Understanding Heterogeneity in the Personality and Interpersonal Functioning of Worriers

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

Graham E. Cooper

Graduate Program in Psychology

The Ohio State University

2018

Dissertation Committee:

Professor Michael Vasey, Advisor

Professor Ruchika Prakash

Professor Julian Thayer

Abstract

Generalized Anxiety Disorder (GAD) is a chronic and impairing condition. Despite the fact that there are treatments available, research evidence suggests that there is a need to increase the efficacy of those treatments. One potential path is via consideration of heterogeneity in the population of pathological worriers.

Recent research has demonstrated that, contrary to the prevailing view pathological worriers show heterogeneity in the level of Autonomic Arousal (AA) symptoms they experience. Whereas such symptoms are blunted in some worriers, they are heightened in others. Several recent tests of a recently proposed model of pathological worry suggest that this heterogeneity is a function of individual differences in level of cognitive control capacity. AA symptoms are blunted when cognitive control capacity is high but heightened when such capacity is low. The present study investigated whether such individual differences in cognitive control can also account for observed heterogeneity among worriers in personality features and social behaviors.

Specifically, the present study sought to replicate and extend the findings of two previous studies. In one, it was found that at high levels of worry, high levels of cognitive control predict obsessive-compulsive personality disorder traits (Chriki 2015). In the other, worriers showed heterogeneity in their social behaviors in a confederate social interaction task (Erikson & Newman, 2007). The current study was designed to replicate

both previous studies, and to additionally clarify the extent to which the worry by cognitive control interaction could account for the findings by Erikson and Newman. A sample of 163 individuals enrolled in Psychology 1100 at The Ohio State University completed an in-lab confederate social interaction task along with measures assessing worry, cognitive control capacity, OCPD-spectrum traits, and a variety of constructs related to general and interpersonal functioning.

Results indicated that cognitive control capacity moderated the association between worry and AA symptoms, as found in previous research from our lab. Furthermore, the findings of individual differences in OCPD-spectrum traits were replicated, as was the finding that such differences are predicted by the interaction between worry and cognitive control. However, with regards to the social interaction task, the majority of the findings reported by Erikson and Newman (2007) were not replicated in the current sample. Similarly, with several noteworthy exceptions, worry and cognitive control capacity failed to interact to predict variation on most of the interpersonal constructs of interest. Although such differences may still exist within the broader population of worriers, the lack of significant results for a number of the tested constructs suggests that the present findings should be interpreted with caution. Implications for further research are discussed.

To Elizabeth

For your love, devotion, and unfailing faith in my abilities, this is as much your achievement as it is mine.

Acknowledgments

I would like to thank my advisor, Dr. Michael Vasey, for his incredible patience and expert input throughout my dissertation process. I would also like to extend my sincere gratitude to the other members of my thesis committee, Dr. Julian Thayer and Dr. Ruchika Prakash, for their invaluable contributions. Finally, I would like to thank my colleague Gim Toh, and all of our undergraduate research assistants, for their help in collecting the data described here.

Vita

June, 2008 .....Vintage High School

2012.....B.A. Psychology, University of California, Berkeley

2014.....M.A. Psychology, The Ohio State University

2013 to 2016 .....Graduate Teaching Associate, Department of Psychology, The Ohio State University

2017 to 2018 .....Psychology Intern, VANCHCS

Fields of Study

Major Field: Psychology

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Chapter 1: Introduction

Generalized Anxiety Disorder (GAD) is a chronic and impairing condition. Although efficacious treatments are available, there is considerable room for improvement. One path to such improvement is consideration of heterogeneity in the characteristics of the disorder. Such heterogeneity is well documented in regards to autonomic arousal (AA) symptoms (Vasey, Chriki, & Toh, 2017). This heterogeneity appears to be a function of individual differences among pathological worriers with regards to their capacity for cognitive control. Those individual differences may also contribute to other types of heterogeneity, specifically in personality and interpersonal functioning. This study aimed to test these hypotheses.

Excessive and uncontrollable worry in a variety of domains is the hallmark of GAD (American Psychiatric Association, 2013). This worry is accompanied by a number of additional symptoms, including muscle tension, fatigue, difficulty concentrating, and sleep disturbances. The lifetime prevalence of GAD in the general population is approximately 5% (Kessler et al., 2005), though this figure is elevated in primary care settings (Roy-Byrne & Wagner, 2004). This chronic use of medical care resources points to chronic impairment among patients with GAD. GAD, even when presenting without comorbidities, is associated with a substantial amount of impairment (Wittchen, 2002).

Although Cognitive-Behavioral Therapy (CBT) is generally seen as the gold standard for treating anxiety and related disorders, research evidence suggests that there is considerable room for improved efficacy in the case of GAD. A meta-analysis examining the effects of CBT for GAD (Westen & Morrison, 2001) found that despite a high completion rate (84%) and substantial pre-post treatment effect, the percentage of patients who were ultimately deemed "improved" was relatively low (i.e., 44% for the intent-to-treat group). Although long-term follow-up data were limited for GAD, overall results of this study suggest that although patients, on average, benefitted from treatment, there was a tendency for them to remain symptomatic. However, a more recent meta-analysis (Covin et al., 2008) found evidence for substantial improvements that were generally maintained at follow-up. Nonetheless examination of the individual studies reveals that substantial minorities of patients remain symptomatic despite improvement or showed a limited treatment response to begin with.

The fact that a substantial subset of patients remain symptomatic following treatment (e.g., Roemer, Orsillo, & Barlow, 2002) suggests that while our treatments are efficacious overall, there is still room for improvement. One reason for this may be the presence of heterogeneity in the underlying processes contributing to the persistence of the disorder that, until recently, has been largely ignored. Indeed, an analysis of the published literature suggests that relatively little is known about the factors that contribute to the onset and maintenance of GAD, relative to other anxiety-related disorders (Dugas et al, 2010). Increasingly, evidence supports this perspective, particularly with regards to heterogeneity in AA.

Historically, AA symptoms were associated with the GAD diagnosis. AA symptoms are similar to those experienced by individuals during a panic attack and reflect a state of autonomic hyperarousal (e.g., accelerated heart rate, numbness or tingling, shortness of breath). These symptoms were a feature of the diagnosis through the revised third edition of the DSM (DSM-III-R; APA, 1987) but were dropped in DSM-IV (APA 1994). This decision was, in part, a function of evidence suggesting that patients with GAD do not consistently endorse AA symptoms (Marten, et al., 1993).

In keeping with this perspective, many studies have found a weak association between GAD diagnostic status and self-reported AA. For example, GAD status and worry are not correlated with AA in some studies (e.g., Brown et al., 1998; Brown & McNiff, 2009) and AA symptoms are not always sufficient for distinguishing GAD patients from controls (e.g., Leyfer et al., 2006). Nonetheless, other studies have found a significant link between GAD and AA symptoms. For example, 20%-50% of GAD patients do report elevated AA (e.g., Marten et al., 1993; Starcevic & Bogojevic, 1999) and GAD samples often score higher than controls on measures of AA (e.g., Aldao & Mennin, 2012; Hoehn-Saric et al., 2004). Additionally, significant rates of comorbidity between panic disorder (PD) and GAD (e.g., Brown & Barlow, 1992; Starcevic et al., 1999, Tull et al., 2009) demonstrate that heightened AA can occur in GAD.

This conflicting pattern of results can also be observed in studies utilizing physiological measures of AA. While some such studies have found that AA symptoms are not elevated in GAD patients relative to controls at baseline (Fisher et al., 2010; Fisher & Newman, 2013; Llera & Newman, 2014), other studies have found the opposite result (e.g., Fisher and Newman 2013; Thayer et al., 1996). This heterogeneity can also

be found in the neuroimaging literature with some studies demonstrating heightened activity in the amygdala at baseline among GAD patients relative to controls (e.g., McClure et al., 200; Monk et al., 2008) despite other studies not replicating this pattern of results (e.g., Blair et al., 2012; Monk et al., 2006).

When considering AA in response to emotional provocation, the same pattern of heterogeneity is present. In some studies GAD samples show either no more AA than controls or show less (e.g., Grillon et al., 2009; Hoehn-Saric et al., 1989). Additionally, GAD patients have been reported to show a blunted startle response, relative to the heightened response observed in other anxiety disorder (Lang & McTeague, 2009). On the other hand, other studies (e.g., Pruneti et al., 2010; Thayer et al., 2000) have found that GAD samples demonstrate higher levels of AA than controls in response to emotional provocation. Furthermore, while some studies have elicited AA in GAD patients via a worry induction (Thayer et al., 1996), other studies have failed to do so (e.g., Llera & Newman, 2014).

Early perspectives on AA in worry were articulated in Borkovec's Cognitive Avoidance (CognAv) Model of pathological worry and GAD (Borkovec et al., 2004). According to this model, worry is a cognitive avoidance strategy because it is meant to foster avoidance of future catastrophes and because it suppresses the AA that would normally occur during imaginal processing of future threat possibilities. This latter type of avoidance occurs because the worrier suppresses fear-provoking images and shifts instead to a verbal mode of threat processing, which tends not to activate AA (Vrana, Cuthbert, & Lang, 1986). Insofar as worry does these things, it is negatively reinforced. That is, as in any other anxiety disorder, those behaviors that reduce AA will tend to be

repeated, while behaviors that do not do so (or even make it worse) will be extinguished (Foa & Kozak, 1984). This model dominated the field's understanding of worry and AA for several decades, until Newman and Llera (2011) advanced an alternative model.

Llera and Newman's Contrast Avoidance (ContrAv) Model posits that worry is negatively reinforced, not by suppressing AA, but rather by fostering avoidance of the aversive spike in AA that would otherwise occur when the worrier encounters threat in a relaxed state. To the extent that worry evokes AA and worriers find such unpredictable AA spikes to be aversive, they may learn to worry frequently so as to maintain a chronic state of arousal and thereby avoid such unpredictable spikes. Thus, it is not the end state level of arousal that is meaningful in the maintenance of worry, but rather the magnitude of emotional contrast that the individual ultimately experiences. According to these authors, an individual with GAD is reinforced to worry because a small shift from a chronically elevated level of arousal is subjectively more tolerable than a large, unpredictable, shift from a state of non-arousal. Thus, it is not that worry prepares an individual to adaptively handle threat, but rather that it functions as a coping strategy to avoid intolerable spikes in ones negative emotional experience.

While the CognAv model can account for the evidence of blunted AA among pathological worriers, it is unable to account for the conflicting studies that find the opposite pattern of results. On the other hand, the converse is true for the ContrAv model. To resolve this situation, Vasey et al. (2017) have advanced an integrative model of worry and AA that predicts both of the described patters as a function of individual differences in cognitive control capacity. This model argues that worriers who are high in cognitive control are able to leverage that control such that worry can be used as an

avoidance mechanism that suppresses AA (CognAv model) while worriers who are low in cognitive control instead experience heightened AA during worry and are thereby reinforced through avoidance of unpredictable spikes in their AA (ContrAv model).

Those worriers who are able to use their worry to suppress AA appear to do so by shifting their thought process from threatening imagery to verbal based worry (Toh and Vasey, 2017). As stated by Borkovec et al. (2004), "...when aversive images occur in the process of worry...the shifting of attention to [verbal] worrisome thinking upon each occurrence...results in escape from or avoidance of the somatic element of the fear response..." (p. 83). The shifting of one's attention from imagery to verbal thoughts can be conceptualized as creating cognitive distance, insofar as the threat is no longer salient enough to evoke an autonomic response (Borkovec et al., 1983). Several studies demonstrate that worrying verbally has a weaker association with AA than thinking in images (Tucker & Newman, 1981; Vrana, Cuthbart, & Lang, 1986). In a related study, Borkovec and Hu (1990) instructed three groups of speech phobic individuals to imagine themselves giving a speech. The three groups differed as to whether they were instructed to engage in relaxed, neutral, or worrisome thinking prior to the exercise. Despite no difference between these groups in heart rate (HR) following the induction, those individuals who engaged in worry showed significantly reduced HR during the imagery task, relative to the other two conditions. Thus, by worrying these individuals appear to have suppressed their AA and prevented themselves from emotionally processing their fear. Given that this processing is important for the extinction of fear (Foa & Kozak, 1986), such findings offer a route by which worry functions as an avoidance strategy that maintains anxiety, despite repeated exposure to the feared stimuli (Borkovec & Hu,

1990). However other studies support the ContrAv model by showing that a worry induction elevates AA such that no further increment is seen during fear-provoking imagery (e.g., Newman & Llera, 2011). Vasey et al.'s integrative model proposes that individual differences in cognitive control account for these discrepant findings.

One construct linked to cognitive control is effortful control (EC). EC is a self-regulatory facet of temperament that is believed to reflect one's ability to mobilize a variety of executive functions, including attentional, inhibitory, and activational control (Rothbart & Rueda, 2005). It is possible that based on individual levels of EC and its facets such as attentional control (AC), different worriers essentially operate under different sets of rules. In other words, those worriers who are skilled at controlling the focus of their attention may be able to suppress AA through intensive use of verbal worry. For these worriers, the worry would be negatively reinforced by virtue of its ability to simply suppress their physiological responses to perceived threats. Other worriers who are lower in the ability to control the focus of their attention should experience a greater level of arousal during worry because they are unable to initiate or maintain a shift from imagery to a verbal mode of processing. For these individuals, as noted previously, worry may be negatively reinforced by virtue of reducing unexpected increases in arousal, rather than by suppressing the arousal entirely.

Intuitively it may seem clear that pathological worriers should be low in cognitive control. Indeed, theoretical accounts of worry suggest that pathological worriers are likely to be low in EC and its related constructs (Hirsch & Mathews, 2012). Specifically, it is suggested by Hirsch and Mathews (2012), that pre-existing deficits in AC are not just associated with GAD, but may actually play a causal role in the onset and maintenance of

the basic pathology. Given the DSM's emphasis on "uncontrollable worry" as a core feature of GAD (APA, 2013), this perspective is understandable. After all, if patients with GAD find their worry to be uncontrollable, it would seem counterintuitive for them to be skilled at controlling their thoughts and behaviors; if they are skilled at attentional control, then one would expect them to be able to redirect their attention away from their worry, and towards more adaptive lines of thinking.

Consistent with such a viewpoint, past research from both self-report and objective studies has found a negative association between worry and EC. For example, studies have found that worriers, relative to controls, perform more poorly on a breathing focus task (Borkovec et al., 1983; Pruzinsky & Pruzinsky, 1990). That is, while attempting to focus their attention solely on their breathing, the worriers reported a greater degree of difficulty doing so, and a higher rate of intrusive thoughts. Furthermore, a recent study (Armstrong, Zald, & Olatunji, 2011) provides some insight, in the context of an examination of AC in both GAD and Obsessive Compulsive Disorder (OCD). The purpose of this study was to establish whether or not the co-occurrence of perseverative thinking in GAD and OCD (e.g., perseverative worry and obsessional thoughts) could reflect a common underlying diathesis (i.e., low AC) between the two disorders. The authors found that, as expected, a sample comprising both disorders evidenced a greater degree of perseverative worry as well as lower levels of AC, relative to the non-clinical sample. In addition, it was found that there was a unique relationship between AC and worry in GAD, whereby those subjects with GAD were the only one of the three groups to demonstrate a significant association between AC and worry such that lower levels of AC predicted higher levels of worry (r~ -.50). This is significant, insofar as it supports

the idea that not only are worriers characterized by low AC, but that their difficulty focusing and shifting their attention may be a causal factor in the worry. Additionally, a separate study (Olatunji et al., 2011) found that on a cognitive task, in which participants were required to identify targets that were embedded within series of emotional image, those individuals with GAD were less able to disengage from the distracting images, whether threat-related or neutral, relative to controls. As a result, performance on this task was impaired in the GAD sample. Furthermore, this relative difficulty disengaging from the images was shown to be a function of group differences in their average level of AC. These results would seem to support the notion that worriers are impaired in the ability to effortfully direct their attention from distressing stimuli to more immediately goal-relevant information. And to further emphasize this model of GAD and executive functioning, recent research examining the impact that worry has on executive function (Hayes, Hirsch, & Mathews, 2008) found that worry, especially among pathological worriers, can actually deplete working memory resources. Thus, worriers may be worriers, in part, due to low AC resources, but then the very act of worry, by further depleting those resources, works to keep them that way. Taken together, the above evidence would suggest that worriers are broadly impaired with regards to attentional control resources.

However, it is important to acknowledge that other studies have not found such results. Even in samples showing low levels of AC on average, significant variability is still found among worriers and those with GAD. For example, in the previously noted study (Armstrong, Zald, & Olatunji, 2011) the association between perseverative thinking and AC did not account for the majority of the variance in the constructs. Similarly, the

association between worry and AC was -.54; significant, but far from accounting for all of the variance. Such a correlation leaves room for variation among individual worriers.

A number of studies have reported non-significant relationships between GAD and EC or related constructs. For example, in one study (Bienvenu et al., 2004) conscientiousness (a construct closely associated with EC) was unrelated to GAD symptoms, while in another (Rosellini & Brown, 2011) GAD symptoms and conscientiousness were significantly *positively* related. Studies utilizing performance-based measures of EC have produced results consistent with this overall picture as well. Despite past evidence of general attentional impairment in GAD (e.g., Olatunji et al., 2011), other studies have found that patients with GAD and controls do not significantly differ on the basis of their attentional performance (Hoehn-Saric et al., 1989). And in one study of attentional biases, anxious individuals with good attentional control were better able to shift their attention from threatening stimuli compared to their low-control counterparts (Derryberry & Reed, 2002). Furthermore, recent evidence suggesting that GAD patients in two samples were more able to disengage attention from threat-related pictures of faces than controls supports the notion that at least some such patients have significant capacity for exerting executive control over their attentional focus (Yiend et al., 2014).

Further support for this view comes from the neuroimaging literature. As might be expected, some research has shown that GAD patients have reduced activity in the prefrontal cortex (PFC) during a cognitive task relative to controls, (e.g., Price, Eldreth, & Mohlman, 2011). Given the PFC's role in executive function, this is not surprising, given theoretical accounts of GAD that specify impaired executive functioning. Once

again, however, the story is more complicated. For example, Etkin et al. (2009) found that, relative to control participants, patients with GAD exhibited enhanced functional connectivity at rest between the amygdala and the dorsolateral (dl)PFC. Activity in this particular neurological circuit is thought to be associated with top-down control of amygdala activity, and as such would be expected to be low among chronic worriers. However, these results suggest that the GAD patients showed atypical connectivity between the PFC and the amygdala at rest, when compared to non-clinical counterparts. Indeed, the authors of the study demonstrated that the enhanced activity in this circuit for the worriers might reflect chronic use of cognitive control to regulate excessive anxiety. Specifically, dlPFC-amygdala connectivity showed a negative correlation with subjective reports of anxiety. Notably, this was especially true for scores on the Beck Anxiety Inventory (BAI), which is an instrument that primarily assesses one's experience of AA. These results are important, as they demonstrate not only a surprising link between GAD and neurocircuitry implicated in cognitive control, but also suggest that worriers are using that cognitive control to suppress and avoid their symptoms of AA (consistent with the Cognitive Control model of worry and GAD). Taken together, these inconsistent findings, from a variety of research paradigms, all support the view that there is considerable heterogeneity in GAD with regards to both AA and executive function and that the heterogeneity in the former may be a function of heterogeneity in the latter.

In keeping with this, data from a study conducted by our research group also suggest that there is substantial variation among pathological worriers with regards to EC, and that also individual differences in EC predict the level of AA symptoms (Vasey et al., 2017). These data come from a sample of over 1300 undergraduate students and

provide clear evidence in support of our hypotheses. This study utilized the Effortful Control Scale (ECS; Lonigan and Phillips, 2002), the Penn State Worry Questionnaire (PSWQ; Meyer et al, 1990) which measures intense and uncontrollable worry, and measures assessing physiological hyperarousal, including the Depression and Anxiety Symptoms Scale – Anxiety Subscale (DASS-A; Lovibond and Lovibond, 1995), and the Generalized Anxiety Disorder Questionnaire for DSM-IV, a questionnaire closely following the diagnostic criteria for GAD from the DSM-IV (GAD-Q-IV; Newman et al., 2002).

