Exploring Impulsivity, Hostility, and Poor Decision-Making in Social Anxiety:

An Externalizing Social Anxiety Subtype?

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This thesis titled

Exploring Impulsivity, Hostility, and Poor Decision-Making in Social Anxiety:

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Abstract

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Exploring impulsivity, hostility, and poor decision-making in social anxiety: An externalizing social anxiety subtype?

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Individuals with social anxiety disorder have traditionally been conceptualized as shy, withdrawn, and inhibited. This is certainly true for many people suffering from this disorder; however, a nascent body of research has identified one or more subgroups of socially anxious individuals who exhibit approach-oriented and novelty-seeking behaviors in the context of their fears of social situations. This body of research has, to date, relied exclusively on self-report data to make conclusions about the nature of this “atypical” (Kashdan, McKnight, Richey, & Hofmann, 2009, p.559), or, externalizing subtype of SAD. The current study was the first to use real-time behavioral and neuropsychological assessment outcomes in an analogue sample of socially anxious individuals. It attempted to replicate previous findings involving distinct putative subtypes of social anxiety (externalizing versus internalizing) that are characterized by divergent behavioral patterns. Past research has reported that socially anxious externalizers report engaging in impulsive and hostile behaviors and that socially anxious internalizers report engaging in submissive and withdrawal behaviors. Results of the preset study failed to show behavioral differences between the externalizing versus internalizing subtypes of SAD, limiting the generalizability of previous research findings beyond the self-report domain. Furthermore, the two putative subtypes of SAD failed to self-report differences in constructs that have previously been identified as potential explanatory domains for the heterogeneity across individuals with SAD. These constructs include regulatory focus and behavioral
inhibition/activation/fight-flight-freeze system (BIS/BAS/FFFS). Theoretical implications of these findings are discussed.
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**Introduction**

Social anxiety disorder (SAD) is a psychological disorder characterized by a marked and persistent fear of situations in which real or perceived evaluation may occur (American Psychiatric Association, 2000; Clark & Wells, 1995; Heimberg, Brozovich, & Rapee, 2010). Specifically, individuals with SAD often report fear that they will do or say something embarrassing that will cause others to think negatively of them (Heimberg et al., 2010). SAD affects approximately 12% of individuals at some point in their lives (Kessler, Chiu, Demler, & Walters, 2005; Kessler, McGonagle, Zhao, Nelson, Hughes, et al., 1994), making it one of the most prevalent psychological disorders (APA, 2000).

The prevailing theoretical conceptualizations of SAD characterize those suffering from the disorder as responding to social distress with behaviors such as shyness, withdrawal, and inhibition (e.g., see Clark & Wells, 1995; Heimberg et al., 2010). Social distress may manifest in many different ways, from the physiological symptoms of SAD (e.g., racing heart, sweating, etc.) to the higher-order fears of evaluation (see Heimberg et al., 2010). Recent research has focused on heterogeneity in the ways in which socially anxious individuals respond to social distress (Kachin, Newman, & Pincus, 2001; Kashdan, Elhai, & Breen, 2008; Kashdan & Hofmann, 2008; Kashdan & McKnight, 2010; Kashdan, McKnight, Richey, & Hofmann, 2009). Specifically, this small but growing body of research has identified a putative “atypical” (Kashdan et al., 2009, p. 559) subset of socially anxious individuals who purportedly possess personality characteristics that potentiate behaviors such as hostility or aggression. Similar trends have been postulated with regard to outcome expectancies for novelty-seeking behaviors such as excessive alcohol/substance use and promiscuous sexual activity (Kashdan, Collins, & Elhai, 2006).
Current cognitive-behavioral models of SAD (Clark & Wells, 1995; Heimberg et al., 2010) may not adequately account for the heterogeneity proposed to characterize SAD (e.g., see Kashdan et al., 2009); thus, treatment protocols designed to treat SAD may not be ideal for all symptomatic individuals. In other words, if some individuals with SAD possess these externalizing personality features (i.e., confrontational style), they may respond to social distress very differently compared to individuals with SAD who possess the more internalizing (e.g., withdrawal style) personality features. It has been asserted that behavioral components of any therapy targeting social anxiety concerns should take differing SAD presentations (i.e., internalizing versus externalizing) into account (Kashdan & McKnight, 2010).

The current study aimed to further illuminate the nature of this heterogeneity by examining the behavioral tendencies of socially anxious individuals on several neuropsychological tasks, as well as perceptions of performance during and after a semi-structured social interaction task. We anticipated that individuals with differing putative subtypes of SAD (i.e., externalizing versus internalizing [E–I], respectively) would perform differently on the tasks and would have different self-perceptions in response to the social interaction task. Whereas previous research has focused on self-reported behaviors as evidence of differences between putative externalizing-internalizing (E-I) SAD subtypes, the current study emphasized observable behaviors and neuropsychological test performance in the laboratory as indices of these differences.

1 Whereas Kashdan et al. (2009) use the term ‘atypical’ to refer to the putative subtype of SAD under investigation, in the present study, the author uses the term ‘externalizing’ to refer to the same group of individuals, because it is more conceptually descriptive.
Atypical or “Externalizing” Social Anxiety Disorder?

Until recently, studies including samples with purportedly externalizing presentations of SAD (e.g., novelty-seeking, aggressive, etc.) had not explored the possibility that these externalizing symptom patterns were part of the same overarching “atypical,” or “externalizing” subtype of SAD (e.g., Kachin et al., 2001). Kashdan and colleagues, (Kashdan et al., 2008; Kashdan et al., 2009; Kashdan & McKnight, 2010), however, have recently reported that both novelty-seeking and aggression fit into the “disinhibited” and “risk-prone” (Kashdan & McKnight, 2010, p. 48) behavior patterns thought to characterize externalizing SAD.

In one study, latent class analysis was used to confirm the appropriate number of classes to extract from a subsample of 1,822 socially anxious individuals (study N = 9,282) from the National Comorbidity Survey – Replication (NCS-R; Kessler et al., 2004). Participants had either a lifetime diagnosis of SAD, or a diagnosis within the past 12 months. When risk-prone behaviors were used as classification dimensions, a two-class solution was found to fit the data better than a one- or three-class solution. The authors suggest that there may be qualitative heterogeneity among individuals with SAD, and that risk-prone behavior may explain a large degree of this variability. Risk-prone behaviors were defined as aggression, anger, sexual impulsivity and substance use. Furthermore, the authors report that this difference between latent classes cannot be accounted for by SAD severity or by number and types of feared social situations. Finally, a similar latent class analysis conducted on the entire NCS-R sample revealed that a dissimilar class solution (3 classes) fit the data best, suggesting that these results may be unique to SAD.

Note that, while Kashdan et al. (2009) used an SAD patient sample, the authors did not specify SAD subtype (i.e., generalized versus non-generalized) information for their sample.
Furthermore, while some evidence suggests that individuals with purported externalizing (versus internalizing) SAD engage in differing levels of externalizing behavior, there is evidence against the notion that distress levels differ between the two subtypes in a clinical sample (Kashdan & Hofmann, 2008). Kashdan et al., (2009), however, reported that socially anxious externalizers reported higher levels of distress than socially anxious internalizers. Of note however, is that Kashdan et al. (2009) employed a clinical sample comprised of individuals meeting a diagnosis of SAD within the past twelve months in addition to individuals meeting a current SAD diagnosis. This fact opens the possibility that many individuals included in this sample may not have had clinically severe SAD at the time of participation in the study. Thus, in the present study, we did not necessarily expect differences in global distress levels to differ as a function of externalizing versus internalizing subtype.

The remainder of the Introduction will focus on research areas that support the notion that an externalizing subset of individuals with SAD may exist; these individuals are purportedly characterized by risk-prone and approach-oriented behaviors. Furthermore, neuropsychological differences were reviewed which could explain these results. These research areas include regulatory focus, behavioral approach, hostility/anger, and positive outcome expectancies of risky activity.

Regulatory focus refers to an individual’s tendency to deal with his/her environment in ways that promote positive outcomes, and/or discourage negative outcomes. Positive outcome expectancies refer to the differential tendencies of some individuals to hold positive beliefs about the expected outcome of risky activities, such as substance abuse. The review will conclude with a brief discussion of the use of social interaction tasks in research with socially
anxious individuals in order to elicit different kinds of behaviors (e.g., safety behaviors, anxious arousal, etc.) that hold relevance to the current study.

**Regulatory Focus**

Kashdan et al. (2008) offer some insight into how the putative E-I dichotomy between individuals with social anxiety problems may exist. They cite Higgins’ (1997) regulatory focus theory, which postulates that individuals have a regulatory focus that can be either promotion-focused (approach) and/or prevention-focused (avoidance). According to Higgins (1997), a promotion focus concerns the accumulation of gains, and neglects the possibility of errors made while in pursuit of these gains. A prevention focus, on the other hand, primarily concerns responsibility, safety, and the presence or absence of losses, at the expense of not achieving maximal positive outcomes. In other words, individuals with a primary promotion focus would be more engaging with their environment, and less worried about potential liabilities, whereas individuals with a primary prevention focus will mostly attempt to avoid situations that have potential for negative outcome, and worry less about the risk of missing valuable opportunities.

Kashdan and colleagues (2008) propose that socially anxious individuals who exhibit excessive novelty-seeking behaviors have stronger promotion-focus, and label these individuals as having *approach-oriented SAD*, whereas those socially anxious individuals who exhibit shy and inhibited behaviors have a stronger prevention-focus, and label these individuals as having *avoidance-oriented SAD*. Applied to socially anxious externalizers, avoidance of activities that are high in risk may elicit feelings of regret about a missed social opportunity. Kashdan et al. (2008) point out that individuals may not fall exclusively into one orientation or the other – they argue that an individual may use *either* approach or avoidance orientations across different socially
distressing situations, although one orientation is usually primary across the majority of situations.

The results reported by Kashdan et al. (2008) support the notion that individuals with externalizing versus internalizing SAD differ on their orientation towards approach versus avoidance tendencies. According to Kashdan et al., the externalizing SAD group reported beliefs that risk-taking (in the form of risky sex, substance use, aggression, etc.) was associated with opportunities to enhance social status, while the internalizing SAD group reported beliefs that risk-taking was threatening and not associated with the enhancement of social status. One limitation of the Kashdan et al. (2008) study, and those using similar designs, is that they did not delineate whether: (a) the externalizing construct may be reflective of a specific coping strategy designed to help socially anxious individuals navigate socially distressing situations in particular; or if (b) the externalizing construct is more broad, influencing behavior even in non-social situations. In addition, the cluster analytic techniques that Kashdan et al. (2008) relied upon were performed with self-report data that may have limited generalizability to actual behavior. Cluster analytic techniques performed on ecological momentary assessment data may ultimately prove to yield more valid cluster dimensions for differentiating SAD subtypes.

Differences in regulatory focus may also be reflected in preliminary neuroimaging findings, though literature examining regulatory focus via neuroimaging among socially anxious individuals is currently lacking. Cunningham, Raye, and Johnson (2005) reported that individuals with different regulatory foci exhibited differential amygdalar, anterior cingulate cortex (ACC), and extrastriate cortex activity in response to positive versus negative stimuli. These areas are reported to be heavily involved in motivation and emotional processing (Cunningham et al., 2005). Individuals with a primary promotion focus demonstrated increased activation of these
areas in response to positive stimuli, whereas individuals with a primary prevention focus
demonstrated increased activation on these areas in response to negative stimuli. Birbaurner et
al. (1998) conducted a study that documented the role that the amygdala may play in SAD. In
their study, socially anxious individuals experienced heightened amygdala activation in response
to seeing neutral faces when compared to healthy controls. While it was previously thought that
amygdala activation alone was sufficient to predict a fear response, recent research has
suggested that the amygdala’s role is much more complex (Cunningham, et al., 2005), such that
the amygdala becomes activated in response to stimuli that are consistent with an individual’s
regulatory focus. Stein (1998) posits that SAD may be a disorder of social risk/reward appraisal,
which is a function proposed to be carried out by the ACC (Mathew, Coplan, & Gorman, 2001).
Thus, differential ACC activity may translate into different social risk/reward appraisals, leading
to varying response patterns employed to manage social distress. The ACC may be a brain region
that is responsible for at least some of the differences in regulatory focus and social risk/reward
appraisals observed between individuals with externalizing versus internalizing SAD. The current
study employed several tasks that have been reported to be sensitive to ACC functioning.

