

Effects of a Single-Session Intervention Targeting Perfectionism in College Students

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Perfectionism is a well-established transdiagnostic factor that contributes to the maintenance and exacerbation of a wide range of psychopathology. Although effective, most treatments for perfectionism are inaccessible to the general population, and are time-, resource-, and cost-intensive. Online single-session interventions (SSIs) display promise in preventing and treating negative mental health symptoms; however, no studies have examined the effectiveness of an online SSI targeting perfectionism. To address this, the present study sought to evaluate a novel computerized, self-guided SSI. The two primary aims of the study were: 1) to assess the intervention's acceptability, likability, and utility, and 2) to examine whether the intervention reduces perfectionistic attitudes, depression, anxiety, and stress in a college student population. At baseline, students at a liberal arts college (N=79) were randomized to receive a 40-minute perfectionism SSI or a stress-management control. Participants rated the perfectionism intervention as highly helpful, acceptable, and likable. The perfectionism intervention was associated with greater improvements in perfectionism, depression, anxiety, and stress; however, the differences in reductions between the groups were not statistically significant. Given the small sample size, the study was likely underpowered to detect differences between conditions. Future research with larger sample sizes, a less potent control group, and clinical populations is needed to test the effects of the intervention more extensively. Nevertheless, this study demonstrates that single-session perfectionism interventions hold promise and merit future investigation.

Keywords: Perfectionism, Single-Session Interventions, Online Interventions, College Students

Perfectionism is defined as the strong need to perform at a flawless level and to meet excessively high standards (Flett & Hewitt, 2002). Although perfectionism is multidimensional and can have adaptive elements, it is considered a transdiagnostic factor associated with many forms of psychopathology (Shafran & Mansell, 2001; Egan, Wade, & Shafran, 2011). The type of perfectionism that contributes to psychopathology is known as maladaptive perfectionism, which is characterized by the pursuit of personally demanding standards and the basing of self-worth on performance outcomes in one or more important life domains, despite negative consequences (Shafran, Cooper, & Fairburn, 2002). Maladaptive perfectionism involves critical self-evaluations, concerns about making mistakes and being negatively evaluated by others, and fear of failure (Frost, Marten, Lahart, & Rosenblate, 1990; Egan, Wade, Shafran, & Antony, 2016). Many individuals with high levels of maladaptive perfectionism have core beliefs that they are weak, flawed, and unworthy (Besser, Flett, & Hewitt, 2004). Given these characteristics, it is unsurprising that perfectionism is elevated across eating (Limburg, Watson, Hagger, & Egan, 2017), anxiety (Gnilka, Ashby, & Noble, 2012), depressive (Hewitt & Flett, 1991), and personality disorders (Overholser & Dimaggio, 2020). Perfectionism has particular relevance to obsessive-compulsive personality disorder (OCPD), as one of the diagnostic criteria for OCPD involves perfec-

tionism that interferes with normal task completion (American Psychological Association, 2013; Egan, Wade, & Shafran, 2011). Likewise, obsessive-compulsive disorder (OCD) often involves perfectionistic tendencies; the Obsessive-Compulsive Cognitions Working Group postulates that perfectionism is one of six central cognitive processes involved in obsessive-compulsive disorder (OCCWG, 1997).

In addition to the heightened perfectionism common among clinical populations, a substantial number of individuals who do not meet the diagnostic criteria for any given disorder have high levels of maladaptive perfectionism (Grzegorek et al., 2004). In nonclinical samples, perfectionism is highly correlated with subthreshold symptoms of various forms of psychopathology (Kearns, Forbes, & Gardiner, 2007). For instance, Ferrari (1995) found that perfectionism scores were significantly related to obsessional thoughts, compulsive acts, anger-suppression, anger expression, social desirability, and compulsive checking in a nonclinical college student population. Perfectionism levels are also associated with hopelessness, non-suicidal self-injury, and suicidal ideation and attempts (O'Connor, 2003; O'Connor, 2007). More broadly, perfectionism gives rise to high levels of stress and worry, behavioral impairments, physical health problems, impaired daily functioning, inferior academic performance, and interpersonal problems (Shafran et al., 2002; Flett & Hewitt, 2002).

