The Role of Psychological Inflexibility and Self-Compassion in

Acceptance and Commitment Therapy for Clinical Perfectionism

Abstract

The current study examined psychological inflexibility and self-compassion as theoretically relevant mediators and moderators of outcomes following acceptance and commitment therapy (ACT) for clinical perfectionism. Fifty-three participants with clinical perfectionism were randomized to either a 10-session ACT condition or a 14-week waitlist control condition (only 39 completed the posttreatment assessment). Outcomes tested include concern over mistakes, doubting of actions, personal standards, quality of life, symptom distress and functional impairment, and valued action. Multilevel modeling analyses showed reduced psychological inflexibility mediated the relationship between condition and higher quality of life and increased self-compassion mediated the relationship between condition and decreased concern over mistakes. No other mediation effects were observed. In addition, baseline psychological inflexibility differentially moderated outcomes depending on outcome tested; for example, lower baseline inflexibility predicted more improvement in quality of life whereas higher baseline inflexibility predicted more improvement in symptom distress and functional impairment. Participants with average baseline self-compassion tended to benefit the most from ACT. These findings clarify how psychological inflexibility and self-compassion influence outcomes following ACT for clinical perfectionism. Theoretical and clinical implications of ACT for clinical perfectionism are discussed.

Keywords: acceptance and commitment therapy, clinical perfectionism, psychological inflexibility, self-compassion, mediation, moderation

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Perfectionism has been conceptualized as a multidimensional construct centered on the pursuit of unrealistically high standards and self-criticism due to failure to meet those standards (Limburg, Watson, Hagger, & Egan, 2017). Maladaptive or clinical perfectionism describes continued pursuit of high standards despite negative consequences to mental and/or physical well-being and believing self-worth is primarily defined by achievement of these standards (Limburg et al., 2017; Shafran, Cooper, & Fairburn, 2002). Clinical perfectionism can also be characterized by behaviors like procrastination, premature termination of tasks, and social isolation, which are typically motivated by fear of failure and concern about disappointing oneself and others (Flett & Hewitt, 2002; Shafran & Mansell, 2001). That is, individuals with clinical perfectionism may frequently avoid situations that entail striving for achievement of high standards and that can result in feelings of failure and/or disappointment (Shafran & Mansell, 2001; Weiner & Carton, 2012). Clinical perfectionism has been implicated as a risk and maintaining factor for several forms of maladjustment and psychopathology including depression and anxiety disorders (Egan, Wade, & Shafran, 2011; Limburg et al., 2017).

Despite topographical dissimilarities, the pursuit of achievement and premature task termination behaviors described above functionally reflect attempts to control unwanted internal experiences (e.g., feelings of inadequacy). That is, they are overt instantiations of experiential avoidance (Hayes et al., 2004; Weiner & Carton, 2012). Experiential avoidance is one aspect of the broader construct of psychological inflexibility, which is defined as an inability to be open to present-moment experiences and engagement in rigid behavioral patterns guided by psychological reactions instead of chosen values (Hayes, Luoma, Bond, Masuda, & Lillis, 2006).

The inverse of psychological inflexibility is psychological flexibility—the ability to fully and nonjudgmentally contact the present moment and persist in or change behaviors in the service of personal values (Hayes et al., 2006). Given the pervasive pattern of rigidity underlying clinical perfectionism particularly with respect to rules and excessively high standards, improving psychological flexibility may help these individuals respond to inner experiences in ways that allow them to reengage in meaningful activities. For example, when the thought "I'm not good enough" arises, flexible responding would entail seeing the thought as a thought and choosing to act consistently with values in the moment regardless of the internal experiences that may accompany the chosen behavior.

Psychological flexibility is explicitly targeted by acceptance and commitment therapy (ACT), a cognitive-behavioral approach rooted in contextual behavioral science (Hayes, Barnes-Holmes, & Wilson, 2012). Its overarching objective is to promote greater quality of life by creating a context that trains more flexible ways of relating to internal experiences regardless of their form and frequency (Hayes et al., 2006). Thus, the theory underlying ACT hypothesizes changes in relevant outcomes are explained or *mediated* by changes in psychological flexibility. Empirical evidence supports this hypothesis for conditions related to clinical perfectionism including anxiety, depression, and obsessive-compulsive disorder (OCD; Forman, Herbert, Moitra, Yeomans, & Geller, 2007; Twohig, Plumb Vilardaga, Levin, & Hayes, 2015).

Another process particularly relevant to clinical perfectionism is self-compassion—treating oneself with kindness and nonjudgement in the face of difficult experiences and recognizing such suffering is part of the "human-experience" (Barnard & Curry, 2011; Neff, Kirkpatrick, & Rude, 2007). Self-compassion has been negatively associated with maladaptive self-evaluative patterns such as experiencing distress due to discrepancies between

performance and personal standards (or maladaptive perfectionism) as well as avoidant coping/procrastination (Neff, 2003), suggesting deficits in self-compassion may be linked to clinical perfectionism. Furthermore, self-criticism—the inverse of self-compassion—has been found to mediate the relationship between unhealthy perfectionism and distress (James, Verplanken, & Rimes, 2015), implicating self-criticism as a potential process that maintains poor outcomes in perfectionism. Furthermore, self-compassion has been found to weaken the relationship between maladaptive perfectionism and depression (Ferrari, Yap, Scott, Einstein, & Ciarrochi, 2018), which could indicate its utility as a treatment target in clinical perfectionism. Evidence suggests ACT can be used to increase self-compassion (XX, 2019; Yadavaia, Hayes, & Vilardaga, 2014). ACT may do so by encouraging nonjudgmental observation of self-critical thoughts, self-empathy through strengthening perspective taking, and self-acceptance (Yadavaia et al., 2014). Thus, self-compassion could be another key mediator through which ACT affects changes in outcomes of interest. That is, individuals who receive ACT may be able to improve their wellbeing by intentionally adopting a compassionate stance toward their own difficult experiences—without first having to change them—by recognizing such experiences as part of being human (Neff & Tirch, 2013).