BIS/BAS systems

Gray’s (1972, 1990) Behavioral Inhibition System/Behavioral Activation System (BIS/BAS)
model is a theoretical framework that may be applicable to the differentiation of the purported
E-I social anxiety subtypes. According to this model, there are two neurobiological systems that
act in opposition to one another (Gray & Smith, 1969). The degree to which individuals differ
across these two domains is reflected in their levels of impulsivity (BAS) and anxiety (BIS)
(Tsanadis, 2005). The BAS can be conceived of as a “go” mechanism with the goal of compelling
an individual to engage in approach behaviors. The opposing system, the BIS, is the “stop”
mechanism, which is proposed to prevent the individual from responding to a cue in order to prevent potential harm (Gray, 1972). Gray (1987) also proposed that the BAS involves dopaminergic neurons in the mesolimbic system, and activation of these areas has been found in past research to be associated with illicit drug use (Koob & LeMoal, 1997). This may be applicable to individuals with SAD, who frequently display drug use and other impulsive behaviors (Kashdan et al., 2006; Buckner, Bonn-Miller, Zvolensky, & Schmidt, 2007).

Alternatively, it may be possible to conceptualize externalizing versus internalizing SAD in terms of a recent model, the Fight-Flight-Freeze System (FFFS; De Young, 2010), which is an extension of the BIS/BAS model (De Young & Gray, 2009). According to the FFFS model, the BIS and FFFS respond to two different types of threatening stimuli (Gray, & McNaughton, 2003; Pickering & Gray, 1999). The FFFS responds to threats that are immediately present, and activates a response that is either active avoidance (e.g., panic, escape, or freezing) or an active attempt to eliminate the threat (e.g., hostility and attack). On the other hand, the BIS responds to stimuli that the individual recognizes as potentially beneficial, but still possess a degree of threat in the form of risk (i.e., an approach/avoidance conflict). The BIS then, activates behaviors such as vigilance, rumination, avoidance, and anxiety, with the goal of preparing oneself for this risk (Gray & McNaughton, 2003). In thinking about the aggressive and hostile tendencies of a subset of individuals with SAD (see Kachin et al., 2001), it seems that the characteristic behavior patterns of externalizing versus internalizing SAD fit with De Young’s (2010) description of the FFFS versus BIS, respectively; however, no data currently exist which link the BIS/BAS/FFFS systems to the putative E-I subtypes directly.

The FFFS has also been implicated in some of the brain structures identified by Cunningham et al. (2005) as being relevant for predicting regulatory focus (McNaughton & Corr,
2004), including the amygdala and ACC. In addition, impulsivity has also been strongly linked to reductions in orbitofrontal cortex activity (OFC; Kolb & Whishaw, 2008), though it is unclear whether this pattern remains stable among individuals with SAD. Individuals with externalizing social anxiety may possess OFCs that are underactivated relative to individuals with internalizing social anxiety, and this trend may help explain some of the self-report results on impulsivity. Administration of neuropsychological tasks which measure impulsivity, such as the Stop-Signal paradigm (Logan, Schachar, & Tannock, 1997), are necessary to determine whether such self-reported differences in impulsivity across the putative E-I subtypes are generalizable to behavioral domains.

**Hostility, Aggression, and Inhibition**

Anger is another domain that may differ across individuals with externalizing versus internalizing SAD subtypes. Past research demonstrates that individuals with SAD are more prone than nonanxious controls to experience anger across a variety of situations, to experience anger without provocation, and to express anger following criticism (Fitzgibbons, Franklin, Watlington, & Foa, 1997; Meier, Hope, Weilage, Elting, & Laguna, 1995). This body of research suggests that individuals with SAD believe that others will invariably evaluate them negatively. Although individuals with SAD may wish to respond with anger towards perceived negative evaluation, doing so may put the individual in danger of further negative evaluation, thereby motivating him/her to suppress his/her anger (Erwin, Heimberg, Schneier, & Liebowitz, 2003). Erwin and colleagues suggest that when socially anxious individuals experience anger, the possibility of a negative-evaluation-eliciting outburst becomes greater. “Anger may therefore elicit anxiety and be suppressed in the service of anxiety reduction. Indeed, discomfort with and suppression of anger, ... seem[s] to be characteristic of the anger expression style of persons...
with social anxiety disorder,” (Erwin et al., 2003, p. 332). In another study (Kashdan & Collins, 2010), participants recorded entries in electronic diaries that randomly prompted participants throughout the day to record their immediate emotional state. It was reported that trait social anxiety was significantly and positively related to experiencing anger, whereas it was significantly and negatively related to feeling happy, relaxed, and generally positive. Interestingly, this effect was present both when the participant was socializing as well as when the participant was alone at the time of the random prompt. These findings also lend support to the notion that externalizing behavior carried out by individuals with SAD may not be confined to socially distressing situations, but rather may represent a more pervasive and stable pattern of behavior that carries over into non-social situations, however it remains to be determined whether socially anxious externalizers versus internalizers report different results in a daily diary study such as this. Furthermore, caution is warranted in making this conclusion without additional data pertaining to other externalizing behaviors, such as substance use.

Some research to date has examined anger and hostility in SAD patients (Kachin et al., 2001). Kachin and colleagues used cluster analysis to classify individuals with SAD based on a variety of interpersonal problem domains, including hostility and over-dominance (i.e., being overly controlling with others). Two clusters emerged from this analysis, with one being characterized by friendly and submissive behaviors, and the other being characterized by hostile and dominant behaviors. More recently, Kashdan’s group (2008) has postulated that individuals with a primary promotion orientation will exhibit disinhibited anger more so than individuals with a primary prevention orientation. According to Kashdan et al. (2008), anger is one of many potential responses that an individual with externalizing SAD may employ to cope with social distress. For example, a socially anxious individual may perceive that another person might
evaluate them in an unfavorable way, and consequently lash out at a perceived offensive other in an effort to deflect negative evaluation. Other responses include participation in activities that are also objectively risky, such as substance abuse or risky sexual activity (i.e., unprotected sex with multiple anonymous partners). While research on the hostile features of the externalizing subtype in SAD has informed the extant literature, many questions remain as to whether these self-reported differences translate to actual behavioral domains.

Some key brain areas appear to be relevant for anger expression, and differences in the functioning of these areas, may be responsible for the self-reported differences in aggression and hostility across the purported E-I subtype. One positron emission tomography (PET) imaging study involved the experimenters instructing participants to imagine carrying out a variety of aggressive acts, and identified the ventromedial prefrontal cortex as potentially being relevant for aggression (Pietrini, Guazzelli, Basso, Jaffe, & Grafman, 2000). Admittedly, a limitation of this study is that it is impossible to ensure that participants were thinking as instructed during the procedures. Additionally, the study fails to capture the social-interactional component that is crucial to aggression. Lotze, Veit, Anders, and Birbaumer (2007) utilized a variant of the same reactive aggression paradigm used in the present study, the Taylor Aggression Paradigm (TAP-M; see Measures), on individuals while in a functional magnetic resonance imaging (fMRI) scanner. The TAP-M is a reactive aggression paradigm in which participants are subjected to noxious stimuli, ostensibly at the hands of another person, and are given the opportunity to “retaliate” with their own noxious stimuli. Results indicated that the medial prefrontal cortex was activated during the aggressive retaliation phase of the task. More specifically, the authors reported that the dorsomedial prefrontal cortex exhibited increased activity relative to other structures during the selection of the retaliation stimulus intensity, and was positively correlated
with the strength of the selected stimulus. The ventromedial prefrontal cortex, by comparison, exhibited increased activity relative to other structures while participants observed their “opponent” suffering (via a pre-recorded video tape) as well as during the retaliation itself. Other functional neuroimaging studies have identified the amygdala as an important structure in the expression of anxiety and aggression (Davidson & Irwin, 1999). Birbaumer et al. (1998) reported that males with SAD demonstrated increased amygdala activation in response to neutral (therefore threatening) faces compared to normal controls. In addition, amygdala activity is widely accepted to be important in the experience of anger (Panksepp, 1998). The present study is the first to utilize a neuropsychological task designed to investigate behavior patterns associated with anger regarding differentiation of the putative E-I subtypes of SAD.

**Risky Decision-Making and Positive Outcome Expectations**

Individuals with SAD may be motivated to use illicit substances for a variety of reasons, including anxiety management. The effect that an individual believes a substance will have on their social performance has been investigated as a possible differentiating factor between externalizing versus internalizing SAD (Kashdan et al., 2006; Kashdan, et al., 2009). Kashdan et al. (2008) cite outcome expectancies of risky situations as being at least partially responsible for differences in outward behavior across individuals with SAD. For example, a socially anxious individual may self-medicate with anxiolytic substances such as alcohol or marijuana if he/she believes that the behavior will result in a sense of social stability or security.

There is an extensive literature base documenting the abuse of alcohol among individuals with SAD (e.g., Buckner, et al., 2007; Burke & Stephens, 1999; Ham, Bonin, & Hope, 2007; Ham & Hope, 2005). In fact, between 16-39% of individuals presenting for treatment with alcohol dependence also meet criteria for SAD, which is higher than the lifetime prevalence rate
of SAD (Chambless, Cherney, Caputo, & Rheinstein, 1987; Page & Andrews, 1996; Schneier, Martin, Liebowitz, Gorman, & Fyer, 1989; Smail, Stockwell, Carter, & Hodgson, 1984). In addition, alcohol use disorders are very common among individuals with SAD (48%; Grant, et al., 2005). Kidorf and Lang (1999) found that the effect that a socially anxious individual believes alcohol will have on his/her social performance is directly related to the frequency and intensity of alcohol use (but see also Ham & Hope, 2005). It may be the case that socially anxious externalizers consume alcohol primarily to enhance their status (promotion-focusing) while socially anxious internalizing consume alcohol primarily to reduce anxiety due to social distress (prevention-focusing), though this question remains open for empirical evaluation.

In order to investigate potential reasons that individuals with SAD consume alcohol, past research has explored the potentially anxiolytic effects of alcohol. Several models including Tension Reduction Theory (TRT; Cappell, 1975) and Stress Response Dampening (SRD; Levenson, Sher, Grossman, Newman, & Newlin, 1980) posit that alcohol use results in lowered perceptions of tension. However, more recent research has indicated that alcohol use may have a diphasic effect on these indices (Wilson, 1988). Specifically, small to moderate doses of alcohol have been reported to produce increases in heart rate (Levenson, 1987), while higher doses of alcohol tend to produce depressant effects on heart rate (Knott & Beard, 1972). To further complicate the issue of the precise effect of alcohol on perceived tension during a social interaction, other research has demonstrated that the pharmacological effect of alcohol is not as important as the expected effect. For example, Marlatt and Rohsenow (1980) used a balanced placebo design, and randomized participants into four cells along two dimensions: expected alcohol versus consumed alcohol, and expected placebo versus consumed placebo. Results indicated that, regardless of the actual type of beverage consumed (alcohol versus tonic only), participants who
believed that they consumed alcohol demonstrated smaller increases in heart rate in response to a social stressor task (i.e., a hetero-social interaction) than those who believed that they had consumed only tonic (see also Breslin & Wilson, 1992; Wilson, Abrams, & Lipscomb, 1980).

Ham and Hope (2006) have reported that positive outcome expectations concerning alcohol use in social situations are positively related to both weekly alcohol consumption and alcohol-related problems among socially anxious undergraduates. However, they demonstrated that social anxiety was negatively (albeit non-significantly) related to positive outcome expectations, as well as perceived drinking norms. Given that the findings of Ham and Hope indicated an overall negative trend between social anxiety severity and alcohol-related problems, the authors concluded that having SAD represents a slight protective factor with regard to risk for alcohol-related problems. However, these results must be interpreted while considering the possibility that a restriction of range may have existed within Ham and Hope’s study sample. Specifically, given that the participants in Ham and Hope’s study were attending college and participating in research studies, they may have been relatively high-functioning. It may be the case that alcohol-related problems are more likely to relate positively to social anxiety in the upper levels of severity. This notion is supported by similar studies that have relied on community samples as opposed to undergraduate samples (Kushner, Abrams, & Borchardt, 2000).