Analyses revealed a correlation of only r = -.26 between scores on the ECS and scores on the PSWQ, as well as a correlation of only r = -.35 between the ECS and scores on the GAD-Q-IV. Thus, higher symptoms of pathological worry were only modestly associated with lower self-reported EC. The magnitude of these correlations leaves ample room for individual difference among worriers in their levels of EC. Furthermore, regression analyses revealed an interaction between ECS and PSWQ scores predicting DASS-A scores. High symptoms of pathological worry predicted AA *except* when in the presence of high EC. Specifically, PSWQ scores were significantly positively correlated with AA, only for ECS scores <1.71 *SDs*. Although GAD-Q-IV scores significantly predicted DASS-A scores at all levels of EC, the pattern of results was the same as the pattern shown when PSWQ scores were used, and the relationship was weaker when EC was high. When only those individuals in a GAD analog group were considered, the positive correlation between GAD-Q-IV and DASS-A scores was only significant when ECS < -.25 *SDs*. These results were replicated by Toh and Vasey (2014), in a follow-up study examining over 960 individuals. Consistent with expectations, among those

reporting high GAD symptoms, high levels of EC predicted lower AA by virtue of a greater predominance of verbal thoughts during worry. As these data show, pathological worry is associated with symptoms of AA, but this is only true if that individual is low in EC. Insofar as this is the case, individual differences in EC between worriers may be associated with other kinds of heterogeneity.

Aside from AA and cognitive control capacity, heterogeneity among pathological worriers has been reported in personality characteristics and interpersonal functioning. With regards to personality characteristics, the most obvious possibility is that the co-occurrence of high EC and worry results in a constrained, over-controlled personality style that is distinct from that exhibited by worriers with low EC (Chriki 2015). Indeed, of particular interest is the personality trait of Conscientiousness, a dimension of the Five Factor Model of Personality, which has been associated with EC and its correlates (Roberts et al, 2009). Individuals who are high in conscientiousness are those who are ambitious, hardworking, high achievers, and organized. However, those at the high end of this dimension also may be characterized as overcontrolled and rigid (McCrae and Costa, 2003). Research has begun to investigate the association between this personality trait and the maladaptive personality style characteristic of individuals with Obsessive Compulsive Personality Disorder (OCPD). This style is characterized as "a pervasive pattern of preoccupation with orderliness, perfectionism, and mental and interpersonal control, at the expense of flexibility, openness, and efficiency"(APA, 2013). Recent studies have found that measures assessing Conscientiousness are particularly correlated with certain subscales of measures assessing maladaptive personality traits such as "Compulsivity" (Samuel and Widiger, 2011). Indeed, one study investigating

comorbidities between anxiety and personality disorders found that 23% of individuals meeting DSM-III-R criteria for GAD were also likely to meet criteria for Obsessive Compulsive Personality Disorder (OCPD) and in fact the prevalence of this personality disorder in this sample of individuals with anxiety disorders was highest amongst individuals with GAD (Sanderson et al, 1994). Thus, while not all pathological worriers fit the personality profile typical of individuals with OCPD, given the association between EC and conscientiousness, it is reasonable to expect that such personality traits will be found particularly among worriers with high EC. Developmentally, worriers with a high level of EC are more likely to have been reinforced throughout their lives to worry as they are more successful at suppressing PH and avoiding other intense emotional experiences. This may result in a rigid pattern of control that high EC worriers value. They may be more likely to have a rigid and defensive stance towards situations that involve uncertainty, and therefore, they may be more likely to endorse traits of OCPD. Indeed, a prior study conducted in our laboratory (Chriki, 2015) found that while higher levels of EC were associated with reduced impact of worry on general functioning by participant report, they predicted stronger associations between worry and several OCPD personality traits, particularly those associated with low extraversion (i.e., detached coldness and risk aversion) and, to a lesser extent, low openness (i.e., inflexibility and constrictedness).

Considered in context with the other research from our group, this suggests that the presence of high EC among worriers may represent a double-edged sword. On the one hand, EC appears to be protective, such that worriers with high EC are less likely to experience significant symptoms of AA. To the extent that this is the case, it is not

surprising that worry is reinforced; AA is highly aversive for anxious individuals. On the other hand, this may come at a cost. These individuals may learn to use their cognitive control resources maladaptively in the service of avoiding threat. Such an approach may lead these individuals to become constricted and rigid. And although this emotional detachment and rigidity protects the individual from the experience of threat, it may also insulate them from novel experiences, bad or good. What is interesting, however, is that Chriki (2015) did not find an association between worry and individuals' levels of subjective happiness or general functioning. That is, despite approaching the world in a more rigid and constricted manner, these individuals did not report being less happy with or less functional in their lives. One possible explanation for this surprising finding is that while these individuals may experience a decreased quality of life, they may view this as a reasonable trade-off to make in the service of reducing uncertainty. Another possibility is that these individuals are impaired, but in ways that are not readily apparent to themselves.

One domain in which this may particularly be the case is interpersonal functioning (Chriki 2015). Broadly speaking, interpersonal functioning in psychopathology is thought to be characterized by self-fulfilling prophecies, whereby the individual's negative expectations for social interactions can create an environment in which those expectations appear to be directly confirmed (Erikson and Newman, 2007). Although this hypothesis has been examined in the context of certain forms of maladjustment, including depression and social anxiety, little has been done to study this process in the context of pathological worry and GAD symptoms. Nonetheless, chronic worriers often report that their chief concerns are social-evaluative in nature (e.g.,

Borkovec, 1994), and individuals with GAD demonstrate biased attentional processing of both threatening faces (Mogg, Millar, and Bradley, 2000) and social threat-related words. Thus, while social-evaluative concerns are not diagnostic of GAD, many of these pathological worriers spend a significant amount of their time spent worrying about such concerns.

Consistent with this view, Erickson and Newman (2007) reported social difficulties in pathological worry, including marital difficulties, low family cohesion, and few friendships. The direction of that relationship, is not immediately clear, however, and it may be that at least some of these individuals are experiencing social difficulties as a *result* of their worry, rather than as a trigger for it. Consistent with this line of thinking, prior research has found that a subset of individuals with GAD actually appear to underestimate the negative impact that they have upon others (Newman et al., 2004).

Although Newman and colleagues did not collect a measure of cognitive control, it is possible that EC and its related constructs could help to explain why this is the case. That is, high worriers with high EC may be eliciting negative reaction from others, by way of their cold, aloof, and restricted personality style, without realizing it, or perhaps without realizing that their behavior is the source of the negative reaction. Furthermore, if such individuals also use their high capacity for cognitive control to refocus their attention away from social threat, they may miss important social cues (e.g., frustration) that might otherwise alert them to the effect that they are having on their conversation partner (Erikson and Newman, 2007). In a laboratory-based examination of these effects, Erikson and Newman (2007) had high worriers interact socially with a confederate. Over the course of the interaction, the pair completed two tasks. The first was an unstructured,

collaborative story construction task while the second was a structured exercise in which the confederate and the participant took turns disclosing personal information in response to specific prompts. Over the course of both tasks, Erikson and Newman (2007) found that the level of worry reported by the participant predicted both over- and under-estimation of how uncomfortable they appeared to the confederate. That is, some worriers believed that they were having a more negative impact than was actually perceived by the confederate, but others, as predicted by the previously discussed research, did not realize how much of a negative impact they were having on the confederate. On average the GAD analogs did not disclose less overall, and were not rated as less likeable by confederates, relative to control participants. Nonetheless, those GAD analogs who underestimated their negative impact on the confederate tended to disclose less and were less well liked. Thus, individuals who approached the social interaction with a more rigid, less open perspective were not as well liked by the confederate and also seemed unaware that they were having that effect. These findings are interesting, as they are consistent with the previously noted expectations, but they do not permit conclusions to be drawn regarding the underlying factors associated with this specific form of heterogeneity.

At first glance, recent findings by Chriki (2015) suggest that individual differences in EC are unlikely to account for social impairment. Specifically, Chriki found that worriers with high EC reported lower levels of social impairment than worriers with low EC. Although such self-appraisals of social impairment may be accurate, it is also possible that they reflect distorted perceptions or atypical social goals. Indeed, Chriki (2015) examined the individual items that were used to measure social impairment and noted that they did not reflect objective social impairment. For example,

one item asked whether or not the individual experienced interference in their social activities. It is entirely possible, that those worriers having a non-disclosing, aloof interpersonal style are satisfied with their interpersonal relationships. Thus, they may be objectively less socially successful due to their interpersonal style but do not realize it because they prefer to keep others at a distance. That is, the personality style exhibited by these individuals may be socially impairing without them actually realizing it.

Given the likely link between high EC and detached coldness and risk aversion in worriers, I propose that individual differences in EC may also be responsible for this heterogeneity in social functioning. That is, consistent with their broader overcontrolled tendencies, those worriers with high EC may be the worriers who disclose less and are less well-liked by confederate raters. On the other hand, I expect that worriers with low EC are more likely to disclose and more likely to be well-liked by confederates. However, such disclosure may also reduce the confederate's liking for the worrier to the extent that it is excessive. For example, Heerey and Kring (2007) found that partners interacting with socially anxious subjects rated the interaction quality lower as a function of the subject's excessive disclosure and reassurance-seeking. Consequently, I intend to conduct a series of exploratory analyses to further characterize the heterogeneity amongst worriers. Specifically, I also predict that worriers will show heterogeneity across a number of additional social constructs. First, those worriers who are cold and restricted may have smaller social networks, relative to other worriers, and also derive less social support from those networks. Second, insofar as these worriers do not trust close social relationships, they may also be less likely to seek out reassurance when distressed, whereas low-EC worriers may be more likely to *excessively* seek out reassurance. Taken

together, these predictions also suggest potential heterogeneity in attachment styles. High constriction and rigidity, as in high EC, should be associated with a deactivated attachment system, consistent with an avoidant-insecure attachment style (Lynch, 2018). That is, higher levels of EC ought to predict a tendency to hold others at arm's length and to feel misunderstood. On the other hand, dysregulation and emotional dependence, as in low-EC, should be associated with an attachment system that reflects an anxious-insecure style (Skowron & Dendy, 2004).

In summary, the proposed study seeks to replicate Chriki's (2015) findings that individual differences in EC are associated with heterogeneity in personality features and that such heterogeneity is also associated with heterogeneity in patterns of interpersonal functioning. The latter hypothesis will be tested using the social interaction task used by Erikson and Newman's (2007) supplemented with a number of questionnaires aimed at assessing individual differences in the previously stated domains of social functioning. Thus, I will be able to replicate and expand upon past findings to determine whether or not EC is potentially responsible for the apparent heterogeneity in social functioning among worriers.

My primary hypotheses are as follows:

First, I expect to replicate the prior results from our lab regarding the interaction between worry and EC. That is, I hypothesize that this interaction will predict the symptoms of AA such that high-EC worriers report lower levels of AA than their low-EC counterparts.

Second, I hypothesize that individual differences in EC at high levels of worry will be associated with heterogeneity in personality features. Specifically, worriers with

high EC will be more likely than their low EC counterparts to endorse traits associated with the obsessive-compulsive spectrum, especially traits of low extraversion and low openness as found by Chriki (2015).

Third, I also believe that the interaction will predict impairment, both at a social and general level, such that high-EC worriers will report experiencing relatively lower levels of subjective impairment. That is, high-EC worriers will report relatively higher levels of social functioning, emotional wellbeing and overall physical health.

Fourth, I expect that individual differences in EC among worriers will predict heterogeneity on a social interaction task, as previously reported by Erikson and Newman (2007). Specifically, I believe that relative to low-EC worriers, high-EC worriers will be less well liked by the confederates, less likely to make significant emotional disclosures, and more likely to underestimate their negative social impact on the confederate. However, I also expect that low-EC worriers may negatively impact their impact on the confederate due to excessive disclosure. Furthermore, because worry is expected to be associated with risk aversion overall, it should be noted that worry will likely be negatively associated with willingness to disclose. Thus, worry should be negatively associated with willingness to disclose, but this effect should be stronger when EC is high.

Fifth, I also intend to conduct several exploratory analyses to further clarify the social functioning of worriers. Specifically, I hypothesize that those worriers with high EC will demonstrate poorer social networks (both with regards to size and quality) and more avoidant attachment style. In contrast, those worriers low in EC will demonstrate higher levels of reassurance seeking and more anxious attachment style.

Finally, it should be noted that the interaction predicted in my first hypothesis is not a prerequisite to test my subsequent hypotheses. Due to my recruiting strategy, the between-subjects variance on worry will be restricted, which may make the proposed interaction difficult to detect. Nonetheless, it would still be possible to test the main effect of EC on the other constructs of interest. Given that my participants will be selected for their relatively high level of worry, EC main effects would be sufficient to support my hypotheses.

Chapter 2: Methods

Participants

Sampling Strategy:

Participants were recruited in two ways. First, participants were prescreened through the Research Experience Program (REP). Individuals completed 2 items regarding their worry, along with the Effortful Control Scale-Persistence/Low Distractibility (ECS-PLD), during the REP prescreening phase. Specifically, I extended invitations to individuals who reported both that they worry at least 50% of each day and that worry is problematic for them. Among those individuals I oversampled those who were at low and high levels of EC (lower and upper quartile of the ECS-PLD) in order to increase my power for examining EC-based heterogeneity among worriers. I also recruited 10% of worriers falling in the middle two quartiles of EC. In order to meet my recruitment targets, I also opened the study for enrollment by any Psychology 1100 student who reported worrying for at least 50% of each day and stated that worry is a problem for them.

Sample Size:

A power analysis was conducted to determine the needed sample size, as described by Cohen, Cohen, West, & Aiken (2002). If the effect size of EC as a

moderator of the relationship between worry and personality traits of low extraversion (i.e., detached coldness and risk aversion) is of the magnitude found by Chriki (2015) with comparable R^2, a sample size of 65 individuals would be required to have 80% power to detect the effect at an alpha level of 0.05. However, insofar as the magnitude of the effects of EC on other aspects of functioning is not known, I proposed a sample size of at least 100 participants to enhance power to find those effects.

Final Sample:

The sample was composed of 163 students, including 117 females and 46 males, with a mean age of 18.83. (SD = 1.33). Participants were undergraduate students enrolled in an introductory psychology class at the Ohio State University. All participants were 18 years of age or older and were compensated with course credit. Participants were prescreened and recruited to complete two 2.5-hour laboratory sessions, as part of a larger joint project. Those selected for the study were emailed to invite their participation in the study. During the first session, participants were walked through informed consent. They then completed a battery of questionnaires using Qualtrics, which is a secure, web-based data collection service. During the second session, participants again complete a variety of questionnaires and also engaged in a social interaction task.

Measures

Demographics:

Demographic Questionnaire: The demographic questionnaire included items concerning the participant's age, gender, year in school, race and ethnicity, marital status, and primary language.

Questionnaire Assessing Autonomic Arousal:

Depression, Anxiety, and Stress Scales-Anxiety (DASS-A): The DASS (Lovibond & Lovibond, 1995) is a 42 item self-report measure designed to yield three scales measuring the negative emotional states of depression (DASS-D), anxiety (DASS-A), and stress (DASS-S). Participants are asked to respond to each question using a 4-point Likert scale, anchored by 0 (Did not apply to me at all) and 3 (Applied to me very much, or most of the time). The DASS-D taps into dimensions of depression including dysphoria and hopelessness, while the DASS-S assesses dimensions that are similar to worry, such as difficulty relaxing and agitation. The DASS-A, on the other hand, predominantly assesses symptoms of autonomic arousal. This subscale includes items such as "I had a feeling of faintness" and "I felt I was close to panic". The authors report good psychometric properties for the DASS. Internal reliability for the DASS-A was found to be high ($\alpha = .81$ respectively).

Questionnaires Assessing Worry:

Penn State Worry Questionnaire (PSWQ): The PSWQ (Meyer, Miller, Metzger, & Borkovec, 1990) is a self-report measure of pathological worry. It consists of 16 items rated on a Likert scale ranging from 1 (Not at All Typical) to 5 (Very Typical). Example items include, "my worries overwhelm me," and "I have been a worrier all my life." This

measure has demonstrated good internal consistency ($\alpha = 0.93$), high test-re-test reliability (0.92) over a period of 8 – 10 weeks.

Worry and Anxiety Questionnaire (WAQ): The WAQ (Dugas et al., 2001) consists of 11 items covering DSM-IV diagnostic criteria for GAD. The WAQ has satisfactory test–retest reliability and good known-groups validity (Dugas et al., 2001). The authors found the WAQ to have 82% specificity and 75% sensitivity. The Somatic subscale of the WAQ was retained for this study to include items measuring restlessness or feeling keyed up or on edge, being easily fatigued, difficulty concentrating or mind going blank, irritability, muscle tension, and sleep disturbance.

Questionnaires Assessing Effortful Control:

Effortful Control Scale-Persistence/Low Distractibility subscale (ECS): The ECS (Lonigan & Philips, 2001) consists of 24 items rated on a 5-point Likert scale ranging from 1(Not at All) to 5 (Very Much). The ECS yields two subscale scores reflecting Persistence/Low Distractibility (ECS-PLD; 12 items) and Impulsivity (ECS-I; 12 items). In this study we will be using the ECS-PLD subscale, which focuses on attention control and the capacity to persist in activities despite reactive motivation to avoid. Example items from the ECS-PLD subscale include, "It's very hard for me to concentrate on a difficult task when there are noises around" and "I can quickly switch from one task to another." The measure has good psychometric properties in college samples (Vasey, 2012).

Adult Temperament Questionnaire-Effortful Control Subscale (ATQ-EC): The ATQ-EC (Evans & Rothbart, 2007) is a 19-item self-report questionnaire that includes

the measurement of three facets of EC, including activation control, inhibitory control, and attentional control. The subscale shows good internal correlations for the three facets ($\alpha > 0.66$), and for the overall subscale ($\alpha = 0.78$). The items of the ATQ-EC ask participants to rate the extent to which statements are descriptive of themselves on a Likert scale ranging from 0 (extremely untrue of you) to 7 (extremely true of you). The ATQ-EC has been widely used by Rothbart and her colleagues and others in college student and other adult populations (e.g., Evans & Rothbart, 2007).

Measure of Personality:

Five-Factor Obsessive-Compulsive Inventory (FFOCI): The FFOCI (Samuel et al, 2012) is a self-report questionnaire that contains 120 items asking participants to rate the extent to which statements are true for them. Each item is scored on a 5-point Likert scale rated from "false/strongly disagree" to "definitely true/strongly agree". The FFOCI contains 12 subscales that correspond to personality facets related to Obsessive Compulsive Personality Disorder (OCPD). Research has found good internal reliability for this measure, showing that the internal reliability of the subscales range from .77 to .87. Additionally, the scales show good convergent validity and correlate highly with other scales measuring related constructs (Samuel et al, 2012).

Measure of General Functioning:

Short Form Health Survey-36 (SF-36): The SF-36 (Ware et al, 1993) is a 36-item self-report questionnaire on functional health and well-being. The scale comprises of the two factors of Physical Health and Mental Health, which are broken down into several

subscales, including Physical Functioning, Social Functioning, Emotional Wellbeing, and General Health (i.e. overall perceptions of general physical health). The subscales have shown good internal reliability ($.68 < \alpha < .92$). It has been extensively used in research on a range of populations to assess the effect of various illnesses on indices of general functioning (Ware & Gandek, 1998). For the purposes of the present study, the subscales of interest are Social Functioning, Emotional Wellbeing, and General Health

Measures of Social Network and Social Support:

Social Network Index (SNI): The SNI (Cohen, Doyle, Skoner, Rabin & Gwaltney, 1997) is a self-report questionnaire assessing the size of participants' social networks. Respondents are asked to identify whether or not they have any of twelve different types of social relationships (e.g., friends, neighbors, classmates) as well as whether or not they speak (in person or on the phone) to those individuals at least once every two weeks. The questionnaire also assesses the total number of individuals in the respondents' social network. Ultimately, three scores related to the respondent's social network are produced. The first, Number of High-Contact Roles, assesses the number of social roles in which the respondent is active regularly (i.e., has social contact at least once every 2 weeks). The second, Number of People in Social Network, assesses the number of individuals with whom the respondent has regular social contact (i.e., at least once every 2 weeks). The final, Number of Embedded Networks, is highly similar to Number of High-Contact Roles but collapses all family/friend roles into a single domain. Research has found that the measure has good convergent validity (e.g., Cohen, et. al. 1997).

Interpersonal Support Evaluation List- College Student Version (ISEL): The ISEL (Cohen and Hoberman, 1983) is a self-report measure that contains 48 items asking college-aged participants to rate the extent to which they have access to social support. The inventory consists of four subscales: appraisal, tangible, self-esteem maintenance, and belonging. Sample items include "I know someone who I see or talk to often with whom I would feel perfectly comfortable talking about any problems I might have adjusting to college life. (Appraisal)"; "I know someone who would give me $100 to help with my tuition. (Tangible)"; "Most of my friends think I am smart. (Self-esteem maintenance)"; "I hang out in a friend' s room or apartment quite often. (Belonging)." Respondents mark "Probably true" (PT) or "Probably false"(PF) for each item. Research has shown that the ISEL possesses good internal validity. The internal reliability of the total scale is adequate (a = .77) and the internal reliability of the subscales ranges from .60 to.77 (Cohen and Hoberman, 1983).