In addition to investigating *how* ACT produces therapeutic gains, it is also important to identify variables that predict *who* benefits from ACT. Doing so could guide treatment matching and increase the probability of positive treatment response. Given ACT aims to increase psychological flexibility, it is theoretically plausible individuals with more psychological inflexibility may show greater improvement than those with less inflexibility as they have the most room to improve this skill. Conversely, individuals with high psychological inflexibility may be more resistant to treatment. Accordingly, empirical support for the moderating effect of

psychological inflexibility in ACT is mixed. Wolitzky-Taylor, Arch, Rosenfield, and Craske (2012) found individuals with anxiety disorders tended to have better outcomes in ACT compared to CBT when baseline psychological inflexibility was in the moderate range whereas Craske et al. (2014) reported that higher baseline psychological inflexibility predicted better outcomes for CBT relative to ACT for social anxiety. Considering the incongruent and preliminary nature of such findings, more research is needed to clarify our understanding of how baseline psychological inflexibility influences the effectiveness of ACT. Additionally, given the theoretical and empirically demonstrated relationship between self-compassion and perfectionism, investigating how baseline self-compassion influences treatment performance may provide helpful information on which to base treatment recommendations.

Data for the present study were drawn from a randomized controlled trial comparing ACT to a waitlist control condition among individuals with clinical perfectionism. In the trial, we found, relative to the waitlist condition, ACT resulted in greater improvements in self-reported wellbeing, clinical perfectionism, psychological inflexibility, and self-compassion over the course of the study (XX, 2019). Given psychological inflexibility and self-compassion appear to be critical processes in ACT as a treatment for clinical perfectionism, we tested whether improvements from ACT for clinical perfectionism were mediated by decreases in psychological inflexibility and increases in self-compassion. Understanding the active mechanisms underlying treatment response may help to improve precision of future treatment iterations for clinical perfectionism. We predicted improvement in psychological inflexibility and self-compassion would mediate the relationship between condition and outcomes.

We also examined if baseline psychological inflexibility and self-compassion moderated ACT outcomes. Identifying variables that influence treatment response may clarify which

therapeutic procedures are indicated given client profiles at baseline, increasing intervention effectiveness and efficiency. We did not have a specific prediction with respect to moderation given extant mixed findings for psychological flexibility and lack of research on self-compassion as a moderator of treatment response in ACT.

Method

Recruitment

Participants were recruited from a town in the western U.S. using newspaper advertisements, flyers, and announcements in university classes. To be included in the study, individuals needed to: (1) score at least five on the Dimensional Obsessive-Compulsive Scale (DOCS) Symmetry subscale (Abramowitz et al., 2010), (2) report significant distress and/or functional impairment related to clinical perfectionism based on a clinical interview, (3) be willing to complete 10 sessions of therapy, (4) be cognitively and physically able to complete intervention and assessments, (5) not be currently seeking therapy for clinical perfectionism, and (6) be stable on any prescribed psychotropic medications for the past 30 days.

Participants

Sample description. The mean age of our sample was 25.4 (SD = 12.3). The majority of participants were self-identified female (73.6%), European American (84.9%), single (73.6%), and members of the Church of Jesus Christ of Latter-day Saints (LDS; 79.2%).

Participant flow. Fifty-six individuals participated in the baseline intake interview but three were excluded due to not completing the intake assessment (n = 1) and not reporting perfectionism as a primary presenting concern (n = 2). The remaining 53 eligible participants were randomized to a treatment or waitlist condition. Another four participants dropped out prior to their first post-baseline assessment, leaving 26 ACT participants and 23 waitlist participants.

Of those 49 participants, 39 completed the posttreatment assessment and 31 completed the follow-up assessment. More details about participant flow and study design have been reported elsewhere (XX, 2019).

Procedures

Procedures were reviewed and approved by a university institutional review board. Participants signed an informed consent document prior to study participation. Participants in the treatment condition received 10 weekly sessions of ACT and participants in the waitlist condition began a 14-week waitlist. Study assessments were conducted at pretreatment, posttreatment, and one-month follow-up. Participants completed self-report measures at all assessment points.

The treatment protocol was modified from an ACT for OCD manual used in Twohig et al. (2010). It covered general assessment and orientation to therapy (Session 1), creative hopelessness (Session 2), acceptance/willingness (Sessions 3 and 4), defusion (Sessions 5 and 6), values and committed action (Sessions 7 and 8), and skills maintenance and relapse prevention (Sessions 9 and 10). An addendum to the manual instructed therapists to attend to aspects of clinical perfectionism that could alter treatment delivery: (1) distress may be more prominent than functional impairment, (2) some aspects of perfectionism may be adaptive (e.g., having high standards), and (3) elements of perfectionism may be ego-syntonic or values-consistent. The protocol addendum used in this study can be found here: https://www.utahact.com/treatment-protocols.html. The current protocol did not explicitly target self-compassion though it was addressed when relevant (e.g., practicing defusion from self-critical thoughts).

Measures

Screening measure.

Dimensional Obsessive-Compulsive Scale (DOCS)—Symmetry (Abramowitz et al., 2010). The DOCS symmetry subscale was used to screen for clinical perfectionism. It contains five items measuring severity of avoidance, distress, and interference due to a perceived need to make things "just right" (Abramowitz et al., 2010). Each item is scored from 0 to 4; higher scores reflect greater severity (Abramowitz et al., 2010). Individuals who scored at least five (just below the mean of 6.13 in an OCD sample; Abramowitz et al., 2010) were further assessed for eligibility during the intake assessment. This subscale has shown good to excellent internal consistency in clinical and unscreened samples and good convergent, divergent, and criterion validity (Abramowitz et al., 2010).

Outcome measures.

Frost Multidimensional Perfectionism Scale (FMPS; Frost, Marten, Lahart, & Rosenblate, 1990). Of the six FMPS subscales, the three most clinically relevant subscales were included in present analyses: Concern Over Mistakes (9 items); Doubts About Actions (4 items); and Personal Standards (7 items). These subscales have been used to evaluate outcomes in previous clinical trials (e.g., Egan et al., 2014; Handley, Egan, Kane, & Rees, 2015; Riley, Lee, Cooper, Fairburn, & Shafran, 2007). Items are scored from 1 to 5. Higher scores suggest higher levels of clinical perfectionism. This measure has demonstrated construct validity and adequate internal consistency (Frost et al., 1990). Our sample had good to excellent internal consistency across the three subscales (Cronbach's αs ranged from .85 to .94).

