Psychotherapy Feedback on the Counseling Center Assessment of Psychological Symptoms (CCAPS): Effects on Outcome and Client Moderators of Effectiveness

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**Background**

While psychotherapy is effective for a majority of people, research consistently shows that some individuals do not achieve positive outcomes from treatment (Finch et al., 2001). Studies have estimated that 30-50% of clients do not improve, with 5-15% of clients deteriorating, or reliably worsening, during treatment (Lambert & Ogles, 2004). Further, clinicians overestimate the change they are inducing in their clients (Walfish et al., 2012) and fail to predict negative outcomes (Hannan et al., 2005).

Routine outcome monitoring (ROM) aims to address this clinician blind spot and reduce negative outcomes by capturing client progress at regular intervals throughout treatment, ideally at every session, and providing that information back to the treating clinician in real-time, allowing the clinician to adjust treatment if indicated. Building on this, patient-focused research uses ROM data from past clients to model average change trajectories over the course of treatment, often stratified by initial distress and other client characteristics at intake. A client’s actual change during treatment can be compared to their predicted change trajectory, and this information is provided to clinicians as feedback to inform treatment (Boswell et al., 2013). The feedback can alert a clinician when a client off track for a positive outcome or inform the clinician that progress is on track with similar clients’ progress. Many ROM feedback systems have been developed for use in psychotherapy, including the OQ-45 (Lambert et al., 2013), CORE-OM (Barkham et al., 2001), PCOMS (Duncan & Miller, 2008), and TOP (Kraus et al., 2005). Across systems, feedback has largely been shown to improve outcomes (Lambert et al., 2018), and ROM has quickly become a recommended standard in psychotherapy treatment, with APA including ROM as a component of effective evidence based care (APA Presidential Task Force on Evidence-Based Practice, 2006).

The current study evaluates the effectiveness of a new ROM feedback system developed for use in college counseling centers. It also tests for differential effects of feedback across different domains of distress, assesses for differential effects by counseling center, and explores client moderators of feedback’s effectiveness. Before presenting the specific aims of this investigation, the literature on the impact of feedback on outcomes is reviewed, with special attention to when and for whom feedback is most effective. First, however, the methods behind ROM feedback will be illustrated by focusing on two of the most commonly used systems: the Outcome Questionnaire 45 (OQ-45; Finch et al., 2001) and the Partners for Change Outcome Management System (PCOMS; Miller, Duncan, Sorell, & Brown, 2005).

The OQ-45 assesses client functioning across three domains: psychological symptoms, interpersonal problems, and social role functioning. It provides scores in each domain, as well as a total score, which is most commonly used. In clinical practice, clinicians are presented with a graphical representation of their clients’ scores over time, as well as an expected change trajectory to which their clients’ actual change is compared. This expected change trajectory is based on longitudinal treatment data from thousands of previous clients and is stratified by initial OQ-45 score. Change is modeled according to the dose-effect model (Howard et al., 1986), which characterizes change as a decelerating logarithmic curve, with rapid initial decrease in symptoms, followed by increasingly more sessions needed to achieve the same amount of change. The OQ-45 also provides several alerts, indicating that clients are deviating significantly from the expected recovery curve in either the positive or negative direction. A positive alert can be indicative that a client is making progress more quickly than expected and may be ready to terminate therapy earlier, while a negative alert indicates that therapy is not progressing as quickly as expected, and the client might be at risk for a negative treatment outcome. Alerts are based on 80% tolerance intervals around the expected scores at each session, with scores falling outside the upper limit of the tolerance interval generating a negative alert indicating that they are at risk of being in the approximately 10% of clients likely to have a negative outcome. The OQ-45 also provides clinical support tools and an assessment for signal cases, systems for helping clinicians problem solve off track cases by identifying factors that have been shown to relate to client outcome.

The PCOMS assesses mental health functioning with the 4-item Outcome Rating Scale (ORS) and therapeutic alliance with the 4-item Session Rating Scale (SRS). It also uses expected trajectories of change for the ORS, based on Bayesian inference. ORS trajectories incorporate a client’s initial score, as well as their change at the current session relative to the initial score (Miller et al., 2005). Clients whose scores fall below the 50th percentile of the expected trajectories are identified as at risk (Anker et al., 2009), indicating that they are making less change than the average client. While other ROM instruments employ other methods to provide feedback on client progress, the OQ-45 and PCOMS provide two examples.

Feedback has been shown to improve outcomes and help prevent negative treatment outcomes across feedback systems and methods. A recently published meta-analysis of 24 studies using either the OQ-45 or PCOMS system examined the effect of feedback across many populations and treatment modalities (Lambert et al., 2018) and found that in a majority of studies (70%), feedback improved outcomes. Consistent with a previous meta-analysis of the OQ-45 (Lambert & Shimokawa, 2011), there was a small (SMD = .14) effect of feedback for all clients, and a larger effect for clients identified as off track (SMD = .33), with significant reductions in deterioration specifically for those off track clients. For the PCOMS, there was a small to moderate effect of feedback for all clients (SMD = .40), with significantly more clients achieving a reliable positive change, but no significant effect in reducing deterioration. A 2016 systematic review found more moderate results, with just over half of studies showing a positive effect of feedback (Gondek et al., 2016). When considering only off track clients, however, 73% of studies found a positive effect.

While a majority of studies support the effectiveness of feedback, it is important to understand why feedback is effective, under what conditions, and for whom. Answering these questions may shed light on the minority of studies in which feedback was not found to improve outcomes. Contextual Feedback Intervention Theory (Sapyta et al., 2005) suggests that in order for feedback to be effective, it has to provide additional information beyond what a therapist could glean from the client on their own. Studies showing that clinicians fail to identify worsening in their own clients, even when provided with the base rate of deterioration, suggest that feedback does just that (Hannan et al., 2005). Additionally, the feedback must be actionable and timely. Feedback should be delivered regularly, optimally on a session by session basis, when treatment can still be altered, not at the end once deterioration has already occurred. Similarly, Feedback Intervention Theory (Kluger & DeNisi, 1996) suggests that feedback works by eliciting a comparison between actual and desired progress. A discrepancy between the two may prompt therapists to change their treatment plan or relax adherence to a specific model of treatment.

In addition to theories on mechanisms by which feedback improves outcomes, research comparing the effects of feedback for all clients versus only off track clients begins to answer the question of when feedback is effective. As found in the meta-analyses and systematic review outlined above, the effect of feedback on symptom improvement is strongest for off track clients, but this does not rule out an attenuated effect for on track clients, and several studies found that even for on track clients, outcomes are improved when they receive feedback (Amble, Gude, Stubdal, et al., 2015; Harmon et al., 2007; Shimokawa et al., 2010). Some research, including a meta-analysis, found that feedback may also shorten treatment for on track clients, perhaps by indicating to therapists that the client has achieved the amount of change expected and may not need continued treatment (Lambert et al., 2003). When including off track clients as well, however, a systematic review found no effect of feedback on number of sessions in 60% of studies and a negative effect in 20% of studies (Gondek et al., 2016). This finding is not entirely unexpected, as in some cases, offering more sessions may in fact be an indication of clinician responsiveness to feedback indicating that a client needs more treatment to achieve the desired outcome. Lending credence to this, off track clients in feedback conditions indeed received more sessions than off track clients in no feedback conditions (Gondek et al., 2016; Lambert et al., 2003).

Most ROM measures capture a single domain of distress (see the TOP for an exception), and the literature is largely silent on how domain specific feedback and alerts compare to general feedback alerts. One study found that providing feedback separately for wellbeing and affective distress improved outcomes compared to providing feedback on wellbeing alone (Dyer et al., 2014). Building on these results, it may be that providing feedback on specific domains of distress and impairment (e.g. alerts when clients’ depression scores are off track) may further improve outcomes. This, however, remains to be tested. Further, it is unknown whether certain domains benefit from feedback more than others.

Despite heterogeneity in results regarding the effects of feedback, there is little research examining whether certain types of clients benefit more from feedback, especially client characteristics than can be measured from the outset of treatment. The most frequently studied client characteristic is level of initial distress, although this research has produced mixed results. One study found that feedback produced more positive effects for clients that started therapy with higher distress, the clients who were most likely to otherwise have a poor outcome in therapy (Lambert et al., 2001). Another study, however, found that client initial distress did not moderate the effect of feedback (Amble, Gude, Ulvenes, et al., 2015), and yet another review paper found that studies including more severe clients produced smaller effects of feedback, although this effect was across studies, not within a single study (Davidson et al., 2015). Similarly, studies of ROM feedback in more distressed populations (e.g. psychiatric hospital or inpatient) have typically found smaller effects of feedback than studies including outpatients or clients seen at college counseling centers (Probst et al., 2013; Simon et al., 2012). The mixed findings regarding the effect of initial distress on feedback seem likely due to differences in the populations and ranges of severity included. Regarding diagnosis, Lambert et al. (2018) found in their meta-analysis that the effect of feedback did not differ by diagnosis, although the ROM measures included in the study did not offer diagnosis specific feedback, and the authors indicate that more work should be done in this area. The authors also acknowledge that some clients (or therapists) do not respond to feedback, but recognize that “we have no knowledge of the extent to which this is a function of patient variables, therapist factors, or something connected to the nature of the feedback” (pp 533-534).

To our knowledge, only one study has been published that assessed client moderators beyond diagnosis or initial severity (Errázuriz & Zilcha-Mano, 2018). Unexpectedly, this study found that for clients with prior psychiatric hospitalizations, receiving feedback actually produced worse outcomes than not receiving feedback. Also unexpected, for clients who started with greater distress and went off track during treatment, receiving no feedback was better than receiving feedback that they were off track. The authors hypothesize that for these highly distressed and potentially more vulnerable clients, receiving feedback that they are not progressing as expected may be a negative experience that may further impede treatment progress. The paucity of studies, let alone the unexpected results observed, indicate that more attention to client moderators of feedback’s effectiveness is needed.

Taken as a whole, the literature suggests that while feedback is generally effective, more can be done to extend its positive impact and to understand under what conditions and for whom it is effective. The present study aims to address these gaps by evaluating the impact of one specific multidimensional feedback system developed and refined to meet the needs of clients treated in college counseling centers, as well as to examine both client moderators and the impact of feedback on multiple domains of specific distress and impairment.

**The Center for Collegiate Mental Health and The Counseling Center Assessment of Psychological Symptoms**

The Center for Collegiate Mental Health (CCMH) is a nationally representative practice research network (PRN) of university and college counseling centers (Hayes et al., 2011), built on a collaborative infrastructure involving multiple stakeholders, including university administrators, psychological researchers (faculty members and graduate students), industry partners, and over 600 counseling centers. As a PRN, CCMH facilitates the collection of information that will both inform clinical practice and advance research on the mental health services provided to university counseling clients, while not adding substantial burden to everyday clinical practice.