Treatments for Perfectionism

Treatments for perfectionism are based on models that suggest cognitive and behavioral components may maintain the core biases and attitudes in perfectionism (Shafran et al., 2002). More specifically, maladaptive thinking patterns and cognitive biases such as dichotomous thinking, selective attention toward mistakes, rumination, self-criticism, self-blame, and overgeneralization play a role in maintaining perfectionism and its poor outcomes (Egan et al., 2016; Shafran et al., 2002). Such biases may contribute to procrastination behaviors, higher standard-setting, and inability to complete tasks (Egan et al., 2016; Sirois, 2014). Perfectionism is also antithetical to self-compassion (Brown, 2008; Nadeau, 2020), as internal self-dialogue is quite harsh and involves automatic perfectionism-themed thoughts about the self, judgments, and elements of self-neglect (Ferrari, 1995; Hewitt, 2020). Self-criticism may even mediate the relationship between perfectionism, psychological distress (James et al., 2015), and depression (Ferrari, Yap, Scott, Einstein, & Ciarrochi, 2018). Because of these cognitive and behavioral maintenance factors, a perfectionistic cycle is often quite resistant to change, thus some researchers suggest that perfectionism is a fixed part of personality (Hewitt et al., 2017). However, it might be more helpful to look at perfectionism as a cognitive vulnerability factor related to psychopathology that can change with targeted treatment (Egan et al., 2011). Indeed, perfectionistic beliefs can be changed through cognitive-behavioral therapy (CBT). Common elements of CBT target cognitive and behavioral processes in perfectionism via psychoeducation, cognitive restructuring, and self-compassion techniques (Egan et al., 2016; Nadeau, 2020).

A growing body of evidence shows that CBT for nonclinical and clinical populations reduces perfectionism, with medium to large effect sizes (Kearns et al., 2007; Lloyd, Schmidt, Khondoker, & Tchanturia, 2015). Targeting perfectionism may also lead to a reduction in other psychological disturbances characteristic of mental disorders (Egan et al., 2011; Lloyd et al., 2015). In particular, studies have found that depression, anxiety, and eating problems are often reduced with medium effect sizes in both clinical and nonclinical samples (e.g. Kearns, Forbes, & Gardiner, 2007; Steele & Wade, 2008; Shafran et al., 2017). There is also evidence supporting the utility of self-compassion interventions for perfectionism

in nonclinical populations, although effects on reducing secondary disorders are less consistent (Rose, McIntyre, & Rimes, 2018; Nadeau, 2020). Therefore, combining more traditional cognitive-behavioral components with self-compassion techniques may be beneficial in alleviating perfectionism, as suggested in prior research (Fairweather-Schmidt & Wade, 2015).

Although there has been a recent surge in randomized controlled trials evaluating treatments for perfectionism (Lloyd et al., 2015), for many individuals psychotherapy interventions remain difficult to access given the face-to-face and individualized nature of treatment (Andersson, 2016). Cost, transportation issues, waiting lists, lack of trained mental health professionals, and stigma—typical barriers in facing treatment—might limit access to perfectionism interventions. And such barriers may be particularly strong for under-resourced populations (Andrade et al., 2014). Further, those with subclinical problems (e.g. someone who is perfectionistic and anxious but doesn't meet criteria for a disorder) would be unlikely to go to great lengths to seek out an intervention. This lack of access points to a clear need for more accessible mental health programs targeting perfectionism.

Internet-Based Interventions

As a response to lack of access, internet-based interventions have been rapidly developed. Internet-based interventions are effective for a variety of mental health disorders and problems (e.g. Parks et al., 2018), including perfectionism (e.g. Rozental et al., 2017). Online interventions for perfectionism utilize the same techniques present in in-person treatment (e.g. cognitive restructuring, self-compassion), are typically self-guided, and often report effect sizes comparable to in-person treatments (Suh et al., 2019). For example, Suh and colleagues' meta-analysis on 10 face-to-face and online interventions for perfectionism reported that there were no significant differences in delivery modality on effect sizes for perfectionism, depression, and anxiety (Suh et al., 2019). At present, there have been several randomized controlled trials evaluating online programs which have demonstrated great value in reducing the burden created by perfectionism (e.g. Egan et al., 2014).

However, one potential problem with both face-to-face and online perfectionism interventions is their length Lloyd and colleagues' (2015) meta-analysis of 8

perfectionism interventions reported that the number of treatment sessions ranged from 8 to 14, resembling the typical length of cognitive-behavioral therapy. Non-completion rates were high in many of the studies, which are reflective of treatment adherence norms; one in five adults will drop out of treatment before the recommended dose is complete (Olfson et al., 2009). Poor retention is even more common among online interventions. For instance, in the study conducted by Shafran and colleagues (2017), there was significant non-engagement and non-completion of modules, with 71% of participants completing fewer than half the modules and only 14.5% people completing five or more modules. Strikingly, even participants who had high rates of non-completion and non-engagement had reduced perfectionism. Change in perfectionism was largest at the beginning of the intervention, indicating that potential may lie in briefer, more compact interventions. This is consistent with other research reporting that the number of sessions is often unrelated to the magnitude of that treatment's effect (Weisz et al., 2017). Rozental and colleagues (2017) and Shafran et al (2017) noticed these effects in their 8-week long online interventions for perfectionism, and they suggested that brief, online interventions may have positive impacts on perfectionism and maximize scalability.

