortful control (akin to ego resiliency) is negatively related to psychopathology (Muris et al., 2008) and predicts social competence (Zhou et al., 2010) and that low effortful control is related to an increase in both internalising and externalising disorders (Lengua et al. 2008).

## **Review of the relationship between childhood invalidation, psychopathology and interpersonal functioning**

There is strong and consistent empirical evidence that childhood invalidation is associated with psychopathologies and poorer interpersonal functioning (Davis & Petretic-Jackson, 2000). Childhood maltreatment has been found to be associated with increased interpersonal problems, depression, difficulties regulating mood and post-traumatic stress (commonly characterised by hyperarousal to threat and avoidance responses; Cloitre et al., 2005). Childhood maltreatment is associated with elevated symptoms of all three PD clusters and individuals with PD report greater rates of maltreatment (Tyrka et al., 2009). Specifically, longitudinal studies have demonstrated that neglect or maltreatment in early life is associated with internalising disorders (Keiley et al., 2001; Kim et al., 2009; Manly et al., 2001), whereas multiple types of maltreatment, particularly physical or sexual abuse is associated with externalising disorders (Kim et al., 2009). In addition, individuals with a validating childhood have been rated as having higher ego resiliency (Weinfield, 1999) which suggests an association exists between an individual's childhood environment and their self-regulatory capacity. In fact, it has been suggested that a complex interaction of childhood environment and temperament may channel an individual into one of the three ARC types (Donnellan & Robins, 2010).

### **Limitations and implications of the reviewed literature**

Examination of the existing theoretical and empirical literature revealed a number of limitations. PD research has predominantly focused on Cluster B PD (e.g. Borderline and Antisocial PD; Clark, 2005) which is characterised by emotional and behavioural under-control, despite strong evidence that Cluster A and C PD (e.g. Obsessive-Compulsive PD), characterised by over-control, are associated

with poor treatment responses (Fournier et al., 2008). Given the number of service users who re-present to services, i.e. are 'treatment-resistant', a greater understanding of the over-controlled population will improve and support services involved in their care and treatment. Few existing theories have linked theory to practice and despite significant focus on developing interventions for under-control such as dialectical behaviour therapy (Linehan, 1993), specific mechanisms of change for therapeutic work with over-control is only starting to be recognised and investigated (e.g. Lynch et al., in prep).

Currently personality disorder is defined categorically by the Diagnostic and Statistical Manual (DSM) IV-TR (American Psychological Association, 1980), resulting in diagnostic co-morbidity and heterogeneity between those sharing the same categorical diagnosis (Widiger & Trull, 2007).. A dimensional approach to PD, such as is being considered by the DSM-V research agenda (American Psychiatric Association, 2012) would avoid this.

Despite substantial evidence for the influence of parental temperament and behaviour on a child's interpersonal functioning (e.g. Calkins & Fox, 2002; Eisenberg et al., 1993), the combined effect of temperament and childhood environment on personality style and socio-emotional functioning has been largely neglected.

The mediating effect of individual differences in emotion regulation and personality has been overlooked in research examining temperamental influences on psychopathology (Bijttebier et al., 2009). A greater understanding of this influence would allow for interventions to be better tailored to the individual and improve treatment effectiveness.

### **Methodological limitations**

Temperament, personality and psychopathology can be measured with a wide variety of tools such as self-report, psychophysiological and biobehavioural measures. For example interpersonal functioning can be measured via the Inventory of Interpersonal Problems (Kim & Pilkonis, 1999), facial EMG and the Interpersonal Perception Task (Costanzo & Archer, 1993) respectively. The review did not uncover any empirical studies that used all three types of measurement and identified a predominance of self-report measures which are sensitive to biases such as social desirability and therefore limited in their measurement of latent variables (e.g. Claes et al., 2009; 2010; Spinrad et al., 2007; Eisenberg et al., 1993; 2000; Juffer et al., 2004; Zhou et al., 2010). Two studies used self-report and behavioural methods (Spinrad et al., 2007; Simonds et al., 2007). Beauchaine and colleagues (2001, 2002 (cited in 2007 paper) & 2007) used all three types of measure over the course of several separate and slightly different studies.

A number of studies relied on correlational designs, which limit their ability to draw conclusions about causal relationships between variables. Moreover, the review did not uncover any studies which used mediation analyses as a means of testing hypothesised mechanisms and relationships within models. Given the evidence which supports the mediating role of an individual's style of emotion regulation (e.g. under-, over- or flexible), the evidence base would benefit from such analyses.