While the findings of Ham and Hope (2006) indicate that social anxiety severity was not related to positive outcome expectations about alcohol use, they acknowledge that, “...there may be a subset of socially anxious individuals with larger social networks who could be at risk for problem drinking,” (Ham & Hope, 2006, p. 354). Kashdan, et al. (2006) echoed the possibility that, when socially anxious individuals do hold positive outcome expectations about risky
behaviors, they are much more likely to report expecting to carry them out than socially anxious individuals without positive outcome expectations. It may be the case that Ham and Hope’s (2006) results were influenced by an externalizing subset of socially anxious individuals (with positive outcome expectancies about alcohol use) being overshadowed by the larger, internalizing group of socially anxious individuals. However, this is an empirical question that remains to be addressed.

Neuropsychological research exists which also may explain substance use heterogeneity through differences in risky decision-making patterns. Bechara, Damasio, Tranel, and Anderson (1998) reported that patients with ventromedial prefrontal cortex lesions performed poorly on the Iowa Gambling Task (IGT; Bechara, Damasio, Damasio, & Anderson, 1994; see Measures) compared to patients with dorsolateral prefrontal cortex lesions, as well as healthy controls. The IGT measures orientation to future rewards and punishments, and provides a good approximation to real-life substance use decision-making processes, which may be reduced among socially anxious externalizers.

**Self-Observer Discrepancy and Visible Anxiety**

Social anxiety research has utilized social interaction paradigms to simulate real-world encounters (Alden & Wallace, 1995). Socially anxious individuals are known to experience social anxiety in a wide range of social situations (Heimberg et al., 2010). Social interaction tasks have been used extensively in many research groups as a social stressor task, and have been demonstrated to reliably elicit social anxiety (e.g., Alden & Wallace, 1995). In one study (Alden & Wallace, 1995), socially anxious individuals participated in an interaction with a confederate who was trained to respond either positively or negatively to the participant. Afterward, the participant, the confederate, and the experimenter all rated the participant’s performance in
terms of non-verbal anxiety (e.g., blushing), positive non-verbal behavior (e.g., warmth), verbal behavior (e.g., *was the participant self-disclosing*?), and overall likeability. Results indicated that socially anxious individuals differed from normal controls in the extent to which their self-ratings differed from the experimenter ratings. Specifically, this group-by-rater interaction reflected that socially anxious individuals rated their anxiety as more visible than did the experimenter, whereas controls did not show the same magnitude of discrepancy (though this effect was also significant in the control group). Socially anxious participants also rated their warmth and overall likeability as lower than did the experimenter, and this difference did not emerge to the same degree among controls (though again, this effect was significant in the control group).

In keeping with past research conducted by Kashdan and colleagues (e.g., see Kashdan & Hofmann, 2008; Kashdan & McKnight, 2010) using self-report data, it is reasonable to expect that individuals with externalizing versus internalizing SAD would differ in their perceived social performance in terms of factors such as warmth, hostility, and engagement. Given that patients with externalizing SAD may utilize externalizing coping behaviors more so than patients with internalizing SAD, it was reasonable to expect that the behaviors of externalizing SAD patients would be more readily observable than internalizing coping behaviors (Zuckerman & Lubin, 1985). Self-observer discrepancies in conversational performance may, therefore, be narrower for socially anxious externalizers than for socially anxious internalizing. On the other hand, it is

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3 Although Alden and Wallace (1995) report that they gathered data from both the experimental confederate and the experimenter, they only report data gathered from the experimenter and from the participant. Data gathered from the confederate was not reported.

4 Self-observer discrepancies (see Rodebaugh & Chambless, 2002) occur when there is a significant difference between an individual’s self-perceived performance on a task and an objective observer’s opinion of the same performance. In the present study, it was assumed that socially anxious externalizers would engage in more *outward/external* social anxiety-related behaviors, which would reasonably be expected to be more visible to an objective observer (i.e., hostility, over-dominance, etc.) compared to those of an individual with internalizing SAD (i.e., behavioral inhibition, etc.). Thus, it seems reasonable to assume that larger self-observer discrepancies would exist among those with internalizing SAD compared to those with externalizing SAD.
unclear whether socially anxious externalizers possess the insight, in the moment, necessary to recognize externalizing conversational behaviors they may carry out. The present study utilized a semi-structured social interaction task in order to assess possible differences between individuals with putative externalizing versus internalizing SAD, using both self-report and observer-report domains, for exploratory purposes.

**Current Study**

The following hypotheses were generated and tested in a sample of participants with high social anxiety symptoms: (1) socially anxious externalizers would show increased impulsivity compared to socially anxious internalizers, (2) socially anxious externalizers will stay more risky across the duration of a study task, whereas socially anxious internalizers will become less risky over the duration of the task, (3) socially anxious externalizers would show increased situational hostility compared to socially anxious internalizers, (4) socially anxious externalizers would report a stronger increase in state hostility across the duration of the study compared to socially anxious internalizers, (5) socially anxious externalizers would report higher promotion and lower prevention regulatory foci compared to socially anxious internalizers, and (6) subjective state distress would increase at an equivalent rate between socially anxious externalizers versus internalizers. A series of exploratory analyses was also conducted involving constructs that may be relevant to the putative E-I subtypes, but which previous research has not examined to date: (7) whether self-observer discrepancies would be smaller between participants with externalizing (versus internalizing) SAD, (8) whether participants with externalizing versus internalizing SAD would report differing levels of BIS, BAS, and FFFS.

Analyses were performed both including and excluding individuals with sub-clinically elevated social anxiety concerns, in order to confirm that the obtained findings were not a result
of sample selection. In other words, it may have been the case the differences between the E-I subtypes emerge in clinical populations only. Individuals with sub-clinically elevated social anxiety may not have demonstrated the magnitude of differences in impulsivity poor decision-making and hostility reactivity as do individuals with SAD.
Method

Participants

An online, psychology department-wide, prescreen assessment was used to identify potential participants. The first questionnaire that was used was a single-item measure designed to determine if potential participants have a past history of serious head injury or neurological issues. Participants with a history of these issues were excluded from the study, given that past research has reported that some of the neuropsychological measures utilized in the present study are sensitive to such injuries (Bechara et al., 1994). The second questionnaire that was used to screen participants for the current study was the Social Interaction Anxiety Scale (SIAS; Mattick & Clark, 1998; see Appendix A) in order to identify those individuals who qualified for a probable diagnosis of SAD (i.e., scoring a 34 or above on the Social Interaction Anxiety Scale [SIAS], see Measures). Individuals without probable SAD according to this measure were excluded from the study. Lastly, the Cognitive Appraisal of Risky Events - Expected Involvement scale (CARE-EI; Fromme, Katz, & Rivet, 1997; see Measures) was also used to screen participants. The CARE-EI is a measure designed to assess propensity for engaging in risky activities such as illicit drug use, aggressive and illegal behaviors, risky sexual activities, and heavy drinking. Individuals whose total score fell between the 35th and the 65th percentiles were excluded from the study; this was done in order to maximize statistical power by creating extreme groups (Abrahams & Alf, 1978). After classifying individuals with probable SAD as having either probable externalizing (upper 35% of the CARE-EI) or probable internalizing SAD (lower 35% of the CARE-EI), participants were invited to participate. Study enrollment was open with regard to race/ethnicity and gender. The present study thus recruited an analogue sample of socially anxious individuals whose diagnostic status was confirmed during an initial interview
Initially, 43 participants enrolled in the study. One participant was excluded due to lack of English proficiency, one participant was excluded due to a lack of even subclinically elevated social anxiety symptoms, and one participant was excluded due to not having signed a post-study consent form giving the experimenter permission to analyze data gathered using deception. Nine participants endorsed sub-clinically elevated levels of SAD, with the remaining 31 participants presenting with clinically significant SAD. Sample characteristics may be found in Table 1.
Table 1

*Sample Characteristics by Putative Externalizing-Internalizing Subtype.*

<table>
<thead>
<tr>
<th>Study Measure</th>
<th>Externalizing</th>
<th>Internalizing</th>
<th>Difference Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>19.00 (1.35)</td>
<td>19.27 (1.39)</td>
<td>t(37) = -.59</td>
</tr>
<tr>
<td>Sex</td>
<td>15 male (62.5%)</td>
<td>9 male (60%)</td>
<td>$\chi^2(1) = .64$</td>
</tr>
<tr>
<td>Race</td>
<td>95.8% Caucasian</td>
<td>100% Caucasian</td>
<td>$\chi^2(1) = .02$</td>
</tr>
<tr>
<td>SIAS-S</td>
<td>34.46 (7.65)</td>
<td>34.58 (10.30)</td>
<td>t(37) = -0.64</td>
</tr>
<tr>
<td>SPS</td>
<td>25.00 (11.34)</td>
<td>19.25 (12.27)</td>
<td>t(35) = 1.13</td>
</tr>
<tr>
<td>BFNE-S</td>
<td>27.29 (7.97)</td>
<td>25.42 (9.12)</td>
<td>t(37) = 0.69</td>
</tr>
<tr>
<td>BDI-II</td>
<td>12.54 (7.51)</td>
<td>8.42 (4.64)</td>
<td>t(36) = 1.63</td>
</tr>
<tr>
<td>NEO-FFI-E</td>
<td>38.92 (4.45)</td>
<td>39.17 (3.51)</td>
<td>t(37) = 0.65</td>
</tr>
<tr>
<td>BIS/BAS – BAS</td>
<td>25.72 (6.64)</td>
<td>24.93 (6.12)</td>
<td>t(37) = 0.46</td>
</tr>
<tr>
<td>BIS/BAS – BIS</td>
<td>8.58 (2.60)</td>
<td>7.20 (2.04)</td>
<td>t(37) = 1.75</td>
</tr>
<tr>
<td>BIS/BAS – FFFS</td>
<td>6.33 (1.81)</td>
<td>5.80 (1.42)</td>
<td>t(37) = 0.97</td>
</tr>
<tr>
<td>RFS – Approach</td>
<td>9.42 (1.72)</td>
<td>9.53 (2.20)</td>
<td>t(37) = -0.19</td>
</tr>
<tr>
<td>RFS – Avoidance</td>
<td>8.00 (1.96)</td>
<td>8.40 (1.84)</td>
<td>t(37) = -0.66</td>
</tr>
</tbody>
</table>

*Note.* SIAS-S = Social Interaction Anxiety Scale – Straightforward Items; SPS = Social Phobia Scale; BFNE-S = Brief Fear of Negative Evaluation Scale – Straightforward Items; BDI-II = Beck Depression Inventory – II; NEO-FFI-E = NEO – Five Factor Inventory – Extraversion Scale; BIS/BAS – BAS = BI/BA Scale – Behavioral Activation Subscale; BIS/BAS – BIS = BI/BA Scale – Behavioral Inhibition Scale; BIS/BAS – FFFS = BI/BA Scale – Fight Flight Freeze Scale; RFS – Approach = Regulatory Focus Scale – Approach Subscale; RFS – Avoidance = Regulatory focus Scale – Avoidance Subscale; Sample size varies between 37-39 due to missing data; Standard deviation presented in parentheses.
Measures

Clinician-Administered Measures.\(^5\)

*Anxiety Disorders Interview Schedule for DSM-IV – Social Phobia subsection (ADIS-SP; DiNardo, Brown, & Barlow, 1994).* The ADIS-IV-L is a widely used, semi-structured clinical interview designed to assess for current and lifetime diagnoses of SAD. The complete ADIS-IV has been reported to have good inter-rater agreement for SAD, including situational fear ratings \(r = .86\), situational avoidance ratings \(r = .86\), and clinical severity ratings \(r = .80\) (Brown, Di Nardo, Lehman, & Campbell, 2001). The ADIS-IV has also demonstrated a strong kappa coefficient for the diagnosis of SAD, \(\kappa = .77\) (Brown, Di Nardo, Lehman, & Campbell, 2001). The ADIS-IV was used in the current study to assess for diagnostic status of SAD (for descriptive purposes only).

*Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987).* The LSAS is a clinician administered measure that was designed to assess the extent of fear and avoidance in a variety of performance- and interaction-based social situations that have occurred in the past week. If the participant had not experienced a particular situation in the last week, he/she was asked to imagine what his/her anxiety would have been if the participant had experienced the situation. The LSAS has consistently demonstrated good psychometric properties. For example, the internal consistency of the LSAS has been reported to be excellent in a sample of individuals diagnosed with SAD, \(\alpha = .96\) (Heimberg et al., 1999). In the present sample, the internal consistency was found to be good, \(\alpha = .87\). The LSAS was used in the current study to assess for diagnostic status of SAD (for descriptive purposes only).

\(^5\) Additional psychometric information pertaining to the following measures may be found in Appendix B.
**Wechsler Test of Adult Reading (WTAR; The Psychological Corporation, 2001).** The WTAR is designed to assess crystallized intelligence among individuals between the ages of 16 and 89. The WTAR is clinician-administered, and involves asking the participant to read aloud 50 words that are printed on a page. Given that cognitive intelligence has been reported to be correlated with performance on the Iowa Gambling Task (Demaree, Burns, & DeDonno, 2010), the WTAR was used in the present study to rule out the possibility that variation in IGT performance was due to between-group cognitive intelligence. Like many other Wechsler assessment instruments, a large, nationally representative sample was used for the development and norming of this measure (Psychological Corporation, 2001). The pronunciation of the words becomes increasingly difficult as the task progresses. Psychometric evaluation of the WTAR shows that the measure is highly internally consistent among those in the age group that the present study targeted (ages 18-19: $\alpha = .90$; and ages 20-24: $\alpha = .92$; The Psychological Corporation, 2001). In the present sample, the WTAR demonstrated good internal consistency, $\alpha = .86$.

**Self-Report Measures.**

**Subjective Units of Distress Scale (SUDS).** The STUDS is a widely used, verbally-administered measure of state discomfort being experienced by the participant. Participants are asked to rate the degree of their current distress using a 0-100 scale, where 0 is indicative of no distress whatsoever, and 100 is indicative of the worst distress imaginable. The SUDS was used to explore potential affective reactivity differences between individuals with externalizing versus internalizing SAD in response to social threat.

**Regulatory Focus Scale (RFS; Cunningham et al., 2005).** The RFS is a four item self-report measure designed to assess an individual’s regulatory focus. Participants rate their
agreement with four statements using a six-point Likert scale ranging from 1 – strongly disagree, to 6 – strongly agree. Although the measure is very brief, it has demonstrated strong correlations with other measures of self-regulatory focus. Participants’ promotion and prevention foci were calculated by summing the two items that comprise each subscale. Although specific psychometric data on the RFS is limited, multitrait-multimethod analyses conducted with this measure indicated that the scale is a valid indicator of self-regulatory focus and has comparable validity to other measures of the same construct (Farb & Cunningham, 2005). In the present study, the RFS was used to determine if socially anxious externalizers possess higher promotion foci and lower prevention foci than socially anxious internalizers.

**Cognitive Appraisals of Risky Events Scale – Expected Involvement (CARE-EI; Fromme, Katz, & Rivet, 1997).** The CARE-EI is a self-report measure designed to assess the attitudes about different types of risky activities or events. Participants are asked to use a seven-point Likert scale ranging from 1 – not at all likely, to 7 = extremely likely, to rate their expected involvement (i.e., likelihood a participant will participate in a given risky activity within the next six months) in each activity. The CARE-EI contains six scales that assess risky behavior in domains such as illicit drug use, aggressive/illegal behaviors, risky sexual activities, heavy drinking, high-risk sports, and academic/work behaviors. The CARE-EI has demonstrated good psychometric properties (Fromme et al., 1997). The internal consistencies of all of the subscales are adequate (αs range from .64-.85). CARE scores related negatively to social conformity and positively to impulsive sensation seeking, providing support for construct validity. In the present study, the CARE-EI was only used as a screening tool in order to conduct the necessary screening analyses on the prescreen data in allowing differentiation of socially anxious externalizers from socially anxious internalizing. Specifically, individuals scoring in the upper or lower 35% of the distribution were
invited to participate. Participants in the lower 35% were classified as “internalizing,” and participants in the upper 35% were classified as “externalizing.”

Positive and Negative Affect Schedule – Expanded form, (PANAS-X; Watson & Clark, 1994). The PANAS-X is a 60-item self-report measure designed to assess the degree to which an individual is experiencing a number of affective states. The measure is comprised of two General Dimension Scales (Positive Affect and Negative Affect) whose items overlap onto three additional scales: Basic Negative Emotion Scales (Fear, Hostility, Guilt, and Sadness); Basic Positive Emotion Scales (Joviality, Self-Assurance, and Attentiveness); and Other Affective States (Shyness, Fatigue, Serenity, Surprise). Each of these eleven lower order scales has been reported in past research to be internally consistent, all α’s > .71 (Watson & Clark, 1994). The PANAS-X was used in the present study to investigate differences in self-observer discrepancies across externalizing versus internalizing SAD.

Positive and Negative Affect Schedule – Expanded form, Hostility Subscale, Past Moment Instructions (PANAS-XHM; Watson & Clark, 1994). The PANAS-XHM is comprised of six items which assess the degree to which an individual feels hostility at any given moment. Participants are asked to indicate the amount of hostility using 5-point numerical responses ranging from, 1 – very slightly or not at all, to 5 – extremely. Psychometric data suggest that the hostility subscale of the PANAS-X utilizing past moment instructions demonstrated strong psychometric properties, and the PANAS-X was normed using a large undergraduate sample (N = 1,027), making its use appropriate for the purposes of the present study (Watson & Clark, 1994). The hostility subscale utilizing past moment instructions demonstrates good internal

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6 Past moment instructions refers to the time frame participants are asked to recall when considering responses. In this case, participants were instructed to describe their affect as it occurred in the past moment, allowing for state affect to be measured.
consistency, $\alpha = .82$ and shows acceptable levels of self-peer agreement (Watson & Clark, 1994). The PANAS-XHM was used to assess state hostility before and after each set of tasks in the current study, and functioned as the within subjects variable in analyses examining state hostility.

**Behavioral Inhibition/Behavioral Activation Scale (BI/BA Scale; Carver & White, 1994).**

The BI/BA is a 20-item self-report measure designed to assess the relative activation levels of Gray’s (1987) behavioral inhibition/behavioral activation systems. Participants respond to the 20 items using four-point Likert-style responses ranging from 1 (*strongly agree*) to 4 (*strongly disagree*). Although the BI/BA Scale is divided into two overarching scales (BIS and BAS), the BI scale yields only one behavioral inhibition score while the BA scale yields three behavioral activation scores: (1) *reward responsiveness*, (2) *drive*, and (3) *fun-seeking* (Carver & White, 1994). The BI/BA Scale has demonstrated good psychometric properties in past research.

As discussed above (see BIS/BAS systems), it has been proposed that the BIS may encompass another system known as the *Fight/Flight/Freeze System* (FFFS; De Young, 2010). Whereas the BIS was proposed to mediate behaviors such as hypervigilance and anxiety, the FFFS was proposed to mediate behaviors such as escape, freezing, or elimination of the threat (Gray, & McNaughton, 2003; Pickering & Gray, 1999). Recently, Heym, Ferguson, and Lawrence (2008) have proposed an alternative factor solution to the BI/BA Scales to the original factor solution proposed by Carver and White (1994). Results indicated that a two-factor solution (BIS and FFFS) provided a good fit to the data in an undergraduate sample, and provided significantly better fit in comparison to the single-factor BIS solution originally proposed by Carver and White (1994). The internal consistencies of the BIS and FFFS factors were both acceptable, $\alpha = .75$ and .73, respectively. In the present sample, the BAS scale demonstrated good internal consistency,
α = .89; as did the BAS subscales for fun-seeking, α = .86, reward responsiveness, α = .83, and drive, α = .82. The BIS and FFFS scores (based on scoring recommended by Heym et al.[2008]) both demonstrated acceptable internal consistency, αs = .77 and .71, respectively. The BIS scale (based on scoring recommended by Carver & White [1994]) also demonstrated acceptable internal consistency, α = .79. The present study utilized scoring based on the factor structure proposed by Heym et al. (2008) for all analyses involving the BI/BA Scale items, and was the first to examine BIS/FFFS differences between individuals with putative externalizing versus internalizing SAD.

**Perception of Interaction Performance scale (PIP; Reilly & Weeks, in preparation).** The PIP is a 17-item self-report measure developed for use in other ongoing studies in the Center for Evaluation and Treatment of Anxiety (CETA) at Ohio University. It was adapted from Rapee and Lim’s (1992) *Perceptions of Speech Performance* scale (PSP), which asks participants to rate their self-perceived performance on a speech task using a 5-point numerical scale ranging from *Not at all,* to *Very much.* For the PIP, participants are instructed to rate their social performance during a semi-structured social interaction task by indicating their agreement with a variety of statements, such as, *I kept eye contact with interaction partner.* The statements are either negative, or positive (reverse-scored), with higher scores being indicative of more negative perceptions of social performance. Rapee and Lim’s (1992) original measure has demonstrated adequate internal consistency, α = .75, while the PIP has demonstrated good internal consistency, α = .83 (Reilly & Weeks, in preparation). Because, to the author’s knowledge, there is no previously validated measure of perceived social interaction performance, the use of the PIP was justified for the present study. The PIP was administered to participants (i.e., PIP-Self) and the participants’ confederate interaction partner (i.e., PIP-Other) in order to investigate self-
observer discrepancies in interaction performance, and how these discrepancies may differ across socially anxious externalizers versus internalizers.

Confederate Responsiveness Form (CRF). The CRF is a 2-item rating scale that asks raters to assess how confederates responded to the participant. The version used in the current study was a modification of a version used in previous research (Weeks, Heimberg, & Heuer, 2011). The inter-item correlation was The scale utilizes a 10-point Likert-style response set ranging from 1 – Very Negative/Rude to 10 – Very Positive/They got along well. These ratings were made in order to account for the possibility that differential confederate performance may have affected self-judgments following the interaction.

Neuropsychological Measures.

Stop-Signal Task (SST; Logan, Scharchar, & Tannock, 1997). The SST is a computer task designed to measure inhibitory control by measuring reaction time in response to “go” and “stop” signals. In this task, participants are seated comfortably at a computer, and are instructed to discriminate between a square and a circle by pushing either a left or right button on the keyboard, respectively. Participants are instructed to make this discrimination as quickly (yet accurately) as possible. However, on approximately 25% of trials, an auditory tone is played after the shape is displayed on the screen—in this situation, the participant is instructed to make no response, inhibiting their reaction to the shapes (Logan et al., 1997).

In a study utilizing the SST, Logan et al. (1997) administered the task to a sample of undergraduates and found that stop-signal reaction time was positively and significantly related to impulsivity. Odd-even reliability estimates indicate that the SST is an internally consistent measure of impulsivity, $r = .95$. Construct validity analyses conducted by Logan et al. showed that individuals who scored above their sample median level of impulsivity showed significantly
longer stop-signal reaction times than individuals who scored below the median level of impulsivity.