One form of brief intervention that has been developed in response to the high likelihood that an individual will access a treatment only once is single-session interventions (SSIs). SSIs are effective for adults (Campbell, 2012), youths (Schleider & Weisz, 2017), and college students (Samson & Tanner-Smith, 2015) with diagnosed psychiatric disorders and sub-clinical issues. SSIs have been demonstrated to improve anxiety, depression, problematic drug and alcohol use, and risk factors for mental health problems such as hopelessness, anxiety sensitivity, physiological stress self-hate, perceived control, fixed mindset, and agency (Tanner-Smith et al., 2015; Schleider, Dobias, Sung, Mumper, & Mullarkey, 2020; Schleider, Dobias, Sung, & Mullarkey, 2020). Gains are often maintained at follow-up, and participants typically rate single-session interventions as likable, acceptable, and useful (Duan & Bu, 2017; Wasil et al., 2021; Samson & Tanner-Smith et al., 2015; Schleider & Weisz, 2017). These interventions are particularly useful when delivered in an online, self-guided format because they can be made widely accessible, reducing the

barriers to mental health care (Schleider et al, 2020a). Although short-term therapies have been shown to reduce perfectionistic tendencies and related problems and are comparable in effect sizes (Dodd et al., 2019; Lloyd et al., 2014; Fairweather-Schmidt & Wade, 2015), only one study has examined a single-session perfectionism intervention (LaSota, Ross, & Kearney, 2017), which lasted for several hours in-person and focused on psychoeducation, setting high standards, fear over mistakes, and reducing stress. To-date, no brief online perfectionism interventions have been tested. Given that online SSIs are effective in reducing mental health concerns (Schleider & Weisz, 2018b), and other types of brief interventions are effective in reducing perfectionism (e.g. Dodd et al., 2019; Fairweather-Schmidt & Wade, 2015), an online SSI aiming to decrease perfectionism might be particularly useful. The brevity and accessibility of such an intervention may amplify its potential impact, decreasing costs, time, and other problems associated with receiving a normal length and/or in-person intervention.

College students may be a good fit for a single-session intervention targeting perfectionism, considering that many students have problems with perfectionism, anxiety, and depression (LaSota et al., 2017), and mental health issues appear to be on the rise in college students (Curran & Hill, 2017). Perfectionism may be an etiological and maintenance factor of these mental health problems in college student populations for two primary reasons. First, work and studies are the two top domains of life in which people report being the most perfectionistic (Stoeber & Stoeber, 2009). Living in an academic environment could potentially lead to the exacerbation of perfectionistic tendencies. Second, college students are constantly evaluated based on their work and social skills and must meet certain self-presentation and performance-based standards (Klibert et al., 2014), which may contribute to the stress surrounding academic performance and the pressure to succeed that college students often report as a top stressor (Bedewey & Gabriel, 2015). An environment filled with excessive studying, academic pressure, and stress would undoubtedly influence perfectionism and may have particular relevance to highly competitive colleges that maintain a culture of perfectionism. Of relevance, Molnar and colleagues (2020) found that 14% of college students have extremely elevated levels of perfectionism, while other

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studies have found that two thirds can be categorized as perfectionists, with a quarter of those individuals meeting criteria for maladaptive perfectionism (Grzegorek et al., 2004). These rates have increased over the past decade, concurrent with rates of other mental health problems (Curran & Hill, 2017).

The increasing rates of perfectionism in college students may be contributing to the increase in mental illness among college populations, treatment-seeking behaviors, and other stressors (Pacewicz, Gotwals, and Blanton, 2018). Considering this information, there is an urgent need for brief, online interventions that reduce perfectionism and protect against the development of anxiety and depression among college students (Klibert et al., 2014). Targeting perfectionism in an online single-session intervention might help reduce the burden placed on college counseling centers, reduce distress among students, and prevent future dysfunction. Although traditional perfectionism programs are effective for various clinical and nonclinical concerns, no research to date has assessed the impact of a brief, online perfectionism program in a college population.