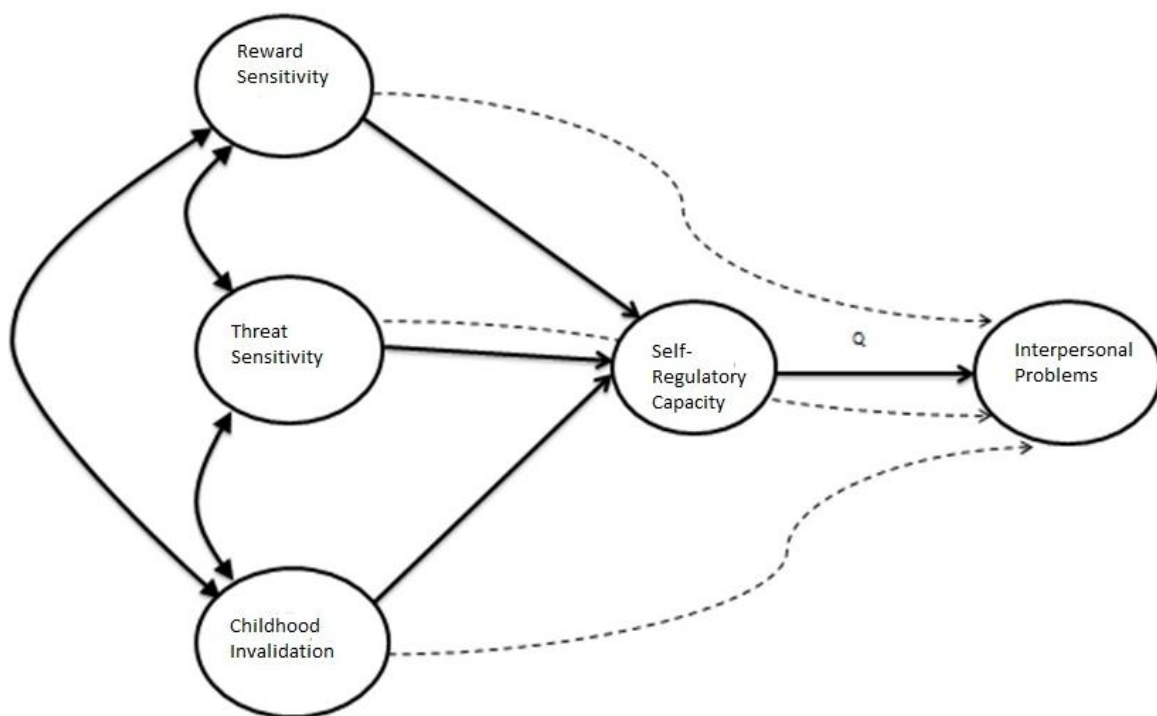
### **Future Research: combining all evidence into the new model**

Critical examination of the literature has identified a need for a new model of personality and socio-emotional functioning. The new model, developed by Lynch et al. (in press), aims to integrate consistent findings from the theoretical and empirical papers underpinning McNaughton and Gray



(2000), Clark (2005) and Porges (1995) and respond to the limitations outlined above by (i) taking a dimensional approach to PD; (ii) covering the full PD dimension from over-controlled PD to under-controlled PD; (ii) including and accounting for individual differences in temperament and family/environment; (iv) including a self-regulatory component (SRC) as a mediator between temperament and childhood invalidation and interpersonal functioning; and (v) allowing for a quadratic relationship between SRC and interpersonal functioning, such that both too much and too little self-control characterise poor self-regulation and are associated with interpersonal problems. The model is represented in Figure 2.

Figure 2. New integrated model of personality and socio-emotional functioning.



*Note.* Direct effects are indicated by a dashed arrow and indirect effects (mediated by SRC) are indicated by a solid arrow. All relationships are linear aside from that indicated by 'Q' between SRC and Interpersonal Problems which is hypothesised as quadratic. Double headed arrows indicate covariance relationships.

## **Explanation of concepts in the new model**

### ***Temperament: threat and reward sensitivity.***

Threat and reward sensitivity form the temperament component of the model. Threat sensitivity is akin to NA and FFFS and activated by aversive stimuli, reward sensitivity is akin to PA and BAS and activated by appetitive stimuli. Individuals vary in their sensitivity to each of these motivational systems and activation of each system results in different behaviours. High sensitivity to reward is associated with approach behaviours whereas high sensitivity to threat is associated with withdrawal and inhibition.

