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Gender and the Connection between Distress Tolerance and Psychopathology

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Abstract

This study investigated the potential moderating role gender plays in the association of distress tolerance (DT) with internalizing and externalizing symptoms of psychopathology. I hypothesized that DT would have a main effect on resilience to both internalizing and externalizing problems. Further, I expected that gender would moderate this effect for externalizing, but not internalizing, symptoms, such that men would exhibit a stronger (inverse) relationship between DT and externalizing problems. I tested these hypotheses in samples of 1,211 undergraduates and 224 treatment-seeking adults. There was strong evidence for the main effect of DT on both symptom dimensions, but the data did not support the gender moderation hypothesis. I recommend that future research replicates these analyses in larger clinical samples with more diverse forms of psychopathology.

Gender and the Connection between Distress Tolerance and Psychopathology

Introduction

Distress tolerance (DT) is the ability to persist in goal-directed activity while experiencing aversive emotional states. DT is a risk factor for diverse mental disorders. Specifically, prior research has found a connection between levels of DT and anxiety, depression, eating problems, substance misuse, and antisocial behavior (Leyro et al., 2010). However, it is unclear why diminished DT predisposes some people to internalizing symptoms (depression, anxiety, eating problems) and others to externalizing symptoms (substance use and antisocial behavior). This thesis explores the idea that the relationship between DT and the emergence of internalizing and/or externalizing symptoms may vary by gender.

Before considering the potential moderating effects of gender, it is important to understand the direct associations between DT and various internalizing disorders. Those with internalizing symptoms of psychological disorders (such as anxiety, depression, borderline personality disorder, and non-suicidal self-injury) tend to ruminate about their faults or problems, and these disorders are more associated with negative cognitive thinking than the expression of these thoughts in concrete actions. Anxiety disorders are a type of internalizing disorder, and low DT has been shown to increase one's vulnerability to various anxiety disorders including panic disorder, obsessive-compulsive disorder (OCD), social anxiety disorder (SAD), and generalized anxiety disorder (GAD) (Keough, Riccardi, Timpano, Mitchell, & Schmidt, 2010). In these cases, the inability to withstand stressful situations may lead to increased anxiety that stressful events will occur and that one will be judged by one's peers as a result. Post-traumatic stress disorder (PTSD) is another type of anxiety disorder, and thus internalizing disorder. Low DT is also associated with greater PTSD symptom severity. Studies comparing DT levels and PTSD

symptom severity from when veterans were checked into a residential PTSD treatment facility to when they were discharged from the facility demonstrating that PTSD symptoms attenuate as DT increases (Banducci, Connolly, Vujanovic, Alvarez, & Bonn-Miller, 2017). Other studies have demonstrated that symptoms of various internalizing disorders, including anxiety and depressive disorders, decrease as DT increases when comparing symptom severity and DT pre-treatment and post-treatment (McHugh et al, 2014). From these results, one can conclude that there is a strong association between DT and internalizing disorder symptom presentation.

Researchers have shown strong associations between DT and internalizing disorders beyond anxiety as well. Depressive disorders, such as major depressive disorder (MDD), persistent depressive disorder, and bipolar disorder, are another type of internalizing disorder. Compared with individuals without MDD, those with MDD demonstrate lower DT, which was measured via the time it took participants to quit a frustrating motor-skills task (Ellis, Vanderlind, & Beevers, 2013). Therefore, not only do those with internalizing disorders have lower levels of DT, controls without internalizing disorders have higher levels of DT in comparison. Low DT works to perpetuate stress and increase depression symptom severity, manifesting in a positive feedback loop. (Williams, Thompson, & Andrews, 2013). Thus, low DT can increase one's vulnerability to internalizing problems, and, once the internalizing symptoms are entrenched, low DT can also worsen symptom severity, causing further impairment.

Other studies have shown how DT may act as the link between certain traits and the development of internalizing disorders. Borderline personality disorder (BPD) is characterized by negative affectivity and emotional volatility, which leads to problems regulating one's emotions when stressful situations arise. For this reason, researchers believed there would be a

strong association between DT and BPD symptom severity. However, one study utilizing both self-report and behavioral measures of DT found that neither were associated with BPD symptom severity and that high symptom severity could be better explained by emotion dysregulation (Iverson, Follette, Pistorello, & Fruzzetti, 2012). Another study concluded that, while low DT may not be the only factor leading to an increase in BPD symptom severity, it can moderate the relationship between negative emotionality and BPD symptom severity (Bornovalova, Matusiewicz, & Rojas, 2011). Therefore, low DT may explain why some individuals with emotion regulation problems go on to develop BPD while others do not, although the evidence is inconclusive.

DT levels can also explain the discrepancies between why some individuals engage in problematic behaviors relevant to internalizing psychopathology while others do not. A primary example is nonsuicidal self-injury (NSSI), in which one harms oneself without the intention of killing oneself (Nock & Mendes, 2008). Those who engage in NSSI have lower DT levels than those who do not engage in such behaviors (Nock & Mendes, 2008). However, when contrasting those who engage in NSSI and those who attempt suicide, individuals attempting suicide have higher DT levels (Anestis, Knorr, Tull, Lavender, & Gratz, 2013). Those who harm themselves with the intent of suicide may have higher DT levels because they need to be able to withstand the pain of death, while those who utilize NSSI do harm themselves as well but for the intent of attenuating negative affective states.