The Present Study

The present study extends prior research by conducting the first randomized controlled trial on a self-administered, online SSI designed to reduce perfectionism in a college student population. To assess the effectiveness of the program, which is based on psychoeducation, cognitive restructuring, and self-compassion, a randomized controlled trial was conducted comparing the program with a stress-management control. It was hypothesized that the online single session intervention will decrease perfectionism in college students, with secondary effects on depression, anxiety, and stress. Participants were also asked to rate the intervention's acceptability and utility and we hypothesized it would be rated as acceptable, likable, and useful.

Methods

Participants

Participants were undergraduate liberal arts college students who were enrolled in introductory psychology courses. Participants were recruited via an online platform (i.e. SONA) that allows students to sign up for studies in order to gain research credits. In total, 91 students participated in the present study; however, five participants were removed for failing both atten-

tion checks in each assessment or—admitting they did not watch the videos or give their best effort in completing the perfectionism intervention, leaving a total of 86 participants with usable pre-and post-data. Additionally, only 79 participants completed and passed the follow-up assessment. Participants were randomized to either the perfectionism (N=45) or control intervention (N=41). In total, participants were 89.5% female and 4.7% other, 80% were in their first and second year of college, 37.2% non-Hispanic White, 5.8% African American, 37.2% Asian/Pacific Islander, and 19.8% Other or Hispanic. As displayed in Table 1, the two groups did not differ on any demographic variables.

Materials

Dysfunctional Attitudes Scale-Perfectionism (DAS-PA; Weissman & Beck, 1978). The DAS was originally developed to study depression and has several subscales, including perfectionism, which was identified as a subscale by Beck and colleagues (1991). The subscale measures perfectionistic attitudes and has excellent internal consistency. Scores on the subscale are predictive of later depression and anxiety (Jacobs et al., 2009). The Likert Scale is a continuum from 0 (Fully Disagree) to 6 (Fully Agree).

Big Three Perfectionism Scale (BTPS; Smith, Saklofske, Stoeber, & Sherry, 2016). The BTPS evaluates three higher-order factors (rigid perfectionism, self-critical perfectionism, and narcissistic perfectionism) through 10 lower-order perfectionism facets (self-oriented perfectionism, self-worth contingencies, concern over mistakes, doubts about actions, self-criticism, socially prescribed perfectionism, other-oriented perfectionism, hypercriticism, grandiosity, entitlement). This scale was selected over older, more traditional perfectionism measures (MPS and FMPS) due to accessibility and its assessment of the perfectionistic attitudes targeted more directly in the intervention. Other-oriented perfectionism, socially prescribed perfectionism, and parental standards, which are assessed in other common measures of perfectionism, are not addressed in the intervention. Although the BTPS is new, it has strong psychometric properties (Smith et al., 2016). Participants respond on a Likert Scale from 0 (Disagree Strongly) to 4 (Agree Strongly).

Depression, Anxiety and Stress Scales-21 (DASS-21; Lovibond & Lovibond, 1995). The DASS-21 is a 21-item self-report questionnaire consisting of

three subscales: depression, anxiety and stress. Ratings are provided using Likert Scales ranging from 0 (“Did not apply to me at all”) to 3 (“Applied to me very much or most of the time”). The instructions on the DASS-21 were aligned with the timeline of the study; participants were asked to rate their symptoms ‘in the past week.’ The subscales and total score have good reliability and construct validity in both clinical and nonclinical samples (Antony, Bieling, Cox, Enns, & Swinson, 1998; Henry & Crawford, 2005). DASS-21 scores are highly correlated with other measures of depression and anxiety (Osman et al., 2012) and perfectionism (Aldahadha, 2018).

Additional Questions about Perfectionism and the Intervention. To assess the intervention’s ability to alter metacognitive self-appraisals about perfectionism, the following three questions were asked at baseline: “Do you consider yourself to be a perfectionist?,” “Does perfectionism get in the way of your happiness,” and “Does perfectionism slow progress toward your goals?” Participants also completed several questions about the acceptability, likability, and perceived helpfulness of the intervention, which were partially derived from the Program Feedback Scale (PFS), a valid and reliable measure used to assess acceptability and perceptions of internet based SSIs (Sung, Mumpfer, & Schleider, 2021). They were asked, “How much did you like the intervention?,” “How much do you feel like the intervention helped you understand perfectionism?,” and “How helpful do you think the intervention was in teaching you to combat your perfectionism?” In addition, perceived changes in perfectionism were assessed at 1-week follow-up with the question: “Do you think that completing the program helped you with your perfectionism in the past week?”