Questionnaires Assessing Social Impairment:

Short Form of the Inventory of Interpersonal Problems Circumplex Scale (IIP-SC): The IIP-SC (Soldz et al, 1995) is a 32-item self-report measure that assesses interpersonal functioning based on the circumplex model of human behavior (Wiggins, 1982). It is a shortened form of the 64-item IIP-C (Alden, Wiggins, and Pincus, 1990), which was derived out of Horowitz' s original 127-item Inventory of Interpersonal Problems. This short form was established in order to assess interpersonal difficulties in individuals within the context of research. Items are rated on a 5-point Likert scale ranging from "not at all" to "extremely." Participants are asked to rate the extent to which

certain interpersonally-related behaviors are too hard for them, such as “It is hard for me to ask other people to get together socially with me”, or are behaviors they do too much, such as “I am too aggressive towards other people.” The scale was validated in a college sample and was found to have high internal consistency ($\alpha = .89$) and good convergent validity (Hopwood et al, 2008).

Excessive Reassurance Seeking Scale (ERSS): The ERSS (Joiner & Metalsky, 2001) is a 4-item measure assessing the construct of excessive reassurance seeking, using items such as "Do you frequently seek reassurance from the people you feel close to as to whether they really care about you?" Participants score each item on a 7-point Likert scale, where a higher score corresponds to higher levels of reassurance seeking. The ERSS has been used extensively in research, and has demonstrated good internal consistency and convergent validity.

Questionnaires Assessing Attachment:

Experiences in Close Relationships-Revised (ECR-R): The ECR-R (Fraley, Waller, and Brennan, 2000) is a measure of adult attachment-related anxiety and avoidance, consisting of 36 7-point Likert items ranging from "strongly disagree" (1) to “strongly agree” (7). 18 of the items are statements relating to attachment-related anxiety (e.g., "I'm afraid that I will lose my partner's love.") while the other 18 items assess attachment related avoidance (e.g., "I am nervous when partners get too close to me"). The ECR-R is a revised version of the Experiences in Close Relationships questionnaire (ECR; Brennan, Clark, and Shaver, 1998). The items on the ECR-R were selected using techniques based on Item Response Theory but were selected from the same item pool as

those from the ECR. Although the original items are worded to refer to a romantic partner, they have frequently been reworded in past research to reference different individuals, or even simply close relationships in general.

Inventory of Parent and Peer Attachment (IPPA): The IPPA (Armsden and Greenberg, 1987) is a measure of perceived adolescent attachment to parents and peers. The revised measure (Armsden 1986), which will be used here, consists of 75 5-point Likert items, split into three factors (25 items each): maternal attachment (e.g., "my mother respects my feelings."), paternal attachment (e.g., "my father respects my feelings."), and peer attachment (e.g., "when we discuss things, my friends care about my point of view."). Scores on each item range from "almost never or never true" (1) to "almost always or always true" (5). The subscales have good internal consistency (a = .87, .89, and .92, for maternal attachment, paternal attachment, and peer attachment, respectively), and good convergent validity.

Questionnaires Measuring Social Impact:

Desire for Future Interaction Questionnaire (DFI): The DFI (Coyne, 1976). is an 8-item measure of an individual's interest in future interaction with another person (e.g., “Would you like to meet this person again?”). Individuals respond using a 5-point Likert scale ranging from “not at all” (1) to “definitely” (5). The measure has demonstrated high internal consistency in past research (α=.97; Papsdorf and Alden, 1998).

Impact Message Inventory-IIA Octant Scale Version (IMI-IIA). The IMI-IIA (Kiesler & Schmidt, 1993) is a measure of a person's interpersonal impact, measured via self-report of covert reactions experienced by one’s interaction partner. Participants

respond to 56 items reflecting feelings, urges, and thoughts about what the other person wants over the course of an interaction. Items are partitioned into eight scales (octants): Dominant, Hostile-Dominant, Hostile, Hostile-Submissive, Submissive, Friendly-Submissive, Friendly, and Friendly-Dominant. Although scales do not share items in common, the constructs overlap. For example, Hostile-Submissive, Submissive, and Friendly-Submissive scales are all characterized by a target's behavior that seems submissive (e.g., when I am with this person she makes me feel in charge), but the scales differ on whether such unassertiveness appears to be socially hostile, neutral, or friendly. Each item is scored on a 4-point Likert scale, ranging from "not at all" (1) to "very much so" (4). As in Eriksen and Newman (2007), the IMI-IIA was used to assess participants' impact on confederates, and an adapted version was used by participants to rate their perceptions of their own impact (IMI-IIA Self). Both versions of the scale have demonstrated acceptable to high levels of internal consistency (Schmidt, Wagner, and Kiesler, 1999; Eriksen and Newman, 2007).

Measure of Participant Disclosure:

Disclosure Measures: Emotional disclosure of participants, as in Eriksen and Newman (2007), was operationalized in three ways. First, by the average value of participants' chosen disclosure topics from a list of topics varying in personal and emotional content. Past research has provided ratings for these topics (Jourard, 1971; Meleshko & Alden, 1993). Second, using total number of seconds elapsed during participants' disclosures (i.e., total time talking). Third, using confederate ratings of participant disclosure level on a 3-item scale of perceived openness to sharing personal

information (α=.89). On a 5-point Likert scale ranging from "not at all" (1) to "very much so" (3), confederates will rate the following items: "Did s/he reveal personal information about herself?"; "Did s/he seem to be open to sharing details about her life?"; "Would you say that s/he seemed distant and impersonal?" (reverse scored). Additionally, participants provided ratings of confederate disclosure level on a similar scale which omits the third item (Eriksen and Newman, 2007).

Social Interaction Task:

The procedure for the social interaction task closely followed that used by Eriksen and Newman (2007). After hearing a brief introduction from the experimenter, both members of the dyad completed an initial SUDs rating. The experimenter then read instructions asking the interactants to get to know each other. They were instructed to each choose four disclosure topics from a list and to then take turns alternately talking about themselves and listening to the other member of the dyad speak. The experimenter then provided a list of topics and asked if there were any questions, followed by a scripted question about topic selection by the confederate. The experimenter stated that s/he would return in 10 minutes, and left the room. Though the ordering of the disclosures was presented as being random, the confederate was always assigned the first turn at self-disclosure. Confederates had a scripted list of topics to disclose from, while participants freely chose their disclosure topics. Topics for disclosure were derived from a list of 19 topics rated for level of disclosure, with higher self-disclosure topics increasingly reflecting personal needs, emotional processes, and strivings (Jourard, 1971). Similar numbers of low, medium, and high topics were represented on the list that

was given to participants. Confederates' disclosures were scripted to reflect high levels of self-disclosure to provide standard stimuli to pull for participant disclosure, as disclosure tends to elicit partners' disclosure (Dindia, 2000). Confederates disclosed on the following topics in sequence: "What are your guiltiest secrets?"; "What are the sources of strain and dissatisfaction in your relationship with the opposite sex?"; "What were the occasions in your life on which you were the happiest?"; and "What are the actions you have most regretted doing in your life and why?" The confederate disclosures followed scripts from a previous study (Meleshko and Alden 1993). Confederate scripts included disclosures on relatively personal topics with relational themes to provide emotion-evocative imagery, including mild guilt about a minor lie to a parent, dissatisfaction with a current dating relationship, happiness over a renewed relationship between parents, and regret about anger at a parent in a past conflict. Following the completion of the task, the experimenter returned to the room and separated the interactants in order to allow for privacy while they both completed questionnaires. The confederate was taken to a separate room and completed the DFI, the IMI, and the disclosure rating form. The participant remained in the original room, where they completed a second SUDs rating, the IMI-Self, and the disclosure rating form. Undergraduate research assistants were recruited to serve as the experimenters and confederates. All assistants received the same description of the study as the participants and were blind to the design, hypotheses, and groups.

To confirm confederate adherence to the social interaction scripts by the confederates, trained raters performed content checks on digital video recordings of each social interaction. Two undergraduate research assistants, who were naïve to the study,

were recruited and trained to serve as raters for this purpose. Each rater independently listened to each recording in its entirety and counted deviations from the script. The raters provided summations of the number of sentences which were delivered verbatim, the number of sentences which had minor deviations that were not subjectively judged to dilute the sentences' meanings (i.e., minor wording changes), the number of sentences that were subjectively judged to be incorrect (i.e., dropping a whole clause; changing the core details of a story), and sentences that were missing from the delivery entirely. Each rater's adherence rating was calculated as the sum of verbatim sentences and sentences with minor deviations, divided by the total number of sentences in the entire script. The two raters' ratings were subsequently compared to assess reliability as described under the Analytic Strategy section, below.

Analytic Strategy

For the purposes of script adherence, 75% was pre-established as an acceptable cutoff. Participants who interacted with confederates showing a personal adherence average below this cutoff were not included in the main analyses. This 75% threshold was selected in order to ensure a reasonable level of confederate accuracy, while being liberal enough to keep the number of eliminated participants low.

In order to test the hypothesized interactions, I utilized multiple linear regression (MLR) analyses. Specifically, I performed hierarchical regressions with two steps. At the first step, I entered the predictor (Worry), and the moderator (EC). At the second step, I additionally included the interaction between the predictor and the moderator (i.e., Worry x EC). In light of the present study's focus on interaction effects, I elected not to include

sex the first step of the models to maximize degrees of freedom and hence statistical power to detect interactions.[1]

I probed interactions using PROCESS for SPSS (Hayes, 2017). PROCESS is an SPSS macro, which uses the Johnson-Neyman technique to examine regions of significance for the simple slope of the predictor at all observed values of the moderator (Hayes, 2017). I used PROCESS for models in which the interaction term produced a significant result. For the purposes of informing future research into the relevant constructs, I probed other interactions as well, but only when the addition of the interaction term accounted for at least 1% of the overall variance in the model (as assessed by an R^2-change of at least than .01).

Although regression models included a test of the Worry x EC interaction it is important to note that the study's hypotheses can be supported even when that interaction is not significant. That is because the pivotal issue for my hypotheses is the effect of EC when Worry is high. Statistical power to detect an interaction is constrained by the variance of the product term representing that interaction (McClelland & Judd, 1993). Consequently, to the extent that my recruitment strategy yielded a sample in which high worriers were over-represented, the variance in that product term will be restricted. However, in that case a test of the effect of EC at an average level of worry becomes a test of EC's effect among high worriers. To shed further light on the extent to which EC predicts heterogeneity among high worriers, in any cases where the interaction did not

[1] All of the models reported in this study were also conducted with sex included as a covariate. This did not result in a meaningful change in the significance or direction of the effects of interest in any of the models.

meet the specified threshold, I nonetheless also report the simple slope tests for the EC at high (and low) levels of worry.

Chapter 3: Results

Preliminary Analyses

Adherence coders showed satisfactory agreement (r = .96; p<.01). For the initial sample of 168 cases, the mean adherence rate was 82.23%. However, 3 confederates, accounting for a total of 5 cases, each had an individual script adherence rate below the set threshold of 75%. Therefore, these cases were excluded from further analyses, bringing the final sample size to 163. The script adherence rate across this final sample was 83.73%.

Descriptive Statistics and Zero-Order Correlations

Mean scores, standard deviations, and internal consistency reliabilities for all analyzed measures are presented in Table 1. Zero-order correlations for those variables are presented in Table 2. Means were within the expected ranges and most correlations were consistent with past findings. As expected, my recruitment strategy results in a relatively high average score on the PSWQ (M = 61.01). It has previously been reported that the PSWQ mean in a college sample is 47.6 while the mean in an analog clinical sample is 67.2 (Molina and Borkovec, 1994). As in previous studies, scores on the PSWQ and WAQ were only moderately negatively correlated with scores on the ATQ-EC and the ECS-PLD (note that the scoring of the ECS-PLD was reversed in order to match the directionality of the ATQ-EC). Due to the high correlation between the two measures of

Worry (i.e., the PSWQ and WAQ; r = .67), they were standardized and averaged to create a single composite measure, which was then re-standardized. The two measures of EC (i.e., the ECS-PLD and ATQ-EC scales) were strongly correlated as well (r = .65), and a composite EC measure was created using the same procedure.

Table 1. Descriptive Statistics

	M	SD	α	N
PSWQ	61.01	12.73	.93	162
WAQ	46.53	15.48	.88	163
ECS-PLD	28.21	8.67	.89	163
ATQ-EC	78.07	14.80	.81	161
DASS-A	11.12	8.15	.89	162
SF-36 GenHeal	62.49	20.83	.84	162
SF-36 EmoWel	55.94	18.43	.85	162
SE-36 SocFun	68.21	23.44	.83	162
IIP-SC	77.86	18.24	.89	163
FFOCI-E	54.95	12.42	.89	162
FFOCI-O	75.79	14.57	.88	162
IMI-HS	.03	.89	---	150
IMI-HS-Self	1.91	.61	.80	156
IMI-HS-CF	1.89	.75	.85	156
Disclosure	11.36	3.39	.88	158
Time Speaking	228.22	137.79	---	153
Topic Intimacy	4.03	.35	---	153
DFI	25.87	9.33	.96	156
ERSS	12.42	6.89	.91	163
SNI-HigRol	5.15	1.45	---	163
SNI-Num	19.29	9.65	---	163
SNI-EmbNet	2.06	1.17	---	163
ISEL	31.57	9.10	.91	163
IPPA-Mom	93.04	21.82	.96	162
IPPA-Dad	85.12	21.41	.96	161
IPPA-Peer	98.60	15.48	.95	161
ECR-Anx	4.05	1.25	.93	162
ECR-Avd	3.56	1.05	.91	162

PSWQ = Penn State Worry Questionnaire; **WAQ** = Worry and Anxiety Questionnaire; **ECS-PLD** = Effortful Control Scale-Persistence/Low Distractibility; **ATQ-EC** = Adult Temperament Questionnaire-Effortful Control; **DASS-A** = Depression, Anxiety, and Stress Scales-Anxiety; **SF-36 GenHeal** = Short Form Health Survey-36 General Health Perceptions; **SF-36 EmoWel** = Short Form Health Survey-36 Emotional Wellbeing; **SF-36 SocFun** = Short Form Health Survey-36 Social Functioning; **IIP-SC** = Inventory of Interpersonal Problems Circumplex Scale; **FFOCI-E** = Five-Factor Obsessive-Compulsive Inventory Extraversion; **FFOCI-O** = Five-Factor Obsessive-Compulsive Inventory Openness; **IMI-HS** = Impact Message Inventory Hostile-Submissive; **IMI-HS-Self** = Impact Message Inventory Hostile-Submissive Self; **IMI-HS-CF** = Impact Message Inventory Hostile-Submissive Confederate; **Disclosure** = Confederate ratings of participant disclosure; **Time Speaking** = Total time spent by participant speaking; **Topic Intimacy** = Average value of participant's chosen topics; **DFI** = Desire for Future Interactions; **ERSS** = Excessive Reassurance Seeking Scale; **SNI-HigRol** = Social Network Index High-Contact Roles; **SNI-Num** = Social Network Index Number of People in Social Network; **SNI-EmbNet** = Social Network Index Number of Embedded Networks; **ISEL** = Interpersonal Support Evaluation List; **IPPA-Mom** = Inventory of Parent and Peer Attachment Mom; **IPPA-Dad** = Inventory of Parent and Peer Attachment Dad; **IPPA-Peer** = Inventory of Parent and Peer Attachment Peer; **ECR-Anx** = Experiences in Close Relationships Anxiety; **ECR-Avd** = Experiences in Close Relationships Avoidance

Table 2. Zero-Order Correlations

	1	2	3	4	5	6	7	8	9	10	11	12
1. Sex	--	--	--	--	--	--	--	--	--	--	--	--
2. PSWQ	.29**	--	--	--	--	--	--	--	--	--	--	--
3. WAQ	.34**	.67**	--	--	--	--	--	--	--	--	--	--
4. Worry	.38**	.73**	.92**	--	--	--	--	--	--	--	--	--
5. ECS-PLD	-.05	-.26**	-.42**	-.42**	--	--	--	--	--	--	--	--
6. ATQ-EC	-.11	-.19*	-.33**	-.34**	.65**	--	--	--	--	--	--	--
7. EC	-.10	-.25**	-.41**	-.42**	.91**	.91**	--	--	--	--	--	--
8. DASS-A	.23**	.51**	.65**	.66**	-.46**	-.31**	-.43**	--	--	--	--	--
9. SF-36 GenHeal	-.12	-.25**	-.36**	-.42**	.24**	.25**	.27**	-.38**	--	--	--	--
10. SF-36 EmoWel	-.14	-.45**	-.61**	-.66**	.33**	.28**	.34**	-.50**	.30**	--	--	--
11. SE-36 SocFun	-.22**	-.25**	-.44**	-.51**	.30**	.26**	.31**	-.47**	.25**	.62**	--	--
12. IIP-SC	.15	.53**	.46**	.46**	-.46**	-.34**	-.44**	.54**	-.30**	-.36**	-.19*	--
13. FFOCI-E	.03	.38**	.21**	.20*	-.01	.09	.05	.19*	.00	-.34**	-.08	.39**
14. FFOCI-O	-.04	.32**	.16*	.13	.02	.12	.08	.19*	-.09	-.24**	-.06	.26**
15. IMI-HS	.16*	.30**	.29**	.28**	-.08	-.09	-.10	.25**	-.15	-.13	-.15	.35**
16. IMI-HS-Self	.12	.33**	.31**	.32**	-.21**	-.23**	-.24**	.29**	-.09	-.36**	-.18*	.51**
17. IMI-HS-CF	-.12	-.14	-.13	-.11	-.05	-.06	-.06	-.06	.08	-.11	.02	-.04
18. Disclosure	.13	.03	-.01	.04	-.16*	-.14	-.18*	.10	-.06	.04	.02	.10
19. Time Speaking	-.06	-.17*	-.04	-.05	-.05	.03	-.01	-.03	.04	.06	-.09	-.04
20. Topic Intimacy	-.11	-.10	-.14	-.18*	.11	.07	.11	-.15	.16*	.11	.26**	.03
21. DFI	.20*	.00	.04	.05	.07	.17*	.13	.05	.06	.12	-.10	-.07
22. ERSS	.25**	.26**	.31**	.32**	-.12	-.19*	-.17*	.23**	-.28**	-.18*	-.26**	.34**
23. SNI-HigRol	.08	-.08	-.07	-.11	.10	.00	.06	-.09	.13	.18*	-.05	-.22**
24. SNI-Num	.10	-.09	-.06	-.07	.14	.03	.10	-.13	.05	.21**	.03	-.22**
25. SNI-EmbNet	.14	-.13	-.08	-.08	.12	.05	.09	-.16*	.07	.22**	.03	-.27**
26. ISEL	-.01	-.27**	-.30**	-.30**	.26**	.16*	.24**	-.32**	.28**	.53**	.34**	-.48**
27. IPPA-Mom	-.08	-.12	-.26**	-.31**	.29**	.17*	.25**	-.31**	.19*	.46**	.28**	-.31**
28. IPPA-Dad	.01	-.04	-.09	-.10	.21**	.13	.19*	-.14	-.01	.31**	.24**	-.11
29. IPPA-Peer	.11	-.17*	-.21**	-.20*	.03	.04	.04	-.11	.20*	.41**	.29**	-.24**
30. ECR-Anx	.18*	.50**	.52**	.58**	-.32**	-.34**	-.37**	.48**	-.40**	-.48**	-.40**	.62**
31. ECR-Avd	-.07	.24**	.27**	.30**	-.19*	-.17*	-.19*	.21*	-.18*	-.46**	-.25**	.33**