Outcome Questionnaire-45.2 (OQ-45; Lambert et al., 1996). The OQ-45 consists of 45 items and assesses symptom distress and functional impairment (Lambert et al., 1996). Items are rated from 0 to 4 with higher scores reflecting greater distress and/or impairment (Lambert et al., 1996). The OQ-45 has shown excellent internal consistency and good temporal stability and

convergent validity (Lambert et al., 1996). Internal consistency was excellent in the current study (α = .94).

Quality of Life Scale (QOLS; Burckhardt & Anderson, 2003; Flanagan, 1978). We used the revised 16-item version of the QOLS (Burckhardt & Anderson, 2003) to evaluate overall satisfaction with quality of life. Items are scored from 1 to 7; higher scores indicate higher quality of life (Burckhardt & Anderson, 2003). The QOLS has shown reliability and convergent and divergent validity (Burckhardt & Anderson, 2003). Internal consistency was good in our sample (α = .89).

Valuing Questionnaire (VQ)—Progress (Smout, Davies, Burns, & Christie, 2014). We used the Progress subscale of the VQ to measure behavioral progress toward personal values (Smout et al., 2014). Its five items are rated from 0 to 6. Higher scores indicate more valued action. The Progress subscale has shown convergent and incremental validity as well as good internal consistency (Smout et al., 2014). Internal reliability was good in our sample (α = .81). The VQ also contains an Obstruction subscale measuring interference with valued living related to experiential avoidance (Smout et al., 2014). Given we specifically wanted to measure behavioral enactment of values, the Obstruction subscale was not included in present analyses.

Process of change measures.

Acceptance and Action Questionnaire —II (AAQ-II; Bond et al., 2011). The AAQ-II contains seven items that collectively measure psychological inflexibility (Bond et al., 2011). Items are rated from 1 to 7 with higher scores reflecting greater psychological inflexibility. The AAQ-II has been found to have adequate reliability and validity in clinical and unscreened samples (Bond et al., 2011) and treatment sensitivity (e.g., Fledderus, Bohlmeijer, Pieterse, & Schreurs, 2012). Internal consistency was excellent in the present sample (α = .92).

Self-Compassion Scale (SCS; Neff, 2003). The SCS comprises 26 items assessing self-compassion. Items are rated from 1 to 5; higher scores indicate more self-compassion. A total sum score is calculated from six subscale scores: mindfulness, self-kindness, common humanity, over-identification, self-judgment, and isolation (the latter three are reverse-scored). The SCS has demonstrated excellent internal consistency and convergent and divergent validity (Neff, 2003). Internal consistency was excellent in the current sample ($\alpha = .95$).

Statistical Analyses

Data were collected from participants who completed pretreatment, posttreatment, and follow-up assessments including those who did not attend the 10 intervention sessions. All 53 participants who were randomized were included in multilevel analyses (i.e., moderation models, *b* and *c'* pathways in mediation models) as multilevel models allowed for inclusion of participants who did not complete the posttreatment or follow-up assessments. However, the regression models (to determine path *a* in our mediation analyses) only included participants who completed the posttreatment assessment (n = 39). Thus, moderation results were based on an intent-to-treat sample whereas mediation analyses were based on both participants who only completed the posttreatment assessment and the intent-to-treat sample. There were no significant differences in key demographic variables (e.g., age, gender, ethnicity, marital status, religion, income) between participants who completed versus did not complete the posttreatment assessment (*p*s > .05).

Linear mixed effects models (i.e., multilevel models) were used to test mediation and moderation effects of psychological inflexibility and self-compassion across time. In all mixed effects models, intercepts were allowed to vary by participant. Statistical analyses were conducted with R in RStudio (R Core Team, 2015; RStudio Team, 2015) using the following

packages: tidyverse (Wickham, 2017), lme4 (Bates, Maechler, Bolker, & Walker, 2015), texreg (Leifeld, 2013), and DataCombine (Gandrud, 2016).

Mediation. To test for mediating effects of psychological inflexibility (AAQ-II) and self-compassion (SCS), we used lagged (time *t-1* predicting time *t*) mixed effects models. Figure 1 is a schematic path diagram illustrating the lagged mediation pathways. To evaluate significance of the *a* path ($X_{t=1} \longrightarrow M_{t=2}$), we fit a regression model (i.e., a mixed effects model without any random effects) with the mediator at posttreatment, condition as the predictor, and the baseline mediator as the covariate. For the *b* and *c'* paths, the outcomes of interest were the specified outcome variables. Condition ($X_{t=1} \longrightarrow Y_{t=2,3}$) and the mediator ($M_{t=1,2} \longrightarrow Y_{t=2,3}$) were used to test the lagged effects of condition and the individual mediators controlling for the corresponding outcome variable at baseline.

Moderation. The moderating effect of baseline psychological inflexibility and self-compassion on the relationship between condition and outcomes over time was tested using a series of nested mixed effects models to determine the best-fitting model. The first included a two-way interaction between the variable of interest at baseline and condition (Model 1), the second included a two-way interaction between the variable at baseline and time (Model 2), and the third included a three-way interaction term of the variable at baseline, condition, and time (Model 3).

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Results

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Mediation Effects

Coefficients and model fit indices for the lagged mediation models for AAQ-II and SCS are presented in Tables 1 and 2 respectively.

Psychological inflexibility. Condition significantly predicted decreases in psychological inflexibility over time (*a* path; *p* = .010). It was also associated with less concern over mistakes (*p* < .001), less doubting of actions (*p* = .022), greater quality of life (*p* < .001), less symptom distress and functional impairment (*p* = .003), and more valued action (*p* < .001), controlling for the lagged mediator (*c'* path). The only significant *b* path was from AAQ-II to QOLS (*p* = .028), indicating psychological inflexibility only mediated the relationship between condition and quality of life. That is, decreases in psychological inflexibility might have partially explained how ACT improved quality of life relative to the waitlist condition. Psychological inflexibility did not mediate the effect of treatment on concern over mistakes, doubting of actions, symptom distress and functional impairment, or valued action.