Procedure

Approval for this study was received from the Institutional Review Board (IRB) at Barnard College. Upon signing up for the study, participants were directed to a Qualtrics form, where they completed a consent form and agreed to study duties. Study duties required the participant to fill out pre, post, and 1-week follow-up measures, in addition to actively engaging with the intervention. After providing consent, participants responded to a series of demographic questions and measures assessing perfectionism, depression, anxiety, and stress. Immediately following the completion of

the measures, participants were randomly assigned to either the experimental or stress-management control condition through the Qualtrics randomizer element. The experimental intervention took approximately 40 minutes and required participants to maintain active participation through video and open-ended responding, while the stress-management condition lasted for a similar amount of time and consisted of a video and articles about stress. Attention checks were included to ensure participants were paying attention, along with a direct question following the intervention which asks participants if they did their best. Following the completion of the intervention, participants immediately filled out the measures for a second time, except for the Depression, Anxiety, and Stress Scales. Participants had access to the follow-up assessment 168 hours (seven days) after they completed their first assessment and received a reminder email to take the assessment. If they did not take the assessment within 24 hours of receiving the email, they were sent additional reminders. The follow-up assessment consisted of questions about perceived changes in perfectionism in addition to the same measures used at baseline. Participants were debriefed at the end of the study. Statistical analyses were conducted in SPSS. Independent samples t-tests were run to assess for differences between groups at baseline and a series of repeated measures, ANOVAs, were utilized to examine the effect of the perfectionism intervention compared to the stress-management control on the various outcome measures. Descriptive statistics on the likability and acceptability of the intervention were also analyzed.

Perfectionism Intervention: The intervention was based on a treatment guide for clinical perfectionism (Egan et al., 2016), which has been used to develop prior perfectionism interventions (e.g. Rozentel et al., 2017; Shafran et al., 2017). The intervention was delivered through Qualtrics and consists of colorful text, images, and video clips. Participants can easily follow the intervention by clicking the arrows to the next page when they appear and writing in the text boxes provided. More specifically, the intervention included 4 major modules that take around 40 minutes total to complete and last for approximately 10 minutes each: 1) psychoeducation about perfectionism and its negative consequences, 2) cognitive restructuring of self-critical perfectionistic thoughts, 3) self-compassion techniques, and 4) generalization and mainte-

nance of information learned in the intervention.

Psychoeducation and Consequences of Perfectionism: Given that perfectionism is considered ego-syntonic and perfectionists believe their high standards improve their functioning, it is important educate participants about the counterproductive nature and negative effects of perfectionism (Overholser & Dimaggio, 2020). By increasing awareness about the problems associated with perfectionism, clients may feel more motivated (Yeh et al., 2017) and be able to more easily change the thoughts and behaviors contributing to these outcomes (Kutlesa & Arthur, 2008). Therefore, the program defines perfectionism and discusses its consequences in the form of telling fictional stories about characters who are perfectionists. After learning what perfectionism is, participants learn the various ways perfectionism can manifest in life and its multidimensional nature. Throughout the psychoeducation module, they apply this information to their own lives.

Cognitive Restructuring and Automatic Thoughts. Cognitive-behavioral therapy can reduce the tendency for unconstructive automatic thoughts about the self (Overholser & Dimaggio, 2020). Interventions can help perfectionists become aware of, challenge, and change their automatic self-critical thought processes (Besser et al., 2004; Overholser & Dimaggio, 2020). Therefore, this section of the intervention explains how to combat the self-critical thoughts related to perfectionism through utilizing the three-step process (catch, challenge, and change) of CBT. Challenging and changing is explained in the context of self-compassion. The primary way participants are instructed to challenge their thoughts is by thinking about what a loving friend would say about their thoughts. Participants will practice catching, challenging, and changing self-critical thoughts that both a fictional character and they themselves experience.

Self-Compassion: Because low self-compassion is often characteristic of perfectionism (Brown, 2008), and interventions rooted in self-compassion are effective in reducing perfectionism (Nadeau, 2020), participants will be taught how to be more compassionate, forgiving, and kind to themselves. Self-compassion principles (Raes et al., 2011) are fused throughout the CBT section (e.g., mindfulness versus over-identification) and are also explained in the self-compassion module. Self-kindness over

self-judgement is taught by explaining the tendency to focus on mistakes in perfectionism, the importance of forgiveness, and affirmation exercises. Next, common humanity versus isolation is taught through a discussion and exercise on how everybody makes mistakes and no one is alone in their suffering.

Concluding Components: The intervention ends by discussing how reducing perfectionism can improve one's life. Neurogenesis is explained to show that change is possible, although change requires commitment. Participants are encouraged to apply the cognitive distortion and self-compassion practices to everyday life.