Along with the evidence supporting the relationship between DT and internalizing disorders, prior research also supports the association between DT and externalizing disorders. Externalizing disorders encompass problematic substance use and antisocial behavior, often in response to negative affective states. Antisocial personality disorder (ASPD) and psychopathic

traits are considered externalizing disorders because they involve taking negative impulses and turning them into aggressive, manipulative behaviors. Individuals with ASPD tend to utilize aggression as a response to stressful situations, while those with high levels of psychopathy feel more detached from others around them, which may explain homicidal behavior (Sargeant, Daughters, Curtin, Schuster, & Lejuez, 2011). Consistent with that conceptualization, low levels of DT have been shown to be associated with ASPD, while high levels of DT are associated with increased levels of psychopathic traits (Sargeant, Daughters, Curtin, Schuster, & Lejuez, 2011).

ASPD commonly co-occurs with substance use disorders (SUDs), another class of externalizing disorder, and DT levels can account for this as well. Low levels of DT predict a comorbidity between the ASPD and SUD. Low DT levels have also been shown to predict the development of SUDs (Daughters, Sargeant, Bornoalova, Gratz, & Lejuez, 2008). In fact, DT was originally investigated in the context of substance use disorders and their treatment. Low levels of DT predict substance use, and the development of SUDs, since individuals who use substances typically do so as negative reinforcers for negative affective states (Daughters et al, 2005). With an increase in levels of DT, individuals can abstain from substances longer or use substances less frequently (Bornoalova, Gratz, Daughters, Hunt, & Lejuez, 2012). Also, relapse can be attributed to low DT levels and the absence of other coping mechanisms to handle adverse situations (Bornoalova, Gratz, Daughters, Hunt, & Lejuez, 2012). Therefore, increasing DT levels, and learning alternative coping methods, can directly impact the health of individuals and can attenuate externalizing disorder symptoms.

DT has been shown to be implicated in both internalizing and externalizing disorders, but another question is the relationship between DT and gender. In one investigation utilizing an undergraduate sample, women were found to report less DT than men, with the finding

demonstrating a small effect, Cohen's $d = .21$ (Simons & Gaher, 2005). Another study reported in the same article affirmed that men endorse higher DT, with a Cohen's $d = .32$ in this other undergraduate sample (Simons & Gaher, 2005). However, behavioral measures of DT need to be assessed as well, or else the bias of self-report may influence individuals to assume that indeed men do have higher levels of DT than women. One such behavioral measure of DT is the carbon dioxide challenge, in which individuals are asked to breathe in carbon dioxide, constricting their capacity to breathe. The goal is to see how long individuals choose to last at this task before disliking the physical sensation and quitting the task; therefore, the task has been shown to be a reliable behavioral measure of DT (Brown, Lejuez, Kahler, & Strong, 2002). Women were found to be significantly more likely to terminate a carbon dioxide challenge compared to men, indicating that women have lower DT levels than men (Brown, Lejuez, Kahler, & Strong, 2002). However, in addition to these findings, men were also found to be more likely to use alcohol as a coping mechanism for negative affect than women would (Simons & Gaher, 2005). This indicates that men may have similar experiences of low DT as women but may manifest these behaviors in different ways.

Prior literature has described the relationship between gender, levels of DT, and type of symptom (whether it be internalizing or externalizing). The prevailing theory is that low levels of DT in women lead to higher prevalence of internalizing disorders and low levels of DT in men lead to a higher prevalence of externalizing disorders (Daughters et al, 2009). Low DT levels have been shown to be associated with more affective problems, and different researchers have found that low DT is associated with more internalizing symptoms for females (Daughters, Gorka, Magidson, MacPherson, & Seitz-Brown, 2013). However, researchers have not agreed on the consequences of low levels of DT in males. Some researchers have found a non-significant

relationship between males with low DT levels and increased internalizing symptoms; however, they also found a non-significant relationship between males with low DT levels and increased externalizing symptoms (Daughters, Gorka, Magidson, MacPherson, & Seitz-Brown, 2013).

However, researchers have found that depressive symptoms and low DT levels combine to create problematic alcohol use in both genders, showing that internalizing symptoms can combine with low DT to manifest in an externalizing disorder (Gorka, Ali, & Daughters, 2012). The manifestation of psychological symptoms for men and women with low levels of DT needs to be investigated further to delineate these relationships further.

Prior research has shown that women experience more internalizing symptoms and men experience more externalizing symptoms. However, men may be as vulnerable to internalizing symptoms as women yet manifest these symptoms as externalizing symptoms. If so, treatment should be changed for men and for externalizing disorders to center on coping with negative emotions, such as anxiety or depression, to combat problematic behaviors, such as aggression or substance use, which might be the ultimate expression of internalizing vulnerability in this population.

I hypothesized that the association between DT and internalizing symptoms would be equally strong for men and for women, such that both men and women with low levels of DT would exhibit higher internalizing symptoms, relative to those with high DT (Daughters, Gorka, Magidson, MacPherson, & Seitz-Brown, 2013; Gorka, Ali, & Daughters, 2012). I further hypothesized that the association between DT and externalizing symptoms will be stronger for men than for women, such that men with low levels of DT would exhibit a higher increase in externalizing symptoms than women (Daughters, Gorka, Magidson, MacPherson, & Seitz-Brown, 2013; Gorka, Ali, & Daughters, 2012).