The Counseling Center Assessment of Psychological Symptoms (CCAPS; Locke et al., 2011) is a routine outcome monitoring instrument developed by CCMH specifically for use in the college population. It captures distress across the most common domains seen in college counseling centers and is intended to be used at intake and throughout treatment. It is currently used in over 600 counseling centers. When the CCMH was launched (Locke et al., 2008), clinicians using the CCAPS received a report for each client that provided CCAPS scores in a tabular format (see Appendix A), with CCAPS scores as percentiles normed on a large sample of treatment seeking college students. It offered no comparison of a client’s progress to their expected progress or indication of whether their progress was on or off track for a positive outcome.

After several years of operation and in order to meet the needs of its practitioner stakeholders, CCMH developed a feedback system for the CCAPS. Using CCAPS data previously collected through clinical practice, the feedback system was largely modeled after the OQ-45 feedback system. The feedback was incorporated into a new CCAPS report with several additional features (see Appendix B for an example of the new report). The main addition to the report was a graphical display of a client’s actual CCAPS scores over time on each subscale, overlaid on colored shading indicating whether the scores correspond to low (white shading), moderate (yellow shading) or high distress (red shading) based on the scale’s clinical cut points. This visual allows for ease of interpreting trends across treatment sessions. Additionally, expected recovery trajectories based on past clients starting at a similar level of distress were added alongside the client’s actual scores, allowing for a visual comparison between the two. Finally, an alert system was added to indicate if a client was off track from their expected recovery trajectory. This off track alert is displayed as a blue dot, and no alert is displayed if a client’s scores are on track. The example report in Appendix B shows off track alerts on several subscales.

Returning to Contextual Feedback Intervention Theory (Sapyta et al., 2005), the visual discrepancy between a client’s current scores and the low distress range informs therapists about how much additional change a client needs to make to move into that range. Additionally, the visual discrepancy between actual and expected recovery trajectories indicates when a client is not changing as would be expected. This is reinforced by the off track alert generated when a client deviates significantly, indicating a change to treatment may be needed, or at minimum a conversation with the client about treatment progress and goals. This conversation can be informed by the graphical depiction of the scores mentioned above, which provide context for the alert. By allowing the graphical display of client scores and data derived alerts to work in tandem, the new CCAPS report is able to provide new, actionable information for the therapist and client.

The development of the new feedback system exemplifies an important step of in the evolution of the CCHM PRN by fostering a positive loop between research and practice (McAleavey et al., 2015). CCAPS data collected as part of routine clinical practice has indeed been used in research to better understand how clients change while in treatment, as well as used to develop the feedback tool that was implemented back into counseling centers with the goal of informing everyday clinical practice and ultimately improving clinical outcomes. The present study will evaluate whether the data derived feedback system did positively impact client outcomes, and if so, on what dimensions of distress and for whom.

**Research questions**

The primary research question assesses the impact of the CCAPS feedback system. Did client outcomes improve after the implementation of the new feedback system? It is hypothesized that feedback will improve client outcomes. Because the CCAPS as a routine outcome measure was in place prior to the feedback system being implemented, any effects of the feedback system will be above and beyond the effect of monitoring outcomes alone. It should be mentioned that the current study makes no attempt to isolate only the effects of a single component of the new CCAPS feedback system and report (e.g. the effect off track alerts independent of the graphical depiction) or to isolate the effects of the feedback system from any impacts it may have had on how therapists resultingly conducted treatment. Instead, this constellation of report changes and any accompanying behavioral changes are evaluated together as pathways by which feedback can have effects on therapy.

It should be mentioned here that although client outcomes are the focus of the present study, these are not the only type of outcomes that should matter in evaluating such a system. Other outcomes that are left to future research include outcomes at the therapist and center levels, such as therapist satisfaction and burnout. Future directions for such research will be explored in the discussion in connection with the findings from the present study.

The second research question expands on prior research, which has largely been done in unidimensional measures of distress, to assess whether the effect of feedback differs by subscale. Although not directly addressing differential effectiveness by diagnosis, as suggested by Lambert et al. (2018), this question can help to fill this gap in the literature by indicating whether certain domains benefit more from feedback. If the results show that some domains benefit less from feedback than others, this would indicate the need for further research and development of feedback methods specifically attuned to those domains.

Third, this study will assess whether there is a center effect of feedback, as the CCAPS feedback system was implemented in hundreds of UCCs across the country. This question makes a valuable contribution to the literature, which to our knowledge has not previously assessed for differential effects by location, and the presence of a center effect would suggest center characteristics that moderate feedback’s effectiveness. Although such potentially explanatory center characteristics are not measured in the present study, testing for a center effect will inform future research directions on identifying characteristics of centers for which feedback was especially helpful. Such characteristics may be able to be implemented elsewhere to magnify positive effects of feedback.

Fourth, several client moderators will be evaluated to answer the question, for whom does feedback most improve outcomes. Some are based on prior research findings, while others are new variables being explored. Similar to prior research, this study will compare on track to off track clients to determine whether the effect of feedback is stronger for off track clients. Also building on prior research, baseline scores on each CCAPS subscale will be tested to determine whether clients who present with more distress benefit more from feedback. Additionally, whether or not a client had previously psychiatric hospitalizations will be included to compare to the surprising result found by Errázuriz and Zilcha-Mano (2018).

Two previously untested moderators will also be examined: each client’s total number of sessions and the frequency with which the CCAPS is administered throughout treatment. Centers have latitude to administer the CCAPS during treatment as frequently or infrequently as they choose. CCMH recommends that it is most effective when administered at every session, which many centers follow, while other centers administer it only at prespecified sessions (e.g. 1st, 3rd, and 7th). This presents a unique opportunity to evaluate the effect of administration frequency within the same measure being used across multiple centers.

**Methods**

**Procedure**

Data for the present study were collected within CCMH which, as mentioned above, is a practice research network of over 600 university and college counseling centers. Participating centers collect data locally as part of clinical routine using standardized measures and can elect to contribute their center’s deidentified data to the centralized CCMH repository after securing IRB approval. Each year of CCMH data captures a single academic year, spanning from July 1 to June 30 of the following year. Four years of CCMH data from two discrete time periods are used in the present study, and centers are included if they contributed data to the repository during all four years. The first time period (2013-2015) captures data from before the CCAPS feedback system was implemented on July 27, 2015, and the second time period (2016-2018) begins one year after the feedback system was released. This intentional one-year gap accounts for the gradual adoption of the new system over the year following its release. While many centers began using the new feedback system as soon as it was made available, others began using it at a later date (e.g. the start of the following semester) after having a chance to train staff in the new system. Any centers who had not updated to the new system by July 1, 2016 (the start of the next CCMH data year) were excluded. This one-year gap also allows for centers to become accustomed to the new system, ensuring that any clinical benefits coinciding with its release are not simply attributable to novelty.

A dichotomous variable will be created indicating whether a client received treatment before or after the new CCAPS feedback system was released. These will be referred to as the feedback as usual condition, in which therapists received the CCAPS report with a tabular depiction of subscale scores, and enhanced feedback condition, in which therapists received data-derived graphical feedback and off track alerts. It is important to note that these two conditions occurred one after the other temporally, not simultaneously, and clients were not randomized to conditions. Although using an archival control has the drawback of not controlling for any effects of time, in comparison to randomizing entire centers to different conditions simultaneously, it has the benefit of each center’s archival data serving as its own control in respect to center policies, types of treatment provided, and characteristics of clients generally seen at the center. Approximately 262,000 clients received treatment at 82 centers during these four years, 110,000 in the feedback as usual condition and 152,000 in the enhanced feedback condition.

**Measures**

**Counseling Center Assessment of Psychological Symptoms (CCAPS).** The CCAPS (Locke et al., 2011; Locke, Bieschke, et al., 2012) is a multidimensional instrument designed to assess common mental health concerns of students seeking treatment at college counseling centers. There are two versions of the CCAPS available: the CCAPS-62 and the CCAPS-34, and CCAPS administered as the 62-item version can be scored as CCAPS-34. The CCAPS-34 is recommended for repeated measures use throughout treatment, and treatment feedback, including graphical expected recovery curves and off track alerts, is only available for the 34-item version. The CCAPS-34 (Locke, McAleavey, et al., 2012) has 34 items capturing distress across seven domains: Depression (6 items), Generalized Anxiety (6 items), Social Anxiety (5 items), Academic Distress (4 items), Eating Concerns (3 items), Alcohol Use (4 items), and Hostility (6 items), as well as a general distress index (DI) aggregating distress across multiple domains (20 items). In completing the CCAPS, clients are asked to rate themselves over the past two weeks on a Likert scale, from 0 (*not at all like me)* to 4 (*extremely like me*). Each subscale is scored by taking the average of the questions that load onto that subscale. As such, higher subscale scores indicate more distress, with scores ranging from 0 to 4.

All CCAPS-34 subscales have demonstrated good internal consistency (Cronbah’s alpha ranging from .82-.91), criterion validity (strong correlations with other established measures of similar constructs), discriminant validity (weak correlations with unrelated constructs; Locke, McAleavey, et al., 2012), and all subscales with related diagnostic categories have demonstrated expected elevations in clients with the corresponding diagnoses (McAleavey et al., 2012).

As previously mentioned, the methods behind the feedback system for the CCAPS-34 were based largely on those used in the OQ-45 (Finch et al., 2001). Expected treatment response trajectories and off track alerts were based on approximately 30,000 clients seen in counseling centers across the United States in 2012-2014. Each subscale was modeled independently using linear mixed effects modeling with fixed and random effects for intercept and session number. Session number was log transformed consistent with research showing decelerating recovery trajectories. Baseline CCAPS values on each subscale were binned so that each bin spanned at least 1% of baseline scores on that subscale. The number of bins per subscale ranges from 13 to 49 depending on the distribution of the subscale. A separate model was then run for each bin, resulting in a predicted slope and predicted CCAPS score for each session through session 20. This provides graphical expected recovery curves that account for baseline severity (The Center for Collegiate Mental Health, 2019).

In addition to expected recovery curves, off track alerts are also provided for each subscale. Off track alerts are based on one tailed 90% tolerance intervals around the expected trajectory for each bin. When actual client scores fall above the tolerance boundary, an off track alert is generated, alerting the therapist that the client is at risk of a negative treatment outcome. Diverging from the OQ-45 methodology, no positive rapid response alerts are displayed, so only an upper limit to the tolerance interval was needed. The CCAPS is intended to be used with clients in individual treatment, so only CCAPS administered at individual therapy appointments are included in the recovery curves and considered in the calculation of off track alerts.