Stress Management Program: The stress-management program was designed as an active control, for comparison with the perfectionism intervention, and did not contain any perfectionism components. Although different in structure, the course content was similar to stress management conditions used in prior studies (Hoge et al., 2013). Like the perfectionism intervention, the stress-management program lasted for around 40 minutes and was delivered through Qualtrics. Participants were instructed to watch a video and read excerpts describing the effects of stress and the various ways to manage stress. The content included details about how chronic stress affects the mind, body, and performance, and explored ways to reduce stress, including exercise, nutrition, mindfulness, positive experiences, time management, and sleep.

Results

Baseline Scores and Group Comparisons

Table 1 shows the demographic characteristics for each group and the group mean scores of each of the outcome measures. According to independent samples t-tests, there were no significant differences between the groups on any demographic or clinical variables at baseline. Scores on the Big Three Perfectionism Scale and the Dysfunctional Attitudes Perfectionism Scale were elevated in both groups ($M=55.7$ on the DAS-PA; See Table 1) compared to previously studied populations, including a clinically depressed adolescent sample ($M=53.7$ on the DAS-PA; Jacobs et al., 2009). Total scores on the DASS-21 indicated mild to moderate levels of depression, anxiety, and stress (Lovibond & Lovibond, 1995) (See Table 1). The majority of the sample (95.3%) considered themselves to be a perfectionist to some degree, to a considerable degree, or very much, while 74.7% ac-

knowledged that perfectionism sometimes gets in the way of their happiness, and 72.9% said that perfectionism sometimes slows progress towards goals.

Intervention Acceptability and Likability

Participants reported liking the intervention; 22.2% liked it “a little bit,” 42.2% liked it “somewhat,” and 35.6% liked it “very much,” while no one reported disliking the intervention. Participants also indicated that the intervention was helpful in increasing their understanding of perfectionism; in terms of how helpful it was, 2.2% said “not at all,” 6.7% said “a little bit,” 42.2% reported “somewhat,” and 48.9% selected “very.” Perceived helpfulness in teaching participants to combat their perfectionism was also assessed, with 4.4% of participants saying it was not at all helpful, 8.9% saying it was a little bit helpful, 60% saying it was somewhat helpful, and 26.7% saying it was very helpful. At the 1-week follow-up, participants were asked, “Do you think that completing the program helped you with your perfectionism in the past week?” and 18.2% said “not at all,” 25% selected “very little,” 52.3% said “somewhat,” and 4.5% said “very much.” When asked “How much did you try to implement the techniques learned into your daily life?,” most people reported putting some effort in; 6.8% said “not at all,” 22.7% selected “very little,” 65.9% said “somewhat,” and 4.5% said “very much.” Twenty-two participants left open-ended feedback, and 19 of these comments were positive and emphasized the utility or likable features of the intervention.

Change in Outcome Measures

Repeated measures ANOVAs were utilized to test the hypothesis that the perfectionism intervention would reduce perfectionistic attitudes and depression, anxiety, and stress more than the stress-management control. Differences were assessed at baseline, immediate post-test, and 1-week follow-up, except for DASS-21, which was only assessed at baseline and 1-week follow-up. The first ANOVA was conducted on the Dysfunctional Attitudes Perfectionism Subscale, which violated Mauchly's Test of Sphericity $X^2(2)=25.924, p<.05$, thus the degrees of freedom was adjusted for by reporting the Greenhouse-Geisser results. The effect of time was significant ($F(1.54, 115.782) = 6.145, p<.05, n_2 = .076$); however, the time*condition interaction effect was not ($F(1.54, 115.782) = 1.935, p>.05, n_2 = .025$) (See Figure 1). Similarly, Mauchly's Test of Sphericity indicated

that the assumption of sphericity was violated for the changes in the Big Three Perfectionism Scale ($X^2(2)=38.864, p<.05$). After using the Greenhouse-Geisser correction, the effect was significant for time ($F(1.327, 74.335)=4.685, p<.05, n_2 = .077$), but not for time*condition ($F(1.327, 74.335)=.072, p>.05, n_2 = .001$) (See Figure 2). Finally a repeated measures ANOVA of DASS total scores at baseline and at the 1-week follow-up revealed that there were significant differences for time ($F(1, 74) = 185.872, p<.05, n_2 = .715$), but no effect for condition ($F(1, 74)=188.943, p>.05, n_2 = .011$). Subscale scores were not analyzed due to the lack of significant differences found for time and time*condition on the DASS total scores.

Discussion

The present study sought to examine the effectiveness of a single-session intervention in improving perfectionism and associated mental health characteristics in a college-student population. Although symptoms improved for all clinical measures following the perfectionism intervention, they similarly improved in the control condition. These findings are discussed in detail below.