Methods

Participants

This study involved two samples collected as part of a larger study. Sample 1 included undergraduate Psychology students at the College of William & Mary. Sample 2 included 225 adults who reported a history of treatment for anxiety or depression. The Sample 2 was recruited via Qualtrics Panels. Both Sample 1 and Sample 2 completed all measures via Qualtrics online platform.

Prior to exclusions, there were 1,647 participants enrolled in Sample 1. Participants were on average 19.14 years old ($SD = 1.57$), and ages ranged from 16-44. Two participants were excluded from the age demographic variable as they did not self-report their age accurately. The majority of the participants, 57.3%, identified as female, 33.0% identified as male, .4% identified as “not male or female”, and the remaining 9.3% declined to respond. Along with self-reporting their gender, the participants also self-reported their race and/or ethnicity. The majority of our participants self-reported as White (63.7%), 8.4% identified as Asian-American, 7.8% identified as Black, 5.6% identified as “Other”, 4.8% identified as “More than one race”, .4% identified as Native American/Alaska Native, and the remaining 9.3% declined to respond.

After excluding those who did not finish the study (i.e., started the survey but did not complete it), duplicate responses, and those who did not pass the validity check (i.e., provide a correct answer to an attention-check item), bringing the undergraduate participant total down to 1,217, the demographic variables did change. The age of the participants remained relatively young ($M = 19.17$, $SD = 2.66$) and ages now ranged from 17-44. The majority of the participants still self-reported as female, but the percentage who did so increased to 62.9%, while 36.6% identified as male, .4% identified as “not male or female”, and the remaining .1% was comprised

of participants who did not respond to this question. The frequencies corresponding to race and/or ethnicity changed as well after exclusions were taken into consideration. The majority of the participants still identified as White, yet the amount who did so went up to 71.7%, while 9.0% identified as Asian American, 7.9% identified as Black, 5.7% identified as “Other”, 5.3% identified as More than one race”, .5% identified as Native American/Alaska Native, and the remaining .1% was comprised of participants who chose not to respond to this question.

While the data I utilized for Sample 1 did not contain questions asking about diagnostic history, some of the participants in the sample answered these questions as part of another study. When merging these two studies and data files together, 441 people from Sample 1 answered questions about diagnostic history. Specifically, these questions asked participants if they had ever been diagnosed with a depressive disorder, an anxiety disorder, an attention disorder or learning disability, an eating disorder, psychosis, a personality disorder, or a substance use disorder. The participants could select all responses that applied to them. They were also able to choose that they had never been diagnosed with a psychological disorder, that they did not know if they had been diagnosed, and the last option was that they could “decline to respond”. Of this sub-sample of 441 participants from Sample 1, 14.97% answered they had been diagnosed with a depressive disorder, 21.5% with an anxiety disorder, 7.0% with an attention disorder or learning disability, 2.5% with an eating disorder, .2% with psychosis, .5% with a personality disorder, and .2% with a substance use disorder. 67.1% replied that they had never been diagnosed with these disorders, while 2.9% replied that they did not know if they had been diagnosed, and 1.1% declined to respond to the questions. The fact that the percentages add up to over 100% shows the comorbidity of diagnoses seen in Sample 1. There was a significant prevalence of

internalizing disorders in the sample but not a significant prevalence of externalizing disorders (substance use disorders or personality disorders).

The demographic statistics of the Sample 2 were distinct from the those of Sample 1. Those in the Sample 2 had been diagnosed with either a depressive or anxiety disorder. The exclusions performed on Sample 1 (removing those who had not completed the battery of questionnaires, removing earlier duplicated responses, and removing those who did not pass the validity check question) were unnecessary since all the participants completed their questionnaires one time and passed the validity check question. Sample 2 was older than Sample 1 ($M = 46.39$, $SD = 14.104$). Sample 2 had a high proportion of females, 92%, with 7.6% identifying as males, and .4% identifying as other. Sample 2 was also composed mostly of individuals who identified as “White” (92.4%), with 5.8% identifying as “Hispanic/Latino/a”, 4.9% identifying as “African-American/Black”, 2.2% identifying as “Native American/Alaska Native”, .9% identifying as “Asian-American/Asian”, .4% “Native Hawaiian or Pacific Islander”, and .4% identifying as “Middle Eastern/Arab/Arab-American”. The percentages exceeded 100% since the participants were given the option to select the race(s) they most closely identified with, meaning they could choose more than one choice.

Measures

Distress Tolerance Scale (DTS; Simons & Gaher, 2005)

DT was measured via the DTS questionnaire (Simons & Gaher, 2005). In previous studies, the internal consistency has been reported as “good”. In the present study, Cronbach’s alpha values were .93 in Sample 1 and .92 in Sample 2. This questionnaire asks you to “Think of times that you feel distressed or upset,” while responding to statements on a 5-point Likert scale (from 1 = “Strongly Agree to 5 = “Strongly Disagree”). The measure consists of 16 items,

including one reverse coded item, the full scale of which is included in Appendix A. Higher scores on this measure indicate higher DT.