One relevant limitation of the CCAPS feedback system relates to ceiling effects. For some subscales (Anxiety, Eating, Academics, and Social Anxiety), clients starting treatment near the ceiling of the subscale are not able to receive off track alerts because the upper limit of the tolerance interval falls above the ceiling of the scale, making it impossible for clients to score above the tolerance interval. The inability to alert is indicated on the CCAPS report by a line through the area where an alert would normally appear.

**Standardized Data Set (SDS).** The SDS collects information on demographics, academics, and mental health history and is most often administered at the beginning of treatment (Hayes et al., 2011). The present study includes one item from the SDS: prior psychiatric hospitalizations.

**Analyses**

Three different client outcomes (deterioration, pre to post change, and rate of change) will be examined to evaluate whether outcomes were improved in the enhanced feedback condition compared to the feedback as usual condition, answering research question one. For each outcome, results on each of the eight CCAPS subscales will be compared to determine whether the effect of feedback differed by subscale, answering research question two. Mixed effects modeling will be used to control for nesting of clients within centers. Analyses will be conducted with restricted maximum likelihood (REML) estimation for linear mixed models and maximum likelihood (ML) estimation for generalized linear mixed models using the *nlme* (Pinheiro et al., 2019) and *lme4* (Bates et al., 2015)packages in the R programming language (version 3.5.2; R Core Team, 2018). To address research question three, a random effect of feedback at the center level will be included in each model, assessing whether the effect of feedback differed by center. Improvement to model fit from the addition of the random effect will be evaluated using a likelihood ratio test (LRT). Finally, answering research question four, several moderators of feedback will be tested. Effect sizes will be calculated where feasible using Nakagawa and Schielzeth’s (2013) R2 for generalized linear models with the *r2glmm* package in R (Jaeger, 2017). Additionally, standardized coefficients will be interpreted as standardized measures of the effect of each variable.

For all analyses, clients with at least three CCAPS administrations, CCAPS data at their first session, and complete data on all moderators will be included. Clients starting near the ceiling on certain subscales (Anxiety, Social Anxiety, Academic Distress, and Eating) who were not able to receive an off track alert were removed from analyses. Only data from each client’s first 20 sessions were modeled. The cutoff of twenty sessions was chosen because the CCAPS report only provides data based feedback for sessions through 20. Most clients seen in university counseling centers do not reach this maximum, and less than 5% of the included sample exceeded 20 sessions.

**Deterioration.** First, the rate of deterioration, or reliable worsening, in each condition will be evaluated. Clients will be classified as deteriorated if their change on a CCAPS subscale from first to last administration exceeds the subscale’s Reliable Change Index (RCI) in a negative direction, e.g., they worsen by more than the RCI of the scale (The Center for Collegiate Mental Health, 2019). The RCI is a method developed by Jacobson and Truax (1991) to determine whether change exceeds measurement error based on the reliability of the scale. Due to ceiling effects on each subscale, some clients start treatment with a score high enough that they are not able to deteriorate. These clients will be removed from this analysis, and the reduced N for each subscale will be reported.

Deterioration analyses will be modeled using two-level mixed effects logistic regressions for each CCAPS subscale, with clients nested within counseling centers. The models will include the dichotomous feedback variable, testing whether rates of deterioration differed by feedback condition. Additionally, random effects for the intercept and feedback variable will be included to test whether centers differ in their rate of deterioration and if the effect of feedback on deterioration differed by center. The general model equation implemented across all subscales is presented here:

where the overall effect of feedback on deterioration is represented by , while represents center specific variance for that effect. As the enhanced feedback is specifically targeted at reducing deterioration in clients at risk for negative outcomes, it is hypothesized that clients in the enhanced feedback condition will be less likely to deteriorate than clients in the feedback as usual condition. Moderating effects will be tested by interacting each moderator with feedback condition variable.

**Pre to post change.** Second, pre to post change will be compared across the two conditions. Change scores will be calculated from each client’s first and last CCAPS administration. Analyses of pre to post change will be modeled using two-level linear mixed effects models, again with clients nested within centers. Similar to the previous model, this will include fixed and random effects for the intercept and feedback condition. While the analysis of deterioration captures only feedback’s effect on negative treatment outcomes, this analyses tests whether feedback resulted in more positive client change. The general model equation implemented across all subscales is presented here:

where the overall effect of feedback on pre to post change is represented by , while represents center specific variance around that effect. It is hypothesized that clients seen in the enhanced feedback condition will experience more change than clients in the feedback as usual condition. Moderating effects will be tested by interacting each moderator with feedback condition.

**Rate of change.** As the third type outcome, clients’ rate of change will be compared across feedback conditions to test whether clients’ CCAPS scores improved more quickly in the enhanced feedback condition. This will be modeled with a three-level linear mixed effects model, with sessions nested within clients nested within centers. The model will include fixed and random effects for the intercept, which represents a client’s baseline score, and fixed and random effects for session number, representing the rate of change during treatment. Additionally, fixed and random effects for the interaction between session number and feedback will be included at the center level, capturing the effect of feedback on rate of change. In order to model the decelerating curve proposed by the dose effect model of therapy (Howard et al., 1986) and confirmed by prior research with the CCAPS (Lefevor et al., 2017), several different transformations of session number will be tested prior to adding the feedback or moderator variables. The best fitting transformation that minimizes the AIC will be used in subsequent analyses. Transformations include linear, logarithmic (log(session)), negative reciprocal (-1/session), and quadratic (session + session2). For each transformation, sessions will be numbered starting at zero. The general equation implemented across subscales is as follows:

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where the overall effect of feedback on rate of change is represented by , with center specific variance around that represented by While the full random effects structure specified above will be tested for each subscale, the best fitting random effects structure ultimately used for each subscale will be determined using the AIC. It is hypothesized that clients seen in the enhanced feedback condition will have steeper slopes, experiencing more rapid change during treatment. Moderating effects will be tested with a three-way interaction between the moderator, feedback condition, and session number.

**Moderators.** Several moderators will be examined to determine for whom feedback is most effective, addressing research question three. Interactions between each moderator and the dichotomous feedback condition variable will be added in a single block to the models for each of the outcomes outlined above. Due to the large sample size, interactions significant at the *p* < .01 level will be retained, and effect sizes will be interpreted. As indicated in the introduction, five moderators will be examined: whether a client went off track, initial CCAPS score, prior psychiatric hospitalization, frequency of CCAPS administration, and total number of administrations. The operationalization of each variable is detailed below, and all moderator variables will be standardized, in addition to the outcome variable.

First, whether or not a client went off track at any point during treatment will be dichotomized into two categories: not off track and off track. For clients seen in the enhanced feedback condition, going off track resulted in an off track alert. For clients in the feedback as usual condition, however, no alert was produced, and the therapist would not have been made aware that the client was off track. As outlined in the CCAPS section, going off track is triggered by a client’s score falling outside the upper bound of the 90% tolerance interval around the expected treatment trajectory for their baseline score. It is anticipated that clients who go off track will have worse outcomes than those who do not go off track. Although prior research did not consistently find a differential effect for on track and off track clients, it is hypothesized that the effect of feedback will be stronger for clients who go off track than clients who remained on track during treatment. Said another way, clients who went off track in the enhanced feedback condition and received an alert will have more positive outcomes than clients who went off track in the feedback as usual condition but did not receive an off track alert. This moderator was not tested for the outcome of deterioration, since all clients who were classified as deteriorated also met criteria for going off track.

Second, each client’s initial CCAPS score on the subscale being analyzed will be standardized and centered around the mean of their center’s baseline CCAPS scores. Both the centered client score and center average score will be included in the model. It is anticipated that higher baseline CCAPS scores will be associated with more positive outcomes and that within the restricted range of distress captured by the CCAPS, clients with higher baseline distress will benefit more from feedback and centers with higher average CCAPS scores will benefit more from feedback. Third, prior psychiatric hospitalizations will be dichotomized into no lifetime history of psychiatric hospitalization and one or more psychiatric hospitalization(s) at any point in the client’s life. It is anticipated that clients with prior psychiatric hospitalizations will have poorer outcomes and benefit less from feedback, consistent with findings from one previous study (Errázuriz & Zilcha-Mano, 2018), although in a different population and setting.

Fourth, the frequency of CCAPS administrations throughout treatment will be captured by dividing each client’s total number of CCAPS administrations by their total number of individual sessions, representing the proportion of sessions with a CCAPS; variance in CCAPS administrations will be partitioned into client within center variance and between center variance. It is anticipated that outcomes will improve as CCAPS frequency increases and that this effect will be stronger in the enhanced feedback condition, since more frequent administrations will provide more data about client progress, and therapists will have more opportunity to use the feedback to inform treatment. Fifth and finally, the total number of individual therapy sessions will be included and similarly partitioned into between and within center variance. It is anticipated that more sessions will be associated with better outcomes, and that this effect will also be stronger in the enhanced feedback condition.

Results

A total of 39,358 clients from 71 centers were included in analyses, although some subscales had reduced Ns due to clients not being able to go off track or deteriorate on those subscales. Total clients and centers for each subscale are included in the results table for each model. Of the 39,358 clients, 13,765 were in the feedback as usual condition, and 25,593 were in the enhanced feedback condition. Table 1 shows the data reduction process and the number of clients and centers lost at each step.

Internal consistencies for CCAPS subscales from data included in the present study were in line with established psychometrics for this scale, with alphas ranging from 0.81 on Generalized Anxiety and 0.9 on DI. After removing sessions above 20, clients attended from 3 to 20 individual sessions, with a mean of 7.93, a SD of 4.48, a median of 7, and a mode of 3. Clients in the enhanced feedback condition had higher starting CCAPS scores on some subscales, consistent with increasing trends in CCAPS scores during the time period the data was collected (Xiao, Carney, et al., 2017). Clients in the enhanced feedback condition also attended 0.7 more sessions on average, had more frequent CCAPS administrations, and were less likely to have a prior hospitalization. Table 2 compares all moderators by feedback condition, as well as other demographic variables. Across both conditions, 64.33% of clients went off track on at least one subscale at some point during treatment, and this did not differ between feedback conditions. The percentage of clients going off track on each subscale ranged from 15.15% on the DI to 27.27% on Academic Distress. Figure 1 shows the proportion of clients going off track at each session for both conditions.

## Deterioration

First, client deterioration, or reliable worsening, on each subscale was examined as an outcome. The direction of the effect on this outcome across all subscales was toward reduced deterioration in the enhanced feedback condition; however, the effect of feedback only significantly improved model fit on the DI (2(1) = 7.18, *p* = 0.007). Clients in the enhanced feedback condition were 10% less likely to deteriorate on the DI. The effect was small, however, ( = -0.11, SE = 0.04, OR = 0.9, *z* = -2.71, *p* = 0.007), and the R2 was less than 1%, indicating that feedback explained little variance in deterioration. Table 3 shows the effect of feedback on all subscales, and Table 4 presents deterioration rates for each subscale by feedback condition.