Continued

Table 2. Zero-Order Correlations Continued

	13	14	15	16	17	18	19	20	21	22	23	24
1. Sex	--	--	--	--	--	--	--	--	--	--	--	--
2. PSWQ	--	--	--	--	--	--	--	--	--	--	--	--
3. WAQ	--	--	--	--	--	--	--	--	--	--	--	--
4. Worry	--	--	--	--	--	--	--	--	--	--	--	--
5. ECS-PLD	--	--	--	--	--	--	--	--	--	--	--	--
6. ATQ-EC	--	--	--	--	--	--	--	--	--	--	--	--
7. EC	--	--	--	--	--	--	--	--	--	--	--	--
8. DASS-A	--	--	--	--	--	--	--	--	--	--	--	--
9. SF-36 GenHeal	--	--	--	--	--	--	--	--	--	--	--	--
10. SF-36 EmoWel	--	--	--	--	--	--	--	--	--	--	--	--
11. SE-36 SocFun	--	--	--	--	--	--	--	--	--	--	--	--
12. IIP-SC	--	--	--	--	--	--	--	--	--	--	--	--
13. FFOCI-E	--	--	--	--	--	--	--	--	--	--	--	--
14. FFOCI-O	.74**	--	--	--	--	--	--	--	--	--	--	--
15. IMI-HS	.03	.00	--	--	--	--	--	--	--	--	--	--
16. IMI-HS-Self	.29**	.15	.57**	--	--	--	--	--	--	--	--	--
17. IMI-HS-CF	.17*	.13	-.73**	.14	--	--	--	--	--	--	--	--
18. Disclosure	-.08	-.21**	.18*	-.01	-.27**	--	--	--	--	--	--	--
19. Time Speaking	-.18*	-.22**	-.04	-.15	-.02	-.05	--	--	--	--	--	--
20. Topic Intimacy	.17*	.13	-.03	.02	.07	-.12	-.13	--	--	--	--	--
21. DFI	-.13	-.17*	.23**	-.05	-.30**	.56**	.24**	-.18*	--	--	--	--
22. ERSS	.02	.05	.01	.04	.00	.08	.13	-.13	.01	--	--	--
23. SNI-HigRol	-.18*	-.18*	-.05	-.23**	-.10	.14	.05	-.02	.09	-.07	--	--
24. SNI-Num	-.26**	-.24**	.03	-.20*	-.18*	.14	.05	.06	.10	.03	.64**	--
25. SNI-EmbNet	-.33**	-.31**	.00	-.25**	-.19*	.13	.11	.00	.10	-.01	.60**	.84**
26. ISEL	-.45**	-.33**	-.07	-.38**	-.20*	-.02	.02	.04	.10	-.17*	.30**	.42**
27. IPPA-Mom	-.19*	-.09	-.09	-.20*	-.05	-.07	-.06	-.01	.08	-.06	.17*	.23**
28. IPPA-Dad	-.22**	-.10	.07	-.04	-.14	.05	-.07	.09	.12	-.04	.05	.16*
29. IPPA-Peer	-.34**	-.36**	-.14	-.26**	-.07	.15	.04	-.02	.15	-.06	.12	.22**
30. ECR-Anx	.23**	.16*	.17*	.32**	.02	.05	-.04	-.15	-.07	.51**	-.15	-.14
31. ECR-Avd	.42**	.38**	.19*	.42**	.12	-.12	-.20*	-.02	-.17*	-.14	-.16*	-.37**

Continued

Table 2. Zero-Order Correlations Continued

	25	26	27	28	29	30	31
1. Sex	--	--	--	--	--	--	--
2. PSWQ	--	--	--	--	--	--	--
3. WAQ	--	--	--	--	--	--	--
4. Worry	--	--	--	--	--	--	--
5. ECS-PLD	--	--	--	--	--	--	--
6. ATQ-EC	--	--	--	--	--	--	--
7. EC	--	--	--	--	--	--	--
8. DASS-A	--	--	--	--	--	--	--
9. SF-36 GenHeal	--	--	--	--	--	--	--
10. SF-36 EmoWel	--	--	--	--	--	--	--
11. SE-36 SocFun	--	--	--	--	--	--	--
12. IIP-SC	--	--	--	--	--	--	--
13. FFOCI-E	--	--	--	--	--	--	--
14. FFOCI-O	--	--	--	--	--	--	--
15. IMI-HS	--	--	--	--	--	--	--
16. IMI-HS-Self	--	--	--	--	--	--	--
17. IMI-HS-CF	--	--	--	--	--	--	--
18. Disclosure	--	--	--	--	--	--	--
19. Time Speaking	--	--	--	--	--	--	--
20. Topic Intimacy	--	--	--	--	--	--	--
21. DFI	--	--	--	--	--	--	--
22. ERSS	--	--	--	--	--	--	--
23. SNI-HigRol	--	--	--	--	--	--	--
24. SNI-Num	--	--	--	--	--	--	--
25. SNI-EmbNet	--	--	--	--	--	--	--
26. ISEL	.44**	--	--	--	--	--	--
27. IPPA-Mom	.18*	.37**	--	--	--	--	--
28. IPPA-Dad	.10	.33**	.36**	--	--	--	--
29. IPPA-Peer	.23**	.56**	.24**	.25**	--	--	--
30. ECR-Anx	-.20*	-.42**	-.27**	-.19*	-.39**	--	--
31. ECR-Avd	-.40**	-.53**	-.32**	-.33**	-.57**	.33**	--

Continued

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

PSWQ = Penn State Worry Questionnaire; **WAQ** = Worry and Anxiety Questionnaire; **ECS-PLD** = Effortful Control Scale-Persistence/Low Distractibility; **ATQ-EC** = Adult Temperament Questionnaire-Effortful Control; **DASS-A** = Depression, Anxiety, and Stress Scales-Anxiety; **SF-36 GenHeal** = Short Form Health Survey-36 General Health Perceptions; **SF-36 EmoWel** = Short Form Health Survey-36 Emotional Wellbeing; **SF-36 SocFun** = Short Form Health Survey-36 Social Functioning; **IIP-SC** = Inventory of Interpersonal Problems Circumplex Scale; **FFOCI-E** = Five-Factor Obsessive-Compulsive Inventory Extraversion; **FFOCI-O** = Five-Factor Obsessive-Compulsive Inventory Openness; **IMI-HS** = Impact Message Inventory Hostile-Submissive; **IMI-HS-Self** = Impact Message Inventory Hostile-Submissive Self; **IMI-HS-CF** = Impact Message Inventory Hostile-Submissive Confederate; **Disclosure** = Confederate ratings of participant disclosure; **Time Speaking** = Total time spent by participant speaking; **Topic Intimacy** = Average value of participant's chosen topics; **DFI** = Desire for Future Interactions; **ERSS** = Excessive Reassurance Seeking Scale; **SNI-HigRol** = Social Network Index High-Contact Roles; **SNI-Num** = Social Network Index Number of People in Social Network; **SNI-EmbNet** = Social Network Index Number of Embedded Networks; **ISEL** = Interpersonal Support Evaluation List; **IPPA-Mom** = Inventory of Parent and Peer Attachment Mom; **IPPA-Dad** = Inventory of Parent and Peer Attachment Dad; **IPPA-Peer** = Inventory of Parent and Peer Attachment Peer; **ECR-Anx** = Experiences in Close Relationships Anxiety; **ECR-Avd** = Experiences in Close Relationships Avoidance

Primary Analyses

Hypothesis 1 - Worry x EC Predicting Autonomic Arousal

To test the first hypothesis, the Depression, Anxiety, Stress Scale-Anxiety (DASS-A) score was entered as the dependent variable in the regression model. The composite scores for Worry and EC were entered at the first step of the regression model, and the Worry x EC interaction term was entered at the second step. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model was .48 ($p<.001$). As shown in Table 3, the effect of Worry was significant at average levels of EC (semi-partial [*sr*] = .54, $p<.01$), and the effect of EC was significant at average levels of Worry (*sr* = -.16, $p = .01$). In addition, the interaction term was significant (*sr* = -.16, $p = .01$). As shown in Figure 1, Worry significantly predicted DASS-A scores at both high levels (+1 SD [standard deviation]) of EC (B = 3.8, $p<.01$), and low levels (-1 SD) of EC (B = 6.36, $p<.01$). Examination of the region of significance revealed that the simple slope was significant for all values of EC. However, consistent with expectations, EC moderated the relationship between Worry and DASS-

A, such that Worry was more strongly positively associated with DASS-A scores at low versus high levels of EC.

As shown in Figure 2, and when considered from the opposite viewpoint, EC significantly predicted DASS-A scores at high levels of Worry (B = -2.75, p<.01), but not at low levels of Worry (B = -.19, p = .78). Examination of the region of significance revealed that the simple slope was significant for values of Worry > -.29 *SDs* (i.e., values of Worry greater than .29 *SD*s below the mean of EC). That region comprised 62.35% of cases. Thus, consistent with expectations, EC was significantly negatively associated with DASS-A scores at high levels of Worry. However the R^2-change of .025 was of a lesser magnitude, relative to the R^2-change that has previously been reported (.064; Vasey, Chriki, & Toh, 2016).

Table 3. Regression Analysis Predicting DASS-A from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.458	.458	<.01
Intercept	11.07	.47		<.01			
Worry	.58	.53	.53	<.01			
EC	-.19	.53	-.17	.01			
Step 2					.483	.025	.01
Intercept	10.54	.50		<.01			
Worry	.61	.53	.54	<.01			
EC	-.18	.52	-.16	.01			
Worry x EC	-.16	.48	-.16	.01			

Figure 1. Worry x EC Predicting DASS-A

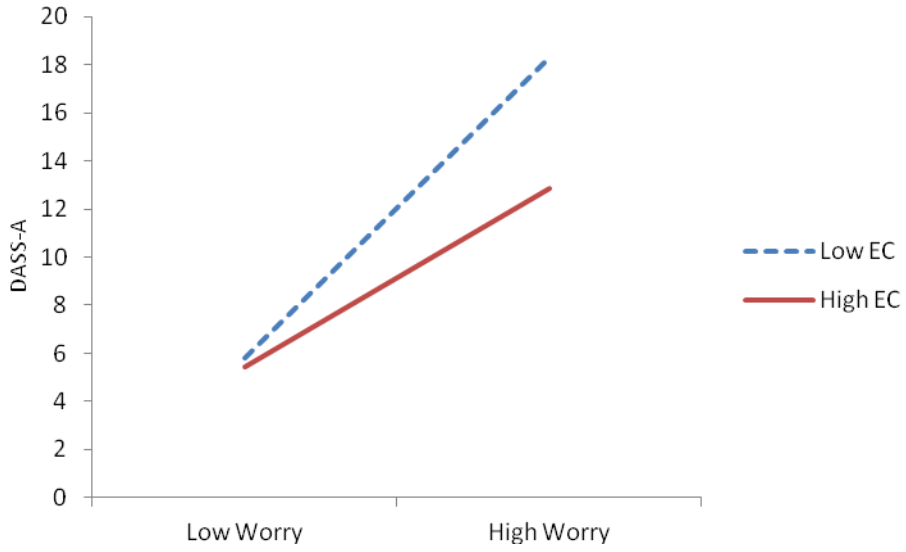
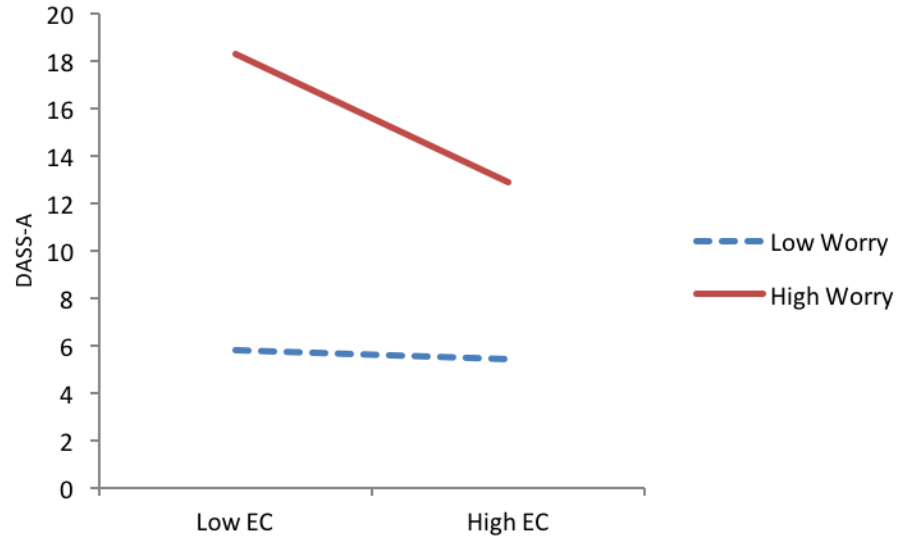


Figure 2. EC x Worry Predicting DASS-A



Hypothesis 2 - Worry x EC Predicting Obsessive-Compulsive Personality Disorder Traits

For the first model, the Five Factor Obsessive-Compulsive Inventory Extraversion (FFOCI-E) score was entered as the dependent variable. The composite scores for Worry

and EC were entered at the first step of the regression model, and the Worry x EC interaction term was entered at the second step. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model was .09 (p<.01). As shown in Table 4, at average levels of EC the effect of Worry was significant (sr = .21, p<.01), while the effect of EC was not (sr = .14, p=.07). In addition, the interaction term was significant (sr = .17, p=.03). Note that the FFOCI is scored such that a high score on a given construct (e.g., extraversion) indicates deficits in that domain (and thus higher levels of OCPD traits). As shown in Figure 3, Worry was significantly positively associated with FFOCI-E scores at high levels of EC (B = 5.07, p<.01), but not at low levels of EC (B = .90, p = .56). Examination of the region of significance revealed that the simple slope was significant for values of EC >-.34 *SDs*. That region comprised 62.96% of cases. Thus, consistent with expectations, EC moderated the relationship between Worry and FFOCI-E scores such that Worry was significantly positively associated with OCPD extraversion characteristics when EC was high but not when it was low.

Considered from the opposite viewpoint, as shown in Figure 4, EC significantly predicted FFOCI-E scores at high levels of Worry (B = 4.01, p<.01), but not at low levels of Worry (B = -.17, p = .93). Examination of the region of significance revealed that the simple slope was significant for values of Worry >.07 *SDs*. That region comprised 53.70% of cases. Thus, consistent with expectations, high levels of EC were significantly positively associated with OCPD extraversion characteristics at high levels of Worry.

However the R^2-change of .028 was of a lesser magnitude, relative to the R^2-change that has previously been reported (.09; Chriki, 2015).

Table 4. Regression Analysis Predicting FFOCI-E from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.061	.061	.01
Intercept	55.01	.95		<.01			
Worry	.27	1.08	.24	<.01			
EC	.16	1.07	.15	.06			
Step 2					.088	.028	.03
Intercept	55.87	1.02		<.01			
Worry	.24	1.08	.21	.01			
EC	.15	1.06	.14	.07			
Worry x EC	.17	.97	.17	.03			

Figure 3. Worry x EC Predicting FFOCI-E

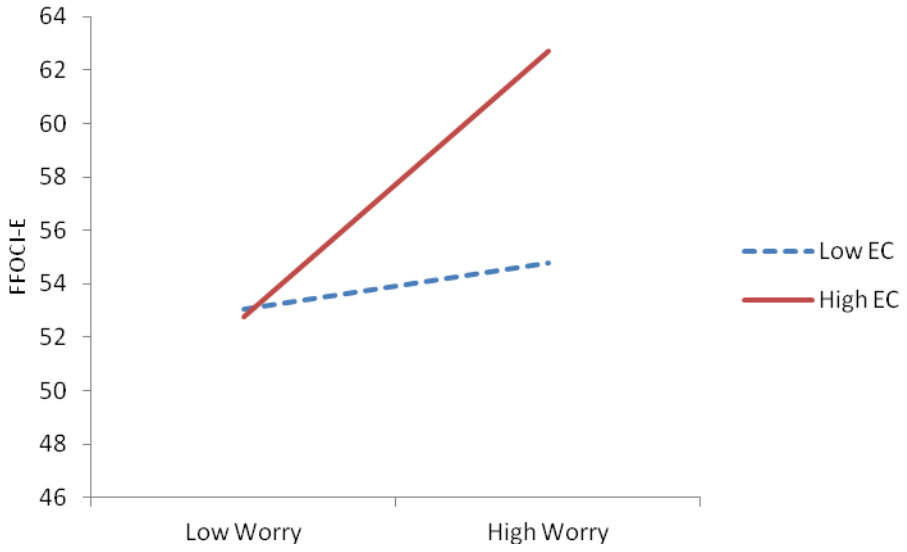
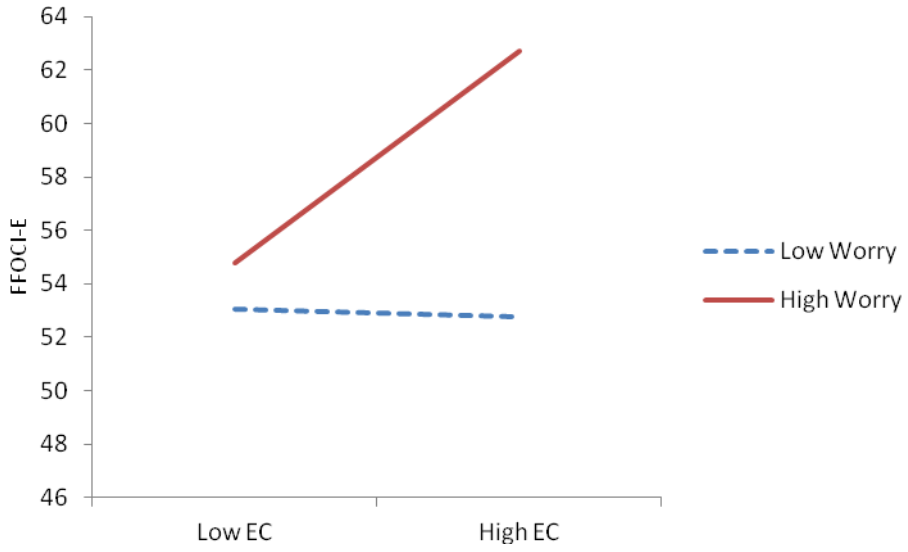


Figure 4. EC x Worry Predicting FFOCI-E



Follow-up analyses sought to determine which facets of FFOCI-E accounted for the effect of the interaction on the total subscale score. In order to make this determination, the detached coldness (FFOCI-Detached Coldness) and risk aversion (FFOCI-Risk Aversion) scores were each entered separately as the dependent variable.

The overall R^2 for the FOCCI-Detached Coldness model was .06 (p = .02). As shown in Table 5, at average levels of EC the effect of Worry was significant (sr = .20, p = .01), but the effect of EC at average levels of Worry was non-significant (sr = .02, p = .78). In addition, the interaction term was non-significant (sr = .09, p = .23). Examination of EC's simple slopes revealed that the effect was non-significant at both low levels of Worry (B = -.50, p = .56) and at high levels of Worry (B = .85, p = .31). Examination of the region of significance revealed that there was no value of Worry for which the simple slope of EC reached significance. Because the R^2-change for the interaction did not meet the specified threshold, analyses did not proceed further. That said, the direction of the

effect was in the expected direction. Contrary to expectations, EC was not significantly positively associated with detached coldness, even at high levels of Worry.

Table 5. Regression Analysis Predicting FFOCI-DetCol from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.053	.053	.01
Intercept	25.42	.56		<.01			
Worry	.24	.63	.22	.01			
EC	.03	.63	.03	.75			
Step 2					.062	.009	.01
Intercept	25.71	.61		<.01			
Worry	.22	.64	.20	.01			
EC	.02	.63	.02	.78			
Worry x EC	.09	.57	.09	.23			

The overall R^2 for the FOCCI-Risk Aversion model was .10 (p<.01). As shown in Table 6, at average levels of EC the effect of Worry was significant (sr = .16, p = .03), as was the effect of EC at average levels of Worry (sr = .22, p = .01). In addition, the interaction term was significant (sr = .19, p = .01). As shown in Figure 5, Worry was significantly positively associated with FFOCI-Risk aversion scores at high levels of EC (B = 2.74, p<.01), but not at low levels of EC (B = -.06, p = .94). Examination of the region of significance revealed that the simple slope was significant for values of EC >-.08 *SDs*. That region comprised 53.09% of cases. Thus, consistent with expectations, and with the pattern observed for the total FFOCI-E subscale score, high levels of Worry were significantly positively associated with risk aversion at high levels of EC.

Considered from the opposite viewpoint, as shown in Figure 6, EC predicted FFOCI-Risk Aversion scores at high levels of Worry (B = 3.16, p<.01), but not at low levels of Worry (B = .37, p = .66). Examination of the region of significance revealed that the simple slope was significant for values of Worry >-.33 *SDs*. That region comprised 62.96% of cases. Note, as above, that higher scores on a FFOCI construct indicate greater deficits on that domain. Thus, consistent with expectations, at high levels of Worry, EC was significantly positively associated with risk aversion.

The interaction term was not significant when FFOCI-Detached Coldness was entered as the dependent variable (sr = .09, p = .23), but was significant when FFOCI-Risk Aversion was entered as the dependent variable (sr = .19, p = .01). Thus, it appears that the effect of the interaction on the total FFOCI-E subscale score was largely driven by the interaction's effect on FFOCI-Risk Aversion. That said, the Detached Coldness model was in the expected direction.