Personality Inventory for DSM-5-Brief Form (PID-5-BF; Krueger, Derringer, Markon, Watson, & Skodol, 2011)

To measure internalizing and externalizing problems, the Personality Inventory for DSM-5-Brief Form (PID-5-BF) was utilized. The PID-5 is a measure of abnormal personality traits, which are considered maladaptive variants of the normative Big 5 personality model (Krueger, Derringer, Markon, Watson, & Skodol, 2011). These trait domains are “Negative Affect (the experience of negative emotions), Detachment (isolating yourself physically and emotionally from others), Antagonism (hostile behavior), Disinhibition (impulsive behavior), and Psychoticism (delusional and/or hallucinatory behavior)”. “Negative Affect” and “Detachment” are measures of internalization, while “Antagonism” and “Disinhibition” are measures of externalization. Psychoticism can be regarded as a measure of a thought disorder and will only be included for exploratory analysis. The PID-5-BF is composed of 25 items answered on a 4-point Likert scale (from 0 = “Very False or Often False” to 3 = “Very True or Often True”). Examples of items on the questionnaire are included in Appendix B. The domains ranged in reliability in prior research, with Cronbach alpha levels ranging from .59 (Detachment) to .77 (Psychoticism) (Fossati, Somma, Borroni, Markon, & Kreuger, 2017). In the present study, Cronbach’s alpha values were .88 for Sample 1 and .91 for Sample 2.

Procedures

All the participants answered questions from a battery of questionnaires that took approximately 30 minutes to complete. Once the participants activated the link sent to them and began the study, they were brought to a screen that asked to ensure they had “At least 30 minutes

of uninterrupted time to complete the questionnaire[s], and that [they were] in a setting free of distractions”. They were also told to be alert for validation checks that would arise at some point while completing the battery of questionnaires. The validity check was utilized to ensure that participants were paying attention to the survey questions and taking the process seriously. Next another screen appeared which described the study and asked the participants if they would like to consent and participate. In describing the study, the screen explained to the participants that they could skip any question. They were also free to withdraw from the study at any point “without negative consequences” and told that no identifying information would be connected to them.

Analytic Plan

As mentioned above, people who did not finish the survey, completed the survey more than once, and who failed the attention check were excluded. Also, I did not include those who identified as “not male or female” for the gender demographic question, resulting in a decrease to 1,211 participants in Sample 1 and 224 participants in Sample 2. And, Sample 2 was only utilized to check the main effects seen in Sample 1 but was not utilized for the moderation analysis, since the uneven distribution by gender made it so that it was not especially informative for interaction.

For the PID-5-BF, negative affectivity and detachment dimensions were summed to form an index of internalizing problems, whereas antagonism and disinhibition dimensions were summed to create an externalizing problems index.

I utilized the new indices to conduct a bivariate correlation between the variables “DT”, “Gender”, “Internalizing”, and “Externalizing”. I then conducted a moderation analysis using “PROCESS” which automatically computes simple slopes if an interaction exists between

variables (Hayes, 2017). I conducted the analysis using “DT” as the predictor variable, “Gender” as the moderator, and “Internalizing” as the outcome. I then performed an analogous analysis for externalizing problems.

Results

I hypothesized that gender would moderate the effects of DT on the presentation of both internalizing and externalizing symptoms, thinking that low DT would lead to a high prevalence of internalizing symptoms in both genders, whereas low DT would only lead to a high prevalence of externalizing symptoms in men.

Compared to DT levels in Sample 1 ($M = 3.53$, $SD = .87$), Sample 2 reported lower DT on average ($M = 2.73$, $SD = .83$). After performing a t-test, the differences in DT between groups proved to be significant with a large effect size, $t(1433) = 12.90$, $p < .05$, Cohen’s $d = .95$. Likewise, compared to Sample 1’s levels of internalizing symptoms ($M = 8.69$, $SD = 5.39$) and externalizing symptoms ($M = 5.34$, $SD = 4.74$), Sample 2 reported greater levels of both internalizing ($M = 15.36$, $SD = 6.83$) and externalizing ($M = 6.46$, $SD = 5.51$) problems. A t-test confirmed this group difference in internalizing symptoms was large and statistically significant, $t(1433) = -16.25$, $p < .05$, Cohen’s $d = 1.11$. The effect size when comparing externalizing symptoms between samples was smaller, $t(1433) = -3.17$, $p < .05$, Cohen’s $d = .23$.

The bivariate correlations from Sample 1 (Table 1) indicated that gender, DT, internalizing symptoms, and externalizing symptoms were all substantially interrelated. That is, all Pearson correlation values were statistically significant at a 0.01 alpha level. Gender was coded as 1 = male, 2 = female. Gender was found to be negatively associated with DT, with a small effect size, such that women self-reported lower levels of DT. Gender was positively associated with internalizing symptoms, with a small effect size, such that women were associated with

experiencing more internalizing symptoms than men. And, gender was negatively associated with externalizing symptoms, with a small effect size, such that men were associated with experiencing more externalizing symptoms than women. DT was negatively associated with both internalizing symptoms (with a large effect size) and externalizing symptoms (with a small effect size), such that as DT decreased symptoms of psychological disorders increased. And, internalizing symptoms were positively associated with externalizing symptoms, with a medium effect size, such that higher internalizing symptoms were associated with congruently high externalizing symptoms.