Self-compassion. Similar to the results for the AAQ-II, the *a* path and all *c'* paths were significant in the lagged mediation models for SCS (*p*s < .040). Greater self-compassion from pretreatment to posttreatment also significantly predicted reduction in excessive concern over mistakes from posttreatment to follow-up (*b* path; *p* = .023), suggesting self-compassion mediated the link between condition and excessive concern over mistakes. In other words, decrease in concern over mistakes among participants in the ACT condition was potentially due in part to an increase in self-compassion. Self-compassion did not mediate the effect of treatment on doubting of actions, quality of life, symptom distress and functional impairment, or valued action.

Moderation Effects

Psychological inflexibility. For baseline psychological inflexibility, the best-fitting models (based on χ^2-difference tests) included the three-way interaction of time, condition, and

baseline psychological inflexibility (see Table 3). Figure 2 provides an overview of how outcomes changed over time by condition and baseline psychological inflexibility.

For FMPS Concern Over Mistakes, participants with lower inflexibility at baseline tended to show greater decreases in scores over time in the ACT condition relative to the waitlist condition. That is, ACT tended to be more helpful for participants with lower inflexibility in the area of concern over mistakes especially when considering maintenance of gains from posttreatment to follow-up (see Figure 2, Panel A).

There were greater decreases in FMPS Doubts About Actions scores from pretreatment to posttreatment in the ACT condition when baseline inflexibility was higher compared to the waitlist condition (see Figure 2, Panel B). However, scores converged following posttreatment such that there were no differences between groups at follow-up among those with higher baseline inflexibility.

For the OQ-45, higher inflexibility predicted more improvement over time in the ACT condition even though symptom distress and functional impairment generally decreased regardless of level of inflexibility. Scores of participants in the waitlist condition remained relatively constant (see Figure 2, Panel C).

ACT participants generally showed an increase in valued action from pretreatment to posttreatment, with a greater magnitude of increase observed among those with higher inflexibility relative to the sample (see Figure 2, Panel D). Across conditions, participants showed a reduction in valued action from posttreatment to follow-up. Generally, scores of most participants either did not change or decreased from pretreatment to follow-up.

In terms of quality of life, participants with lower AAQ-II scores relative to the sample tended to perform better in the ACT condition than those in the waitlist condition (see Figure 2,

Panel E). Participants with the highest levels of baseline inflexibility demonstrated similar trajectories for quality of life regardless of condition as demonstrated by the overlapping error bars between groups in Figure 2, Panel E.

Self-compassion. For self-compassion, the three-way interaction models produced the best fit with the exception of the model with FMPS Doubts About Actions as the outcome variable (see Table 4). Figure 3 provides an overview of how outcomes changed over time by condition and baseline self-compassion.

ACT was most effective for participants with average self-compassion scores relative to the sample with respect to concern over mistakes, symptom distress and functional impairment, valued action, and quality of life as evidenced by bigger differences between groups at posttreatment and follow-up (see Figure 3, Panels A, C, D, and E). In addition, self-reported valued action of participants with the lowest and highest self-compassion scores did not differ from that of waitlist participants at follow-up. For doubting of actions, the most parsimonious model only included an interaction between self-compassion and time, indicating the trajectory of doubting of actions over time depended on baseline levels of self-compassion but this effect did not differ between conditions. However, doubting of actions seemed to decrease more when self-compassion was higher in the ACT condition but not the waitlist condition (see Figure 3, Panel B). For symptom distress and functional impairment, participants with highest self-compassion relative to the sample also maintained and improved on treatment gains following termination of therapy (see Figure 3, Panel C). Although there was some variation in patterns of outcomes over time, generally, participants with lower self-compassion scores at baseline responded more poorly to treatment and those whose scores were in the mid-range showed the greatest gains from treatment.

Discussion

Overall, our findings suggest psychological inflexibility and self-compassion had precise mediating effects on outcomes in that these processes of change only explained changes in specific variables (quality of life and concern over mistakes respectively). In addition, psychological inflexibility produced inconsistent moderation effects such that there was no clear answer as to whether ACT was more appropriate for participans with lower versus higher baseline inflexibility. However, the moderating influence of self-compassion was more consistent: participants with average levels of self-compassion tended to respond more favorably to ACT than the waitlist condition.

Mediation. Reduced psychological inflexibility mediated the relationship between condition and higher quality of life whereas increased self-compassion explained the relationship between condition and decreased concern over mistakes. No mediation effects were observed for other outcomes. These mediation findings suggest there may be unique specificity in the effect of individual processes of change on outcomes. For example, because practicing psychological flexibility is relevant to all forms of difficult inner experiences and not just presenting concerns (e.g., perfectionism), it is unsurprising the only significant mediation effect was found for a general index of wellbeing like quality of life. In fact, psychological flexibility has been linked to broad health outcomes (Kashdan & Rottenberg, 2010), supporting this interpretation.

Similarly, self-compassion can be considered an antidote to self-criticism (Neff, 2003) and self-criticism within perfectionism is most explicitly manifested in reactions to mistakes (e.g., "You are a failure because you made a mistake"). Thus, it is plausible the process most pertinent to allowing individuals to hold mistakes more lightly and be more forgiving toward themselves is self-compassion. Our mediation findings underscore the role of psychological

inflexibility and self-compassion as mechanisms of change in ACT and directly link these therapeutic processes to improved outcomes, providing some support for the theory underlying ACT.

Nonetheless, we predicted psychological inflexibility and self-compassion would have mediated the relationship between condition and other outcomes as well. The lack of significant mediation effects on other outcome variables may be due to the small sample size such that only mediation effects with large enough magnitudes were found to be statistically significant. Despite this potential limitation in our findings, it also suggests the significant mediation effects observed in our study were relatively robust.