Table 6. Regression Analysis Predicting FFOCI-RisAve from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.062	.062	.01
Intercept	29.58	.56		<.01			
Worry	.22	.63	.20	.01			
EC	.25	.63	.22	<.01			
Step 2					.098	.036	.01
Intercept	30.16	.60		<.01			
Worry	.18	.63	.16	.03			
EC	.24	.62	.22	.01			
Worry x EC	.19	.57	.19	.01			

Figure 5. Worry x EC Predicting FFOCI-RisAve

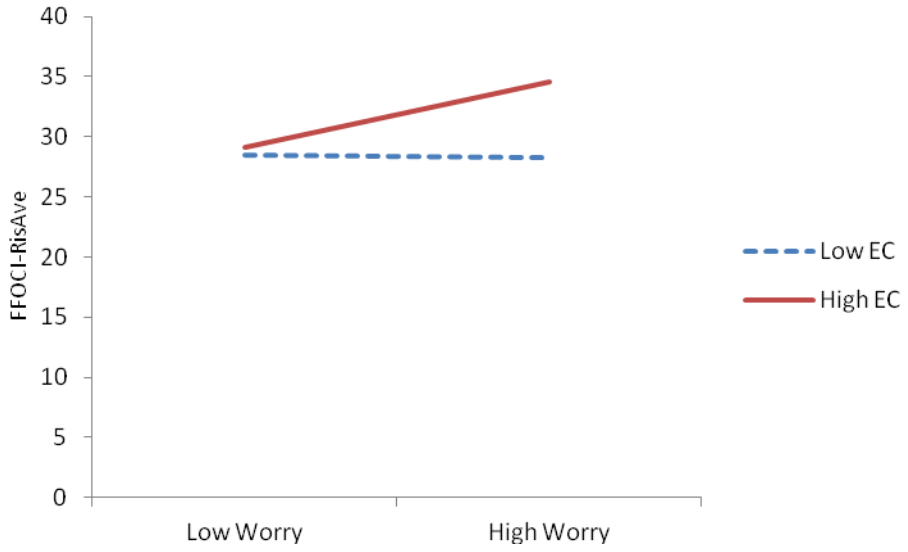
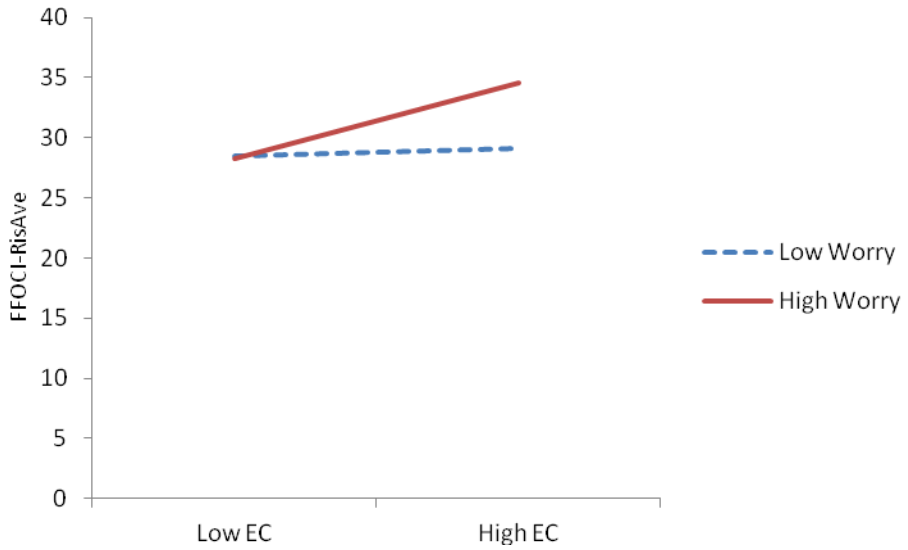


Figure 6. EC x Worry Predicting FFOCI-RisAve



For the second model, the Five Factor Obsessive Compulsive Inventory Openness (FFOCI-O) score was entered as the dependent variable. The standardized composite scores for Worry and EC were entered in the first step of the regression model, and the

Worry x EC interaction term was entered at the second step. Regression diagnostics revealed two high-influence cases (Standardized Dffits= 1.11 and 1.21, respectively) that improved model fit. With those cases included, there was a significant individual effect of Worry (*sr* = .17 *p* = .03) but not of EC (*sr* = .15, *p* = .06), and the interaction was non-significant (*sr* = .04, *p* = .57). When the high-influence cases were excluded from the analysis, the overall R^2 for the final model was .04 (*p* = .08). As shown in Table 7, when the high-influence cases were excluded from the analysis, the effect of Worry was significant on average (*sr* = .20, *p* = .01), but the effect of EC was not (*sr* = .11, *p* = .17). In addition, the interaction term was non-significant (*sr* = .03, *p* = .66). Examination of the EC main effect found that the effect was non-significant at both low levels of Worry (B = 1.18, *p* = .46) and at high levels of Worry (B = 2.10, *p* = .19). Examination of the region of significant revealed that there was no value of Worry at which the simple slope of EC reached significance. Because the R^2-change for the interaction did not meet the specified threshold, analyses did not proceed further. The R^2-change of .001 was of a much lesser magnitude, relative to the R^{2-}change that has previously been reported (.07; Chriki, 2015). Thus, contrary to expectations, EC did not moderate the relationship between Worry and FFOCI-O scores, although the main effect of EC was in the expected direction.

Table 7. Regression Analysis Predicting FFOCI-O from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.040	.040	.04
Intercept	74.98	1.05		<.01			
Worry	.22	1.23	.20	.01			
EC	.12	1.20	.11	.17			
Step 2					.041	.001	.66
Intercept	75.18	1.14		<.01			
Worry	.22	1.24	.20	.01			
EC	.20	1.20	.11	.17			
Worry x EC	.04	1.10	.03	.66			

Follow-up analyses sought to determine whether any facets of FFOCI-O would yield a significant interaction term. Thus, the Constricted (FFOCI-Constricted), Inflexible (FFOCI-Inflexible), and Dogmatism (FFOCI-Dogmatism) scores were each entered separately as the dependent variable in the regression model.

The overall R^2 for the FOCCI-Constricted was .01 (p = .74). As shown in Table 8, at average levels of EC the effect of Worry was non-significant (sr = .02, p = .79), as was the effect of EC at average levels of Worry (sr = -.05, p = .53). In addition, the interaction term was non-significant (sr = -.06, p = .45). Examination of EC's simple slopes revealed its effect was non-significant at both low levels of Worry (B = .03, p = .98) and at high levels of Worry (B = -.85, p = .33). Examination of the region of significance revealed that there was no value of Worry for which the simple slope of EC reached significance. Because the R^2-change for the interaction did not meet the specified threshold, analyses

did not proceed further. In addition, it should be noted that the directionality of the effect was in the unexpected direction.

Table 8. Regression Analysis Predicting FFOCI-Con from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.004	.004	.71
Intercept	22.92	.57		<.01			
Worry	.02	.67	.02	.84			
EC	-.06	.65	-.05	.54			
Step 2					.008	.004	.45
Intercept	22.73	.62		<.01			
Worry	.02	.68	.02	.79			
EC	-.06	.65	-.05	.53			
Worry x EC	-.06	.60	-.06	.45			

The overall R^2 for the FOCCI-Inflexible model was .09 (p<.01). As shown in Table 9, at average levels of EC the effect of Worry was significant (sr = .28, p<.01), while the effect of EC at average levels of Worry was non-significant (sr = .13, p = .09). In addition, the interaction term was non-significant (sr = .10, p = .18). Examination of EC's simple slopes revealed found that the effect was non-significant at low levels of Worry (B = .29, p = .67) and was significant at high levels of Worry (B = 1.51, p = .03). Examination of the region of significance revealed that the simple slope was significant for values of Worry >.24 *SDs*. That region comprised 48.75% of cases.

Because the R^2-change for the interaction did not meet the specified threshold, analyses did not proceed further. Consistent with expectations, EC was significantly positively associated with Inflexibility at high levels of Worry.

Table 9. Regression Analysis Predicting FFOCI-Inflex from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.082	.082	<.01
Intercept	26.37	.46		<.01			
Worry	.32	.54	.29	<.01			
EC	.15	.52	.13	.09			
Step 2					.093	.010	.18
Intercept	26.63	.50		<.01			
Worry	.31	.54	.28	<.01			
EC	.15	.52	.13	.09			
Worry x EC	.10	.48	.10	.18			

The overall R^2 for the FOCCI-Dogmatism model was .05 (p = .04). As shown in Table 10, at average levels of EC the effect of Worry was significant (sr = .16, p = .04), as was the effect of EC at average levels of Worry (sr = .20, p = .01). In addition, the interaction term was non-significant (sr = .06, p = .46). Examination of EC's simple slopes revealed that the effect was non-significant at low levels of Worry (B = .86, p = .14) and was significant at high levels of Worry (B = 1.44, p = .02). Examination of the region of significance revealed that the simple slope was significant for values of Worry >-.55 *SDs* and <1.79 *SDs*. That region comprised 66.87% of cases. Because the R^2-change for the interaction did not meet the specified threshold, analyses did not proceed further. Consistent with expectations, EC was significantly positively associated with Dogmatism at high levels of Worry. This was true at all but the very highest levels of Worry.

Table 10. Regression Analysis Predicting FFOCI-Dogm from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.048	.048	.02
Intercept	25.70	.39		<.01			
Worry	.19	.46	.17	.03			
EC	.23	.44	.20	.01			
Step 2					.052	.003	.46
Intercept	25.82	.42		<.01			
Worry	.18	.46	.16	.04			
EC	.23	.44	.20	.01			
Worry x EC	.06	.41	.06	.46			

Taken together, the interaction term was non-significant when FFOCI-Constricted was entered as the dependent variable (*sr* = -.06, *p* = .45), when FFOCI-Inflexible was the independent variable (*sr* = .10, *p* = .18), and when FFOCI-Dogmatism was entered as the dependent variable (*sr* = .06, *p* = .46). Overall, there was evidence for the expected pattern of results for both Inflexibility and Dogmatism, and evidence in the unexpected direction for Constrictedness. Thus, EC was significantly positively associated with Inflexibility and Dogmatism at high levels of Worry. However, as noted above, none of the subscales produced a significant interaction.

Hypothesis 3 - Worry x EC Predicting General Health, Emotional Wellbeing and, Social Functioning

For the first model, the SF-36 General Health (SF-36 GenHeal) score was entered as the dependent variable. The composite scores for Worry and EC were entered at the first step of the regression model, and the Worry x EC interaction term was entered at the

second step. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model was .21 (p<.001). As shown in Table 11, the effect of Worry was significant on average (sr = -.36, p<.01), while the effect of EC was not (sr = .09, p=.19). However, the interaction term was significant (sr = .15, p = .04). As shown in Figure 7, Worry was significantly negatively associated with SF-36 GenHeal scores at both high levels of EC (B = -5.42, p = .01), and low levels of EC (B = -11.75, p<.01). Examination of the region of significance revealed that the simple slope was significant for values of EC <1.23 *SDs*. That region comprised 88.27% of cases. Thus, consistent with expectations, EC moderated the relationship between Worry and SF-36 GenHeal, such that Worry was significantly negatively associated with general health except when EC was very high.

As shown in Figure 8, and considered from the opposite viewpoint, EC significantly predicted SF-36 Gen Heal scores at high levels of Worry (B = 5.34, p = .02), but not at low levels of Worry (B = -.96, p = .67). Examination of the region of significance revealed that the simple slope was significant for values of Worry >.38 *SDs*. That region comprised 42.59% of cases. Thus, consistent with expectations, EC was significantly positively associated with SF-36 GenHeal scores among high worriers. However, the R^2-change of .023 was of lesser magnitude, relative the R^2-change that was previous reported (.04; Chriki, 2015).

Table 11. Regression Analysis Predicting SF-36 GenHeal from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.188	.188	<.01
Intercept	62.53	1.49		<.01			
Worry	-.37	1.68	-.34	<.01			
EC	.11	1.67	.10	.17			
Step 2					.210	.023	.04
Intercept	63.84	1.59		<.01			
Worry	-.40	1.68	-.36	<.01			
EC	.10	1.66	.09	.19			
Worry x EC	.15	1.51	.15	.04			

Figure 7. Worry x EC Predicting SF-36 GenHeal

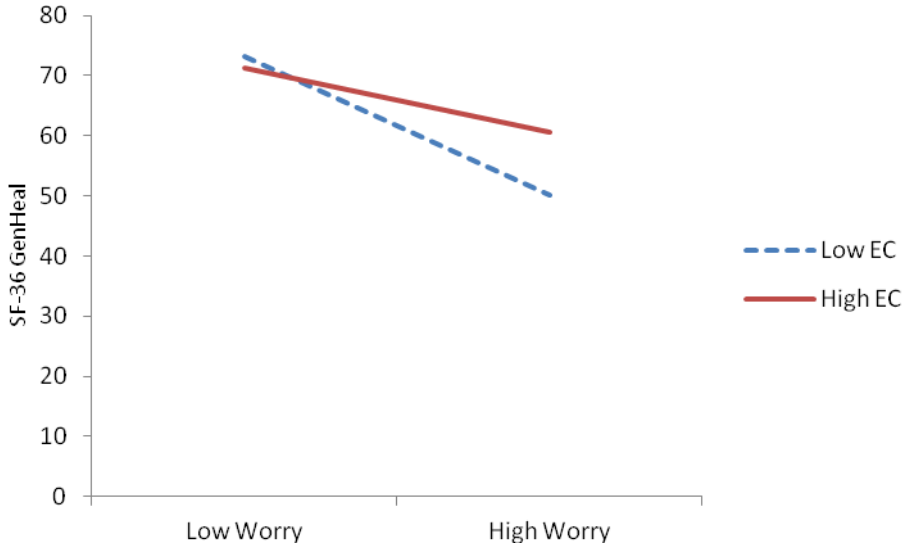
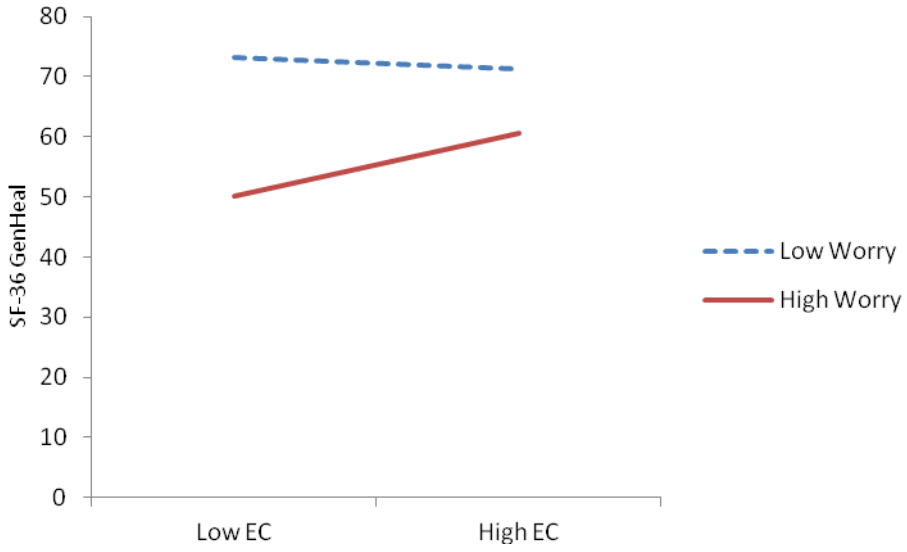


Figure 8. EC x Worry Predicting SF-36 GenHeal



For the second model, the SF-36 Emotional Wellbeing (SF-36 EmoWel) score was entered as the dependent variable. The composite scores for Worry and EC were entered at the first step of the regression model, and the Worry x EC interaction term was entered at the second step. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model was .44 (p<.001). As shown in Table 12, the effect of Worry was significant on average (sr = -.57, p<.01), while the effect of EC was not (sr = .06, p = .32). In addition, the interaction term was non-significant (sr = .06, p=.34). Examination of the EC main effect found that the effect was non-significant at both low levels of Worry (B = .18, p = .92) and at high levels of Worry (B = 2.27, p = .16). Examination of the region of significance revealed that there was no value of Worry at which the simple slope of EC reached significance. Because the R^2-change for the interaction did not meet the specified threshold, analyses did not proceed further. Thus, consistent with previous findings (Chriki 2015) but contrary to expectations, EC did not

moderate the relationship between Worry and SF-36 EmoWel scores. However, the effect was in the expected direction.

Table 12. Regression Analysis Predicting SF-36 EmoWel from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.435	.435	<.01
Intercept	55.94	1.10		<.01			
Worry	-.63	1.24	-.57	<.01			
EC	.07	1.24	.06	.31			
Step 2					.438	.003	.34
Intercept	56.38	1.19		<.01			
Worry	-.64	1.26	-.57	<.01			
EC	.07	1.24	.06	.32			
Worry x EC	.06	1.13	.06	.34			

For the third model, the SF-36 Social Functioning (SF-36 SocFun) score was entered as the dependent variable. The composite scores for Worry and EC were entered at the first step of the regression model, and the Worry x EC interaction term was entered at the second step. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model was .28 (p<.001). As shown in Table 13, the effect of Worry was significant on average (sr = -.43, p<.01), while the effect of EC was not (sr = .10, p = .15). In addition, the interaction term was non-significant (sr = .07, p = .30). Examination of EC's simple slopes revealed that the effect was non-significant at low levels of Worry (B = .90, p = .71) and at high levels of Worry (B = 4.23, p = .07). Examination of the region of significance revealed that there was no value of Worry at

which the simple slope of EC reached significance. Because the R^2-change for the interaction did not meet the specified threshold, analyses did not proceed further. The R^2-change of .005 was much lower than the R^2-change that was previously reported (.06; Chriki, 2015). Thus, contrary to expectations, EC did not moderate the relationship between Worry and SF-36 SocFun scores. However, consistent with expectations, the direction of the effect suggested that EC was positively associated with self reported Social Functioning at high levels of Worry.

Table 13. Regression Analysis Predicting SF-36 SocFun from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.274	.274	<.01
Intercept	68.23	1.58		<.01			
Worry	-.47	1.79	-.42	<.01			
EC	.11	1.78	.10	.14			
Step 2					.279	.005	.30
Intercept	68.94	1.71		<.01			
Worry	-.48	1.81	-.43	<.01			
EC	.11	1.78	.10	.15			
Worry x EC	.07	1.62	.07	.30			

For the fourth model, the Inventory of Interpersonal Problems Circumplex Scale (IIP-SC) score was entered as the dependent variable. The composite scores for Worry and EC were entered at the first step of the regression model, and the Worry x EC interaction term was entered at the second step. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model was .29 (p<.001). As shown in

Table 14, the effect of Worry was significant on average (*sr* = .31, *p*<.01), as was the effect of EC (*sr* = -.27, *p*<.01). However, the interaction term was non-significant (*sr* = -.06, *p* = .34). Examination of EC's simple slopes revealed that the effect was significant at both low levels of Worry (B = -4.37, *p* = .02) and at high levels of Worry (B = -6.69, *p*<.01). Examination of the region of significance revealed that the simple slope was significant for values of Worry >-1.21 *SDs*. That region comprised 87.73% of cases. Because the R^2 -change for the interaction did not meet the specified threshold, analyses did not proceed further. However, the effect was in the expected direction, and EC was significantly negatively associated with Interpersonal Problems at high levels of Worry. The magnitude of the interaction's effect, *sr* = -.06, was larger than what has been previously reported (-.01; Chriki, 2015).

Table 14. Regression Analysis Predicting IIP-SC from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.289	.289	<.01
Intercept	77.76	1.21		<.01			
Worry	.34	1.37	.30	<.01			
EC	-.30	1.36	-.27	<.01			
Step 2					.293	.004	.34
Intercept	77.29	1.31		<.01			
Worry	.35	1.40	.31	<.01			
EC	-.30	1.36	-.27	<.01			
Worry x EC	-.06	1.23	-.06	.34			

Hypothesis 4 - EC Predicting Heterogeneity on the Social Interaction Task

Quadratic Relationship Between Hostile-Submissive Impact Rating Discrepancy and Worry

In order to attempt to replicate the results reported in Erikson and Newman (2007), the composite score for Worry was entered as the dependent variable. The Impact Message Inventory Hostile-Submissive (IMI-HS) discrepancy score was entered in the first step of the regression model, and the quadratic term (squared discrepancy score) was entered in the second step. The discrepancy score was not standardized for this analysis, due to its meaningful zero-point. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model was .08 (p<.01). As shown in Table 15, there was a significant individual effect of IMI-HS (sr = .28, p<.01), but the quadratic term did not significantly improve the model's fit (sr = -.07, p = .37). The R^2-change for the quadratic term was much lower than the R^2-change that was previously reported (.27; Erikson and Newman,2007). Furthermore, the effect was in the unexpected direction. Contrary to expectations, it was not possible to replicate the main finding of Erikson and Newman (2007).