However, the bivariate correlations from Sample 2 (Table 2) proved to be a different story, as only certain variables were found to be significantly related. Gender was found to be significantly associated with internalizing symptoms with a small positive effect size, such that there was a higher association between women and internalizing symptoms than men. DT was found to be significantly negatively associated with both internalizing and externalizing symptoms with large effect sizes for both, such that as DT levels increased psychological symptoms decreased. And internalizing symptoms were found to be significantly positively associated with externalizing symptoms, with a large effect size as well, such that higher internalizing symptoms was associated with higher externalizing symptoms.

I computed independent samples t-tests to look at the relationship between gender and DT for both Sample 1 and Sample 2. The results for Sample 1 ($t(1209) = 4.98, p < .05, \text{Cohen's } d = .30$), indicate a significant difference between gender and DT levels, with a small to medium effect size. However, the results for Sample 2 ($t(222) = 1.22, p = .22, \text{Cohen's } d = .32$), do not indicate a significant difference in DT levels experienced by men and women, with a small to medium effect size.

I conducted simple regression analyses for Sample 1, which assessed the effect of an independent variable on the dependent variable while keeping the other variables constant. When looking at internalizing symptoms as the outcome, gender was not found to be significantly related to presence of internalizing symptoms. The effect size was positive yet small, indicating that women experience more internalizing symptoms. DT was significantly negatively associated with internalizing symptoms, with a large effect size, such that as DT decreased internalizing symptoms increased. For externalizing symptoms gender was found to be significantly negatively associated, with a small effect size, such that men reported higher externalizing symptoms than women. DT was also significantly negatively associated with externalizing symptoms, with a medium effect size, such that as DT decreased externalizing symptoms increased. The results of such analyses can be found in Tables 3-4.

I conducted the same simple regression analyses for Sample 2. Contrary to Sample 1, gender was found to be significantly positively associated with internalizing symptoms, with a small effect size, such that women reported higher internalizing symptoms than men. DT was also significantly negatively associated with internalizing symptoms, with a large effect size, such that as DT decreased internalizing symptoms increased. A significant association was not found between gender and externalizing symptoms in Sample 2 as it was in Sample 1. The effect size was positive and small, indicating that women self-reported marginally more externalizing symptoms than men. DT was found to be significantly negatively associated with externalizing symptoms, with a large effect size, such that as DT decreased externalizing symptoms increased. The results of such analyses can be found in Tables 5-6.

Using the “PROCESS” macro in SPSS, I conducted moderation analyses to determine if gender moderates the association between DT and internalizing symptoms, as well as whether

gender moderates the relationship between DT and externalizing symptoms (Hayes, 2017). I conducted these analyses solely on Sample 1. In opposition to my hypothesis, gender did not significantly moderate the relationship between DT and internalizing symptoms ($b = .07$, $SE = .31$, $standardized\ beta = .03$, $p = .83$). Nor did gender moderate the relationship between DT and externalizing symptoms, ($b = -.16$, $SE = .31$, $standardized\ beta = -.07$, $p = .61$), with an especially low effect size and significance regarding internalizing symptoms. Figures 1-2 illustrate the moderation effects.

Discussion

The present article investigated whether the influence of DT on the presence of internalizing or externalizing symptoms varied by gender. Prior research articles have asked the same question; however, the results were unexpected and needed further clarification. Most previous articles found that low DT in females, but not males, led to an increase in internalizing symptoms (Daughters, Gorka, Magidson, MacPherson, & Seitz-Brown, 2013). However, even though most researchers agree that men experience more externalizing symptoms than women, prior articles have not found that low DT in men leads to higher externalizing symptoms when compared to women (Daughters et al, 2009; Daughters, Gorka, Magidson, MacPherson, & Seitz-Brown, 2013). The current article sought to elucidate these previous findings and hypothesized that low DT in both men and women led to higher internalizing symptoms but only led to higher externalizing symptoms in men. The results did not support the hypothesis as gender did not significantly moderate the association between DT and symptoms of psychopathology.

As previously stated, I conducted an independent sample t-test to investigate the differences between men and women when it comes to DT. A significant difference was found between the two genders in Sample 1 but not in Sample 2. The finding in Sample 1 concurs with

prior literature which found men and women to self-report differences in DT levels (Brown, Lejuez, Kahler, & Strong, 2002; Simons & Gaher, 2005).

In Sample 1, the main effect between gender and internalizing symptoms was not found to be significant. This contradicts prior literature which stated that women reported experiencing higher internalizing symptoms than men (Daughters et al, 2009). There was a significant negative main effect between gender and externalizing symptoms, such that men reported more externalizing symptoms than women. This finding is consistent with prior literature (Daughters et al, 2009).

In Sample 2, the opposite effects were found as Sample 1. The main effect between gender and internalizing symptoms was found to be significant, such that women report experiencing higher internalizing symptoms than men. This finding is congruent with previous literature (Daughters et al; Daughters, Gorka, Magidson, MacPherson, & Seitz-Brown, 2013). However, the main effect between gender and externalizing symptoms was not found to be significant in Sample 2. This finding contradicts prior literature, as stated above (Daughters et al, 2009).