Addressing research question two, feedback had more of an impact on reducing deterioration on a general index of distress than on any of the domain specific subscales, although the effect was small. Addressing research question three, the random effect of feedback within centers did not significantly improve model fit on any of the subscales, and for several subscales, the inclusion of a random effect of feedback produced boundary estimates for the parameters and near singular fit warnings. This indicates that the effect of feedback on deterioration did not differ by center, and random effects of feedback were not included in subsequent models.

Finally, interactions were tested between feedback condition and each of the moderator variables. None of the moderators produced a significant effect. Looking at main effects in the absence of significant interactions, client baseline was related to deterioration on all subscales except Eating Concerns and Alcohol Use, such that higher client baseline scores decreased the odds of deterioration. Average center baseline did not have a main effect beyond the effect of client baseline. A higher frequency of CCAPS administrations at the client level was associated with decreased deterioration only on the DI, while a higher number of total appointments at the client level was associated with increased deterioration on all subscales except Alcohol Use. Neither variable had a significant effect at the center level. A history of hospitalizations was associated with increased deterioration on all subscales. Coefficients for moderators and main effects are shown in Table 5.

## Pre to Post Change

Next, pre to post treatment change on each subscale was examined, with positive change indicating improvement. The addition of feedback condition improved model fit on Academic Distress (2(1) = 8.04, *p* = 0.005), Hostility (2(1) = 7.58, *p* = 0.006), and Alcohol Use (2(1) = 7.86, *p* = 0.005). The coefficients themselves, however, were all 0 and non-significant, with R2 values of less than 1%, indicating that this was not a meaningful effect. Table 6 shows the effect of feedback on each subscale, and Figure 2 shows the predicted amount of CCAPS improvement on each subscale for the two feedback conditions. Given the lack of meaningful effects on any subscale, there is no evidence that the effect of feedback differed by domain.

Addressing research question three, a center level random effect of feedback was tested. The random effect of feedback significantly improved model fit on models of Depression (2(1) = 14.81, *p* = 0.001), Generalized Anxiety (2(1) = 17.16, *p* < .001), Social Anxiety (2(1) = 10.43, *p* = 0.005), Alcohol Use (2(1) = 18.75, *p* < .001), and the DI (2(1) = 21.7, *p* < .001), and random effects of feedback were retained for subsequent models of pre to post change on those subscales. These random effects indicate the presence of center variation around the overall effect of feedback; however, this effect was again small, accounting for less than 1% of the variance, while other, unexplained, differences between centers accounted for 1.2% to 3.2% of the variance on those same subscales. Table 6 shows the random effects variance for all subscales and the percent of variance accounted for (ICCs). The small random effects variance components indicate that while enhanced feedback may have been more effective at some centers than others, it was not a large effect. Understanding differences in how the enhanced CCAPS feedback is utilized within each center may help explain these small differences. Although outside the scope of this study, the discussion will explore possible center policies and characteristics that may be associated with more positive feedback effects.

Finally, five moderator variables were added to the model to address research question four. Client baseline CCAPS score was a significant moderator on four subscales, although the direction of the effect was not consistent. For Generalized Anxiety ( = -0.01, SE = 0, *t*(36966) = -2.88, *p* = 0.004) and the Distress Index ( = -0.01, SE = 0, *t*(39273) = -3.05, *p* = 0.002), as baseline CCAPS increased, feedback became less effective. On the other hand, for Hostility ( = 0.01, SE = 0, *t*(39273) = 2.75, *p* = 0.006) and Alcohol Use ( = 0.01, SE = 0, *t*(39273) = 3.53, *p* < .001), as baseline CCAPS increased, feedback became more effective. Center baseline was a significant moderator for Social Anxiety ( = 0.02, SE = 0.01, *t*(35707) = 3.31, *p* = 0.001), indicating that as the average center baseline level of Social Anxiety increased, feedback became more effective. While significant, these moderators had a very small effect, with standardized coefficients of .01-.02 and R2 values less than 1%. Other moderators did not have a significant effect.

There was a strong main effect for going off track on all subscales, and the lack of significant interaction indicates that this effect did not differ by feedback condition. Even in the enhanced feedback condition where clients who went off track received an off track alert, receiving this alert did not result in returning to an on track trajectory and achieving outcomes similar to clients who did not go off track. Other main effects indicated that, consistent with prior research (Carney et al., 2020), clients with higher baseline CCAPS achieved more positive change. Diverging from models of deterioration, there were also significant main effects on every subscale for CCAPS frequency and number of appointments at the client level, such that independent of feedback condition, clients with more frequent CCAPS administrations and more appointments achieved more change. Interestingly, the average number of appointments at the center level had a negative effect on Hostility, such that centers with a higher average number of appointments produced less change on Hostility, while clients within each center that received more appointments achieved more change. Consistent with models of deterioration, clients with prior hospitalizations achieved less change on most subscales. The effects for all moderators and main effects are presented in Table 7.

## Rate of Change

Finally, the rate at which CCAPS scores changed during treatment was examined. Prior to examining the predictors of interest, different transformations of session number were tested to determine which shape of change provided the best fit for the data. A log transformation provided the best fit on all subscales. The resulting shapes of change can be seen in Figure 3.

The effect of feedback on rate of change significantly improved model fit on Depression (2(1) = 15.3, *p* < .001), Generalized Anxiety (2(1) = 16.35, *p* < .001), Social Anxiety (2(1) = 29.6, *p* < .001), Eating Concerns (2(1) = 10.42, *p* = 0.001), and the DI (2(1) = 20.57, *p* < .001). Although model fit was improved, the coefficients for the effect of feedback on slope (represented by the Slope \* Feedback coefficients) were not significant, and the standardized coefficients were quite small ( = 0 to -.01), indicating that clients in the enhanced feedback condition experienced at most .01 standardized units of CCAPS change more per standardized session than clients in the feedback as usual condition. The overall effects of slope indicate that clients did improve during treatment on all subscales, and the main effects for feedback indicate that clients in the enhanced feedback condition started treatment with slightly higher scores on Depression, Generalized Anxiety, Social Anxiety, and the DI, and slightly lower scores on Hostility and Alcohol Use. Table 8 shows the effect of feedback on each subscale, and Figure 3 shows the predicted trajectories for the two feedback conditions. Addressing research question two, there is no evidence that feedback had a differential effect across domains.

Addressing research question three, the random effect of feedback at the center level improved model fit on Depression (2(1) = 25.73, *p* < .001), Generalized Anxiety (2(1) = 38.41, *p* < .001), Social Anxiety (2(1) = 31.88, *p* < .001), Hostility (2(1) = 39.19, *p* < .001), Alcohol Use (2(1) = 43.71, *p* < .001), and the DI (2(1) = 48.35, *p* < .001). Although random effects of feedback were retained for these subscales in subsequent models, differences between centers in the effect of feedback on rate of change accounted for less than 1% of the variance on each subscale, while other center effects accounted for 2.2% to 7.0% of the variance in slope, and differences between clients accounted for 90.7% to 97.6% of the variance. Similar to models of pre to post change, this indicates that while there may be differences between centers in the effect of feedback, these differences are small, as are general differences between centers in change trajectories. Random effects variance and ICCs are presented in Table 9.

Finally, moderator variables were tested. After the inclusion of moderator variables, a random effects structure without a random client intercept provided the best fit. Moderators of the effect of feedback on client rate of change are represented by the three-way interaction terms with slope and feedback (e.g. Slope \* Feedback \* Client baseline). The moderating effect of client baseline was significant for Hostility ( = -0.01, SE = 0, *t*(65792) = -3.84, *p* < .001) and Alcohol use ( = -0.01, SE = 0, *t*(65214) = -4.76, *p* < .001), such that as client baseline increased, the effect of enhanced feedback became stronger, resulting in steeper slopes, although the effect was very small, indicating that for clients in the enhanced feedback condition a one standardized unit increase in the moderator was associated with an additional .01 standardized unit of CCAPS change per standardized session. Standardized coefficients for all other moderators were 0.

Looking at main effects of the moderator variables on client rate of change, as client baseline increased, clients experienced more rapid decreases in symptoms across all subscales. Similar to analyses of pre to post change, clients who went off track during treatment exhibited slower recovery trajectories. As CCAPS frequency increased, clients experienced more rapid decreases in symptoms; conversely, as total number of appointments increased, clients experienced slower change, although both effects were small. Finally, hospitalization had a small effect such that clients with prior hospitalizations experienced slower change. Coefficients for all moderators and main effects are presented in Table 10.

**Discussion**

The present study evaluated the effectiveness of psychotherapy feedback on the CCAPS outcome measure and explored differences in the effect of feedback by domain, by center, and by client characteristics. The study had four aims. The first aim, consistent with prior research, was to test the hypothesis that client outcomes were improved in the enhanced feedback condition. The other three aims were more exploratory in nature: first, evaluate differences in the effect of feedback by domain of distress; second, test for differences in the effect of feedback by center; and third, assess the impact of client moderators on the effect of feedback.

**Research question 1: Did feedback improve outcomes?**

Research question one examined whether the enhanced feedback condition improved outcomes on the CCAPS. Although it was hypothesized based on prior research that enhanced feedback would improve outcomes, across three operationalizations of client outcome tested here (deterioration, pre to post treatment change, and rate of change), feedback did not meaningfully improve client outcomes. While many previous studies have found an effect of this type of data derived feedback, this effect is far from universal, and some possible reasons why this effect was not replicated within CCMH are discussed below.

A majority of psychotherapy feedback research has been done on the OQ, which has some notable differences from the CCAPS. First, the OQ is a unidimensional general measure of distress, while the CCAPS comprises 7 domain specific subscales. Although the CCAPS does also offer a general distress index, it is largely made up of questions from the domains of anxiety and depression. While the OQ does assess symptomology similar to some of the subscales of the CCAPS, it also includes items assessing interpersonal relationships and social functioning. The broader content area assessed by the OQ may thus have allowed it to produce stronger feedback effects. It may also be that feedback is more effective on a general distress measure than on domain specific measures like the CCAPS subscales. Importantly, when measuring similar college student populations, the general OQ score does not suffer from ceiling effects and clients who start treatment at an elevation such that they are not able to deteriorate. In fact, published deterioration rates on the OQ in college counseling center settings are typically around 10%, which is higher than deterioration rates on any single subscale of the CCAPS (2-6%) (Hansen et al., 2002). The higher rates of deterioration captured on the OQ may thus have allowed the scale to pick up on effects of feedback in reducing deterioration, one of the main outcomes that has shown an effect of feedback (Lambert et al., 2018).