Moderation. Findings from our moderation analyses were mixed. ACT was generally more effective than a waitlist control when participants reported lower baseline psychological inflexibility for concern over mistakes and quality of life but more effective for higher baseline inflexibility for doubting of actions (only from pretreatment to posttreatment), distress and impairment, and valued action (only from pretreatment to posttreatment). Thus, it seems the moderating influence of baseline psychological inflexibility depended on the outcome of interest. The result that higher baseline inflexibility led to better outcomes (specifically for doubting of actions, symptom distress and functional impairment, and valued action) is consistent with the interpretation that ACT leads to behavioral change by addressing a skills deficit in adaptive responding to unpleasant internal experiences.

The reason lower baseline psychological inflexibility was associated greater improvement in concern over mistakes and quality of life following ACT could be concern over mistakes—a hallmark trait in clinical perfectionism—and quality of life might have been especially resistant to change when inflexibility was high to begin with. Hence, a 10-session

course of ACT appears to be inadequate for maintaining global gains in clinical perfectionism when baseline inflexibility is high. The inconsistency of these interaction effects is congruent with the extant literature on the moderating effect of baseline psychological inflexibility in ACT (Craske et al., 2014; Wolitzky-Taylor et al., 2012) and further underscore the intricate interplay among baseline presentation, response to treatment over time, and outcome domain tested.

Clearly, the question of whether ACT is more effective for specific levels of baseline inflexibility does not yet have an empirically informed answer. Our findings provide some explanation for inconsistent findings. First, the moderation effect of baseline inflexibility depended on the type of outcome tested. Thus, clarifying which dependent variable is of greatest clinical interest is critical. Second, the effect of baseline inflexibility on response to ACT could be non-linear such that improvement over the course of ACT may not be uniform as baseline inflexibility increases or decreases (see Figure 2). Instead, there may be ranges of inflexibility at pretreatment in which individuals are most likely to benefit from ACT, complicating how we conceptualize this relationship.

A meta-analytic approach may provide a more reliable aggregate picture of moderation effects though previous meta-analyses show consistent moderators across clinical trials are rare (e.g., Olatunji, Davis, Powers, & Smits, 2013; Schneider, Arch, & Wolitzky-Taylor, 2015). In particular, psychological inflexibility may be difficult to measure with a brief assessment given its complex and context-sensitive nature. Thus, expanding our focus on other potential moderators that can be measured with greater accuracy could increase coherence of the current knowledge base on treatment moderators. Despite lack of clarity in the extant literature, it is important clinical researchers continue to seek to identify useful treatment moderators using reliable and valid assessment and appropriate statistical methods because doing so would

improve treatment recommendations for individuals seeking mental health services and increase the likelihood they receive the most helpful intervention.

With respect to baseline self-compassion as a moderator of treatment response, it appeared participants with low self-compassion at baseline did not see much improvement from treatment as they demonstrated significant overlap in outcomes with waitlist participants. Generally, participants who started off with self-compassion in the middle range relative to the sample showed the most improvement from ACT; this subgroup had bigger between-condition differences compared to the subgroup with the highest levels of baseline self-compassion. These findings suggest individuals with low self-compassion and for whom perfectionistic patterns might be more entrenched might on average be less likely to benefit from ACT. For example, even though participants with low self-compassion at baseline reported more valued action and less concern over mistakes following ACT, these gains were not maintained at follow-up. A longer course of therapy or an explicit focus on self-compassion might be needed to sustain improvement. Furthermore, there might have been a ceiling effect for treatment response among participants with high self-compassion at baseline. It is possible this subgroup represented the most highly functioning participants given they generally reported less concern over mistakes and symptom severity as well as higher valued action and quality of life. This would explain why differences between conditions were smaller in this subgroup. At the same time, there were still posttreatment and follow-up differences between conditions, indicating participants with high self-compassion and who met study criteria for clinical perfectionism still benefited from receiving ACT.

Limitations

First, the study sample was homogeneous consisting mostly of White college-aged adults who identified as LDS, limiting generalizability of our findings. For example, scrupulosity might have additionally influenced the presentation of clinical perfectionism among LDS participants (Allen & Wang, 2014), possibly differentiating the function of perfectionistic behaviors in this subgroup (e.g., more faith-driven). Second, we used an inactive control condition so we were unable to test moderation and mediation effects in ACT relative to an active psychotherapy such as CBT. Thus, it is unclear if the effects observed are due to receipt of psychotherapy or if they are unique to ACT. Third, we only tested two processes of change: psychological inflexibility and self-compassion. Examining the influence of other processes of change like anxiety sensitivity or specific components of psychological flexibility (e.g., cognitive defusion; Arch, Wolitzky-Taylor, Eifert, & Craske, 2012) may refine our understanding of how therapy leads to improvement in outcomes. Fourth, there is evidence the AAQ-II lacks discriminant validity and performs less well than its context-specific counterparts when used for a specific area of concern (Houghton et al., 2014; Ong, Lee, Levin, & Twohig, 2019; Tyndall et al., 2018; Wolgast, 2014) so it might not have been a sufficiently sensitive measure to detect changes in psychological inflexibility in the present study. Fifth, it is possible the moderation patterns observed reflected regression to the mean given participants with higher baseline inflexibility also tended to have higher baseline severity scores in the outcome domains tested (see Figure 2). Replication of findings with larger sample sizes might help to disentangle effects related to moderation and regression to the mean. Sixth, our small sample size could have obscured "real" moderation and/or mediation effects (i.e., Type II error). Although the use of multilevel models allowed us to use all data points observed, tests of similar research questions with more power (e.g., bigger sample size, more assessment points) are needed to verify current results and interpretations.

Having more assessment points throughout the intervention (e.g., session data) would have permitted a more fine-grained examination of processes of change in ACT for clinical perfectionism and more robust conclusions about the mediating role of hypothesized mechanisms of change. Finally, rate of dropout was high in the current study. This could have biased findings as participants with more severe clinical perfectionism might have been excluded from our analyses. The high dropout could have been an artifact of our recruitment method (yielding mostly students) or poor acceptability of the intervention. Regardless, clinicians using ACT with similar populations may try to reduce attrition by explicitly incorporating motivational strategies or emphasizing valued action.