There are several potential reasons for the lack of significant differences between the intervention and control conditions in the study. Small sample size may have contributed to the null findings. The decreases were fairly large for some measures, yet statistical significance was not achieved. For instance, the mean score dropped from 55.31 at baseline to 48.01 at 1-week follow-up on the Dysfunctional Attitudes Perfectionism Scale in the experimental group, which is almost a seven-point decrease and a decline of three points greater than the stress-management control. A post-hoc sensitivity analysis with the study's sample size ($N=79$) suggested we had adequate power (.80) to detect an effect size of .10 or larger, which is slightly larger than a medium effect (partial eta squared = .9). Therefore, our sample size was likely underpowered if the intervention had a small to medium effect. Although traditional 8-week perfectionism interventions have medium to large effect sizes, the extremely brief nature of the intervention makes a larger effect size less probable. Additionally, although there were 79 participants who passed attention checks and submitted each assessment, many participants skipped questions. This led to fewer participants' scores being analyzed in each

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ANOVA; for example, only 58 participants' scores were analyzed for the repeated measures ANOVA for the BTPS. The majority of randomized controlled trials conducted on online single-session interventions have included hundreds of participants (e.g., Schleider & Weisz, 2017), and the in-person SSI conducted on perfectionism included 105 participants in their data analysis with no control group (LaSota et al., 2017). Future work with larger samples is needed to further compare these conditions. In addition, it is possible that the single dose of perfectionism intervention was not sufficient to demonstrate superiority over stress management. Most trials conducted on treatments for perfectionism have ranged from 8-16 sessions in length (LaSota et al., 2017), thus more practice and intervention time may be necessary to create score decreases greater than what the stress-management control produced. Relatedly, although one-week follow-ups have been used in studies of single session interventions in the past (e.g., Davidson, Malloch, & Humphris, 2018; Duan & Bu, 2019), a longer follow-up after the intervention would have provided participants with more time to implement practices they learned in their lives and utilize strategies more frequently. Therefore, future studies could include 3-, 6-, or 12-month follow-ups and also explore whether repeated sessions and practice post-treatment contribute to reductions in perfectionism symptoms. Although there is nothing in the student timeline or a widespread stressful event that would have accounted for a decline in perfectionism, depression, anxiety, and stress from baseline to one-week follow-up, including follow-up assessments at various time points in future research would allow for a more comprehensive understanding of changes in perfectionism over time.

It is also plausible that the stress-management control condition represented an active intervention, suggesting that it was not necessarily an appropriate placebo control, but may provide information about the required specificity of perfectionism interventions. Perfectionistic behavior is thought to be associated with psychopathology, in part due to its association with stress.. Perfectionists have higher levels of stress exposure and stress reactivity (i.e., maladaptive ways of reacting to stressors), and they may generate or exacerbate stress for themselves by engaging in self-critical thinking in response to daily stressors and failing to reach high standards. If stressful events are

reduced, it is likely that perfectionistic behavior and automatic perfectionistic thoughts will subsequently decrease, and when perfectionistic attitudes decrease, stress levels will fall, indicating a bidirectional relationship (Hewitt & Flett, 2002). The results of the present study are similar to a study that had compared face-to-face CBT for perfectionism to a stress-management condition; this study investigated the effectiveness of an online 10-week CBT intervention for perfectionism in first-year psychology students and randomly assigned participants to either stress management, stress-management + CBT, or a control condition (Arpin-Cribbie et al., 2008). The techniques taught in their stress-management condition overlapped with some of the techniques presented in the stress-management control of the current intervention. In line with our results, participants in the stress-management condition had significant decreases in self-oriented perfectionism and concern over mistakes, although the perfectionism intervention and stress-management combined led to greater decreases in the perfectionism construct. The results from Arpin-Cribbie (2008) and the present study may indicate that stress management represents an active treatment for perfectionism and works well in combination with more targeted content. Thus, future research should further explore the complex relationship between perfectionism and stress, compare perfectionism interventions to other types of active controls, and work to elucidate the importance of specificity in perfectionism interventions.