**Iowa Gambling Task (IGT; Bechara, Damasio, Damasio, & Anderson, 1994)**. The IGT is a computerized card game designed to assess an individual’s decision-making skills. Participants are given a “loan” of simulated play money and asked to choose cards from one of four decks over a series of 100 trials. Upon drawing a card from one of the four decks, the participant either only wins money, or wins some money but loses some as well (e.g., “You won $100, but lost $125.”). The participant’s goal is to win as much money as possible by the end of the game. Each deck of cards is associated with differing levels of risk and reward. For example, decks A and B are weighted to give out larger rewards (~$100), but are also associated with much larger costs. Performance on the IGT is reported to be affected by certain types of brain deficits, especially those involving the frontal lobes and these individuals do not show typical improvement in decision-making across the task (Bechara et al., 1994). Individuals with such deficits may be unable to learn from past mistakes, and frequently make decisions that lead to negative outcomes (Bechara, et al., 1994). The IGT shows large effects when normal controls and frontal lobe-damaged patients are compared. It is important to note that the current study screened out those individuals who may potentially have a history of serious head injury to ensure that any effects found are not due to neurological causes. Given that individuals with the externalizing, but not the internalizing, subtype of SAD may exhibit poor decision making skills related to engagement in risky activities (Kashdan & McKnight, 2010), the IGT was administered to assess whether there are decision-making skill deficits in socially anxious externalizers that are not present in socially anxious internalizing.
The TAP-M is a computer task modified from Taylor’s (1967) original competitive reaction time task, in which participants are instructed to play against an opponent (who in actuality does not exist, but rather, is simulated by the TAP computer program) and to respond more quickly in response to a stimulus than the (fictional) opponent. During the current study, participants were told that the opponent in the task was the participant with whom they would shortly be interacting. The experimenter instructed the participant that whomever was slower (between the participant and the “opponent”) to respond to the stimulus (a box on the computer display turning from green to yellow to red) would receive a loud burst of white noise via headphones at an intensity and duration that is set by the opponent (in Taylor’s [1967] original paradigm, electric shocks were used as the aversive stimulus). However, participants were also told that, should they win the trial, the opponent would receive a burst of white noise over their headphones at an intensity and duration that the participant set him/herself. The TAP-M was pre-programmed such that participants “win” and “lose” approximately 50% of the time, and following trials resulting in the participant “losing”, the intensity of the white noise blast that the participant receives varied randomly between 1 – 10, with 10 being the most intense (105 dB), and 1 being the least intense (60 dB). The duration of the white noise blast varied randomly between 0 – 5 seconds in half-second increments. Participants underwent 25 trials using the TAP-M. The task was divided into three blocks of eight trials, with the first trial serving as a practice trial. Hostility is indexed according to the duration and intensity of the white noise bursts that the participant sets for the fictional opponent – given that the bursts were aversive (albeit harmless), greater duration and intensity settings reflected greater reactive hostility. Participants’ noise and duration scores were converted into z-scores and averaged together to
form a composite measure of aggression. This aggression paradigm has been used extensively in past research (e.g., Bushman & Baumeister, 1998; DeWall, Buckner, Lambert, Cohen, & Fincham, 2010).

The TAP-M was used in the current study in order to test for differences in aggressiveness between participants with externalizing versus internalizing SAD. The mean reaction times for all 25 TAP-M trials for the participants were analyzed to explore potential differences in competitiveness across externalizing versus internalizing SAD subtypes. In addition, an analysis was conducted to examine differential changes in hostility across the duration of the task as a function of E-I subtype.

Procedure

All participants underwent the same set of study procedures. Initially, participants were compensated for their time and effort with partial academic credit only. However, due to problems associated with slow recruitment during the early stages of the study, compensation for the present study was altered to include $10 in addition to partial academic credit. Nine participants received only research credit as compensation. The current study took place in either two or three separate rooms at the Center for Evaluation and Treatment of Anxiety (CETA) at Ohio University. Due to a move in laboratory space during data collection, the first 22 participants initiated study procedures in a different space than remaining participants. For the first 22 participants, informed consent, all clinician administered measures, and the battery of self-report measures were completed in an interview room fitted with audio and video recording hardware; in a separate room, the first 22 participants completed all computer-administered measures. For the remaining 21 participants, informed consent, all clinician-
administered measures, the battery of self-report questionnaires, and computer-administered measures were completed in the same room.

For all participants, a behavioral assessment room fitted with video and audio recording equipment was used to record the semi-structured social interaction task (see below), and to complete some final self-report questionnaires. They were not exposed to the behavioral assessment room prior to the social interaction. During the informed consent process, participants were told that the purpose of the study was to examine the relationship between conversational tendencies and computer game skills, and that his/her performance would be rated by a panel of expert raters. This pretense was intended to induce social threat in the study participants. After providing the experimenter informed consent, participants were administered the Social Phobia subsection of the Anxiety Disorders Interview Schedule for DSM-IV – Lifetime Version (ADIS-IV-L; DiNardo, Brown, & Barlow, 1994) and the Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987) to assess clinically significant SAD. Participants were also administered the Wechsler Test of Adult Reading (WTAR; Psychological Corporation, 2001; used to account for potential confounds involving crystallized intelligence on the Iowa Gambling Task [see Iowa Gambling Task, in Measures section above]).

Participants then completed a battery of questionnaires (SIAS, SPS, BFNE, BDI-II, PANAS-XHM, NEO-FFI-E, and BI/BA Scale), and were then told that they would be engaging in some computer game tasks (IGT, Stop-Signal, and TAP-M) followed by an interaction task with another participant (a confederate in the study). Participants were then asked to complete the computerized tests. Participants completed the Stop-Signal Task, the Iowa Gambling Task, and the Taylor Aggression Paradigm-Modified in a fixed order, after being reminded that their performance on these tasks would be evaluated by experts. Participants were then reminded
that they would be completing a “get-to-know-you” interaction with another participant (i.e., the “same participant” who served as their opponent on the TAP-M).

The experimenter then led the participant into the behavioral assessment room, where they were introduced to the confederate. After being introduced, both individuals were reminded by the experimenter that a panel of expert raters would be reviewing their performance on dimensions such as likeability, intelligence, humor, etc. All confederates in the present study were female, in order to standardize the semi-structured interactions across participants. Confederates were trained to maintain a neutral demeanor during their interactions with the participants. Specifically, they were trained to: not ask more personal questions of the participant than the participant asked of the confederate; not laugh out loud in response to any attempts at humor that the participant made (although brief smiles were permitted) and to allow silences for up to 10 seconds (in order to allow for potentially awkward silences). Confederates were also trained to not respond to any of the participants’ questions or statements in either an overtly positive or negative manner, while at the same time not coming across as cold or rude. The participants and confederates also stood in standardized locations within the behavioral assessment room, in order to account for situational variables that could have affected the semi-structured interaction. These interactions were video and audio recorded to ensure that all confederates conformed to these guidelines.

After ending the 4-minute interaction, the participant completed questionnaires assessing how they believed they had performed on several dimensions (i.e., perception of interaction performance [PIP] and state positive and negative affect [PANAS-X; see Measures]), as well as demographics. Following completion of these questionnaires, participants were administered a medical history questionnaire by the examiner in order to screen for history of
head trauma, neurological problems, medications, and/or problematic illicit drug use. SUDS and PANAS-XHM ratings were taken at various points throughout the study: at baseline, immediately before and after all of the computer tasks; and immediately before and after the semi-structured social interaction task. Upon completion of all study procedures, participants were queried as to whether they suspected any elements of deception during the study. They were then given the opportunity to refuse to allow their data to be used in any analyses, and were fully debriefed.⁷

Following completion of study procedures, confederates’ behavior towards the participants during the semi-structured social interaction was rated by objective raters who were blind to study hypotheses, to ensure that confederates were behaving neutrally during the interaction. These raters assessed the confederate’s neutrality by observing a video recording of the interaction and using the CRF to make neutrality ratings.

⁷ One participant became distressed upon hearing about the deception elements during initial debriefing, and refused to undergo a full debriefing; this participant did not provide post-study consent for analysis of his/her study data, and thus, this participant was necessarily excluded from the study.
Results

Preliminary Analyses

Independent samples t-tests were first conducted to determine whether potential confounds existed with respect to possible I-E subtype group differences, focusing on the following variables: differential compensation, demographic makeup, study location, and social anxiety severity (i.e., SIAS, SPS, BFNE-S). An series of independent samples t-tests revealed that participants in each compensation group did not differ on any dependent variables, ts range from |0.01| – |2.46|, ps range from .02 – 1.00. Analyses indicated the participants in each putative SAD subtype did not differ in prevalence of gender, $\chi^2(1,39) = .02, p = .88$, race, $\chi^2(1,39) = .64, p = .42$, or age, $t(37) = -.59, p = .56$. With respect to prevalence of clinically severe versus subclinically-elevated SAD, a chi-square analysis revealed that externalizers in the present study were more likely to endorse clinically significant social anxiety compared to internalizers $\chi^2(1,39) = 3.93, p = .047$, although this effect may have been caused by the relative imbalance of group representation in the sample (24 externalizers, 15 internalizers). Analyses were also conducted to ensure that all variables were normally distributed. Preliminary analyses revealed that there were no differences in any dependent variables in the present study (i.e., self-report measures, neuropsychological measures, self-observer discrepancies) across compensation groups, demographic makeup, study location, or social anxiety severity ts range from |0.01| – |2.46|, ps range from .02 – 1.00. Finally, analyses using objective rating of confederate behavior revealed

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8 An independent samples t-test revealed that participants ($n = 19$) who took part in the study in second set of study locations (see Procedures) endorsed higher fears of public scrutiny (SPS; see Appendix A) compared to individuals who took part in the study in the first set of study rooms $t(35) = -2.46, p = .02$. However, because a large number of t-tests were conducted during preliminary analyses, this result should be considered in light of a significant level of alpha inflation. It is also worth noting that participants who took part in the study in different room-sets did not differ on any other measures of social anxiety (i.e., ADIS-IV-SP diagnoses; or SIAS-S, or BFNE-S scores). Thus, it is unlikely that the set of rooms in which participants completed the various study procedures had an effect on social anxiety during the present study.
that confederates behaved neutrally toward participants during the semi-structured social interaction, $M = 4.74$, $SD = 0.86$. Objective raters also rated confederates as being equivalent in their neutrality toward participants when comparing socially anxious externalizers with internalizers, $t(34) = -0.86$, $p = .40$, and across SAD severity (i.e., ADIS-IV-SP ratings), $F(1,32) = 1.31$, $p = .26$.

**Neuropsychological Analyses**

**Hypothesis 1.** It was hypothesized that socially anxious externalizers would show longer stop-signal reaction times (SSRT) on the Stop-Signal Task (SST) compared to socially anxious internalizing, reflecting higher levels of impulsivity. An independent samples t-test revealed no difference between individuals with externalizing versus internalizing SAD in SSRT, $t(37) = 0.31$, $p = .76$. This effect remained nonsignificant after excluding participants who reported sub-clinically elevated levels of SAD, $t(28) = -0.29$, $p = .78$.

**Hypothesis 2.** It was hypothesized that socially anxious externalizers would not show an improvement in decision-making across five quintiles of Iowa Gambling Task (IGT) trials, whereas socially anxious internalizers were expected to show this normative improvement. A repeated-measures analysis of variance (RM ANOVA) revealed that participants in the hypothesized externalizing versus internalizing subtypes of SAD did not differ on the IGT with respect to improvement in decision-making (after controlling for crystallized intelligence using the WTAR) across the five quintiles of trials (i.e., 1-20, 21-40, 41-60, 61-80, 81-100), $F(4,33) = 0.36$, $p = .84$, partial $\eta^2 = .01$. There were also no significant main effects of putative SAD subtype (between subject), $F(1,36) = .64$, $p = .43$, or IGT quintile (within subject) $F(4,144) = .60$, $p = .67$.

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Follow-up analyses on reaction time on signal and no-signal trials of the SST revealed that internalizers in the present study had faster mean reaction times on both signal and no-signal trials in comparison to externalizers, $t(33.62) = 2.44$, $p = .01$, and $t(34) = 2.63$, $p = .01$, respectively.
The interaction effect remained nonsignificant after excluding individuals with sub-clinically elevated social anxiety $F(4,24) = 0.38, p = .82$, partial $\eta^2 = .06$. Nonsignificant main effects of putative subtype and IGT quintile were also obtained after excluding individuals with sub-clinically elevated social anxiety, $F(1,27) = 1.74, p = .20$, and $F(4,108) = .44, p = .78$ respectively.  