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Table 1

Coefficients From Lagged Mixed Effects Models With AAQ-II as Mediator

	AAQ-II	FMPS-CM	FMPS-DA	QOLS	OQ-45	VQ-Progress
Intercept	16.76***	14.10***	5.63**	0.67	37.66***	6.81
	(3.77)	(4.04)	(2.06)	(9.88)	(9.88)	(3.97)
Condition[a] (*a* path)	-5.49*					
	(2.01)					
Condition[a] (*c'* path)		-7.14***	-1.77*	**9.58*****	-16.11**	5.08***
		(1.75)	(0.74)	**(2.54)**	(4.99)	(1.38)
Lagged AAQ-II (*b* path)		0.03	-0.03	**0.27***	-0.37	0.08
		(0.07)	(0.04)	**(0.12)**	(0.21)	(0.08)
DV at baseline (covariate)	0.34**	0.55***	0.66***	0.88***	0.59***	0.42**
	(0.12)	(0.12)	(0.13)	(0.11)	(0.13)	(0.16)
BIC		439.24	333.92	479.07	537.13	427.81
Log likelihood		-207.01	-154.39	-227.01	-256.14	-201.33
N	36	38	38	36	34	37

[a] Reference group was waitlist.

*** $p < .001$. ** $p < .01$. * $p < .05$.

Table 2

Coefficients From Lagged Mixed Effects Models With SCS as Mediator

	SCS	FMPS-CM	FMPS-DA	QOLS	OQ-45	VQ-Progress
Intercept	5.93***	26.10***	6.02*	14.28	16.27	10.64**
	(1.57)	(6.05)	(2.57)	(8.73)	(13.45)	(3.50)
Condition[a] (*a* path)	3.17***					
	(0.74)					
Condition[a] (*c'* path)		**-6.45***	-1.64*	9.14***	-17.22***	5.32***
		(1.64)	(0.77)	(2.66)	(4.98)	(1.42)
Lagged SCS (*b* path)		**-0.48***	-0.05	-0.24	0.82	-0.13
		(0.20)	(0.09)	(0.31)	(0.51)	(0.18)
DV at baseline (covariate)	0.66***	0.42***	0.62***	0.84***	0.58***	0.44**
	(0.10)	(0.12)	(0.13)	(0.11)	(0.12)	(0.15)
BIC		433.50	335.06	486.15	536.29	426.78
Log likelihood		-204.14	-154.96	-230.55	-255.72	-200.82
N	35	38	38	36	34	37

Note. BIC = Bayesian information criterion; FMPS = Frost Multidimensional Perfectionism Scale; CM = Concern Over Mistakes; DA = Doubting of Actions; OQ-45 = Outcome Questionnaire-45.2; SCS = Self-Compassion Scale; VQ = Valuing Questionnaire; QOLS = Quality of Life Scale.

[a] Reference group was waitlist.

*** $p < .001$. ** $p < .01$. * $p < .05$.

Table 3

Mixed Effects Model Fit Indices for Outcomes of Interest With AAQ-II as Moderator

	AIC	BIC	Log likelihood	χ^2	χ^2 difference	*df*	*p*
FMPS-CM							
Model 1	781.74	798.36	-384.87	769.74			
Model 2	780.93	803.09	-382.46	764.93	4.81	2	.090
Model 3	**766.78**	**805.57**	**-369.39**	**738.78**	**26.15**	**6**	**< .001**
FMPS-DA							
Model 1	581.11	597.73	-284.56	569.11			
Model 2	575.96	598.13	-279.98	559.96	9.15	2	.010
Model 3	**571.02**	**609.81**	**-271.51**	**543.02**	**16.94**	**6**	**.010**
OQ-45							
Model 1	987.28	1003.7	-487.64	975.28			
Model 2	964.93	986.82	-474.47	948.93	26.35	2	< .001
Model 3	**962.83**	**1001.13**	**-467.41**	**934.83**	**14.11**	**6**	**.028**
VQ Progress							
Model 1	729.52	746.1	-358.76	717.52			
Model 2	720.86	742.95	-352.43	704.86	12.67	2	.002
Model 3	**705.76**	**744.43**	**-338.88**	**677.76**	**27.09**	**6**	**< .001**
QOLS							
Model 1	896.17	912.69	-442.09	884.17			
Model 2	890.88	912.91	-437.44	874.88	9.29	2	.010
Model 3	**884.18**	**922.73**	**-428.09**	**856.18**	**18.70**	**6**	**.005**

Note. AAQ-II = Acceptance and Action Questionnaire – II; AIC = Akaike information criterion; BIC = Bayesian information criterion; FMPS = Frost Multidimensional Perfectionism Scale; CM = Concern Over Mistakes; DA = Doubting of Actions; OQ-45 = Outcome Questionnaire-45.2; VQ = Valuing Questionnaire; QOLS = Quality of Life Scale. Model 1 included a two-way interaction term for baseline inflexibility and condition; Model 2 included a two-way interaction term for baseline inflexibility and time; and Model 3 included a three-way interaction term for baseline inflexibility, condition, and time.

Table 4

Mixed Effects Model Fit Indices for Outcomes of Interest With SCS as Moderator

	AIC	BIC	Log likelihood	χ^2	χ^2 difference	*df*	*p*
FMPS-CM							
Model 1	786.92	803.69	-387.46	774.92			
Model 2	781.34	803.71	-382.67	765.34	9.57	2	.008
Model 3	**769.01**	**808.15**	**-370.51**	**741.01**	**24.33**	**6**	**<.001**
FMPS-DA							
Model 1	609.79	626.56	-298.89	597.79			
Model 2	**603.03**	**625.39**	**-293.51**	**587.03**	**10.76**	**2**	**0.005**
Model 3	604	643.14	-288	576	11.03	6	0.087
OQ-45							
Model 1	1027.66	1044.2	-507.83	1015.66			
Model 2	1002.5	1024.6	-493.25	986.5	29.16	2	<.001
Model 3	**999.79**	**1038.5**	**-485.9**	**971.79**	**14.71**	**6**	**0.023**
VQ Progress							
Model 1	753.16	769.89	-370.58	741.16			
Model 2	739.8	762.1	-361.9	723.8	17.37	2	<.001
Model 3	**729.84**	**768.87**	**-350.92**	**701.84**	**21.95**	**6**	**0.001**
QOLS							
Model 1	919.33	936	-453.66	907.33			
Model 2	912.53	934.76	-448.26	896.53	10.80	2	0.005
Model 3	**907.17**	**946.08**	**-439.58**	**879.17**	**17.36**	**6**	**0.008**