### ***Childhood invalidation.***

The new model aims to account for both biological and environmental influences on personality and socio-emotional functioning. The environmental component of the model is accounted for by childhood invalidation. A child growing up in an invalidating environment concludes that their view and experience of emotions is incorrect i.e. invalid; this child never learns to self-regulate and either over- or under-controls their emotions. There is likely to be an interaction/moderating effect between temperament and childhood invalidation, however as the review did not uncover any empirical studies which serve to explain it, it was beyond the scope of the study and so not modelled here; instead a covariance relationship is predicted. As this particular model is designed to inform treatment it focuses on modelling and testing the mediating effect of SRC, to identify mechanisms of change. As temperament and childhood invalidation are stable, this preliminary stage of model testing is less interested in their interaction. Future development of the model will benefit from investigating this.

### ***Self- Regulatory Capacity.***

SRC is a non-affective system which regulates the degree to which responses to incoming stimuli are subjected to inhibitory influence (Watson et al., 1999; Depue & Collins, 1999) and is akin to DvC and BIS. The construct can be understood as a combination of Block and Block's ego-control and ego resiliency; which the new model terms self-control (either over-control or under-control) and self-regulation respectively. Individuals vary in their SRC along a continuum, ranging from excessive emotional over-control (highly inhibited) to self-regulation (flexibly and optimally regulated) to excessive emotional under-control (highly disinhibited).

An individual's emotional and behavioural response to their environment is mediated by their particular style of emotional-control (i.e. their self-regulatory capacity), such that a tendency to over-control will inhibit emotional and behavioural responses and a tendency to under-control will yield to emotional and behavioural responses; both overcontrollers and undercontrollers are poor at self-regulation. Overcontrollers experience three core deficits (i) deficits in the expression and experience of emotion, manifesting as heightened distress tolerance by minimising physical/emotional distress and masking inner feelings (ii) deficits in interpersonal functioning manifesting as avoidant/distant style of relating and (iii) deficit in receptivity and openness manifesting as risk aversion and avoidance of criticism. Undercontrollers experience deficits in the same domains but with different manifestations such as inability to tolerate distress, marked reactivity of mood, unstable and intense interpersonal relationships, sensation/reward seeking and impulsivity (Lynch et al., in prep). In this way the model challenges linear assumptions regarding self-control by suggesting that it is possible to have too much self-control (proposing a quadratic relationship) but impossible to have too much self-regulation (proposing a linear relationship) because a well-regulated person can flexibly adapt their responses for an optimal performance. Resilients do not experience deficits in the aforementioned domains.

### ***Interpersonal functioning.***

Good interpersonal functioning has reliably been shown to be associated with good mental health (e.g. Bowling and Stafford, 2007) and many psychiatric disorders are characterised by deficits in interpersonal relationships (Porges, 2007). The review revealed an association between individual style of emotion regulation and interpersonal functioning; both extremes of self-control (over-control and under-control) are linked to interpersonal problems: Over-control is associated with internalising interpersonal and under-control is associated with externalising interpersonal problems. Whereas flexible control is associated with good interpersonal functioning

### **Mediation**

The model is developmental and suggests that infants are born with an innate temperament into their childhood environment without the skills to self-regulate. Many infants learn this skill within the first year of life, however certain temperaments and environments do not allow for opportunities to develop self-regulatory capacity. This leads to the development and maintenance of overcontrol or undercontrol, which in turn will result in and explains their characteristic difficulties with interpersonal functioning. In this way, an individual's SRC mediates the impact of their temperament and environment on their interpersonal functioning.

A mediator accounts for the relationship between the predictor and outcome, whereas a moderator affects the direction and/or strength of the relationship. i.e. 'moderator variables specify when certain effects will hold, mediators speak to how or why such effects occur' (Baron & Kenny, 1986, pp 1176). In addition, moderators tend to be stable, whereas mediators can change over time. SRC is understood as a mediator as (i) it can change over time and has been shown to be a mechanism of

change; (ii) it explains the relationship between temperament/environment and interpersonal functioning, i.e. an individual's characteristic way of regulating explains why they have good or poor interpersonal functioning. There are no empirical studies to suggest that SRC changes the direction or strength of the relationship between temperament/childhood invalidation and interpersonal functioning and so SRC is not predicted to be a moderator.