Beyond differences in the instrument used for feedback and routine outcome monitoring, there are also differences between the setting in which treatment was delivered in the present study and some previous studies of feedback that found a stronger effect. Most notably, the treatment length in college counseling centers is often much shorter than in community or private practice treatment settings, and the short length of treatment may have limited feedback’s effectiveness, as treatment may not have been long enough for therapists to respond to off track feedback. Another important consideration in comparing the present study to previous research is that this was a naturalistic study before and after implementation of the enhanced feedback system, not an RCT. While the same centers contributed data in both conditions, providing some control for types of clients seen and center policies, it was impossible to control for all such confounding effects, which may have added noise to the data, making it difficult to pick up on an effect of feedback.

**Research question 2: Did the effect of feedback differ by domain?**

Research question two examined whether there were differences in the effectiveness of feedback across the domains captured by the CCAPS. In the context of largely null results of feedback across all CCAPS subscales, there is not evidence to suggest that the effect of feedback on the CCAPS differs by domain. This research question was driven by two aims. First, an empirical question of understanding whether certain domains are more responsive to feedback, and second, identifying subscales on the CCAPS that would benefit from more work on the feedback system to improve the feedback provided. While the present analyses did not produce results supportive of the either of these aims, they do suggest that future work can be done to improve CCAPS feedback across the entire measure. While the CCAPS feedback system was based on the methods used for the OQ feedback system, it might be fruitful to explore statistical methods beyond the ones currently used to derive feedback. For example, there is evidence that client rate of change differs based on the total number of sessions they utilize (Baldwin et al., 2009). While this information is not available at the beginning of treatment, predicted recovery trajectories and feedback could be updated at each session based on trajectories from clients who attended the same number of sessions or more. This feedback may be more responsive to differences in rate of change by total number of sessions attended.

These findings also suggest an opportunity to explore other forms of feedback beyond those based on rate of CCAPS change that may be more attuned to the context of counseling centers and outcomes that are especially relevant to that setting. For example, since the modal number of sessions in the original sample (before excluding clients with only one or two sessions) was one, followed next by two sessions, creating feedback systems based around the rate at which a client changes may not be optimal. Moreover, feedback on other areas than client progress should be considered. In the context of high demand for services within which university counseling centers are operating (Xiao et al., 2017), feedback on outcomes that directly impact a center’s ability to provide efficient clinical services may be particularly useful, such as a client’s predicted service utilization (Janis, 2017), risk of poor attendance (Xiao, Hayes, et al., 2017) or risk of drop out (Xiao, Castonguay, et al., 2017). Feedback on more severe negative outcomes, like suicide (Hayes et al., 2019), may also be impactful. Furthermore, attempts to improve the CCAPS feedback system should rely on clinician experience. Gathering qualitative data from therapists using the CCAPS on ways in which the feedback could be improved, as well as what types of clinical feedback would be most relevant to their work, might be particularly beneficial. Such data gathering would also serves the purposes of a PRN in bridging the gap between science and practice and allowing research and practice to inform each other.

**Research question 3: Did the effect of feedback differ by center?**

Research question three assessed whether the effect of feedback differed by center. Although some small center effects for feedback were identified, they were in the context of generally small differences between centers in the outcomes they produce. Consistent with prior research (Carney et al., 2020), the results indicate that the specific counseling center at which a client receives treatment does not have a large impact on their outcomes, and this extends to the effect of feedback.

Although small, examining the between center variance related to feedback may lead to center policy suggestions that help other centers more effectively implement and use the CCAPS. These center effects may be explained by differences in how the CCAPS feedback system was initially introduced to therapists within a center, center culture around the CCAPS, or how the CCAPS is typically used in treatment. For example, do clinicians routinely look at the CCAPS before every session when it is administered? Do clinicians review the CCAPS in sessions with their clients? Overall, however, despite differences between characteristics, operations, and policies, there is much more variation within centers than there is between centers.

**Research question 4: Were there moderators of the effect of feedback?**

Research question four aimed to address some of the ways that clients and centers differed from each other and how these differences might impact the effect of feedback. This involved the testing of moderators that were either found in previous literature (i.e., initial client severity, going off track, and previous hospitalizations), or that are of specific relevance to the counseling center setting (i.e., length of treatment and frequency of CCAPS administration). Overall, none of the moderators on any of the three outcomes had strong effects that suggest feedback is more effective for certain types of clients within the counseling center context.

Several of the moderators tested did have meaningful main effects on many subscales. The largest effect was for client baseline CCAPS score. Higher baseline CCAPS scores were associated with greater amounts of pre to post change and a more rapid rate of change. This effect may be explained by regression to the mean, as clients who start higher have more room to change and do so more quickly. For deterioration, higher baseline CCAPS scores were associated with lower rates of deterioration, likely because clients who started higher did not have as much latitude to move in a negative direction on the scale. The total number of appointments at the client level also had a significant but smaller main effect. A greater number of appointments was associated with more pre to post change but slower rate of change. This finding is consistent with the good enough level of change model of psychotherapy and prior research (Baldwin et al., 2009). Interestingly, a greater number of appointments was also associated with higher odds of deteriorating, perhaps indicating therapist responsiveness in extending treatment for clients who are not improving.

CCAPS frequency also had a significant main effect independent of feedback condition for both pre to post change and rate of change, with more frequent administrations associated with better outcomes. Unlike the other moderators tested, which cannot be changed, frequency of CCAPS administration is something that centers can control. This suggests that centers should seriously consider administering the CCAPS at every session for the maximum benefit. Such suggestion is consistent with Contextual Feedback Intervention Theory’s premise that for feedback to be effective, it must be timely. Receiving feedback at every session about how a client is progressing compared to past clients offers information that a therapist can use in an immediate and, hopefully, responsive manner to make decisions about future treatment.

Interestingly, the finding that the frequency of CCAPS administration was associated with better outcomes, irrespective of feedback conditions, provides indirect evidence for the effectiveness of routine outcome monitoring in general. It may be that receiving information about a client’s distress more often throughout treatment, even in the absence of feedback on how they compare to the average client, allows a therapist to more effectively use that information to guide future treatment. This effect could be examined further through randomization of clients to different CCAPS frequency conditions within centers.

**Limitations**

While the present study had the benefit of being able to compare enhanced feedback and feedback as usual conditions within the same counseling centers, the study did not randomize clients into each condition and had no control available for the effect of time over the four years the data were collected. The same centers were included in both feedback conditions, which provided some control for systematic differences between centers, but center policies or characteristics may have changed over the four years data were collected, introducing within center variance unrelated to the CCAPS feedback system. Similarly, centers also likely experienced some degree of therapist turnover during this time, which would have resulted in some but not all of the same clinicians being included in both conditions. Differences in therapists likely introduced additional variance not related to the feedback condition. The lack of control for these sources of variance represent a limitation in the ability to isolate the effect of feedback but provide greater external validity for the actual impact of the CCAPS feedback system on client outcomes in CCMH centers.

Another limitation is related to the CCAPS instrument itself. As noted in the methods, several of the subscales experience ceiling effects, in which clients start high enough on the subscale that they are not able to go off track or deteriorate. This necessitated the exclusion of highly distressed clients from analyses of deterioration on these subscales. While the scale was not able to capture deterioration in these clients, they may still have been getting worse during treatment. The limited range of each subscale may have also impacted the ability to find a stronger effect of feedback for more severe clients, as previous studies have found. Additionally, when measuring change on the CCAPS during treatment, it is possible that the change observed is not entirely due to true change on the constructs being measured. For example, Terborg et al. (1980) describe alpha, beta and gamma change. While alpha change represents true change on the construct being measured, beta and gamma change respectively represent change due to participants recalibrating the instrument between assessments and change due to participants reconceptualizing the construct being measured. The present study was not able to disentangle change on the CCAPS due to these three types of change, although all three likely contributed to some degree to observed changes in CCAPS scores.

Finally, clients with only one or two sessions were not included in the analyses, despite being the most common treatment lengths in college counseling centers. This exclusion criteria was used because feedback is not presented until the second session, so for clients with only one or two sessions, therapists would not have a chance to utilize the feedback to inform treatment. The necessity of excluding of clients with the two most frequent treatment lengths highlights the need to consider what types of feedback may be most helpful in the context of clients attending very few sessions.

**Future Directions**

There are a number of important research questions that were not able to be answered in the present study, many of which have been alluded to previously in the discussion. First, future research should address the paucity of knowledge about how therapist and organizational factors impact feedback’s effectiveness (Lambert et al., 2018). At the therapist level, this could include more investigations on how therapists attend to feedback and use it to inform treatment. Although the present study included the moderating effect of how often the CCAPS was administered, no information was available on how often therapists looked at the CCAPS filled out by their clients, and specifically at the feedback it provided on their progress. Prior research has unsurprisingly found that feedback is only effective if therapists attend to it (de Jong et al., 2012); however, more studies are needed to determine how clinicians use feedback to inform treatment, and how this differs based on whether a client is on or off track. Future research addressing these questions could provide a basis for policy recommendations around viewing the CCAPS before sessions, sharing it with clients, and using it for treatment planning.

Future investigations should also examine the impact of organizational variables on psychotherapy feedback. In the present study, for example, no information was collected about how the CCAPS was introduced at each center; yet, this could have had an effect on the findings presented here. Such effect could have been manifested in an interaction between the organization and therapist levels. In a center where the change to the new CCAPS system was imposed top down without therapist buy in, for instance, some therapists may have felt resentful of not being part of the decision, which may have attenuated the feedback’s effectiveness. More generally, if a center had developed a positive culture around routine outcome monitoring, where the CCAPS was discussed positively in supervision and elsewhere, therapists may had been more likely to incorporate CCAPS feedback into treatment planning, allowing it to have more of an impact. Other organizational variables may also play a role in the successful implementation of ROM and feedback system. Built on hundreds of centers using common measures, CCMH is uniquely positioned to examine such variables in future investigations.

More attention could also be given to the impact of off track alerts on treatment. Future studies, including with clients who were in this study’s feedback condition, could examine whether there are differential effects of feedback when alerts happen early in treatment as compared to later in treatment. Considering the typically short length of treatment in counseling centers and session limits present in some centers, therapists may have little time to respond to alerts that happen at the end of treatment. Further research could also examine whether client trajectories change after an off track alert, as a way to determine if therapists are able to use that information to help their clients return to an on track trajectory. Quantitative analyses required to address this question could be complemented by qualitative analyses to understand why some therapists may or may not be able to produce changes in client trajectories. Additionally, qualitative data could be collected from clients on various clinical situations that can result in an alert. For example, a client’s progress may be relatively flat or steadily getting worse and reach a point where the lack of change or worsening triggers an alert. Alternatively, a client may experience positive change initially, but then have a sudden increase in distress due to a stressful life event, resulting in an alert in the midst of treatment otherwise progressing as expected. These two alerts may generate entirely different conversations with the client. If indicated, the current CCAPS alerts could be supplemented with additional clinical information that therapists can use to improve outcomes, as the OQ does.