**Hypothesis 3.** It was hypothesized that socially anxious externalizers would show increased situational reactive hostility on the Taylor Aggression Paradigm – Modified (TAP-M) compared to socially anxious internalizers. On the TAP-M, participants with externalizing versus internalizing SAD did not differ on overall hostile activity $t(37) = -1.17, p = .25$. This effect remained nonsignificant after excluding participants sub-clinically elevated social anxiety, $t(28) = -0.67, p = .51$.  

**Self-Report Analyses**

A summary of intercorrelations for a all self-report measures may be found in Table 2.

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10 Given than the initial stages of the IGT are not reflective of decision-making under risk contingencies (Bechara et al., 1994), follow-up analyses examining individual deck selection within the last twenty trials of the IGT were conducted in order to determine whether risky-deck selection could be isolated to the final phase of the IGT, when deck selection is most reflective of decision-making under risk. These analyses revealed that participants in each subtype of SAD selected an equivalent number of cards from decks A, $t(37) = 0.64, p = .53$; B, $t(37) = -0.35, p = .73$; C, $t(37) = 0.41, p = .68$; and D, $F(37) = -0.44, p = .67$ during the last twenty trials of the IGT. In a final follow-up analysis, the ratio of most conservative (i.e., deck D) to most risky (i.e., deck A) decks selected was examined in order to determine whether socially anxious externalizers made fewer conservative deck choices relative to risky choices compared to socially anxious internalizers. Results revealed that no group differences emerged in the ratio of conservative to risky deck choices on the IGT $t(31) = -0.88, p = .39$.

11 A follow-up RM ANOVA was conducted to determine whether socially anxious externalizers would make progressively more hostile ratings across the duration of the TAP-M compared to socially anxious internalizers. The 25 trials of the TAP-M were divided into three blocks of eight trials (the first trial was counted as a practice trial and excluded from analyses; e.g., see Bushman, 1995), and the three blocks served as the within-subjects variable. The analysis revealed that individuals with externalizing versus internalizing SAD did not differ in hostility across the three blocks of trials $F(2,36) = 0.50, p = .61$, partial $\eta^2 = .03$, nor were there significant main effects of putative SAD subtype (between subject) or TAP-M block (within-subject), $F(1,37) = 1.25, p = .27$, and $F(2,74) = .08, p = .92$ respectively. The interaction effect remained nonsignificant after excluding participants with sub-clinically elevated social anxiety, $F(2,27) = 1.03, p = .37$, partial $\eta^2 = .07$. Similar nonsignificant main effects of putative SAD subtype and TAP-M block were also obtained, $F(1,26) = 1.32, p = .26$, and $F(2,52) = .17, p = .84$ respectively.
Table 2

**Bivariate Correlations of All Self-Report Measures.**

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<td>1. SIAS-S</td>
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<td>3. BFNE-S</td>
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<td>4. BDI-II</td>
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<td>5. NEO-FFI-E</td>
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<td>6. BIS/BAS – BAS</td>
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<td>.26</td>
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<td></td>
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<td>(.89)</td>
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<td>7. BIS/BAS – BIS</td>
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<td>-.16</td>
<td>-.02</td>
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<td>.26</td>
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<td>8. BIS/BAS – FFFS</td>
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<td>.06</td>
<td>.42*</td>
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<td>9. RFS – Approach</td>
<td>-.07</td>
<td>.03</td>
<td>.17</td>
<td>-.24</td>
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<td>10. RFS – Avoidance</td>
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<td>.31</td>
<td>-.02</td>
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<td>-.05</td>
<td>-.06</td>
<td>.30</td>
<td>(.44)*</td>
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*Note.* SIAS-S = Social Interaction Anxiety Scale – Straightforward Items; SPS = Social Phobia Scale; BFNE-S = Brief Fear of Negative Evaluation Scale – Straightforward Items; BDI-II = Beck Depression Inventory – II; NEO-FFI-E = NEO – Five Factor Inventory – Extraversion Scale;
BIS/BAS – BAS = BI/BA Scale – Behavioral Activation Subscale; BIS/BAS – BIS = BI/BA Scale – Behavioral Inhibition Scale; BIS/BAS – FFFS = BI/BA Scale – Fight Flight Freeze Scale; RFS – Approach = Regulatory Focus Scale – Approach Subscale; RFS – Avoidance = Regulatory focus Scale – Avoidance Subscale; Internal consistencies in parentheses along diagonal; An alpha correction of $\alpha = 0.05/10 = 0.005$ was applied to control for the number of correlations each variable was subjected to; $r^2$ = inter-item correlation; *$p < .005$; ns vary from 36-39 due to missing data.
**Hypothesis 4.** It was hypothesized that socially anxious externalizers would show stronger increases in self-reported state hostility across the duration of the study compared to socially anxious internalizers. A RM ANOVA analysis was conducted with the five state-hostility measures serving as the within-subjects variable. Results indicated that the putative E-I subtypes did not differ with respect to self-reported state hostility across the five time points, $F(4,33) = 0.44, p = .78$, partial $\eta^2 = .05$. There were also no significant main effects obtained for putative SAD subtype (between subject) or time point (within subject), $F(1,36) = 1.06, p = .31$, and $F(4,144) = 1.78, p = .14$ respectively. The interaction effect remained nonsignificant after excluding individuals with sub-clinically elevated social anxiety, $F(4,24) = 0.46, p = .77$, partial $\eta^2 = .07$. The main effects of putative SAD subtype and time point also remained nonsignificant after excluding these participants, $F(1,27) = .14, p = .71$, and $F(4,108) = 1.19, p = .32$ respectively.

**Hypothesis 5.** It was hypothesized that socially anxious externalizers would report higher promotion orientation and lower prevention orientation than socially anxious internalizers. Results indicated that socially anxious externalizers and internalizers reported equivalent levels of promotion orientation, $t(37) = -0.19, p = .85$, as well as prevention orientation $t(37) = -0.66, p = .53$. These results remained nonsignificant after excluding individuals with sub-clinically elevated social anxiety for both promotion orientation, $t(28) = -0.29, p = .77$, and prevention orientation, $t(28) = -0.86, p = .40$.

**Hypothesis 6.** It was hypothesized that participants across the hypothesized E-I subtypes of SAD would show equivalent relative changes in state anxiety levels across the duration of the study. A RM ANOVA was conducted, with the five Subjective Units of Distress Scale (SUDS) ratings taken at various points throughout the study ([1] at baseline, [2] immediately before the computerized tasks, [3] immediately after the computerized tasks, [4]...
immediately before the semi-structured social interaction, and [5] immediately after the semi-structured interaction) serving as the within-subjects variables. Results confirmed that participants with both externalizing versus internalizing SAD reported equivalent relative changes in SUDS ratings across the duration of the study, $F(4,34) = 1.21, p = .33$, partial $\eta^2 = .12$. No significant main effect of putative SAD subtype (between subject effect) was detected, $F(1,37) = 1.11, p = .30$. There was a significant within-subjects effect across the duration of the study $F(4,148) = 17.68, p < .001$, partial $\eta^2 = .32$ (see Figure 1).

![Figure 1. Subjective Units of Distress Scale (SUDS) Across Time.](image)

Follow-up repeated contrast analyses revealed that SUDS levels remained stable from time 1 to time 2, $F(1,37) = 0.87, p = .36$, and from time 2 to time 3, $F(1,37) = 0.05, p = .82$. SUDS
levels increased significantly within subjects from time 3 to time 4, \( F(1,37) = 33.39, \ p < .001 \), and from time 4 to time 5, \( F(1,37) = 5.18, \ p = .03 \). The interaction effect remained nonsignificant after excluding participants with sub-clinically elevated social anxiety, \( F(4,25) = .50, \ p = .73 \), partial \( \eta^2 = .07 \). Additionally, no significant main effect of putative SAD subtype (between subject) was obtained, \( F(1,28) = .04, \ p = .85 \). A similar within-subject effect was again detected after excluding participants with subclinically elevated SAD, \( F(4,112) = 12.58, \ p < .001 \).

**Exploratory Analysis 1.** An exploratory analysis was performed in order to determine whether socially anxious externalizers would report differing levels of self-observer discrepancies pertaining to perceived performance during a semi-structured social interaction compared to socially anxious internalizers. First, the standardized residual derived from the ratings of objective observers predicting self-ratings were examined to determine the extent to which participant self-ratings differed from expectations derived from objective ratings (see Rodebaugh & Rapee, 2005 for a discussion of this technique for examining self-observer discrepancy). Standardized residual values of fear, hostility and interaction performance were entered as simultaneous dependent variables in a MANOVA. Results revealed a null multivariate effect of putative SA subtype \( F(3,28) = 1.73, \ p = .18 \), partial \( \eta^2 = .16 \). After excluding participants with subclinical levels of SAD, the results remained stable, \( F(3,19) = 1.06, \ p = .32 \), partial \( \eta^2 = .17 \). When absolute difference scores were used to derive self-observer discrepancy values, the results were identical among the full sample, \( F(3,28) = 1.06, \ p = .38 \), partial \( \eta^2 = .10 \), and after excluding participants with sub-clinically elevated social anxiety, \( F(3,19) = 0.80, \ p = .51 \), partial \( \eta^2 = .11 \).

**Exploratory Analysis 2.** An analysis was run in order to determine whether socially anxious externalizers would report differing levels of Behavioral Inhibition System (BIS),
Behavioral Activation System (BAS), and Fight-Flight-Freeze System (FFFS) activity than socially anxious internalizers. Analyses revealed that participants across the putative E-I subtype reported equivalent levels of BAS, $t(37) = 0.46, p = .65$ and FFFS, $t(37) = 0.97, p = .34$. Contrary to expectation, trend toward a group difference was found such that socially anxious externalizers reported marginally higher levels of BIS compared to socially anxious internalizers, $t(37) = 1.75, p = .09$. These effects were stable after excluding individuals with sub-clinically elevated social anxiety: BAS, $t(28) = -0.50, p = .62$; FFFS; $t(28) = 1.06, p = .30$; and BIS $t(28) = 1.82, p = .08$.

Follow-up analyses were conducted using similar analytic procedures on the BAS subscales of reward-responsiveness, drive, and fun-seeking. Results indicated that no differences across the putative E-I subtype emerged for reward responsiveness, $t(37) = 1.45, p = .16$, drive, $t(37) = 1.22, p = .23$, or fun-seeking, $t(37) = -1.16, p = .25$. Similar results were obtained for the three BAS subscales after excluding participants with sub-clinically elevated social anxiety: reward responsiveness, $t(28) = 0.70, p = .50$; drive, $t(28) = 0.02, p = .99$; and fun-seeking, $t(28) = -1.62, p = .12$.

These analyses were also carried out using the original factor structure of the BIS/BA Scale proposed by Carver and White (1994) in which the BIS and FFFS subscales are collapsed into a single scale. Results followed a similar pattern and revealed that socially anxious externalizers and internalizers did not differ in BIS levels, $t(37) = 1.70, p = .10$. This effect was stable after excluding individuals with subclinical levels of SAD, $F(1,28) = 3.02, p = .09$, adjusted $R^2 = .07$. Considering the marginal $p$ – values along with a relatively small sample, it may be the case that the lack of a significant effect in BIS levels across putative E-I subtype may have been due to low power.
Discussion

The goal of the present study was to attempt to validate a proposed externalizing subtype of SAD (Kachin et al., 2001; Kashdan & McKnight, 2010; Kashdan et al., 2008; Kashdan et al., 2009) beyond the self-report domain. Specifically, the present study sought to extend past research findings indicating that individuals with SAD may be reliably classified into two distinct subtypes characterized by clusters of self-reported behaviors such as impulsivity, poor decision-making, and hostility. The present study measured behavioral correlates of these behaviors, and also extended previous research by exploring potential self-reported explanatory mechanisms that may account for differences between these purported subtypes. Finally several exploratory analyses were conducted in order to probe for potential differences in self-perception and other traits between the putative E-I subtypes.