A significant main effect was found when investigating DT and internalizing symptoms in both samples, and the effect size was greater in Sample 2 compared to Sample 1. In both samples a negative relationship existed, such that as DT decreased internalizing symptoms increased and vice versa. This is consistent with prior literature which has stated that those with internalizing disorders have lower levels of DT compared to those who do not (Ellis, Vanderlind, & Beevers, 2013; Nock & Mendes, 2008).

A significant main effect was also found when analyzing the relationship between DT and externalizing symptoms in both samples and, once again, the effect size was greater in

Sample 2 when compared to Sample 1. For both samples the main effect was lower than that found between DT and internalizing symptoms. Another negative relationship was found, such that as DT decreased externalizing symptoms increased and vice versa. The present result has been found in previous research articles, in which those with SUDs or ASPD have had lower DT levels (Daughters, Sargeant, Bornovalova, Gratz, & Lejuez, 2008; Sargeant, Daughters, Curtin, Schuster, & Lejuez, 2011).

As one can see from the graphs displaying the results of the moderation analyses (Figures 1-2), gender did not significantly moderate the relationship between DT and internalizing symptoms, nor did it moderate the relationship between DT and externalizing symptoms in Sample 1. Although men self-reported more externalizing symptoms and women self-reported more internalizing symptoms in both samples, the slopes of the lines corresponding to gender did not significantly differ. Those who reported lower DT self-reported higher symptoms of both internalizing and externalizing disorders, regardless of gender. This finding was not consistent with prior literature which stated that low DT led to a significantly greater vulnerability in internalizing disorders for females compared to males (Daughters et al, 2009). Researchers should conduct replication analyses to try and elucidate whether the type of psychological disorder one develops depends on both DT levels and gender.

The moderation analyses may have yielded low effect sizes and nonsignificance due to the research question being truly incorrect; however, a number of limitations were present which could have also impacted the results. Because externalizing symptoms are comparatively infrequent in undergraduate populations, it would be interesting to recruit another sample for future research that is enriched for externalizing problems. Thus, recruitment from selected

populations (e.g., those in treatment for substance misuse, those with legal troubles) could make it easier to study the effects of DT and gender on externalizing disorders in future work.

The study was also cross-sectional and did not attempt to investigate how changing DT levels over time affects the number of internalizing symptoms or externalizing symptoms manifested by each gender. Thus, the temporal sequencing between DT deficits and psychopathology symptoms remains uncertain. Finally, this study relied exclusively on self-report surveys to assess DT and psychopathology symptoms. Participants may be biased when it comes to reporting about themselves and/or unaware of their own tendencies.

Future directions should utilize a larger clinical sample and could also utilize clinical measures (such as the Mini International Neuropsychiatric Interview or the Structured Clinical Interview for the DSM-5) to ensure that participants are diagnosed with an internalizing disorder, an externalizing disorder, or both (Sheehan et al, 1998; First, 2014). It would be particularly interesting to look at the differences between those solely diagnosed with internalizing disorders, and those only diagnosed with externalizing disorders, to compare these groups to those who have been diagnosed with both types of disorders (i.e., comorbid internalizing and externalizing problems). Perhaps the gender distribution of the group diagnosed with both types of disorders would differ from the groups solely diagnosed with one type, and perhaps DT levels would play a different role as well. Future studies could also utilize behavioral measures of DT that purposefully frustrate the individual to induce the participant to quit, to see how long the participant can go through aversive states before quitting the task (Leyro, Zvolensky, & Bernstein, 2010). Prior literature has not definitively shown whether behavioral assessments of DT are better than self-reports, but it would be interesting to see if any differences arise in results with the change of assessment (Leyro, Zvolensky, & Bernstein, 2010).

If replications of the present study find larger effect sizes, then the results could yield practical significance as well as statistical significance. If, for instance, it was found that men experience similar levels of internalizing symptoms as women, despite the outward manifestation of externalizing symptoms, then the treatment of internalizing symptoms would be treated as a higher priority. Both men and women would receive treatment that is right for them, which would alleviate impairment due to the presence of untreated internalizing symptoms and lead to a greater sense of well-being.

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Table 1 <i>Correlations Sample 1</i>				
	Gender	DT	Internalizing	Externalizing
Gender	1.000			
DT	-.142**	1.000		
Internalizing	.116**	-.559**	1.000	
Externalizing	-.166**	-.245**	.430**	1.000

**Correlation is significant at the 0.01 level (2-tailed).
1 = male, 2 = female.

Table 2 <i>Correlations Sample 2</i>				
	Gender	DT	Internalizing	Externalizing
Gender	1.000			
DT	-.082	1.000		
Internalizing	.161*	-.684**	1.000	
Externalizing	.033	-.505**	.553**	1.000

*Correlation is significant at the 0.05 level (2-tailed).
**Correlation is significant at the 0.01 level (2-tailed).
1 = male, 2 = female.