The lack of meaningful improvement in client outcomes from the implementation of the CCAPS feedback system raises the question of whether the implementation of the new system was worth the costs of developing this system. In addressing this question, it is important to recognize that the data examined in the present study were collected as part of ongoing routine treatment, and that no changes were made to such routine in order to gather information that would have allowed the assessment of other potential benefits of the new system. Yet, it is possible that meaningful gains may have been experienced by different stakeholders, without directly translating into improved client outcomes. As one example, after the implementation of the new CCAPS feedback system, therapists who used both the old and new CCAPS reports indicated that the new report was much easier to interpret, causing them to use it more. They also noted trickle down effects into how they conducted therapy, indicating that they frequently brought the new CCAPS report into therapy to review with a client because the report was easier for clients to understand than the previous report. In addition, they reported that the visual depiction of distress scores over time sparked conversations about how therapy was progressing and guided the focus of the session. This informal qualitative data suggests that therapist satisfaction, at least related to the CCAPS, may have increased after implementation of the feedback system. Although archival data was available to examine client outcomes before and after the report, there was no infrastructure in place to collect data related to these therapist outcomes.

This suggests a lesson that can be learned from the findings. CCMH and other PRNs should closely evaluate the outcomes they are collecting before rolling out major changes such as the implementation of the CCAPS feedback system. Fully assessing the costs and benefits of such implementation may require setting up additional infrastructure in order to capture a variety of impacts that matter but that are not easily collected through routine outcome monitoring. All stakeholders within the PRN, including therapists and clients, should optimally be involved in these discussions and in deciding what outcomes may be important to measure.

### Table 1

#### Data Reduction Steps

|  |  |  |
| --- | --- | --- |
| Data cleaning step | Client N | Center N |
| Starting N- Centers contributing all 4 years | 262839 | 82 |
| 1+ attended individual appt | 212889 | 81 |
| 3+ attended individual appt | 110878 | 81 |
| 3+ individual appts with CCAPS | 47093 | 77 |
| CCAPS at first appointment | 43417 | 77 |
| Complete data on moderators | 39358 | 71 |

### Table 2

#### Demographic and Predictor Variables by Feedback Condition

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Value | Feedback as usual | Enhanced feedback |
| Total client N (%) |  | 13765 (34.97) | 25593 (65.03) |
| Client age | Mean (SD) | 22.71 (5.45) | 22.01 (4.42) |
| Gender | Woman | 8851 (65.86) | 16399 (66.25) |
|  | Man | 4375 (32.55) | 7729 (31.23) |
|  | Transgender | 67 (0.50) | 209 (0.84) |
|  | Self-identify | 147 (1.09) | 415 (1.68) |
| Prior therapy | No | 5311 (47.43) | 10963 (49.44) |
|  | Yes | 5886 (52.57) | 11212 (50.56) |
| Depression | Mean (SD) | 1.79 (1.01) | 1.84 (1.00) |
| Generalized Anxiety | Mean (SD) | 1.89 (0.91) | 1.98 (0.90) |
| Social Anxiety | Mean (SD) | 1.92 (0.91) | 1.98 (0.90) |
| Academic Distress | Mean (SD) | 1.81 (0.99) | 1.83 (0.97) |
| Eating Concerns | Mean (SD) | 0.79 (0.91) | 0.80 (0.92) |
| Hostility | Mean (SD) | 0.95 (0.85) | 0.88 (0.82) |
| Alcohol Use | Mean (SD) | 0.59 (0.85) | 0.54 (0.82) |
| Distress Index | Mean (SD) | 1.83 (0.79) | 1.87 (0.77) |
| CCAPS frequency | Mean (SD) | 0.76 (0.30) | 0.82 (0.27) |
| Appointment N | Mean (SD) | 8.41 (4.67) | 7.67 (4.36) |
| Hospitalization | No | 12452 (90.46) | 23608 (92.24) |
|  | Yes | 1313 (9.54) | 1985 (7.76) |

### Table 3

#### Effects of Feedback on Deterioration

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Depression | Generalized Anxiety | Social Anxiety | Academic Distress | Eating Concerns | Hostility | Alcohol Use | Distress Index |
| Intercept | -3.63\*\* (0.06) | -3.47\*\* (0.06) | -3.89\*\* (0.06) | -2.86\*\* (0.04) | -3.03\*\* (0.05) | -3.83\*\* (0.06) | -4.05\*\* (0.08) | -3.92\*\* (0.07) |
| Feedback | -0.03 (0.04) | -0.02 (0.04) | -0.04 (0.04) | -0.03 (0.03) | -0.02 (0.03) | -0.07 (0.04) | -0.01 (0.04) | -0.11\* (0.04) |
| Intercept variance | 0.34 | 0.29 | 0.24 | 0.2 | 0.25 | 0.36 | 0.45 | 0.36 |
| LRT for feedback | 0.66 | 0.23 | 0.96 | 1.38 | 0.60 | 3.73 | 0.09 | 7.18\* |
| LRT for random effect of feedback | 0.70 | 0.59 | 6.19 | 0.23 | 0.00 | 0.02 | 2.21 | 0.27 |
| Center N | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 |
| Client N | 33191 | 30756 | 29432 | 27861 | 35366 | 38685 | 38337 | 38070 |
| *Note.* Parameter values indicate coefficients, with standard errors in parentheses; Intercept variance corresponds to variance of random effects; LRT = likelihood ratio test. \* *p* < .01, \*\* *p* < .001 | | | | | | | | |

### Table 4

#### Deterioration Rates by Subscale

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Feedback Condition | Depression | Generalized Anxiety | Social Anxiety | Academic Distress | Eating Concerns | Hostility | Alcohol Use | Distress Index |
| Feedback as usual | 2.37% | 2.90% | 2.09% | 5.36% | 4.42% | 2.06% | 1.61% | 1.99% |
| Enhanced feedback | 2.39% | 2.89% | 1.92% | 5.13% | 4.32% | 1.84% | 1.59% | 1.68% |

### Table 5

#### Moderating Effects of Feedback on Deterioration

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Depression | Generalized Anxiety | Social Anxiety | Academic Distress | Eating Concerns | Hostility | Alcohol Use | Distress Index |
| Intercept | -3.88\*\* (0.07) | -3.7\*\* (0.06) | -4.11\*\* (0.07) | -3.05\*\* (0.04) | -3.07\*\* (0.05) | -3.96\*\* (0.07) | -4.10\*\* (0.08) | -4.28\*\* (0.07) |
| Feedback | 0.01 (0.05) | 0.06 (0.04) | 0.04 (0.06) | 0.00 (0.03) | -0.01 (0.03) | -0.03 (0.04) | 0.02 (0.05) | -0.01 (0.05) |
| Client baseline | -0.66\*\* (0.04) | -0.6\*\* (0.03) | -0.63\*\* (0.04) | -0.55\*\* (0.03) | -0.01 (0.03) | -0.41\*\* (0.04) | 0.04 (0.04) | -0.8\*\* (0.04) |
| Center baseline | -0.05 (0.07) | -0.03 (0.06) | -0.08 (0.06) | -0.01 (0.04) | 0.05 (0.05) | -0.06 (0.06) | -0.09 (0.08) | 0.15 (0.07) |
| Client CCAPS frequency | -0.06 (0.04) | -0.04 (0.04) | -0.04 (0.05) | 0.01 (0.03) | 0.01 (0.03) | -0.1 (0.04) | -0.09 (0.04) | -0.12\* (0.04) |
| Center CCAPS frequency | -0.01 (0.06) | -0.02 (0.06) | 0.06 (0.05) | 0.02 (0.04) | 0.01 (0.05) | 0.00 (0.06) | 0.02 (0.07) | -0.07 (0.06) |
| Client Appointment N | 0.19\*\* (0.04) | 0.17\*\* (0.03) | 0.21\*\* (0.04) | 0.28\*\* (0.03) | 0.17\*\* (0.03) | 0.14\*\* (0.04) | 0.10 (0.04) | 0.18\*\* (0.04) |
| Center Appointment N | -0.13 (0.07) | 0.05 (0.07) | -0.05 (0.07) | 0.00 (0.04) | -0.09 (0.06) | 0.02 (0.07) | 0.16 (0.08) | 0.21\* (0.07) |
| Hospitalization | 0.18\*\* (0.03) | 0.14\*\* (0.03) | 0.10\* (0.04) | 0.15\*\* (0.02) | 0.13\*\* (0.02) | 0.16\*\* (0.03) | 0.16\*\* (0.03) | 0.18\*\* (0.03) |
| Feedback \* Client baseline | 0.00 (0.04) | 0.01 (0.03) | 0.05 (0.04) | 0.00 (0.03) | -0.02 (0.03) | -0.04 (0.04) | 0.07 (0.04) | 0.04 (0.04) |
| Feedback \* Center baseline | 0.01 (0.05) | 0.02 (0.04) | -0.08 (0.05) | -0.01 (0.03) | -0.04 (0.03) | 0.05 (0.04) | 0.03 (0.05) | -0.01 (0.05) |
| Feedback \* Client CCAPS frequency | -0.02 (0.04) | 0.03 (0.03) | -0.02 (0.04) | -0.01 (0.03) | 0.04 (0.03) | 0.03 (0.04) | 0.01 (0.04) | -0.02 (0.04) |
| Feedback \* Center CCAPS frequency | 0.00 (0.04) | 0.03 (0.03) | 0.03 (0.04) | 0.00 (0.03) | -0.04 (0.03) | -0.01 (0.04) | -0.02 (0.04) | -0.03 (0.04) |
| Feedback \* Client Appointment N | 0.00 (0.04) | -0.04 (0.03) | 0.04 (0.04) | 0.02 (0.03) | 0.01 (0.03) | -0.03 (0.04) | -0.01 (0.04) | -0.01 (0.04) |
| Feedback \* Center Appointment N | -0.09 (0.04) | 0.06 (0.04) | -0.01 (0.05) | 0.01 (0.03) | 0.06 (0.04) | 0.04 (0.05) | -0.12 (0.05) | 0.06 (0.05) |
| Feedback \* Hospitalization | 0.02 (0.03) | -0.02 (0.03) | 0.02 (0.04) | 0.01 (0.02) | 0.02 (0.02) | -0.02 (0.03) | -0.03 (0.03) | 0.01 (0.03) |
| Intercept variance | 0.31 | 0.3 | 0.23 | 0.19 | 0.25 | 0.35 | 0.42 | 0.27 |
| Center N | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 |
| Client N | 33191 | 30756 | 29432 | 27861 | 35366 | 38685 | 38337 | 38070 |
| *Note.* Parameter values indicate coefficients, with standard errors in parentheses; Intercept variance corresponds to variance of random effects. \* *p* < .01, \*\* *p* < .001 | | | | | | | | |