Table 15. Regression Analysis Predicting Worry from IMI-HS

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.076	.076	<.01
Intercept	-.03	.08		.67			
IMI	.28	.09	.28	<.01			
Step 2					.081	.005	.37
Intercept	.02	.10		.81			
IMI	.28	.09	.28	<.01			
IMI^2	-.07	.08	-.07	.37			

Worry x EC Predicting Hostile-Submissive Impact Rating Discrepancy Scores

The Impact Message Inventory Hostile-Submissive (IMI-HS) discrepancy score was entered as the dependent variable. The composite scores for Worry and EC were entered at the first step of the regression model, and the Worry x EC interaction term was entered at the second step. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model was .10 (p<.01). As shown in Table 16, the effect of Worry was significant on average (sr = .28, p<.01), but the effect of EC was not (sr = .01, p = .86). In addition, the interaction term was non-significant (sr = -.15, p = .05). As shown in Figure 9, Worry significantly predicted IMI discrepancy scores at low levels of EC (B = .41, p<.01) but not at high levels of EC (B = .14, p = .14). Examination of the region of significance revealed that the simple slope was significant for values of EC <.75 *SDs.* That region comprised 74.00% of cases. Thus, EC moderated the relationship between Worry and IMI-HS. When EC was low, high worriers tended to overestimate the negative impact they had on the confederate, and low worriers tended to underestimate the negative impact that they had on the confederate. However, when EC was high the self-ratings of both high and low worriers more closely approximated confederate ratings. Thus, contrary to expectations, high levels of Worry were associated with more accurate self-ratings of social impact at high levels of EC.

From the opposite viewpoint, as shown in Figure 10, EC failed to predict IMI discrepancy score at both high levels of Worry (B = -.12, p = .26) and at low levels of Worry (B = .15, p = .15). Examination of the region of significance revealed that the simple slope was non-significant for all values of Worry, although it should be noted that

the simple slope flipped signs from low to high levels of Worry. Contrary to expectations, higher levels of EC were associated with more accurate self-ratings at high levels of Worry.

Table 16. Regression Analysis Predicting IMI-HS from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.076	.076	<.01
Intercept	.04	.07		.62			
Worry	.28	.08	.26	<.01			
EC	.02	.08	.01	.86			
Step 2					.099	.023	.05
Intercept	-.02	.07		.82			
Worry	.31	.08	.28	<.01			
EC	.02	.08	.01	.86			
Worry x EC	-.16	.07	-.15	.05			

Figure 9. Worry x EC Predicting IMI-HS

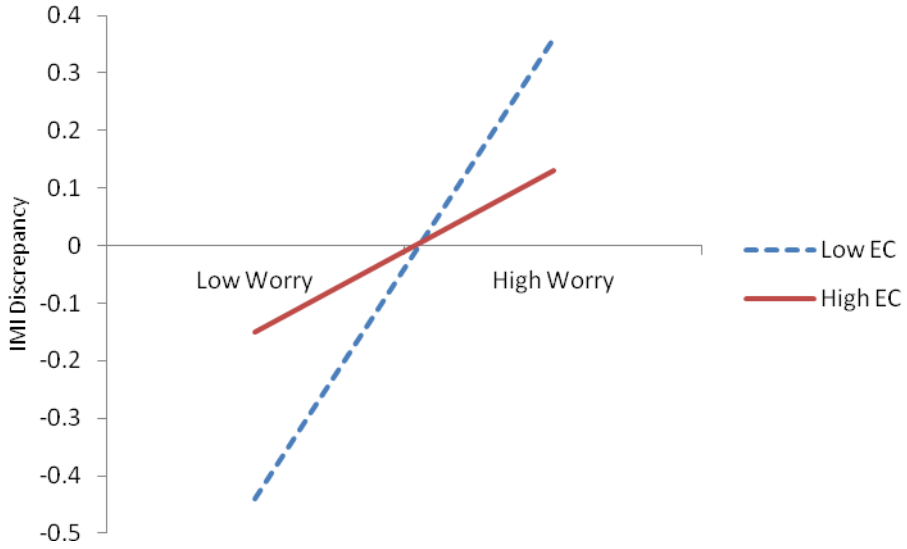
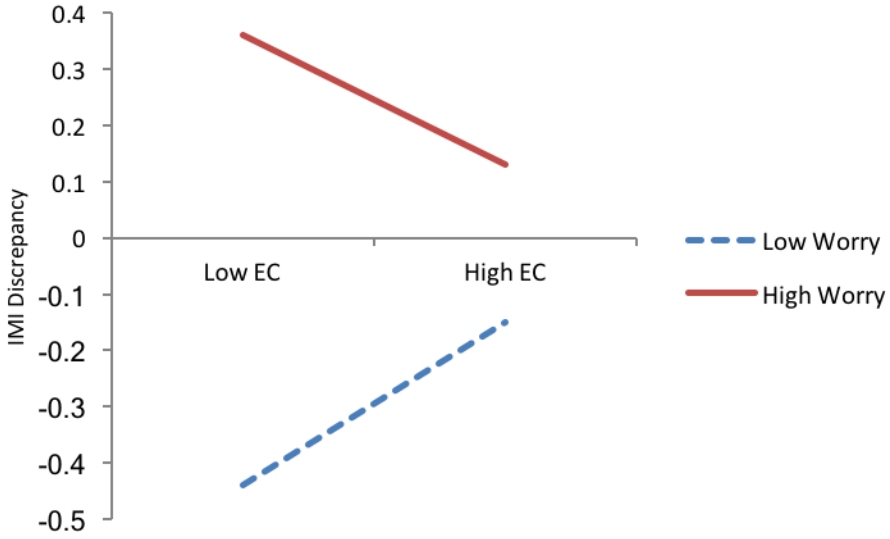


Figure 10. EC x Worry Predicting IMI-HS



Follow-up analyses sought to further understand the ratings provided by the participants and the confederates. Thus, the participant (IMI-HS-Self) and confederate (IMI-HS-CF) ratings for the IMI-HS subscale were each entered separately as the dependent variable in the regression model.

The first model examined the IMI-HS-Self, which was entered as the dependent variable. The composite scores for Worry and EC were entered at the first step of the regression model, and the Worry x EC interaction term was entered at the second step. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model was .12 (p<.001). As shown in Table 17, the effect of Worry was significant on average (sr = .25, p<.01), while the effect of EC was not (sr = -.12, p = .11). In addition, the interaction term was non-significant (sr = -.09, p = .24). Examination of the EC's simple slopes revealed that the effect was non-significant at low levels of Worry (B

= -.03, p = .69) and at high levels of Worry (B = -.14, p = .05). Examination of the region of significance revealed that there was no value of Worry at which the simple slope of EC reached significance. Because the R^2-change for the interaction did not meet the specified threshold, analyses did not proceed further. Nevertheless, the direction of the effect of EC at high Worry suggests that EC was negatively associated with participants' ratings of their own negative impact, which is consistent with the initial predictions.

These results indicate that Worry was positively associated with IMI-HS-Self, suggesting that Worry was significantly positively associated with the tendency to perceive oneself as having a negative social impact on others. The direction of the effect of EC at high levels of Worry suggests that, consistent with expectations, EC predicted a lesser tendency to perceive oneself as having a negative social impact on others.

Table 17. Regression Analysis Predicting IMI-HS-Self from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.115	.115	<.01
Intercept	1.92	.05		<.01			
Worry	.26	.05	.24	<.01			
EC	-.13	.05	-.12	.12			
Step 2					.123	.008	.24
Intercept	1.90	.05		<.01			
Worry	.28	.05	.25	<.01			
EC	-.13	.05	-.12	.11			
Worry x EC	-.09	.05	-.09	.24			

The second model examined the IMI-HS-CF, which was entered as the dependent variable. The composite scores for Worry and EC were entered at the first step of the

regression model, and the Worry x EC interaction term was entered at the second step. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model was .04 (p = .12). As shown in Table 18, the effect of Worry was significant on average (sr = -.16, p = .04), while the effect of EC was not (sr = -.12, p = .13). In addition, the interaction term was non-significant (sr = .12, p = .14).

As shown in Figure 11, Worry significantly predicted IMI-HS-CF scores at low levels of EC (B = -.26, p = .02) but not at high levels of EC (B = -.03, p = .78). Examination of the region of significance revealed that the simple slope was significant for values of EC <.10 *SDs.* That region comprised 51.92% of cases. Thus, at low levels of EC, Worry was significantly negatively associated with confederates' ratings of negative social impact.

From the opposite viewpoint, as shown in Figure 12, EC significantly predicted IMI-HS-CF scores at low levels of Worry (B = -.22, p = .04) but not at high levels of worry (B = .00, p = .96). Examination of the region of significance revealed that EC's simple slope was significant for values of Worry between -2.10 *SDs* and -.52 *SDs.* That region comprised 29.49% of cases. Thus, at low levels of Worry, EC was negatively associated with confederates' ratings of negative social impact. Contrary to expectation, EC was unrelated to such ratings at higher levels of Worry.

Table 18. Regression Analysis Predicting IMI-HS-CF from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.025	.025	.14
Intercept	1.89	.06		<.01			
Worry	-.16	.07	-.15	.07			
EC	-.13	.07	-.12	.15			
Step 2					.039	.014	.14
Intercept	1.92	.06		<.01			
Worry	-.18	.07	-.16	.04			
EC	-.13	.07	-.12	.13			
Worry x EC	.12	.06	.12	.14			

Figure 11. Worry x EC Predicting IMI-HS-CF

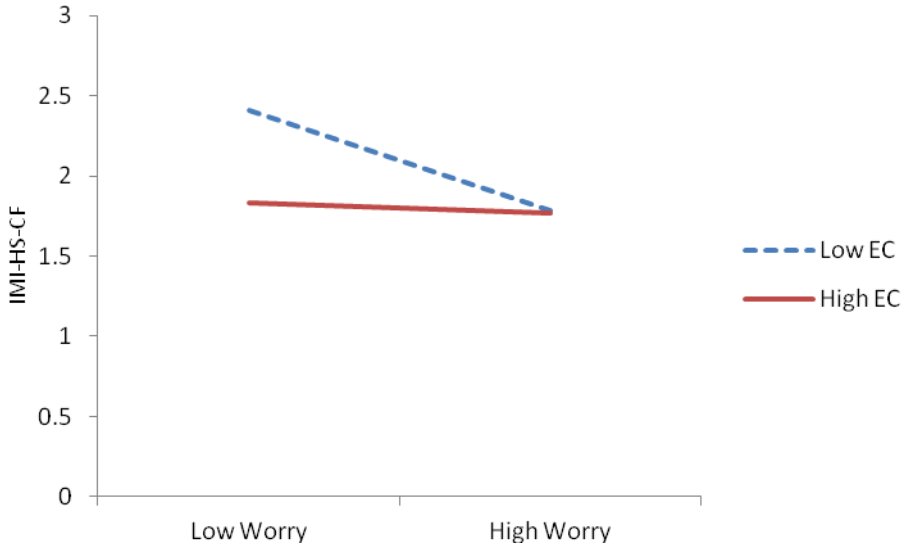
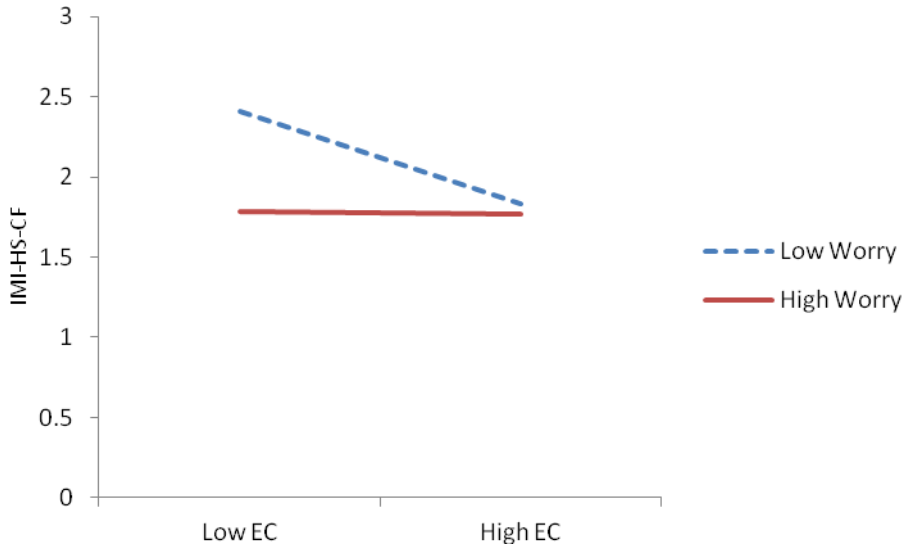


Figure 12. EC x Worry Predicting IMI-HS-CF



Worry x EC Predicting Participant Willingness to Disclose

For the first model, the confederate rating of participant disclosure was entered as the dependent variable. The composite scores for Worry and EC were entered at the first step of the regression model, and the Worry x EC interaction term was entered at the second step. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model was .01 (p = .74). As shown in Table 19, the effects of Worry (sr = .08, p = .34) and EC (sr =.06, p = .44) were both non-significant. The interaction term was also non-significant (sr = -.04, p = .58). Examination of the EC main effect found that the effect was non-significant both at low levels of Worry (B = .38, p = .36) and at high levels of Worry (B = .09, p = .83). Examination of the region of significance revealed that there was not value of Worry at which the EC simple slope reached significance. Because the R^2-change for the interaction did not meet the specified

threshold, analyses did not proceed further. Contrary to expectation, EC did not moderate the relationship between Worry and willingness to disclose. Furthermore, the effect was in the unexpected direction.

Examination of the participants' 10-point ratings of confederate disclosure found that the participants perceived the confederates to be highly disclosing (M = 9.64 *SD* = 1.02). A follow-up analysis found that neither Worry (*sr* = .03, *p* = .74), EC (*sr* = -.08, *p* = .29), nor the interaction (*sr* = .05, *p* = .54) had a significant association with participant ratings of confederate disclosure.

Table 19. Regression Analysis Predicting Disclosure from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.006	.006	.62
Intercept	11.37	.27		<.01			
Worry	.08	.31	.07	.38			
EC	.07	.30	.06	.46			
Step 2					.008	.002	.59
Intercept	11.31	.29		<.01			
Worry	.09	.31	.08	.34			
EC	.07	.31	.06	.44			
Worry x EC	-.04	.28	-.04	.59			

For the second model, Time Speaking was entered as the dependent variable. The composite scores for Worry and EC were entered at the first step of the regression model, and the Worry x EC interaction term was entered at the second step. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model

was .00 (p = .88). As shown in Table 20, the effects of Worry (sr = -.06, p = .44) and EC (sr = -.04, p = .67) were both non-significant. The interaction term was also non-significant (sr = .03, p = .76). Examination of EC's simple slopes revealed that the effect was non-significant both at low levels of Worry (B = -8.56, p = .61) and at high levels of Worry (B = -1.70, p = .92). Examination of the region of significance revealed that there was no value of Worry at which the simple slope of EC reached significance. Because the R^2-change for the interaction did not meet the specified threshold, analyses did not proceed further. Contrary to expectations, EC did not moderate the relationship between Worry and time spent speaking. However, the direction of EC's effect was as expected.

Table 20. Regression Analysis Predicting Time Speaking from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.004	.004	.76
Intercept	228.38	11.21		<.01			
Worry	-.07	12.79	-.06	.46			
EC	-.04	12.41	-.03	.68			
Step 2					.004	.001	.76
Intercept	229.85	12.19		<.01			
Worry	-.07	13.00	-.06	.44			
EC	-.04	12.46	-.04	.67			
Worry x EC	.03	11.37	.03	.76			

For the third model, Topic Intimacy was entered as the dependent variable. The composite scores for Worry and EC were entered in the first step of the regression model, and the Worry x EC interaction term was entered at the second step. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model

was .04 (p = .13). As shown in Table 21, the effect of Worry was non-significant at average levels of EC (sr = -.15, p = .06), as was the effect of EC (sr = .03, p = .68). In addition, the interaction term was non-significant (sr = .06, p = .44). Examination of the EC main effect found that the effect was non-significant both at low levels of Worry (B = -.01, p = .85) and at high levels of Worry (B = .03, p = .40). Examination of the region of significance revealed that there was no value of Worry at which the simple slope of EC reached significance. Because the R^2-change for the interaction did not meet the specified threshold, analyses did not proceed further. Contrary to expectations, EC did not moderate the relationship between Worry and Topic Intimacy. Furthermore, the direction of the effect was not as expected.

Table 21. Regression Analysis Predicting Topic Intimacy from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.033	.033	.08
Intercept	4.04	.03		<.01			
Worry	-.16	.03	-.15	.07			
EC	.04	.03	.04	.66			
Step 2					.037	.004	.44
Intercept	4.05	.03		<.01			
Worry	-.17	.03	-.15	.06			
EC	.04	.03	.03	.68			
Worry x EC	.06	.03	.06	.44			

Worry x EC Predicting Confederate's Desire for Future Interactions

The Desire for Future Interactions (DFI) score was entered into the model as the dependent variable. The composite scores for Worry and EC were entered at the first step of the regression model, and the Worry x EC interaction term was entered at the second step. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model was .03 (p = .16). As shown in Table 22, the effect of Worry was non-significant (sr = .11, p = .19), as was the effect of EC (sr = .16, p = .05). In addition, the interaction term was non-significant (sr = .07, p = .42). Examination of the EC main effect found that the effect was non-significant at low levels of Worry (B = 1.06, p = .36) and was significant at high levels of Worry (B = 2.27, p = .04). Examination of the region of significance revealed that the simple slope was significant for values of Worry >-.02 *SDs* and <1.25 *SDs*. That region comprised 44.08% of cases. Because the R^2-change for the interaction did not meet the specified threshold, analyses did not proceed further.

Contrary to expectations, EC was significantly positively associated with desire for future interaction at high levels of Worry. This was true at all but the very highest levels of Worry.

Table 22. Regression Analysis Predicting DFI from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.029	.029	.10
Intercept	25.96	.74		<.01			
Worry	.13	.84	.12	.15			
EC	.18	.83	.16	.04			
Step 2					.033	.004	.42
Intercept	26.21	.80		<.01			
Worry	.12	.85	.11	.19			
EC	.18	.84	.16	.05			
Worry x EC	.07	.76	.07	.42			

Hypothesis 5 - Worry x EC Predicting Differential Deficits in Social Functioning

Worry x EC Predicting Reassurance Seeking

Excessive Reassurance Seeking Scale (ERSS) score was entered as the dependent variable. The composite scores for Worry and EC were entered at the first step of the regression model, and the Worry x EC interaction term was entered at the second step. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model was .10 (p<.01). As shown in Table 23, the effect of Worry was significant on average (sr = .27, p<.01), while the effect of EC was not (sr = -.04, p=.60). In addition, the interaction term was non-significant (sr = -.02, p=.79). Examination of the EC main effect found that the effect was non-significant both at low levels of Worry (B = -.17, p = .83) and at high levels of Worry (B = -.44, p = .56). Examination of the region of significance revealed that there was not value of Worry at which the simple slope of EC reached significance. Because the R^2-change for the interaction did not meet the specified threshold, analyses did not proceed further. Contrary to expectations, EC did

not moderate the relationship between Worry and excessive reassurance seeking. However, the effect of EC was in the expected direction.

Table 23. Regression Analysis Predicting ERSS from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.102	.102	<.01
Intercept	12.41	.52		<.01			
Worry	.30	.58	.27	<.01			
EC	-.05	.58	-.04	.59			
Step 2					.102	.000	.79
Intercept	12.35	.56		<.01			
Worry	.30	.59	.27	<.01			
EC	-.04	.58	-.04	.60			
Worry x EC	-.02	.53	-.02	.79			

Worry x EC Predicting Social Network Size and Quality

For the first model, the Social Network Index High-Contact Roles (SNI-HigRol) score was entered as the dependent variable. The composite scores for Worry and EC were entered at the first step of the regression model, and the Worry x EC interaction term was entered at the second step. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model was .02 (p = .42). As shown in Table 24, the effect of both Worry (sr = -.11, p = .18) and EC (sr = .01, p = .92) were non-significant. The interaction term was also non-significant (sr = .07, p = .38). Examination of the EC main effect found that the effect was non-significant both at low levels of Worry (B = -.09, p = .62) and at high levels of Worry (B = .11, p = .50). Examination of the region of significance revealed that there is no value of Worry at which the simple

slope of EC reached significance. Because the R^2-change for the interaction did not meet the specified threshold, analyses did not proceed further. Contrary to expectations, EC did not moderate the relationship between Worry and the number of social roles occupied by participants. Furthermore, the effect was not in the expected direction.