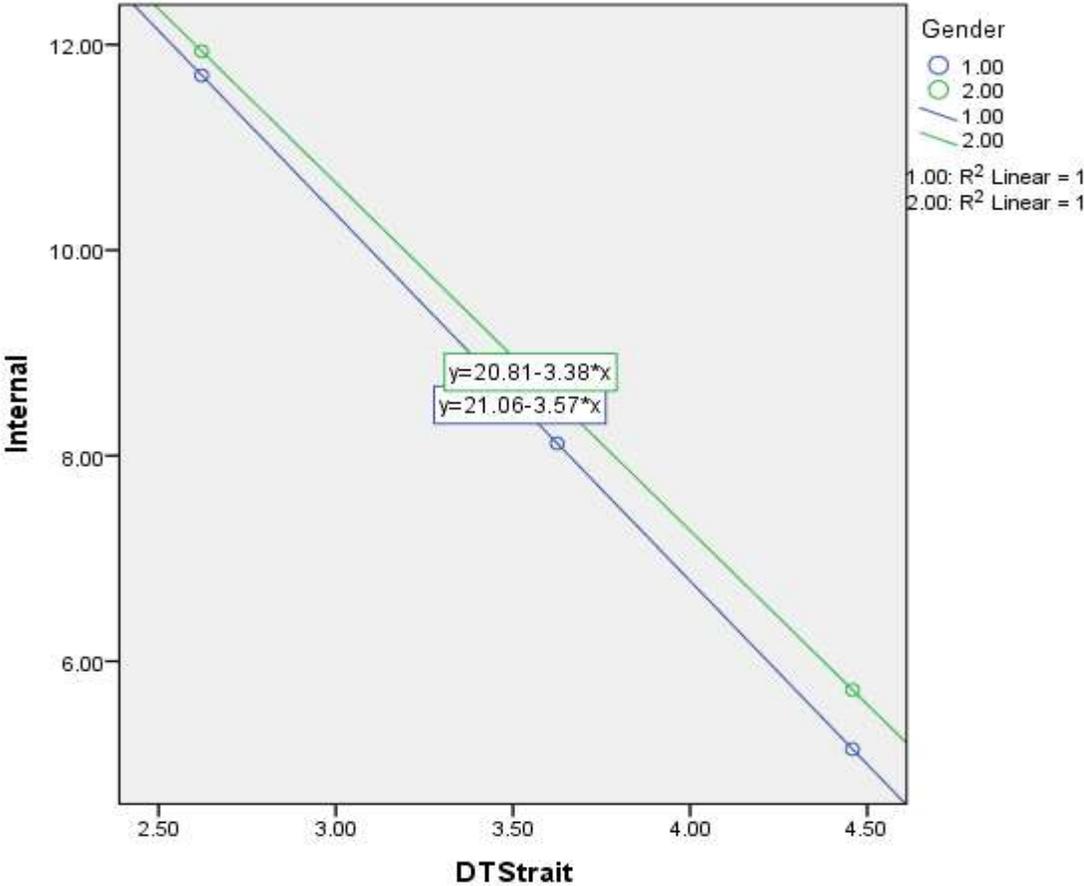
Table 3				
<i>Main Effects Sample 1 Internalizing</i>				
	b	Standard Error	Standardized beta	<i>p</i> value
Gender	.47	.26	.04	.07
DT	-3.46	.15	-.56	.00

Table 4				
<i>Main Effects Sample 1 Externalizing</i>				
	b	Standard Error	Standardized beta	<i>p</i> value
Gender	-1.91	.27	-.197	.00
DT	-1.51	.15	-.28	.00

Table 5				
<i>Main Effects Sample 2 Internalizing</i>				
	b	Standard Error	Standardized beta	<i>p</i> value
Gender	2.17	.99	.11	.03
DT	-5.59	.40	-.68	.00

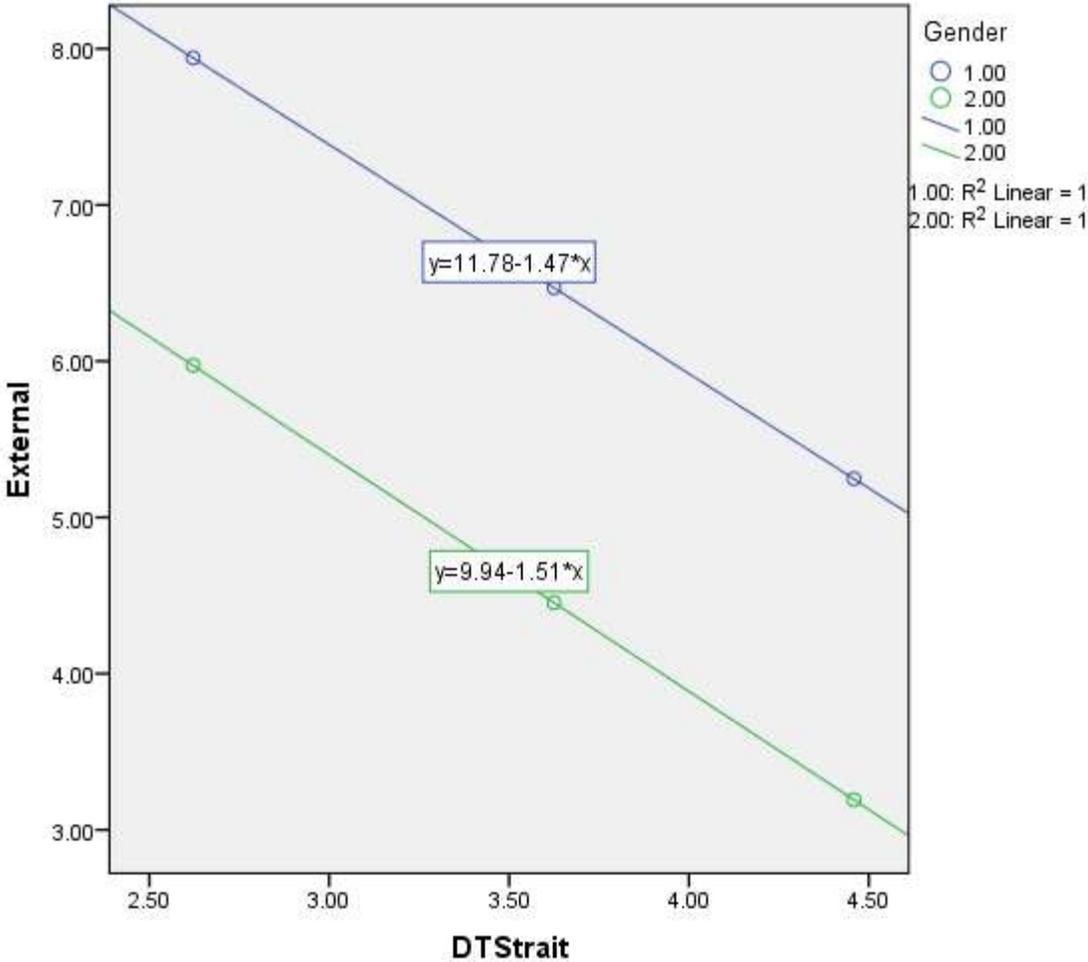
Table 6				
<i>Main Effects Sample 2 Externalizing</i>				
	b	Standard Error	Standardized beta	<i>p</i> value
Gender	.86	.96	.05	.37
DT	-3.32	.39	-.499	.00