The intervention should also be tested in different populations; one of the main limitations to the study is that the perfectionism intervention was designed for high levels of maladaptive perfectionism, yet it was tested in a typical nonclinical college-student population. Although participants had higher than average levels of perfectionism, prior research indicates that perfectionism interventions, including single-session interventions may not be effective for those with low perfectionism. LaSota and colleagues (2017) focused on psychoeducation, setting high standards, fear over mistakes, and reducing stress in their in-person single-session intervention, dividing participants into high, medium, and low perfectionists. They found that participants with low perfectionism showed no significant change over time, while the other two groups did. Many perfectionism treatment studies have also utilized clinical samples (e.g., eating disorder

or depressed populations) with high levels of maladaptive perfectionism (e.g., Kearns, Forbes, & Gardiner, 2007). Additionally, most single-session interventions have been tested in adolescents (Schleider et al., 2020) and previous experience with psychoeducation about perfectionism or CBT for perfectionism could potentially limit its effectiveness. This was highlighted by one participant who wrote, “The intervention was likely not a good match for me as I have undergone CBT in the past for anxiety and perfectionism and already knew a lot of these techniques;” thus, those who have not undergone therapy in the past are younger and more capable of change—potentially making themselves better candidates. In addition to age, other demographic factors, such as gender, may interact with perfectionism (Gnilka & Novakovic, 2017) and impact treatment response. Considering that the present sample was almost 90% female and previous literature on perfectionism consists of majority female participants (Stoeber & Stoeber, 2009), future research could aim to recruit more males to better elucidate the impact of gender on effectiveness of perfectionism treatments. Further research with larger sample sizes, especially research that includes populations with clinical perfectionism, is warranted.

Despite the study’s limitations, many participants appear to have benefited from the intervention, as respondents reported that the intervention was highly acceptable, engaging, and useful. All participants reported liking the intervention “at least a little bit” and 86.7% of participants thought the program was somewhat or very helpful. Additionally, 57% of students thought it was somewhat or very helpful in combating their perfectionism in the week following the intervention and 93% of respondents attempted to implement the learned skills into their daily lives. To conclude, this study is the first to examine the effectiveness of an online single-session intervention in reducing perfectionism, depression, anxiety, and stress. Although prior literature was utilized to formulate hypotheses that the perfectionism intervention would be more effective than a stress-management control, the results only revealed a significant effect for time. The study was likely underpowered to detect differences between conditions, had limitations in that the sample contained many individuals with low perfectionism, and the stress-management condition was perhaps effective at reducing stress, thus indirectly

impacting perfectionism. Future research with larger sample sizes, various types of control groups, and clinical populations is needed to more extensively test the effects of the intervention. Nevertheless, this study adds important information about the effectiveness of a perfectionism intervention when compared to a stress-management control, and it was rated as highly useful, likable, and acceptable by participants.

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Table 1.*Demographic and Mental Health Characteristics for the Perfectionism Intervention and Stress-Management Control Group*

Variable	Intervention	Control	Test of the difference
<i>Demographic characteristics</i>			
1 st or 2 nd Year Student	36 (80%)	33 (80.5%)	p > .05
No. Female (%)	40 (88.9%)	37 (90.2%)	p > .05
No. non-Hispanic White (%)	18 (40%)	14 (34.1%)	p > .05
<i>Mental Health characteristics</i>			
DAS-Perfectionism	55.31 (18.41)	56.08 (17.69)	p > .05
DASS Total	40.86 (20.73)	46.32(22.46)	p > .05
BTPS Total	122.76(25.76)	123.73(25.98)	p > .05

Figure 1.

Changes in Dysfunctional Attitudes-Perfectionism Scores at Three Time Points

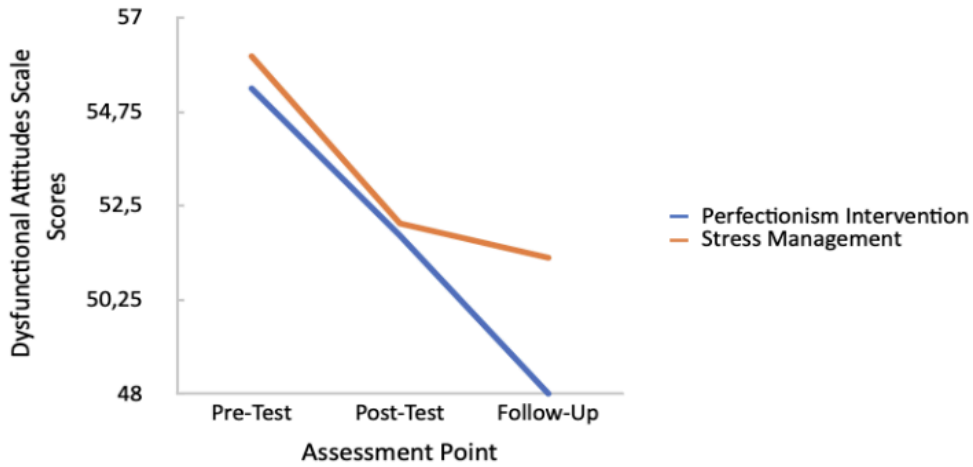


Figure 2

Changes in Big Three Perfectionism Scores at Three Time Points