Table 24. Regression Analysis Predicting SNI-HigRol from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.013	.013	.36
Intercept	5.12	.11		<.01			
Worry	-.11	.13	-.10	.22			
EC	.01	.13	.01	.88			
Step 2					.018	.005	.38
Intercept	5.19	.13		<.01			
Worry	-.12	.13	-.11	.18			
EC	.01	.13	.01	.92			
Worry x EC	.07	.12	.07	.38			

For the second model, the Social Network Index Number of People in Social Network (SNI-Num) score was entered as the dependent variable. The standardized composite scores for Worry and EC were entered at the first step of the regression model, and the Worry x EC interaction term was entered at the second step. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model was .08 (p = .49). As shown in Table 25, the effect of Worry was non-significant (sr = -.05, p = .56), as was the effect of EC (sr = .07, p = .39). The interaction term was also non-significant (sr = .07, p = .37). Examination of the EC main effect found that the effect was non-significant both at low levels of Worry (B = .06, p = .96) and at high

levels of Worry (B = 1.42, p = .20). Examination of the region of significance revealed that there is no value of Worry at which the simple slope of EC was significant. Because the R^2-change for the interaction did not meet the specified threshold, analyses did not proceed further. Contrary to expectations, EC did not moderate the relationship between Worry and the number of individuals in participants' social networks. Furthermore, the effect was in the unexpected direction.

Table 25. Regression Analysis Predicting SNI-Num from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.010	.010	.44
Intercept	19.30	.76		<.01			
Worry	-.04	.86	-.04	.66			
EC	.08	.85	.07	.36			
Step 2					.015	.005	.37
Intercept	19.58	.82		<.01			
Worry	-.05	.87	-.05	.56			
EC	.08	.85	.07	.39			
Worry x EC	.07	.78	.07	.37			

For the third model, the Social Network Index Number of Embedded Networks (SNI-EmbNet) score was entered as the dependent variable. The composite scores for Worry and EC were entered at the first step of the regression model, and the Worry x EC interaction term was entered at the second step. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model was .01 (p = .61). As shown in Table 26, the effect of Worry was non-significant (sr = -.05, p = .51), as was the effect of

EC (*sr* = .06, *p* = .44). The interaction term was also non-significant (*sr* = .03, *p* = .71). Examination of the EC main effect found that the effect was non-significant both at low levels of Worry (B = .05, *p* = .75) and at high levels of Worry (B = .11, *p* = .40). Examination of the region of significance revealed that there is no value of Worry at which the simple slope of EC reached significance. Because the R^2-change for the interaction did not meet the specified threshold, analyses did not proceed further. Contrary to expectations, EC did not moderate the relationship between Worry and the number of different network domains in which participants are active. Furthermore, the effect was in the unexpected direction.

Table 26. Regression analysis Predicting SNI-EmbNet from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.011	.011	.43
Intercept	2.06	.09		<.01			
Worry	-.05	.10	-.05	.54			
EC	.07	.10	.06	.43			
Step 2					.011	.001	.71
Intercept	2.08	.10		<.01			
Worry	-.06	.11	-.05	.51			
EC	.07	.10	.06	.44			
Worry x EC	.03	.10	.03	.71			

For the fourth model, the Interpersonal Support Evaluation List (ISEL) score was entered as the dependent variable. The composite scores for Worry and EC were entered at the first step of the regression model, and the Worry x EC interaction term was entered

at the second step. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model was .12 (p<.001). As shown in Table 27, at average levels of EC the effect of Worry was significant (sr = -.21, p = .01), while the effect of EC was not (sr = .13, p = .09). In addition, the interaction term was non-significant (sr = -.04, p = .62). Examination of EC's simple slopes revealed that the effect was non-significant both at low levels of Worry (B = 1.63, p = .12) and at high levels of Worry (B = .95, p = .34). Examination of the region of significance revealed that there is no value of Worry at which the simple slope of EC reached significance. Because the R^2-change for the interaction did not meet the specified threshold, analyses did not proceed further.

Contrary to expectations, EC did not moderate the relationship between Worry and ISEL score. However, the direction of the effect of EC suggests that higher levels of EC are associated with a greater perception of interpersonal support.

Table 27. Regression Analysis Predicting ISEL from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.108	.108	<.01
Intercept	31.60	.68		<.01			
Worry	-.25	.77	-.22	<.01			
EC	.14	.76	.13	.10			
Step 2					.109	.001	.62
Intercept	31.46	.74		<.01			
Worry	-.24	.78	-.21	.01			
EC	.14	.76	.13	.09			
Worry x EC	-.04	.70	-.04	.62			

Worry x EC Predicting Attachment Style

For the first model, the Inventory of Parent and Peer Attachment Mom (IPPA-Mom) score was entered as the dependent variable. The composite scores for Worry and EC were entered at the first step of the regression model, and the Worry x EC interaction term was entered at the second step. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model was .12 (p<.001). As shown in Table 28, the effect of Worry was significant at average levels of EC (sr = -.23, p<.01), while the effect of EC was not (sr = .13, p = .08). In addition, the interaction term was non-significant (sr = .07, p = .35). Examination of EC's simple slopes revealed that the effect was non-significant at low levels of Worry (B = 1.71, p = .50) and at high levels of Worry (B = 4.76, p = .05). Examination of the region of significance revealed that the simple slope was significant for values of Worry >.32 *SDs* and <.97 *SDs*. That region comprised 29.63% of cases. Because the R^2-change for the interaction did not meet the specified threshold, analyses did not proceed further. The effect of EC suggests that, contrary to expectations, EC was significantly positively associated with secure maternal attachment at moderate levels of Worry. This result became non-significant at increasingly high levels of Worry.

Table 28. Regression Analysis Predicting IPPA-Mom from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.113	.113	<.01
Intercept	93.11	1.63		<.01			
Worry	-.24	1.84	-.22	<.01			
EC	.15	1.83	.13	.07			
Step 2					.118	.005	.35
Intercept	93.74	1.76		<.01			
Worry	-.26	1.86	-.23	<.01			
EC	.15	1.83	.13	.08			
Worry x EC	.07	1.67	.07	.35			

For the second model, the Inventory of Parent and Peer Attachment Dad (IPPA-Dad) score was entered as the dependent variable. The composite scores for Worry and EC were entered in the first step of the regression model, and the Worry x EC interaction term was entered at the second step. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model was .05 (p = .03). As shown in Table 29, the effect of Worry was non-significant (sr = -.01, p = .93), but the effect of EC was significant at average levels of Worry (sr = .16, p = .04). In addition, the interaction term was non-significant (sr = -.14, p = .08). As shown in Figure 13, Worry was unrelated to IPPA-DAD at both high levels of EC (B = -3.06, p = .19), and low levels of EC (B = 2.80, p = .30). Examination of the region of significance revealed that the simple slope was non-significant for all values of EC. Contrary to expectations, Worry was not significantly related to paternal attachment. However, the direction of the simple slopes changed depending on level of EC. Worry tended to predict lower levels of paternal attachment when EC was high versus low.

From the opposite viewpoint, as shown in Figure 14, EC significantly predicted IPPA-Dad at low levels of Worry (B = 6.85, p = .01), but not at high levels of Worry (B = .95, p = .70). Examination of the region of significance revealed that the simple slope was significant for values of Worry <.05 *SDs*. This region comprised 46.58% of cases. This was contrary to expectations. Specifically, EC was significantly related to paternal attachment only when Worry was low.

Table 29. Regression Analysis Predicting IPPA-Dad from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.035	.035	.06
Intercept	85.16	1.67		<.01			
Worry	-.03	1.88	-.03	.72			
EC	.17	1.90	.16	.05			
Step 2					.054	.019	.08
Intercept	83.95	1.79		<.01			
Worry	-.01	1.89	-.01	.93			
EC	.18	1.88	.16	.04			
Worry x EC	-.14	1.70	-.14	.08			

Figure 13. Worry x EC Predicting IPPA-Dad

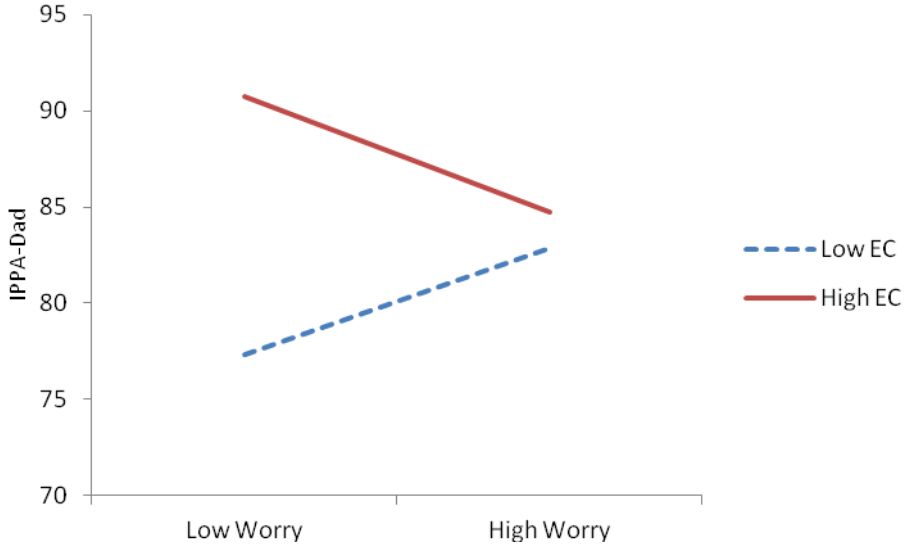
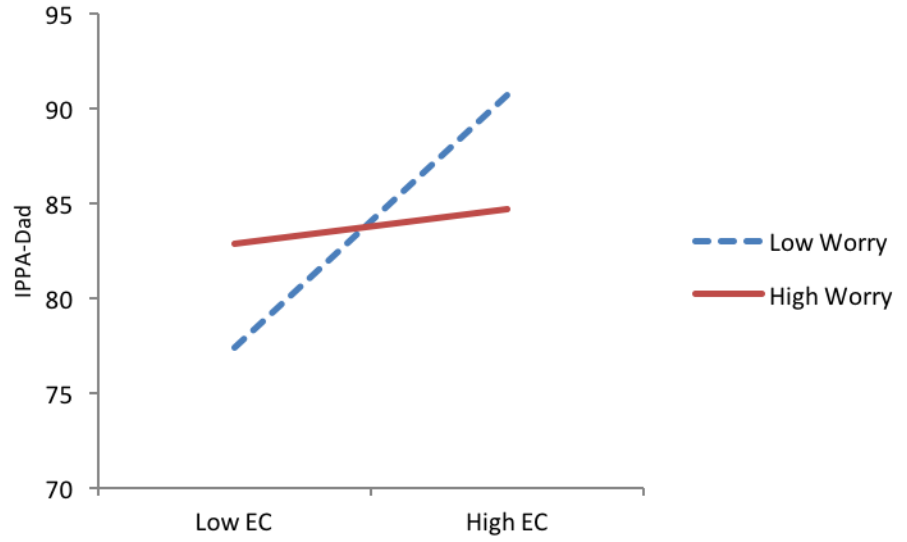


Figure 14. EC x Worry Predicting IPPA-Dad



For the third model, the Inventory of Parent and Peer Attachment Peer (IPPA-Peer) score was entered as the dependent variable. The composite scores for Worry and EC were entered at the first step of the regression model, and the Worry x EC interaction

term was entered at the second step. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model was .06 (p = .02). As shown in Table 30, the effect of Worry was significant on average (sr = -.18, p = .02), while the effect of EC (sr = -.05, p = .55) was not. In addition, the interaction term was non-significant (sr = -.13, p = .09). As shown in Figure 15, Worry significantly predicted IPPA-Peer at high levels of EC (B = -5.24, p<.01), but not at low levels of EC (B = -1.03, p = .61). Examination of the region of significance revealed that the simple slope was significant for values of EC >-.17 *SDs.* This region comprised 57.76% of cases. As expected, at high levels of EC, Worry was negatively associated with peer attachment. When EC was low, however, the effect of Worry was non-significant.

From the opposite viewpoint, as shown in Figure 16, EC was unrelated to IPPA-Peer at both high levels of Worry (B = -2.87, p = .11) and at low levels of Worry (B = 1.30, p = .48). Examination of the region of significance revealed that the simple slope was non-significant for all values of Worry. Contrary to expectations, EC was not significantly related to peer attachment regardless of level of Worry. However, examination of simple slopes suggested that EC tended to become more strongly negatively associated with peer attachment at high versus low levels of Worry.

Table 30. Regression Analysis Predicting IPPA-Peer from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.043	.043	.03
Intercept	98.54	1.20		<.01			
Worry	-.23	1.36	-.20	.01			
EC	-.06	1.35	-.05	.51			
Step 2					.061	.018	.09
Intercept	97.69	1.29		<.01			
Worry	-.20	1.38	-.18	.02			
EC	-.05	1.34	-.05	.55			
Worry x EC	-.14	1.24	-.13	.09			

Figure 15. Worry x EC Predicting IPPA Peer

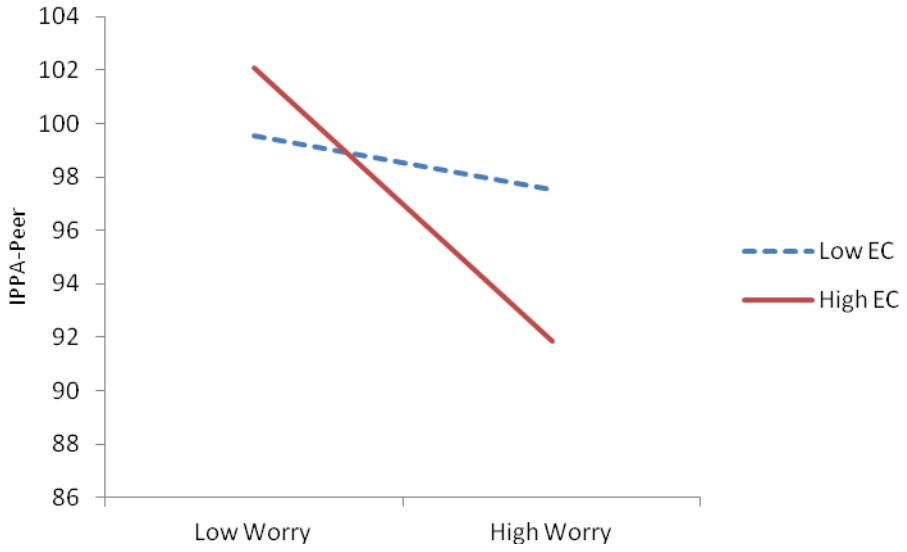
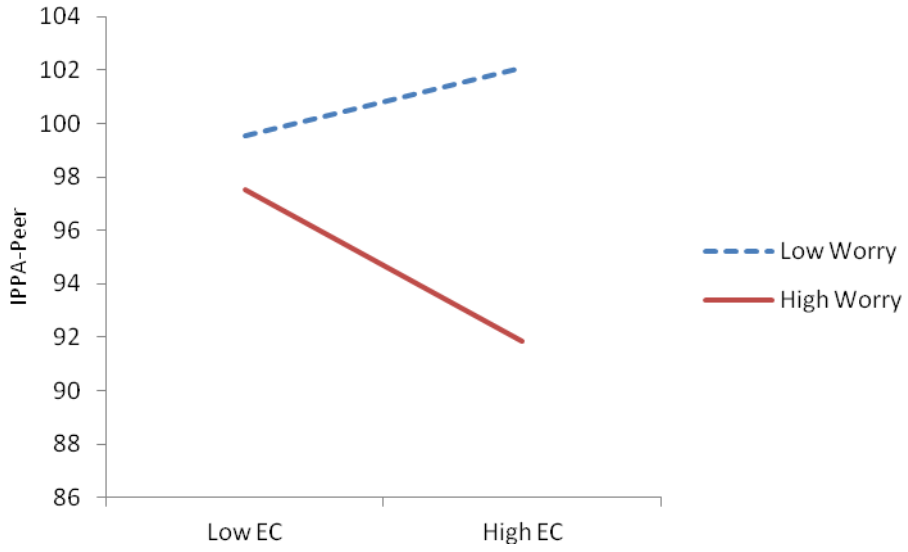


Figure 16. EC x Worry Predicting IPPA-Peer



For the fourth model, the Experiences in Close Relationships Anxiety (ECR-Anx) score was entered as the dependent variable. The standardized composite scores for Worry and EC were entered at the first step of the regression model, and the Worry x EC interaction term was entered at the second step. Experiences in Close Relationships Avoidance (ECR-Avd) was additionally entered as a covariate at the third step. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model was .38 (p<.001). As shown in Table 31, the effect of Worry was significant at average levels of EC (sr = .40, p<.01), while the effect of EC was not (sr = -.12, p = .05). The overall effect of EC was in the expected direction. In addition, the interaction term was non-significant (sr = .07 , p = .26). Worry significantly predicted ECR-Anx at both at high levels of EC (B = .49, p<.01) and low levels of EC (B = .67, p<.01). Examination of the region of significance revealed that the simple slope was significant

for values of EC >-2.04 *SDs.* This region comprised 96.30% of cases. Contrary to expectations, EC did not moderate the relationship between Worry and ECR-Anx.

From the opposite viewpoint, EC significantly predicted ECR-Anx at low levels of Worry (B = -.26, p = .03), but not at high levels of Worry (B = -.08, p = .47). Examination of the region of significance revealed that the simple slope was significant for values of Worry >-1.75 *SDs* and <-.01 *SDs.* This region comprised 39.50% of cases. Contrary to expectations, EC was not significantly related to ECR-Anx at high levels of Worry. However, the effect of EC was in the expected direction.

Table 31. Regression Analysis Predicting ECR-Anx from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.349	.349	<.01
Intercept	4.05	.08		<.01			
Worry	.51	.09	.46	<.01			
EC	-.15	.09	-.13	.04			
Step 2					.354	.005	.26
Intercept	4.09	.09		<.01			
Worry	.50	.09	.45	<.01			
EC	-.15	.09	-.13	.04			
Worry x EC	.07	.08	.07	.26			
Step 3					.377	.023	.09
Intercept	3.42	.29		<.01			
Worry	.59	.09	.40	<.01			
EC	-.17	.09	-.12	.05			
Worry x EC	.09	.08	.07	.26			
ECR-Avd	.19	.08	.15	.09			

For the fifth model, the Experiences in Close Relationships Avoidance (ECR-Avd) score was entered as the dependent variable. The standardized composite scores for Worry and EC were entered at the first step of the regression model, and the Worry x EC interaction term was entered at the second step. Experiences in Close Relationships Anxiety (ECR-Anx) was additionally entered as a covariate at the third step. Regression diagnostics did not reveal any high-influence cases. The overall R^2 for the final model was .13 (p<.001). As shown in Table 32, the effect of Worry was non-significant at average levels of EC (sr = .13, p = .09), as was the effect of EC (sr = -.04, p = .64). In addition, the interaction term was non-significant (sr = -.01, p = .87).

Examination of EC's simple slopes revealed that the effect was non-significant both at low levels of Worry (B = -.03, p = .82) and at high levels of Worry (B = -.06, p = .63). Examination of the region of significance revealed that there is no value of Worry at which the simple slope of EC reached significance. Because the R^2-change for the interaction did not meet the specified threshold, analyses did not proceed further. Contrary to expectations, EC did not moderate the relationship between Worry and ECR-Avd score. Furthermore, the effect was in the unexpected direction.

Table 32. Regression Analysis Predicting ECR-Avd from Worry and EC

	B	SE	*sr*	*p*	R^2	ΔR^2	*p*
Step 1					.097	.097	<.01
Intercept	3.56	.08		<.01			
Worry	.27	.09	.25	<.01			
EC	-.07	.09	-.07	.39			
Step 2					.097	.000	.97
Intercept	3.56	.09		<.01			
Worry	.27	.09	.24	<.01			
EC	-.07	.09	-.07	.39			
Worry x EC	.00	.08	.00	.97			
Step 3					.128	.031	.09
Intercept	2.80	.33		<.01			
Worry	.17	.10	.13	.09			
EC	-.04	.09	-.04	.64			
Worry x EC	-.01	.08	-.01	.87			
ECR-Anx	.19	.08	.18	.02			

Chapter 4: Discussion

The goal of the present study was to replicate and extend Chriki's (2015) earlier findings that individual differences in EC are associated with heterogeneity in personality features and patterns of interpersonal functioning. Specifically, I sought to further clarify these results through the use of additional measures of both personality (e.g., attachment) and social functioning (e.g., a confederate-based social interaction task). A basic prerequisite for testing my hypotheses in these domains was the replication of our research group's previously reported worry by EC interaction (Hypothesis 1).