Note. SCS = Self-Compassion Scale; AIC = Akaike information criterion; BIC = Bayesian information criterion; FMPS = Frost Multidimensional Perfectionism Scale; CM = Concern Over Mistakes; DA = Doubting of Actions; OQ-45 = Outcome Questionnaire-45.2; VQ = Valuing Questionnaire; QOLS = Quality of Life Scale. Model 1 included a two-way interaction term for baseline self-compassion and condition; Model 2 included a two-way interaction term for baseline self-compassion and time; and Model 3 included a three-way interaction term for baseline self-compassion, condition, and time.
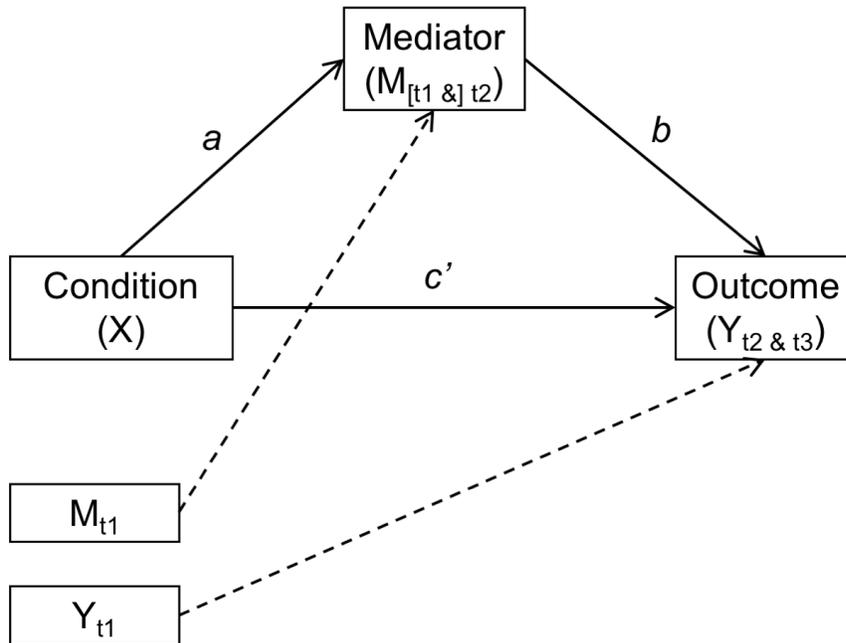
Figure 1. Schematic representation of lagged mediation model. The *a* path was estimated using a regression model with the mediator at posttreatment (t2) as the outcome variable and condition and mediator at baseline (t1) as predictors. Baseline (t1) and posttreatment (t2) scores of the mediator (Acceptance and Action Questionnaire — II or Self-Compassion Scale) were used to predict posttreatment (t2) and follow-up (t3) scores