One particularly interesting pattern of results that emerged from the present study relates to differential reaction times across two of the study tasks, the SST and TAP-M. As stated previously, socially anxious internalizers had significantly quicker reaction times in response to both signal trials and no-signal trials on the SST, suggesting a faster overall reaction time. A similar follow-up analysis was conducted on TAP-M results and found no group differences in reaction time in response to the stimulus. It is worth noting that, in both the SST and TAP-M tasks, participants are explicitly instructed to respond as quickly as possible.

The difference in SST reaction time between groups begs the question: Why would socially anxious internalizers have quicker reaction times than socially anxious externalizers at all? One clue may be the more cognitively demanding nature of the SST compared to the TAP-M. During the SST, participants are required to make one of two possible responses, but only on certain trials. During the TAP-M, only one type of response is required for all trials of the task,
namely to click the mouse in response to a change in color as quickly as possible. This cognitive demand difference in the tasks is reflected in the tasks’ overall reaction times (TAP-M mean RT = 232.59 ms; SST mean RT = 504.66 ms). Cognitive demand as an explanation for group differences in reaction times on the SST but not the TAP-M may be consistent with an explanation derived from negative affect. It is well established that impulsive behavior is strongly linked to negative affect (e.g., Atkinson, Sharp, Schmitz, & Yaroslavsky, 2012); thus, it is possible that socially anxious externalizers may have been higher in negative affect during the present study. Considered alongside affective neuroscience research, which has reported that activated affective states often result in diminished cognitive capacity (Melcher, Born, & Gruber, 2011), it is arguable that socially anxious externalizers may have been experiencing cognitive resource depletion via negative affect than socially anxious internalizers, leading to more difficulty and longer reaction times on a fairly cognitively demanding task (the SST). However, this conclusion should be considered with caution, as the present study did not gather trait negative affect data. Future research could more explicitly explore the role of negative affect in neuropsychological task performance between the putative E-I subtypes.

The present study was the first to incorporate the use of behavioral data to the study of the putative externalizing versus internalizing subtypes of SAD. Given that all previous studies on the externalizing subtype of SAD known to the author have relied exclusively on self-report data, it remained to be addressed whether these self-reported differences (Kachin et al., 2001; Kashdan & Hofmann, 2008, Kashdan et al., 2009) generalized to the behavioral domain. Furthermore, past research employing self-report designs has been inherently less controlled than the present study, which utilized a series of targeted SA manipulations and realistic social encounters in an attempt to elicit a specific set of behavioral differences. In other words, many
potential factors occurring for a participant either before or during participation in a questionnaire study may influence responding on the items.

State self-report data gathered during the present study also represents an advancement over past research because these data were collected in response to targeted and realistic social anxiety situations. The present study’s use of social threat via the TAP-M and the subsequent semi-structured social interaction provided a potential scenario that individuals with SAD may encounter (i.e., a social interaction with someone they believe to have wronged them or evaluated them). Gathering data via self-report through questionnaire designs does not allow for realistic and targeted social anxiety manipulations to be implemented. The present study was also unique in its intended elicitation of hostility toward the simulated interaction partner (i.e., the experimental confederate). This design feature allowed the author to implement a potentially realistic social interaction in which an individual with externalizing SAD would be the most likely to exhibit reactive or hostile tendencies.

The present study’s null findings may be due to a number of factors: First, self-report instruments may be prone to self-presentational biases. Indeed, this tendency underscores the need for implicit attitude measurements (Nosek, Greenwald, & Banaji, 2007). Additional tests and testing methods may be necessary for continued exploration of the putative externalizing subtype of SAD. Broadly speaking, it is essential for assessments to be comprised of more than a single test or testing method in order to gain a deeper understanding of the construct under investigation (Groth-Marnat, 2009).

Second, the particular self-report instrument (i.e., the CARE-EI) used in the present study (as well as in past studies on this issue) to differentiate the putative E-I social anxiety subtypes of individuals, may have psychometric drawbacks. Though CARE-EI was used in the
present study in order to replicate findings from previous research (i.e., Kashdan et al., 2008), it suffers from several psychometric drawbacks that may render it ineffective for future SAD research. One weakness pertains to the clinical sample used to establish construct validity of the CARE-EI (Fromme et al., 1997; Study 4). This study incorporated only a small \( n = 39 \) sample of community outpatients seeking treatment for drug or alcohol addiction. Additional normative clinical data gathered from other clinical groups would allow researchers to more confidently apply the CARE-EI in a wider variety of clinical settings. Despite its norms being initially derived from risky college students, it is simply unclear based on available data that the CARE-EI is a valid measure of risk-taking behavior among \textit{socially anxious} college students. The lack of effects in the present study could potentially be the result of an invalid method of classification of individuals into the putative subtypes in question.

Third, preliminary analyses found evidence for an overrepresentation of individuals with clinically severe SAD among socially anxious externalizers compared to socially anxious internalizers. This trend may have been due to the relatively imbalanced groups in the present study (24 socially anxious externalizers and 15 socially anxious internalizers). This may have resulted in issues relating to low power. Along similar lines, research highlighting stable gender differences in risk-taking (e.g., Fergus, Zimmerman, & Caldwell, 2007) suggests that males tend to be overrepresented in upper echelons of risk-taking severity. Given that the present study utilized equivalent cutoff scores to determine putative SAD subtype across males and females, it may have been more appropriate to determine group membership while controlling for gender (i.e., recruiting the upper and lower 35thiles for males and females separately). This would have controlled for a potential gender confound in the present study.
A further reason for the present findings is that the notion of the existence of an externalizing subtype of SAD may be altogether false. Indeed, it seems peculiar that the estimated prevalence of socially anxious individuals within the externalizing subtype of SAD ranges as high as 40% (Kachin et al., 2001; Kashdan & Hofmann, 2008), and that studies are only just now emerging highlighting it as a potential variant of SAD. Furthermore, additional self-report data which successfully replicated and extended findings by Kashdan and Hofmann (2008), and which were based on identical measures and statistical procedures, revealed that both socially anxious and non-socially anxious individuals could be clustered into similarly sized groups (45% high in self-reported novelty-seeking) according to novelty-seeking tendencies (Menatti, Weeks, & Howell, 2011). Given that the results obtained by Kashdan and Hofmann (2008) were replicated in a non-socially anxious sample, it may be the case that what has been labeled as “atypical SAD” by some researchers (e.g., Kashdan et al., 2009) is simply general, non-SAD-related temperamental variability in risk-taking and impulsivity (Menatti et al., 2011). Taken together with the results of the present study, it is unclear whether the results of Kashdan and Hofmann (2008) may simply be an artifact of cluster analysis itself.13

Future Directions

The results of the present study and previous research on externalizing SAD appear to be discrepant. Although past research has reported results consistent with the notion that qualitatively different subtypes of SAD exist, the present study did not find corresponding behavioral differences pertaining to the putative E-I subtypes. The results of the present study suggest that additional research is necessary in order to more fully conceptualize externalizing

13 It should be noted that Kashdan and Hofmann (2008) used three different clustering algorithms in their study and found convergent results in each. It should also be noted that Kashdan et al. (2009) used latent class analysis, a different data clustering approach, to obtain convergent results.
SAD. Past research on classifying individuals with SAD into subtypes based on self-report data represented an important first step, and results were reported to be predictive of several important variables within social anxiety, including functional impairment (Kashdan et al., 2009). However, the present study attempted to match this self-report classification strategy to neuropsychological and behavioral data, and significant results did not emerge. Future research might explore the classification of socially anxious individuals into internalizing and externalizing subtypes based on neuropsychological test performance itself. The current study was unable to conduct any classification analyses because of its relatively small sample size.

While neuropsychological assessment data may be informative in terms of any internal validity of the externalizing SAD construct, real-world assessment data gathered in vivo may also prove to be an informative area of research. Daily diary designs similar to that implemented by O’Grady, Cullum, Armeli, and Tennen (2011) may be particularly useful in describing experiential differences between individuals with externalizing versus internalizing SAD. Kashdan and Collins (2010) implemented an ecological momentary assessment design and found that, on average, individuals with higher social anxiety reported fewer positive experiences and more anger-oriented cognitions compared to those lower in social anxiety both in social situations and when alone. Future research examining the externalizing subtype of SAD would inform whether Kashdan and Collins’ (2010) results may be moderated by putative E-I subtypes.

Limitations

The present study was subject to a number of limitations. First and foremost, the sample size was smaller than expected due to stringent inclusion criteria as well as recruitment difficulties. This may have limited the power of the analyses, leading to Type II error. It should be noted however that, nonsignificant results notwithstanding, the effect sizes were very small
for the majority of the primary study analyses, with some adjusted $R^2$ values falling below zero. This pattern points to the conclusion that a larger sample size would likely not have yielded significant effects. Second, the use of the CARE-EI to classify socially anxious participants into externalizing versus internalizing subtypes may have prevented meaningful subtypes of SAD from being identified and recruited. On reason may have been that the present sample of socially anxious externalizers were simply not risky compared to the normative population; no normative population data was able to be located for the specific subset of CARE-EI items used in the present study, and Kashdan et al., (2008) do not report means and standard deviations on this specific subset of CARE-EI items. Thus, it may have been that case that the present sample of socially anxious externalizers was not high in risk taking relative to the normative population. Future research might benefit from incorporating the use of behavioral data such as the kind gathered in the present study in order to classify individuals into externalizing versus internalizing subtypes. Third, CARE-EI scores were not re-assessed at the time of the study, following initial prescreening. Because an extreme groups inclusion criterion was implemented, it may have been the case that participants who are typically risky at only a moderate level simply appeared to be very high or very low in risk-taking at the time of the prescreen; but, perhaps when they presented for the study they would not have scored in the higher or lower cutoff groups of the CARE. As a result, the groups may not have been as ‘extreme’ as was intended. The fourth limitation is related to the latter limitation, which is that it was unclear whether the present sample of socially anxious externalizers SAD was truly high in risk-taking compared to the general population. Lastly, concerns about participant time burden did not allow for the assessment of comorbid psychological conditions, which may have had an influence on both endorsement of risky behavior and performance on different study tasks.
References


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doi:10.1037//0022-3514.69.5.950


doi:10.1016/0887-6185(87)90020-X


subset of people in the National Comorbidity Survey-Replication. *Behaviour Research and Therapy, 47,* 559-568. doi:10.1016/j.brat.2009.03.010


Appendix A: Additional Measures

The following measures were initially included in the present study in order to partial out effects of the various constructs they measure from study analyses. However, preliminary analyses revealed that the E-I subtypes of SAD did not differ on the measures included in this appendix, thus, they were not utilized in any subsequent analyses.

**Social Interaction Anxiety Scale (SIAS; Mattick and Clarke, 1998).** The SIAS is a widely used, 20-item self-report measure, designed to assess anxiety tied to interacting with others. Participants are asked to provide Likert-style responses ranging from 0 – *not at all characteristic of me*, to 4 – *extremely characteristic of me*. The version used in the present study was the original 20-item version that was circulated before the 19-item version published by Mattick and Clarke (1998). Factor analysis performed by the authors extracted a single factor. Internal consistency estimates of for the SIAS are quite high (α = .94), and the four- and twelve-week test-retest reliabilities have been reported to be strong (both rs = .92) among individuals diagnosed with SAD (Mattick and Clarke, 1998). Construct validity studies have indicated that the SIAS is able to discriminate individuals with and without SAD (Heimberg, Mueller, Holt, Hope, & Liebowitz, 1992). Specifically, 82% of individuals scoring 34 or above on the SIAS were correctly classified as having SAD. On the other hand, only 18% of healthy controls were incorrectly classified as having SAD. Cox, Ross, Swinson, and Direnfeld (1998) also found that SAD patients reported lower SIAS scores following completion of a cognitive behavioral group therapy (CBGT) protocol that was specifically designed for SAD patients. Finally, the SIAS is significantly and positively correlated with the Social Phobia Scale (Mattick & Clarke, 1998), another widely used measure of social anxiety, \( r = .72 \). In the present sample, the SIAS-S demonstrated good internal consistency, \( a = .82 \). The SIAS was used in the present study first as
a screening tool; scores on a second administration of the SIAS were used as a covariate to control for the possibility that any obtained group (i.e., externalizer versus internalizer) differences were not simply due to initial group differences in SAD severity.