### Table 6

#### Effects of Feedback on Pre to Post Treatment Change

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Depression | Generalized Anxiety | Social Anxiety | Academic Distress | Eating Concerns | Hostility | Alcohol Use | Distress Index |
| Intercept | -0.07\* (0.02) | -0.06\*\* (0.02) | -0.03 (0.02) | -0.05\* (0.02) | -0.04\* (0.01) | -0.06\*\* (0.02) | -0.05\*\* (0.02) | -0.09\*\* (0.02) |
| Feedback | 0.00 (0.01) | 0.01 (0.01) | 0.01 (0.01) | 0.00 (0.01) | 0.01 (0.01) | 0.00 (0.01) | 0.00 (0.01) | 0.01 (0.01) |
| Intercept variance | 0.16 | 0.14 | 0.11 | 0.13 | 0.09 | 0.14 | 0.11 | 0.18 |
| Feedback variance | 0.04 | 0.04 | 0.04 | 0.00 | 0.02 | 0.03 | 0.04 | 0.05 |
| Covariance | 0.14 | 0.3 | 0.28 | 0.00 | 0.4 | 0.07 | -0.13 | 0.18 |
| Residual variance | 0.99 | 0.99 | 0.99 | 0.99 | 1 | 0.99 | 0.99 | 0.99 |
| Center intercept ICC | 2.4% | 1.9% | 1.3% | 1.7% | 0.8% | 1.8% | 1.2% | 3.2% |
| Center feedback ICC | 0.2% | 0.2% | 0.2% | 0.0% | 0.1% | 0.1% | 0.2% | 0.2% |
| LRT for feedback | 4.11 | 1.86 | 6.06 | 8.04\* | 1.57 | 7.58\* | 7.86\* | 3.02 |
| LRT for random effect of feedback | 14.81\*\* | 17.16\*\* | 10.43\* | 0.02 | 2.53 | 4.52 | 18.75\*\* | 21.7\*\* |
| Center N | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 |
| Client N | 39358 | 37051 | 35792 | 37045 | 36648 | 39358 | 39358 | 39358 |
| *Note.* Parameter values indicate coefficients, with standard errors in parentheses; Variance terms correspond to variance of random effects; ICC = intraclass correlation coefficient; LRT = likelihood ratio test. \* *p* < .01, \*\* *p* < .001 | | | | | | | | |

### Table 7

#### Moderating Effects of Feedback on Pre to Post Treatment Change

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Depression | Generalized Anxiety | Social Anxiety | Academic Distress | Eating Concerns | Hostility | Alcohol Use | Distress Index |
| Intercept | -0.08\*\* (0.02) | -0.07\*\* (0.02) | -0.05\* (0.02) | -0.06\*\* (0.02) | -0.04\*\* (0.01) | -0.06\*\* (0.02) | -0.06\*\* (0.02) | -0.09\*\* (0.02) |
| Feedback | -0.02\*\* (0.01) | -0.02\* (0.01) | 0.00 (0) | -0.01 (0) | 0.01 (0) | 0.01 (0) | 0.01 (0.01) | -0.02\* (0.01) |
| Off track | -0.35\*\* (0) | -0.39\*\* (0) | -0.41\*\* (0) | -0.44\*\* (0) | -0.44\*\* (0) | -0.32\*\* (0) | -0.32\*\* (0) | -0.34\*\* (0) |
| Client baseline | 0.5\*\* (0) | 0.41\*\* (0) | 0.35\*\* (0) | 0.43\*\* (0) | 0.45\*\* (0) | 0.62\*\* (0) | 0.66\*\* (0) | 0.41\*\* (0) |
| Center baseline | -0.03 (0.02) | 0.02 (0.02) | 0.01 (0.02) | -0.01 (0.02) | -0.02 (0.01) | -0.04 (0.02) | -0.03 (0.02) | -0.04 (0.02) |
| Client CCAPS frequency | 0.07\*\* (0) | 0.07\*\* (0) | 0.07\*\* (0.01) | 0.06\*\* (0) | 0.05\*\* (0) | 0.07\*\* (0) | 0.05\*\* (0) | 0.07\*\* (0) |
| Center CCAPS frequency | 0.00 (0.02) | 0.01 (0.02) | -0.01 (0.02) | -0.01 (0.02) | 0.01 (0.01) | 0.02 (0.02) | 0.00 (0.02) | 0.00 (0.02) |
| Client Appointment N | 0.1\*\* (0) | 0.1\*\* (0) | 0.1\*\* (0) | 0.09\*\* (0) | 0.07\*\* (0) | 0.1\*\* (0) | 0.08\*\* (0) | 0.11\*\* (0) |
| Center Appointment N | -0.03 (0.02) | -0.02 (0.02) | 0.00 (0.02) | -0.02 (0.02) | 0.00 (0.01) | -0.05\* (0.02) | -0.03 (0.02) | -0.04 (0.02) |
| Hospitalization | -0.03\*\* (0) | -0.03\*\* (0) | -0.02\*\* (0) | -0.02\*\* (0) | -0.01 (0) | -0.02\*\* (0) | -0.01 (0) | -0.03\*\* (0) |
| Feedback \* Off track | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.01 (0) | 0.00 (0) | 0.00 (0) | -0.01 (0) | 0.00 (0) |
| Feedback \* Client baseline | -0.01 (0) | -0.01\* (0) | 0.00 (0) | 0.00 (0) | 0.01 (0) | 0.01\* (0) | 0.01\*\* (0) | -0.01\* (0) |
| Feedback \* Center baseline | 0.00 (0.01) | 0.01 (0.01) | 0.02\*\* (0.01) | 0.00 (0) | -0.01 (0.01) | 0.00 (0) | -0.01 (0.01) | 0.00 (0.01) |
| Feedback \* Client CCAPS frequency | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) |
| Feedback \* Center CCAPS frequency | 0.00 (0.01) | -0.01 (0.01) | -0.01 (0) | 0.00 (0) | -0.01 (0) | 0.00 (0) | -0.01 (0.01) | 0.00 (0.01) |
| Feedback \* Client Appointment N | 0.01 (0) | 0.01 (0) | 0.01 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.01 (0) | 0.01 (0) |
| Feedback \* Center Appointment N | 0.00 (0.01) | 0.00 (0.01) | -0.01 (0.01) | -0.01 (0.01) | -0.01 (0.01) | 0.00 (0) | 0.01 (0.01) | 0.00 (0.01) |
| Feedback \* Hospitalization | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.01 (0) | 0.00 (0) | 0.00 (0) |
| Intercept variance | 0.02 | 0.02 | 0.02 | 0.01 | 0.01 | 0.02 | 0.01 | 0.02 |
| Feedback variance | 0 | 0 | - | - | - | - | 0 | 0 |
| Covariance | 0.12 | 0.26 | - | - | - | - | 0.03 | 0.09 |
| Residual variance | 0.58 | 0.63 | 0.67 | 0.6 | 0.58 | 0.46 | 0.45 | 0.66 |
| Center N | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 |
| Client N | 39358 | 37051 | 35792 | 37045 | 36648 | 39358 | 39358 | 39358 |
| *Note.* Parameter values indicate coefficients, with standard errors in parentheses; Variance terms correspond to variance of random effects. \* *p* < .01, \*\* *p* < .001 | | | | | | | | |

### Table 8

#### Fixed Effects of Feedback on Rate of Change

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Depression | Generalized Anxiety | Social Anxiety | Academic Distress | Eating Concerns | Hostility | Alcohol Use | Distress Index |
| Intercept | 0.38\*\* (0.02) | 0.34\*\* (0.01) | 0.22\*\* (0.01) | 0.12\*\* (0.02) | 0.13\*\* (0.01) | 0.38\*\* (0.02) | 0.22\*\* (0.02) | 0.41\*\* (0.02) |
| Slope | -0.25\*\* (0.01) | -0.2\*\* (0.01) | -0.14\*\* (0.01) | -0.1\*\* (0.01) | -0.06\*\* (0.01) | -0.19\*\* (0.01) | -0.11\*\* (0.01) | -0.25\*\* (0.01) |
| Feedback | 0.02\*\* (0.01) | 0.04\*\* (0.01) | 0.03\*\* (0.01) | 0.01 (0.01) | 0.00 (0.01) | -0.05\*\* (0.01) | -0.05\*\* (0.01) | 0.02\*\* (0.01) |
| Slope \* Feedback | 0.00 (0) | -0.01 (0) | -0.01 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | -0.01 (0) |
| LRT for feedback | 15.3\*\* | 16.35\*\* | 29.6\*\* | 1.7 | 10.42\* | 0.05 | 0.04 | 20.57\*\* |
| Center N | 39358 | 37051 | 35792 | 37045 | 36648 | 39358 | 39358 | 39358 |
| Client N | 71 | 71 | 71 | 71 | 71 | 71 | 71 | 71 |
| *Note.* Parameter values indicate coefficients, with standard errors in parentheses; LRT = likelihood ratio test. \* *p* < .01, \*\* *p* < .001 | | | | | | | | |

### Table 9

#### Random Effects of Feedback on Rate of Change

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Depression | Generalized Anxiety | Social Anxiety | Academic Distress | Eating Concerns | Hostility | Alcohol Use | Distress Index |
| Client intercept variance | 0.865 | 0.778 | 0.861 | 0.766 | 0.829 | 1.128 | 1.206 | 0.83 |
| Client slope variance | 0.08 | 0.071 | 0.051 | 0.075 | 0.063 | 0.091 | 0.088 | 0.076 |
| Client intercept \* slope covariance | -0.129 | -0.085 | -0.065 | -0.093 | -0.087 | -0.215 | -0.225 | -0.097 |
| Center intercept variance | 0.022 | 0.006 | 0.008 | 0.019 | 0.003 | 0.027 | 0.025 | 0.02 |
| Center slope variance | 0.004 | 0.004 | 0.002 | 0.002 | 0.001 | 0.004 | 0.002 | 0.006 |
| Center feedback \* slope variance | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Center intercept \* slope covariance | -0.003 | -0.001 | 0 | -0.003 | 0 | -0.002 | -0.001 | -0.003 |
| Center intercept \* slope \* feedback covariance | 0 | 0 | 0 | 0 | 0 | 0 | -0.001 | 0 |
| Center slope \* feedback \* slope covariance | 0.001 | 0.001 | 0 | 0 | 0 | 0 | 0 | 0.001 |
| Residual | 0.222 | 0.216 | 0.16 | 0.272 | 0.214 | 0.205 | 0.201 | 0.174 |
| LRT for random effect of feedback | 25.73\*\* | 38.41\*\* | 31.88\*\* | 6.82 | 8.07 | 39.19\*\* | 43.71\*\* | 48.35\*\* |
| Center slope ICC | 5.2% | 5.4% | 3.8% | 2.9% | 2.2% | 4.4% | 2.4% | 7.1% |
| Feedback slope ICC | 0.3% | 0.4% | 0.4% | 0.1% | 0.2% | 0.3% | 0.3% | 0.5% |
| Client slope ICC | 94.5% | 94.3% | 95.8% | 97.0% | 97.7% | 95.3% | 97.4% | 92.4% |
| *Note.* Variance terms correspond to variance of random effects; LRT = likelihood ratio test; ICC = intraclass correlation coefficient; \* *p* < .01, \*\* *p* < .001 | | | | | | | | |