Figure 1



Moderation analysis in Sample 1, looking at the effects of gender on the association between DT and internalizing symptoms (1 = male, 2 = female).

Figure 2



Moderation analysis in Sample 1, looking at the effects of gender on the association between DT and externalizing symptoms (1 = male, 2 = female).

Appendix A

The Distress Tolerance Scale

-
1. Feeling distressed or upset is unbearable to me.
 2. When I feel distressed or upset, all I can think about is how bad I feel.
 3. I can't handle feeling distressed or upset.
 4. My feelings of distress are so intense that they completely take over.
 5. There's nothing worse than feeling distressed or upset.
 6. I can tolerate being distressed or upset as well as most people.
 7. My feelings of distress or being upset are not acceptable.
 8. I'll do anything to avoid feeling distressed or upset.
 9. Other people seem to be able to tolerate feeling distressed or upset better than I can.
 10. Being distressed or upset is always a major ordeal for me.
 11. I am ashamed of myself when I feel distressed or upset.
 12. My feelings of distress or being upset scare me.
 13. I'll do anything to stop feeling distressed or upset.
 14. When I feel distressed or upset, I must do something about it immediately.
 15. When I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels.
-

Appendix B

The Personality Inventory for DSM-5-Brief Form

The Personality Inventory for DSM-5—Brief Form (PID-5-BF)—Adult

Name: _____ Age: _____ Sex: Male Female Date: _____

Instructions: This is a list of things different people might say about themselves. We are interested in how you would describe yourself. There are no right or wrong answers. So you can describe yourself as honestly as possible, we will keep your responses confidential. We'd like you to take your time and read each statement carefully, selecting the response that best describes you.						Clinician Use
		Very False or Often False	Sometimes or Somewhat False	Sometimes or Somewhat True	Very True or Often True	Item score
1	People would describe me as reckless.	0	1	2	3	
2	I feel like I act totally on impulse.	0	1	2	3	
3	Even though I know better, I can't stop making rash decisions.	0	1	2	3	
4	I often feel like nothing I do really matters.	0	1	2	3	
5	Others see me as irresponsible.	0	1	2	3	
6	I'm not good at planning ahead.	0	1	2	3	
7	My thoughts often don't make sense to others.	0	1	2	3	
8	I worry about almost everything.	0	1	2	3	
9	I get emotional easily, often for very little reason.	0	1	2	3	
10	I fear being alone in life more than anything else.	0	1	2	3	
11	I get stuck on one way of doing things, even when it's clear it won't work.	0	1	2	3	
12	I have seen things that weren't really there.	0	1	2	3	
13	I steer clear of romantic relationships.	0	1	2	3	
14	I'm not interested in making friends.	0	1	2	3	
15	I get irritated easily by all sorts of things.	0	1	2	3	
16	I don't like to get too close to people.	0	1	2	3	
17	It's no big deal if I hurt other peoples' feelings.	0	1	2	3	
18	I rarely get enthusiastic about anything.	0	1	2	3	
19	I crave attention.	0	1	2	3	
20	I often have to deal with people who are less important than me.	0	1	2	3	
21	I often have thoughts that make sense to me but that other people say are strange.	0	1	2	3	
22	I use people to get what I want.	0	1	2	3	
23	I often "zone out" and then suddenly come to and realize that a lot of time has passed.	0	1	2	3	
24	Things around me often feel unreal, or more real than usual.	0	1	2	3	
25	It is easy for me to take advantage of others.	0	1	2	3	
Total/Partial Raw Score:						
Prorated Total Score: (if 1-6 items left unanswered)						
Average Total Score:						

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