of the outcome variables (Frost Multidimensional Perfectionism Scale (FMPS) Concern Over Mistakes, FMPS Doubting, Quality of Life Scale, Outcome Questionnaire-45.2, and Valuing Questionnaire Progress).
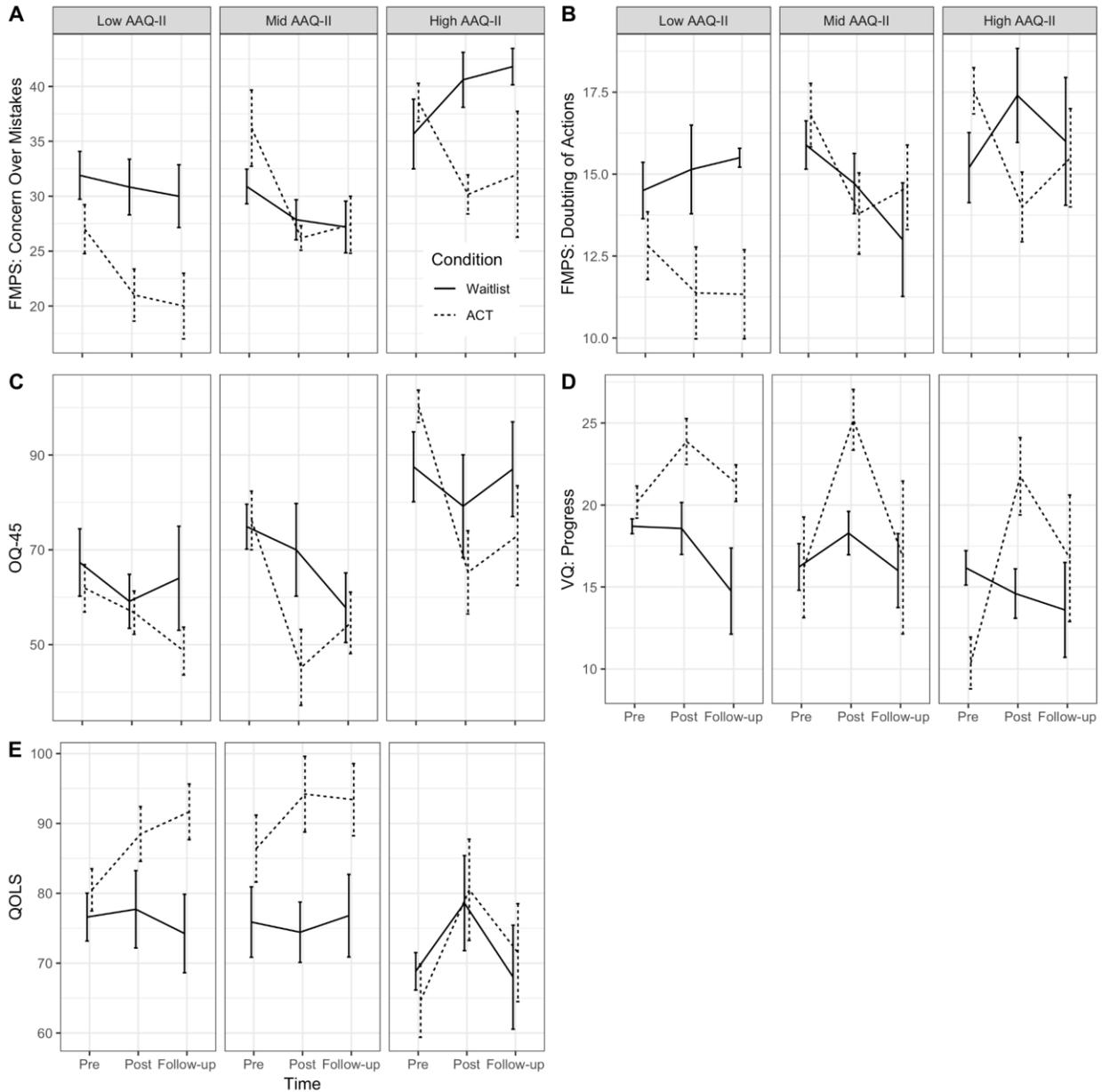
Figure 2. Plots depicting mean scores of outcomes over time by condition and baseline psychological inflexibility (Acceptance and Action Questionnaire – II; AAQ-II). Low, mid, and high groups reflect bins with an approximately equal number of participants. FMPS = Frost Multidimensional Perfectionism Scale; OQ-45 = Outcome Questionnaire-45.2; VQ = Valuing Questionnaire; QOLS = Quality of Life Scale.
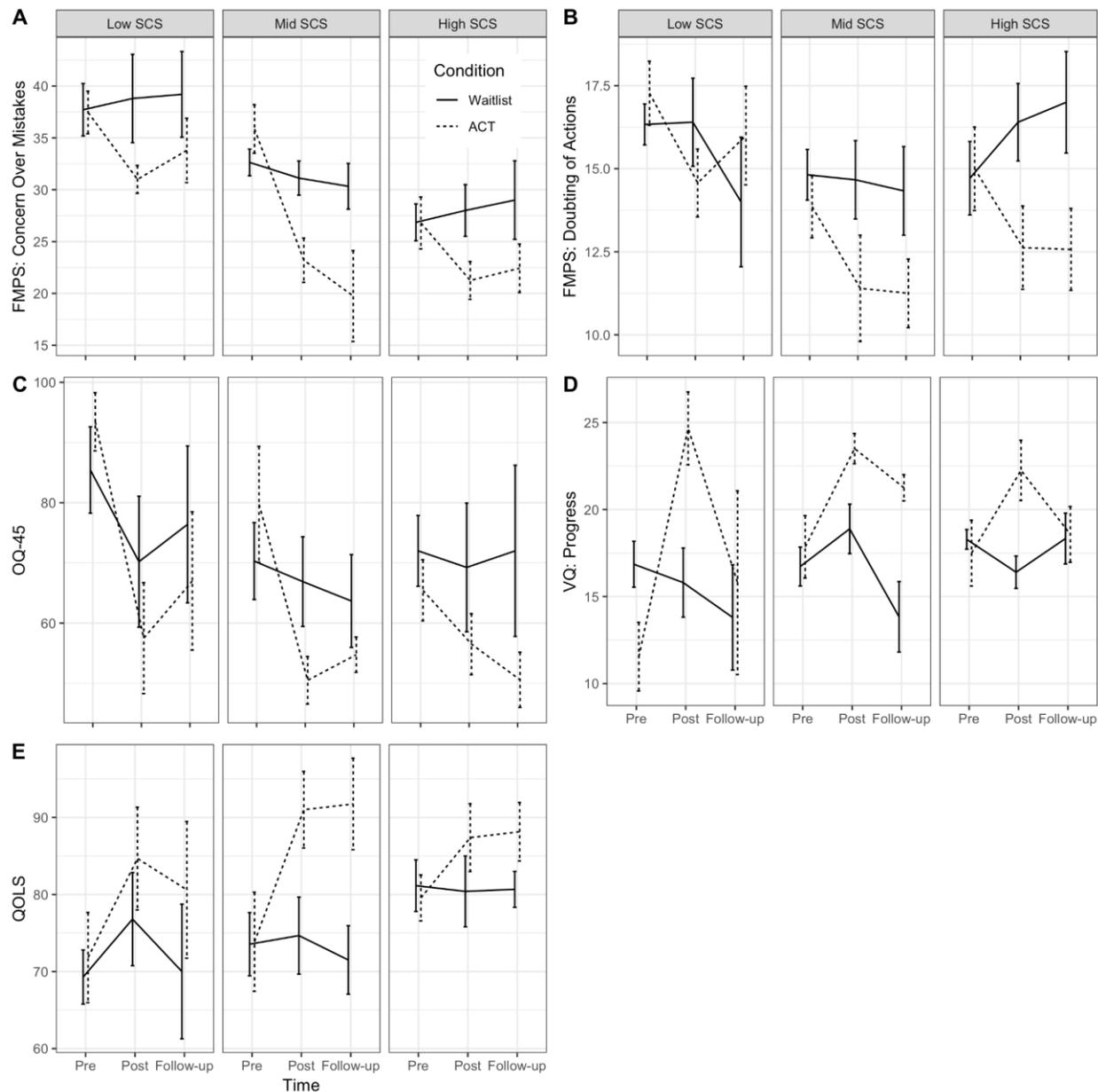
Figure 3. Plots depicting mean scores of outcomes over time by condition and baseline self-compassion (Self-Compassion Scale; SCS). Low, mid, and high groups reflect bins with an approximately equal number of participants. FMPS = Frost Multidimensional Perfectionism Scale; OQ-45 = Outcome Questionnaire-45.2; VQ = Valuing Questionnaire; QOLS = Quality of Life Scale.