**Social Phobia Scale (SPS; Mattick, & Clarke, 1998).** The SPS is another widely used measure of social anxiety symptoms that targets fears related to public scrutiny. It consists of 20 self-report Likert-style ratings which range from 0 – *not at all characteristic of me*, to 4 – *extremely characteristic of me*. The SPS was developed concurrently with the SIAS, and like its partner measure, it demonstrates very strong psychometric properties. Internal consistencies for the SPS range from .89 to .94 across different types of samples including undergraduates and individuals diagnosed with SAD (Mattick & Clarke, 1998). The 12 week test-retest reliability of the SPS is also quite strong in individuals diagnosed with SAD, r = .93 (Mattick and Clarke, 1998). Furthermore, individuals with SAD scored significantly higher on the SPS compared to individuals with agoraphobia, simple phobia, as well as unselected undergraduate and community members. In the present study, the SPS demonstrated good internal consistency, a = .88. The SPS was used in the current study as a covariate to control for the possibility that any group (externlizer versus internlizer) differences were not simply due to initial group differences in SAD severity.

**Brief Fear of Negative Evaluation Scale – Straightforward Items (BFNE-S; Leary, 1983; Rodebaugh, et al., 2004; Weeks, et al., 2005).** The BFNE-S is an 8-item self-report measure designed to assess fears centering on the receipt of negative evaluation (FNE) from others. The BFNE-S is derived from the original BFNE (Leary, 1983), which is a 12-item self-report measure designed to assess FNE. Participants provide responses using 5-point Likert style ratings ranging from 1 – *not at all characteristic of me*, to 5 – *extremely characteristic of me*. The BFNE-S
contains only the eight straightforwardly worded items from the original BFNE. Rodebaugh et al. (2004) and Weeks et al. (2005) have indicated that the BFNE-S possesses superior psychometric properties compared to the original BFNE. For example, the internal consistency of the original version was quite strong in a clinical sample, $\alpha = .89$, but was only marginally acceptable in a normal control sample, $\alpha = .67$. However after removing the four reverse-scored items, the internal consistency improved in both the clinical sample, $\alpha = .92$, and the normal control sample, $\alpha = .90$ (Weeks et al., 2005). Construct validity analyses indicated that the BFNE-S also demonstrated slightly stronger correlations with measures of related constructs than the original 12-item version (e.g., SIAS: $r = .38$ versus .46, SPS: $r = .35$ versus .40) (Weeks et al., 2005). Similarly, these authors reported that socially anxious individuals scored significantly higher on the BFNE-S than non-anxious controls. In the present sample, the BFNE-S demonstrated excellent internal consistency, $\alpha = .94$. The BFNE-S was used in the current study as a covariate to control for the possibility that any group (externlizer versus internlizer) differences were not simply due to initial group differences in SAD severity.

**NEO-Five Factor Inventory – Extraversion Scale (NEO-FFI-E; Costa & McCrae, 1992).** The NEO-FFI-E is a 12-item self-report measure designed to measure extraversion. Participants are asked to rate their agreement with statements pertaining to extraversion using a five-point Likert-style response scale ranging from *Strongly Disagree*, to *Strongly Agree*. The NEO-FFI-E has demonstrated good internal consistency in a community sample ($\alpha = .80$), and test-retest reliability analyses have indicated that the measure is stable across time (six-months: $r = .86$, thirty months: $r = .83$) (Murray, Rawlings, Allen, & Trinder, 2003). In the present study, the NEO-FFI-E demonstrated acceptable internal consistency, $\alpha = .78$. The FPES was used in the current
study as a covariate to control for the possibility that any group (externlizer versus internlizer) differences were not simply due to initial group differences in extraversion levels.

**Beck Depression Inventory – II (BDI-II; Beck, Steer, & Brown, 1996).** The BDI-II is a 21-item self-report instrument designed to assess symptoms commonly associated with major depression. Items were rated on a 0 to 3 scale, with a 3 indicating maximum intensity of the symptom. The BDI-II has demonstrated excellent internal consistency estimates across a wide variety of samples including outpatients and undergraduates, $\alpha = .92$ and $.93$, respectively. In the present sample, the BDI-II demonstrated good internal consistency, $\alpha = .83$. The BDI-II is also found to be strongly and positively correlated with other widely-used measures of depressive symptoms (Segal, Coolidge, Cahill, & O’Riley, 2008), providing support for convergent validity. The BDI-II was also strongly and negatively related to a measure of psychological well-being (Ryff, 1989), $r = -.65$, (Segal et al., 2008), providing support for discriminant validity. The BDI-II was used in the present study to account for the possible confound that perceived social performance could be influenced by depression (and not specific to SAD).
Appendix B: Additional Psychometrics

**Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987).** The clinician asked the participant to respond to items verbally using a 0 – 3 Likert-type scale. Findings from the same study also demonstrated that the LSAS is strongly correlated with other well-established measures of SAD, and to be uncorrelated with several constructs unrelated to SAD, including depression. With regard to construct validity, individuals receiving phenelzine reported greater LSAS score decreases compared to individuals receiving placebo, $d = .67$ (Heimberg et al., 1999).

**Wechsler Test of Adult Reading (WTAR; The Psychological Corporation, 2001).** The WTAR was reported to have excellent 2-12 week test-retest reliability in the age group of interest (ages 18-24: $r = .92$; The Psychological Corporation, 2001). Convergent validity analyses have demonstrated that the WTAR is highly correlated with other measures designed to measure crystallized intelligence (Psychological Corporation, 2001). Construct validity analyses demonstrate that the WTAR is strongly and positively correlated with Verbal Intelligence Quotient (VIQ; $r = .74-.79$) and Full-Scale Intelligence Quotient (FSIQ; $r = .70-.74$) from the WAIS-III (Wechsler, 1997a). Thus, the psychometric properties of the WTAR appeared suitable for the present study.

**Regulatory Focus Scale (RFS; Cunningham et al., 2005).** According to Cunningham et al. (2005), regulatory focus is not necessarily a single continuum. Rather, it is more likely the case that regulatory focus exists on two orthogonal continua, with promotion and prevention representing two axes. In other words, it is possible for an individual to be high in both promotion and prevention focus. In the present sample, the RFS approach scale demonstrated good inter-item correlation $r = .69$, while the avoidance scale demonstrated marginally
adequate inter-item correlation, $r = .44$. Data on previously obtained psychometric properties of the RFS were unavailable.

**Cognitive Appraisals of Risky Events Scale – Expected Involvement (CARE-EI; Fromme, Katz, & Rivet, 1997).** For the purposes of the current study, the scales assessing high risk sports and academic/work behaviors were not administered because there is little theoretical reason to expect these domains to be differentially relevant to individuals with externalizing versus internalizing SAD. It was developed using a college sample of young adults, making it an appropriate measure for use in the current study. Fromme et al. (1997) obtained correlations in the expected directions for all tests. Specifically, the CARE-EI was significantly and positively correlated with impulsive sensation seeking, as well as frequency of involvement for four risk behaviors (drug use, alcohol use, risky sex, and aggression).

**Positive and Negative Affect Schedule – Expanded form, (PANAS-X; Watson & Clark, 1994).** Construct validity analyses indicated that the PANAS-X subscales are highly correlated with other well-established measures of the same constructs. In addition, peer ratings of the eleven lower order scales are significantly correlated with self-report ratings of the same scales, with the exceptions being Guilt and Surprise. The PANAS-X has been used in both self-report and peer report formats in past research examining self-peer discrepancy (Watson & Clark, 1991). Zuckerman and Lubin (1985) have found that the personality traits that are observable (i.e., sociability) have higher levels of self-peer agreement than more internal subjective traits (i.e., mood). This notion has empirical support elsewhere the literature (Kammann, Smith, Martin, & McQueen, 1984; McCrae, 1982).

**The Behavioral Inhibition/Behavioral Activation Scale (BI/BA Scale; Carver & White, 1994).** Jorm, Christensen, Henderson, Jacomb, Korten, et al. (1998) have found internal
consistency estimates to be good for the BIS ($\alpha = .76$) and for the BAS ($\alpha = .83$) in a large community sample ($N = 2725$). The same study indicated that the BAS subscales also independently demonstrate adequate internal consistency, and 8-week test-retest reliability was also acceptable in a large undergraduate sample ($r_s = .59-.69$; Carver & White, 1994). The BIS scale correlates moderately-to-strongly and positively with anxiety as well as negative affect (Carver & White, 1994), and the Drive, Reward, and Fun Seeking scales are all strongly and positively correlated with extraversion as well as positive affect (Carver & White, 1994), providing support for convergent validity of the scale.

**The Stop-Signal Task (SST; Logan, Scharchar, & Tannock, 1997).** Logan and colleagues (1997) characterized the relationship between “go” and “stop” processes in terms of a *race model*. They argued that two reaction tendencies are in opposition, or in a race, with each other, and whichever “wins” is the behavior that will be displayed. For example, if after receiving a stop-signal, a participant fails to inhibit their response, that person’s “go” process dominated his/her “stop” process. On the other hand, if the individual is able to suppress the response after hearing the stop-signal, that person’s “stop” process dominated his/her “go” process.

It is difficult to directly measure stop-signal reaction time, given that no actual reaction time can be recorded if a person successfully inhibits a response. According to Logan et al. (1997), this issue can be addressed by dynamically varying the latency of the presentation of the stop signal after the go signal. For example, if a person successfully suppresses a response after a medium latency stop-signal, the next stop-signal latency will be 50 ms longer. If, however, the individual fails to inhibit a response, the stop-signal latency will decrease by 50 ms. This process continues until the individual reaches a stop-signal latency at which they are able to successfully suppress 50% of trials. Logan et al. (1997) argue that, at this point, the “go” and “stop”
processes are occurring at equal rates, and that an individual’s successful suppression of a “go” process is primarily dependent on random variation. Conceptually, if an individual has a slow stop-signal reaction time, then it will be difficult for that individual to successfully suppress responses and a short stop-signal delay will be necessary for that individual to successfully inhibit a response.

**Iowa Gambling Task (IGT; Bechara, Damasio, Damasio, & Anderson, 1994).** If a subject turns 10 cards from deck A in a row, the person will gain $1000, but the risks associated with that deck make it such that the subject loses $1250, bringing the net loss to $250. On the other hand, choosing 10 cards in a row from deck C will only give the participant $500, but the losses are only $250, making the net gain $250. In other words, advantageous choices come from choosing the more conservative decks, C and D. Typically, when individuals begin the IGT, they sample equally from each of the four decks, but as the task progresses, they tend to favor decks C and D, thereby increasing their overall winnings (Desmuele, Bechara, & Dube, 2008). In order to assess expected differences in performance throughout the IGT between the purported E-I SAD subtypes, the 100 trials of the IGT were broken into five equal parts (i.e., trials 1-20, 21-40, 41-60, 61-80, 81-100). The number of “disadvantageous” choices (i.e., either deck A or B) within each block of 20 trials was subtracted from the number of “advantageous” choices (i.e., either deck C or D) within each block of 20 trials. This yielded five scores with positive values indicating advantageous choosing, and negative scores indicating disadvantageous choosing.

**Taylor Aggression Paradigm– Modified Version (TAP-M; Bushman, 1995; Taylor 1967).** Giancola and Zeichner (1995) have reported that the TAP-M is strongly and positively correlated with several widely used self-report measures of aggression, providing support for convergent validity. Bernstein, Richardson, and Hammock (1987) have reported that the TAP-M was weakly
correlated with constructs such as helping and competition, providing support for discriminant validity. The TAP-M has also been reported to reliably differentiate between teacher- and psychologist-classified aggressive versus non-aggressive children (Murphy, Pelham, & Lang, 1992; Washbusch et al., 2002), providing additional support for construct validity. Additional research has demonstrated that the intensity of a provocation in the laboratory is strongly related to performance on the TAP-M (Giancola & Zeichner, 1995). Specifically, if a participant receives an especially loud and long burst of white noise from his/her “opponent,” that participant is likely to administer an even more intense burst of white noise to the opponent the next opportunity he/she gets.