Our past studies have shown that EC moderates the relationship between worry and AA such that high worriers with high levels of EC report lower AA when compared to their low EC counterparts. By the same token, EC is significantly negatively associated with AA at high levels of worry. In this sample, as in our past studies, worry and EC were modestly negatively correlated with one another, leaving ample room to test for an interaction effect. Results indicated that, as hypothesized, EC moderated the relationship between worry and AA such that their positive correlation was stronger at low versus high levels of EC. Most importantly, at high levels of worry, EC was significantly *negatively* correlated with AA. Thus, Hypothesis 1 was supported, suggesting that this study's sample provided an adequate context to extend research on the Cognitive Control Model of pathological worry.

In addition, I also examined the worry by EC interaction's role in predicting impairment in terms of general health and emotional wellbeing. I hypothesized that, at higher levels of worry, EC would be significantly negatively associated with subjective impairment within these domains. The measure of general health was consistent with this hypothesis, but the measure of emotional wellbeing was not. More specifically, the pattern that emerged for emotional wellbeing was such that higher levels of worry were significantly negatively associated with emotional wellbeing, regardless of level of EC. That is, at higher levels of worry, higher levels of EC did not appear to be protective against reduced emotional wellbeing. This is likely a function of worriers experiencing reduced emotional wellbeing by virtue of their uncontrollable and excessive tendency to worry. Although higher levels of EC were not protective against reduced emotional wellbeing, they may be predictive of heterogeneity in the domains of personality and interpersonal functioning.

One potential path to heterogeneity in social functioning among worriers is heterogeneity in personality style, and my initial analyses examined the relationship between worry, EC, and obsessive-compulsive spectrum traits. Specifically, I hypothesized that I would be able to replicate the findings by Chriki (2015), demonstrating that the worry by EC interaction predicts obsessive-compulsive personality disorder (OCPD) traits. Chriki found that EC moderates the relationship between worry and these traits, such that at higher levels of EC worriers report higher levels of OCPD traits – specifically low extraversion and low openness – in comparison to worriers with lower levels of EC. Considering extraversion first, my results indicated

that, consistent with expectations, EC was significantly negatively associated with extraversion at high levels of worry. In order to further understand which facets of extraversion were driving this relationship, I conducted follow-up analyses using the facet-level components of extraversion: detached coldness and risk aversion. Given my hypotheses related to social impairment among high-EC worriers, it was somewhat surprising to discover that the worry by EC interaction was non-significant for the test substituting detached coldness for the broader extraversion subscale. That said, the pattern of the interaction was consistent with expectation, despite its non-significance. However, at least in the current sample, the effect in question was largely driven by the risk aversion subscale. That is, at higher levels of worry, higher levels of EC were associated with a greater degree of risk aversion.

Contrary to expectations, and inconsistent with Chriki (2015), the worry by EC interaction did not significantly predict the openness trait. As above, follow-up analyses examined whether the facets, in this case constrictedness, inflexibility, and dogmatism, would produce significant interactions. Although all three facets produced non-significant interactions, inflexibility and dogmatism both showed a pattern of results such that higher levels of EC predicted higher levels of impairment among high worriers. Thus, EC was significantly positively associated with inflexibility and dogmatism, but not constrictedness, at high levels of worry. Considered in context with the results from the extraversion facets, these results suggest that worriers with high EC in the present sample may not have been cold and aloof (as would be indicated by detached coldness and constrictedness), but that they were rigid and dogmatic, as well as averse to risk and new

experiences. This combination of traits has clear potential to contribute to social deficits insofar as such individuals may be aversive to interact with, and also unwilling to take social risks.

With regards to interpersonal functioning, I hypothesized that at higher levels of worry, higher levels of EC would be associated with lower levels of subjective social impairment. That is, although worry is likely positively associated with social impairment overall, individuals with higher levels of EC may be less likely to perceive themselves as socially impaired. One potential path to such a pattern of results would be that EC is associated with a rigid personality style that is objectively socially impairing, but subjectively egosyntonic. The prediction on subjective social impairment was based on Chriki's (2015) findings. Chriki reported that at high levels of worry, EC was negatively associated with subjective (as assessed by the SF-36), and that regardless of level of worry, EC was negatively associated with the perception that the respondent has difficulty engaging in certain social behaviors or engages in other behaviors *too much* (as assessed by the IIP-SC). In the present sample, Chriki's results on the IIP-SC were replicated, while the worry by EC interaction predicting SF-36 was not. Thus, the present findings suggest that, regardless of level of worry, EC was negatively associated with the perception that the respondent has difficulty engaging in certain social behaviors or engages in other behaviors *too much*. Furthermore, although worry was negatively associated with general social functioning regardless of level of EC, the pattern of results suggested that EC was positively associated with social functioning at higher levels of worry. Taken together, these results are broadly consistent with Chriki's findings,

suggesting that while worry is associated with social impairment overall, higher levels of EC generally predict lower reports of social impairment. Although I was unable to replicate the worry by EC interaction predicting SF-36, this may simply be due to sample differences. PSWQ scores were higher on average in the present sample (M = 61.01, *SD* = 12.73) relative to Chriki's sample (M = 54.22, *SD* = 16.39). Considering that difference, Chriki's sample may have been better suited to detecting the interaction in question. Ultimately, further research is recommended to help elucidate the relationship between worry, EC, and self-reported social functioning.

The present study also included a social interaction task for the purposes of an attempted replication and extension of the findings by Erikson and Newman (2007). Specifically, Erikson and Newman examined the congruence between confederate ratings of participants' social impact and participants' own self-ratings. A curvilinear relationship was present, such that higher levels of worry were positively associated with both over and underestimation of social impact. Individuals at either end of the estimation bias curve tended to be less well-liked by the confederate, although individuals at the underestimation end were least well-liked. Furthermore, individuals at the underestimation end were less willing to make significant emotional disclosures. Integrating these findings with the worry by EC interaction, I hypothesized that, at high levels of worry, EC would be negatively associated with willingness to disclose, would predict being less well-liked by the confederate, and be positively associated with tendency to underestimate negative social impact. However, I allowed for the possibility

that, at high levels of worry, low levels of EC might also be associated with being less well-liked by virtue of over-disclosure.

My first test replicated an analysis conducted by Erikson and Newman, by seeking to predict individuals' level of worry from their impact discrepancy score (that is, the discrepancy between the confederate's rating of their participant's negative social impact and the participant's own self-rating). While the discrepancy score significantly predicted worry, such that greater overestimation of negative impact by the participant was associated with greater levels of worry, the quadratic term reported by Erikson and Newman did not significantly improve the fit of the model. Thus, contrary to expectations, worry was significantly associated with overestimation of impact, but was not significantly associated with underestimation of impact.

Further analyses examined the impact of individual differences in EC on the relationship between the worry and impact estimation bias. Although EC appeared to moderate the relationship between worry and estimation bias, the pattern of results was not consistent with expectations. On average higher levels of worry were associated with a tendency to overestimate one’s negative impact on the confederate relative to the confederate’s perception. However, at high levels of worry, there was a pattern such that EC was negatively associated with estimation bias. In other words, at high levels of worry, higher EC was associated with greater accuracy of impact estimation. This is contrary to the expected pattern, in which higher levels of EC were expected to be associated with underestimation of impact at high levels of worry. Follow-up analyses suggested that while higher levels of worry were associated with more negative self-

ratings by the participants, confederates had the opposite perception. That is, confederate ratings tended to be more positive at higher levels of worry. However, exploration of the effect found that this was only true at lower levels of EC. That is, when EC was low, worry was associated with more positive ratings of participants. When EC was high, however, there was no significant association between worry and confederate impact ratings.

In order to further understand the interpersonal behavior of the participants, I examined the extent to which worry's association with willingness to emotionally disclose varied as a function of differences in EC. Specifically, I predicted that high levels of worry would predict lower emotional disclosure at high versus low levels of EC, although I predicted that worry would show a weaker form of this association even when EC is low. Willingness to disclose was operationalized using three variables: the confederate's subjective rating of the participants willingness to disclose, the amount of time the participant spent speaking, and the intimacy level of the disclosure prompts chosen by the participant. Although the pattern for effect suggested that worry was negatively associated with the tendency to select intimate disclosure topics, non-significant results across these tests showed that EC did not moderate the relationship between worry and willingness to disclose. Thus while, as predicted, there was some evidence to support an association between worry and being unwilling to emotionally disclose, I did not detect the predicted interaction or an effect of EC on emotional disclosure at high levels of worry.

Further examination of the confederates' perception of the participants was conducted utilizing the confederates' subjective desire for future interaction with the participants. Contrary to expectations, EC did not moderate the relationship between worry and confederates' desire for future interaction with the participants. Instead, there was only a main effect of EC, suggesting that confederates tended to prefer interacting with individuals at higher levels of EC.

Finally, I conducted further analyses aimed at elucidating potential heterogeneity in the social functioning of worriers, by examining a number of related constructs. Specifically, I hypothesized that at high levels of worry, higher levels of EC would predict a more restricted social network, as well as a more avoidant attachment style. In contrast, I hypothesized that lower levels of EC would predict a greater degree of excessive reassurance seeking, along with a more anxious attachment style. I began my exploratory analyses by examining the tendency for participants to engage in excessive reassurance seeking.

Although worry was significantly positively associated with excessive reassurance seeking, EC was not. Contrary to expectations, worriers were no less likely to report reassurance seeking at higher levels of EC than at lower levels. One way to understand these findings, is that because higher levels of EC, at least in this sample, were not associated with a cold and aloof stance, it makes sense that they would not predict reduced reassurance seeking. However, given the surprising nature of these findings further research is needed.

Further understanding of the social behavior of the participants may be obtained through consideration of their social networks. Analyses were conducted using three different measures of social network size: the number of high contact roles an individual has (e.g., spouse, child, neighbor, student, etc.), the actual number of people with whom the individual maintains regular contact, and the number of social domains in which the individual is active (e.g., family, school, work). Contrary to expectations, there were no significant main or interaction effects in any of these analyses. Given the findings reported thus far, it is perhaps not surprising that EC would not predict differences in social networks at high levels of worry – at least not in the current sample. It is more surprising, however, that worry was not associated with such social network characteristics. Given the association between worry and OCPD traits such as risk aversion, one would expect that worriers would broadly report more restricted social networks. It is thus important to consider why this might not be the case in the present sample. One possibility is that worriers, despite their social anxiety, are not actually socially impaired. However, social impairment in anxiety disorders is well recognized (American Psychiatric Association, 2013), and this seems to be an unlikely explanation. An alternative, but related, explanation might be that the social nature of college makes it difficult for college age worriers to socially isolate themselves, and so any impairment that is present cannot be detected by simply examining the size of these individuals' social networks. The final, and potentially most likely explanation, is that this simply is not a clinical sample. That is, although our sampling strategy sought to oversample high worriers, we did not conduct structured diagnostic interviews and thus it is unclear what

percentage of our sample fell in the clinical range. Thus, the present sample may very well be characterized by individuals who experience substantial enough anxiety to report social anxiety, without necessarily being impaired enough to desire social isolation.

However, it is potentially important to distinguish between the size of an individual's social networks, and their actual perceived levels of social support within that network. Worry showed a negative association with perceived support, broadly speaking, but contrary to expectations, EC was not associated with perceived support. That is, while worriers tended to perceive a lack of support, this association did not vary as a function of individual differences in EC.

It should be noted that this does not necessarily indicate that worriers truly have less access to interpersonal support relative to non-worriers. Given the subjective nature of social support, individuals, particularly worriers, may give biased reports of their perceived social support. Particularly of interest, from that perspective, is the lack of an effect of worry on confederates' interest in future interactions with participants. That is, confederate desire for future interaction was not negatively associated with worry, as initially hypothesized. Additionally, at high levels of worry, high levels of EC were associated with a greater participant desire for future interaction. This could indicate that worriers with high levels of EC are somewhat less prone to the sorts of cognitive distortions suggested above.

Consideration of attachment quality may shed further light on the question of perceived social support. Looking first at maternal attachment, worry was negatively associated with maternal attachment, as would be expected. However, contrary to

expectations, the pattern of results suggested that among high worriers, higher levels of EC were associated with more rather than less secure maternal attachment. Replication of this unexpected finding is needed before any substantial interpretations can be made.

Unlike maternal attachment, paternal attachment was not significantly associated with individuals' levels of worry. EC did, however, moderate the relationship between worry and paternal attachment, such that low worry was associated with less secure paternal attachment when EC was low, relative to when EC was high. By comparison, at high levels of worry, EC was unrelated to paternal attachment. Given the focus of the present study on individuals with high levels of worry, the effect of EC at low levels of worry does not bear any significant implications for my hypotheses.

The final attachment-based model examined participants' reported peer attachment levels. Unlike the previous two models, this model produced results that were consistent with my initial hypothesis. That is, individuals with high levels of worry reported superior peer attachment when EC was low, relative to when EC was high. While consistent with expectations, this finding is particularly interesting given that confederates reported a greater desire to interact with the higher-EC individuals, relative to the lower-EC individuals. It is possible that there is some quality of the social interaction task that fails to elicit aversive social behaviors in these individuals. In addition, it is not entirely clear why the expected findings emerged for peers, but not for mothers or fathers. One likely explanation is that peer attachments are more central to an individual during this period of emerging adulthood. That is, college students are simply spending far more time with their peers than with their parents. It may be possible that

the negative social consequences associated with higher levels of EC are only borne out during extended interactions, and such aspects of relationships may also be more apparent in unstructured interactions, rather than the structured task in the present study. Similarly, it may be that such differences are more observable when the interaction partner is not setting a standard of high-level disclosure. In the present study, confederate disclosure may have created a demand effect that reduced variance in level of disclosure. Thus, the effects of high levels of EC may be reported by individuals in their overall peer relationships, without being apparent in other interactions such as those with a confederate or with a parent. These findings require replication, and ultimately this highlights the needs for more ecologically valid measures of social behavior and attachment quality.

Contrary to expectations, EC did not predict attachment styles at high levels of worry, at least as measured by the ECR. In fact, the only significant findings were that worry was positively related to an anxious attachment style, and that EC was negatively associated with anxious attachment at lower levels of worry. The lack of significant findings here, insofar as EC at higher levels of worry is concerned, would suggest that high-worriers – at least in this sample – do not show attachment styles that differ as a function of EC.

Taken together, the findings presented here provide mixed support for my initial hypotheses. I was able to provide further evidence for our research group's well-documented findings regarding the relationship between the worry by EC interaction, and individuals' subjective experience of AA. I was also able to provide further support for

Chriki's (2015) findings that at high levels of worry, higher levels of EC are associated with greater levels of obsessive-compulsive spectrum traits, although mainly for risk aversion and without the tendency toward detached coldness that was expected. In addition, as predicted, at high levels of worry, higher levels of EC predicted better physical health and subjective social functioning. Thus, those hypotheses with the strongest theoretical backing were supported by the present data.

On the other hand, the present study was unable to replicate the pattern of the findings reported by Erikson and Newman (2007). I was also failed to find a consistent pattern of results regarding social impairment and functioning. Although there some evidence suggesting that high levels of worry are associated with insecure attachment to peers at higher versus lower levels of EC , that pattern failed to emerge on other measures related to social functioning, and the overall pattern of null findings suggests that my findings in these domains should be interpreted with caution.

Limitations and Future Directions

There are several limitations to the current study. First and foremost is the size of its sample. The power to find interactions is limited by sample size. Although my power analysis suggested that the study was adequately powered, it may be that the effect sizes reported in past studies were larger than their true values. It may be that the study was simply not adequately powered to find the true effects. My oversampling strategy reduced my power to find interactions by constraining the variance of the product term. Although this strategy increased my power to find an effect of EC at high levels of worry,

sample-specific idiosyncrasies may have limited that power. Specifically, the number of individuals at the confluence of extreme high worry and high EC may not have been sufficient to detect the predicted effects.

From a statistical perspective the number of hypotheses and constructs of interest required that a large number of significance tests be conducted and reported. Given the large number of tests that were run, the probability of false positives is certainly high. Although the theoretical backing for the hypotheses was well defined, the lack of results in the expected directions might suggest that the underlying model was incorrect. However, because Chriki (2015) found results that present study did not, the model cannot simply be dismissed. It is entirely possible that the model is correct, but that sample-specific idiosyncrasies made this sample a poor context in which to test the model.

On a related note, my failure to replicate the findings from Erikson and Newman (2007) may be due, in part, to false positives. Although the curvilinear relationship that they reported between worry and participants' impacts on the confederates was theoretically consistent, it should be noted that there are multiple impact subscales within that measure, and the one reported by Erikson and Newman was one of only two (the other being the submissive scale, which overlaps with the hostile-submissive subscale) which yielded significant results (Erikson & Newman, 2007). Although a theoretical case can be made for why the results might be most apparent on the hostile-submissive subscale, similar arguments can be made for other subscales. It is possible that their significant results for these two subscales are not truly meaningful. The characteristic

shared in common by the two significant subscales is that they both tap in to submissiveness, rather than hostility, which could suggest that participants were not truly having a negative impact on the confederates.

Additionally, the ecological validity of the present study requires closer examination. Studies of social behavior are very difficult to conduct in a way that offers satisfactory ecological validity. And because the present study sought to examine so many facets of social functioning, most constructs could only be measured using questionnaire data. Drawing conclusions from questionnaire data, particularly when many constructs were measured using a single instrument, is inherently problematic. Although questionnaire data can point to important trends when a consistent pattern of results is apparent, such a pattern was not apparent in the present study. The questionnaire data that were collected offered some interpretation difficulties (e.g., whether or not a questionnaire measure of attachment reflects actual attachment experiences or rather cognitive biases), but this is unlikely to account for the failure of the present study to find the predicted effects; the selected measures are widely used and have been validated in numerous studies. On a related note, the non-questionnaire measure that was used, the social interaction task, did not yield the expected results, which could potentially reflect validity concerns. However, it is important to note, again, that the measures that were used are widely used and validated. Thus, it was reasonable to believe that it would reveal the expected differences.

Future research into this domain would benefit from certain changes to the study design. A more focused study could potentially allow for a fuller exploration of the

personality features of interest. These traits were measured using one self-report instrument here, but a more focused study could potentially examine additional measures (including one with validity scales), friend/family reports of personality, as well as a more ecologically valid observation of personality style.

Additionally performance-based and physiological measures of self-regulatory capacity would offer a greater ability to understand the role that this construct plays in predicting personality and interpersonal functioning. While such measures were collected in the context of the present study, their analysis was outside the scope of this dissertation project.

Conclusions

Despite substantial limitations, the present study offers several important findings. First, our research group's previous findings that EC moderates the relationship between worry and AA were replicated. This increases our confidence that an integrative model of worry and GAD can capture the relationship between worry and AA better than any other current model alone. This helps set the stage for continuing research into the characteristics of such worriers, and the broader importance of EC in our understanding of psychopathology. Such continuing research is particularly warranted, given increasing interest in disorders of overcontrol (Lynch, 2018).

The present study was not designed to test any hypotheses regarding the mechanisms by which the EC is protective against AA at high levels of worry. However, there is a strong theoretical argument for what that mechanism likely is. As noted

previously, Etkin et al. (2009) found that patients with GAD exhibited enhanced functional connectivity at rest between the amygdala and the dorsolateral (dl)PFC. This circuit is thought to be associated with top-down control of amygdala activity, and in Etkin et al.'s study was associated with lower reports of subjective physiological arousal. The integrative Cognitive Control model proposes that worriers with high levels of EC, consistent with Cognitive Avoidance, suppress their AA by using their enhanced top-down regulatory abilities to constrain their worry to a verbal form of processing. Indeed, recent evidence from our research group (Toh & Vasey, 2017) demonstrated that worriers with high levels of EC spend a relatively greater percentage of their worry time thinking in verbal thoughts, when compared to worriers with low levels of EC. Furthermore, this greater amount of time spent thinking verbally appeared to account for relatively lower levels of subjective AA among those same individuals. Taken together, the current body of evidence strongly suggests that worriers with high levels of EC experience lower levels of AA, and that this is a function of their engaging in top-down regulation of their cognitive processes. The present study also replicated past research suggesting that EC impacts personality dimensions. The finding that high versus low EC predicts greater obsessive-compulsive spectrum traits at high levels of worry provides further evidence that GAD and pathological worry encompass a more heterogeneous group of individuals than was previously expected. The facet-level findings on these traits offer an important step in characterizing this heterogeneity and illustrate the need for further study.

Surprisingly, individual differences in level of EC at high levels of worry- at least in this sample - were not consistently associated with interpersonal functioning. In fact,

considering all of the regression models that were analyzed in the present study, less than half of them revealed a pattern of results that was consistent with hypotheses. As such, those findings that were consistent with hypotheses should be interpreted with caution. Although it seems likely that the proposed heterogeneity in interpersonal functioning exists, the present study suggests that self-report measures and a relatively brief, scripted interaction may not be highly effective at eliciting it. Thus, the present study offers an initial examination into these constructs, and points to alternative frameworks that may be more successful at elucidating these constructs in the future.

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