Future research is needed to test the new model to determine its reliability, external validity and clinical utility. The model is designed such that it can be tested through self-report, biobehavioural and psychophysiological measures and through structural equation modelling, which will allow for causal inferences to be made between latent variables.

## **Conclusion**

The current review examined the literature relating temperament, childhood invalidation and personality to socio-emotional functioning. The relationships have been reviewed in terms of McNaughton and Gray's (2000) revised RST, Clark's (2005) Three Systems Temperamental model and Block and Block's (1980) ego-control and ego resiliency theory. Following a critical review of the theoretical and empirical literature a new model is proposed which aims to integrate these theories, address limitations, gaps and inconsistencies in the literature and link theory to practice. The model proposes that the effects of the latent constructs of threat sensitivity, reward sensitivity and childhood invalidation on interpersonal functioning are mediated by SRC. The effect of SRC itself on interpersonal functioning is quadratic. The model accounts for individual differences in these constructs.

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## Appendix. Table outlining the review process

SEARCH TERM	DATABASE	HITS	RELEVANT TITLE	RELEVANT ABSTRACT	DATE SEARCHED
emotion regulation AND interpersonal functioning	WoS	133	39	7	24.1.2012
Interpersonal functioning AND over-control* OR under-control*	WoS	197	44	3	24.1.2012
Interpersonal functioning AND temperament* systems	WoS	10	5	1	24.1.2012
self regulatory capacity AND emotion regulation	WoS	18	10	1	24.1.2012
ego control AND emotion regulation	WoS	34	10	1	24.1.2012
Emotion regulation AND over-control* OR under-control*	WoS	197	30	3	24.1.2012
ego control AND emotion* functioning	WoS	46	8	1	24.1.2012
Interpersonal functioning AND childhood maltreatment	WoS	46	12	0	24.1.2012
childhood maltreatment AND ego control	WoS	3	3	2	24.1.2012
childhood maltreatment AND effortful control	WoS	5	3	1	24.1.2012
Effortful control AND emotion* regulation	WoS	185	67	14	24.1.2012
Ego control AND emotion* regulation	WoS	46	11	3	24.1.2012
personality AND interpersonal function* AND individual difference	WoS	35	2	1	24.1.2012
emotion regulation AND interpersonal functioning	PsycInfo	42	15	7	24.1.2012
Interpersonal functioning AND over-control* OR under-control*	PsycInfo	128	36	8	24.1.2012
Interpersonal functioning AND temperament* systems	PsycInfo	6	4	2	24.1.2012
self regulatory capacity AND emotion regulation	PsycInfo	24	3	3	24.1.2012
ego control AND emotion regulation	PsycInfo	8	3	3	24.1.2012
Emotion regulation AND over-control* OR under-control*	PsycInfo	133	23	14	24.1.2012
ego control AND emotion* functioning	PsycInfo	26(using smart text)	9	4	24.1.2012
Interpersonal functioning AND childhood maltreatment	PsycInfo	3	2	1	24.1.2012
childhood maltreatment AND ego control	PsycInfo	48(using smart text)	9	5	24.1.2012
Effortful control AND emotion* regulation	PsycInfo	32	18	13	24.1.2012
Ego control AND emotion* regulation	PsycInfo	2	1	0	24.1.2012
personality AND interpersonal functioning AND individual difference	PsycInfo	49	11	5	24.1.2012
emotion regulation AND interpersonal functioning	PubMedC	317	42	11	26.1.2012

Interpersonal functioning AND over-control* OR under-control*	PubMedC	283	11	2	26.1.2012
Interpersonal functioning AND temperament* systems	PubMedC	147	1	0	26.1.2012
self regulatory capacity AND emotion regulation	PubMedC	127	5	2	26.1.2012
ego control AND emotion regulation	PubMedC	124	5	3	26.1.2012
Emotion regulation AND over-control* OR under-control*	PubMedC	336	8	2	26.1.2012
ego control AND emotion* functioning	PubMedC	54	6	3	26.1.2012
Interpersonal functioning AND childhood maltreatment	PubMedC	69	6	1	26.1.2012
childhood maltreatment AND ego control	PubMedC	27	1	1	26.1.2012
Effortful control AND emotion* regulation	PubMedC	529	14	7	26.1.2012
Ego control AND emotion* regulation	PubMedC	47	4	3	26.1.2012
personality AND interpersonal functioning AND individual difference	PubMedC	261	12	4	26.1.2012