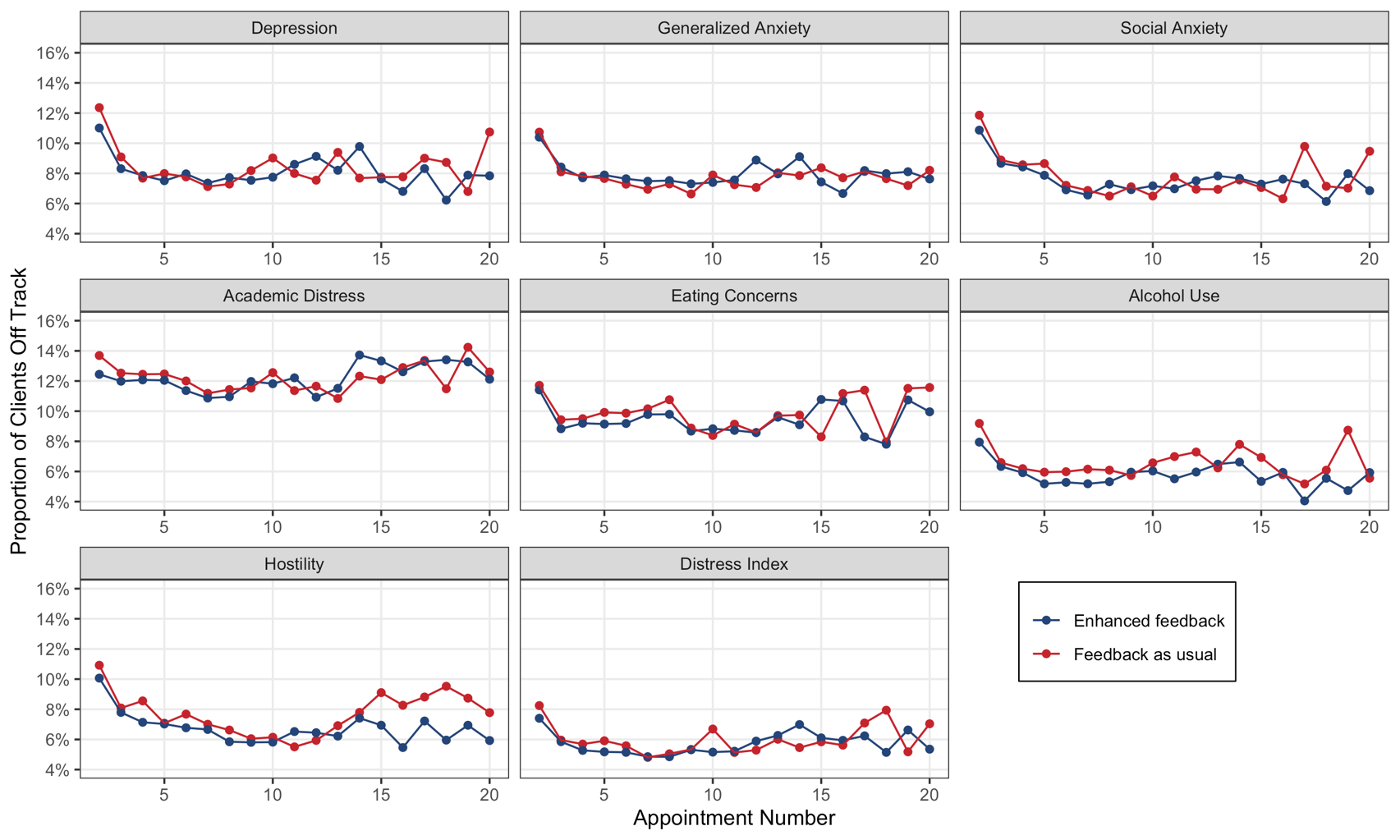
### Table 10

#### Moderating Effects of Feedback on Rate of Change

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Depression | Generalized Anxiety | Social Anxiety | Academic Distress | Eating Concerns | Hostility | Alcohol Use | Distress Index |
| Intercept | 0.4\*\* (0.02) | 0.35\*\* (0.02) | 0.24\*\* (0.02) | 0.11\*\* (0.03) | 0.14\*\* (0.01) | 0.39\*\* (0.02) | 0.23\*\* (0.03) | 0.42\*\* (0.02) |
| Slope | -0.26\*\* (0.01) | -0.21\*\* (0.01) | -0.14\*\* (0.01) | -0.11\*\* (0.01) | -0.07\*\* (0.01) | -0.2\*\* (0.01) | -0.12\*\* (0.01) | -0.27\*\* (0.01) |
| Feedback | -0.01\* (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | -0.01\* (0) | 0.00 (0) | -0.01\* (0) |
| Slope \* Feedback | 0.01\*\* (0) | 0.01 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.01\* (0) |
| Client baseline | 0.99\*\* (0) | 0.94\*\* (0) | 0.97\*\* (0) | 0.94\*\* (0) | 0.95\*\* (0) | 1.1\*\* (0) | 1.13\*\* (0) | 0.95\*\* (0) |
| Center baseline | 0.03 (0.03) | -0.01 (0.02) | -0.03 (0.02) | -0.03 (0.03) | 0.02 (0.01) | -0.02 (0.02) | -0.04 (0.03) | -0.05 (0.02) |
| Off track | 0.09\*\* (0) | 0.09\*\* (0) | 0.08\*\* (0) | 0.09\*\* (0) | 0.09\*\* (0) | 0.09\*\* (0) | 0.09\*\* (0) | 0.07\*\* (0) |
| Client CCAPS Frequency | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | -0.01 (0) | -0.01\*\* (0) | -0.01\*\* (0) | 0.00 (0) |
| Center CCAPS Frequency | 0.02 (0.02) | 0.01 (0.02) | -0.03 (0.02) | -0.04 (0.03) | -0.01 (0.01) | 0.03 (0.02) | 0.01 (0.03) | 0.01 (0.02) |
| Client Appointment N | -0.02\*\* (0) | -0.02\*\* (0) | -0.01\*\* (0) | -0.01\*\* (0) | -0.02\*\* (0) | -0.03\*\* (0) | -0.02\*\* (0) | -0.01\*\* (0) |
| Center Appointment N | -0.03 (0.02) | 0.01 (0.02) | -0.01 (0.02) | -0.04 (0.03) | -0.01 (0.01) | -0.05 (0.03) | 0.00 (0.03) | -0.05 (0.02) |
| Hospitalization | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | -0.01\*\* (0) | 0.00 (0) | 0.00\* (0) |
| Feedback \* Off track | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) |
| Feedback \* Client baseline | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | -0.01\* (0) | -0.01\*\* (0) | 0.00 (0) |
| Feedback \* Center baseline | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) |
| Feedback \* Client CCAPS Frequency | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) |
| Feedback \* Center CCAPS Frequency | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) |
| Feedback \* Client Appointment N | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00\* (0) | 0.00 (0) | 0.00 (0) |
| Feedback \* Center Appointment N | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) |
| Feedback \* Hospitalization | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) |
| Slope \* Off track | 0.13\*\* (0) | 0.14\*\* (0) | 0.13\*\* (0) | 0.17\*\* (0) | 0.15\*\* (0) | 0.12\*\* (0) | 0.11\*\* (0) | 0.12\*\* (0) |
| Slope \* Client baseline | -0.19\*\* (0) | -0.15\*\* (0) | -0.11\*\* (0) | -0.17\*\* (0) | -0.16\*\* (0) | -0.24\*\* (0) | -0.26\*\* (0) | -0.15\*\* (0) |
| Slope \* Center baseline | 0.01 (0.01) | -0.01 (0.01) | 0.00 (0.01) | 0.01 (0.01) | 0.01 (0.01) | 0.01 (0.01) | 0.01 (0.01) | 0.01 (0.01) |
| Slope \* Client CCAPS Frequency | -0.02\*\* (0) | -0.02\*\* (0) | -0.02\*\* (0) | -0.02\*\* (0) | -0.02\*\* (0) | -0.02\*\* (0) | -0.02\*\* (0) | -0.02\*\* (0) |
| Slope \* Center CCAPS Frequency | -0.01 (0.01) | 0.00 (0.01) | 0.00 (0.01) | 0.01 (0.01) | 0.00 (0.01) | -0.01 (0.01) | -0.01 (0.01) | -0.01 (0.01) |
| Slope \* Client Appointment N | 0.03\*\* (0) | 0.02\*\* (0) | 0.01\*\* (0) | 0.00 (0) | 0.00 (0) | 0.02\*\* (0) | 0.00\* (0) | 0.04\*\* (0) |
| Slope \* Center Appointment N | 0.02 (0.01) | 0.01 (0.01) | -0.01 (0.01) | 0.01 (0.01) | 0.00 (0.01) | 0.03\* (0.01) | 0.01 (0.01) | 0.02 (0.01) |
| Slope \* Hospitalization | 0.01\*\* (0) | 0.01\*\* (0) | 0.01\*\* (0) | 0.01\*\* (0) | 0.00 (0) | 0.01\*\* (0) | 0.00 (0) | 0.01\*\* (0) |
| Slope \* Feedback \* Off track | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) |
| Slope \* Feedback \* Client baseline | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00\* (0) | -0.01\*\* (0) | -0.01\*\* (0) | 0.00 (0) |
| Slope \* Feedback \* Center baseline | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) |
| Slope \* Feedback \* Client CCAPS Frequency | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) |
| Slope \* Feedback \* Center CCAPS Frequency | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) |
| Slope \* Feedback \* Client Appointment N | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) |
| Slope \* Feedback \* Center Appointment N | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) |
| Slope \* Feedback \* Hospitalization | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) | 0.00 (0) |
| *Note.* Parameter values indicate coefficients, with standard errors in parentheses; Variance terms correspond to variance of random effects. \* *p* < .01, \*\* *p* < .001 | | | | | | | | |

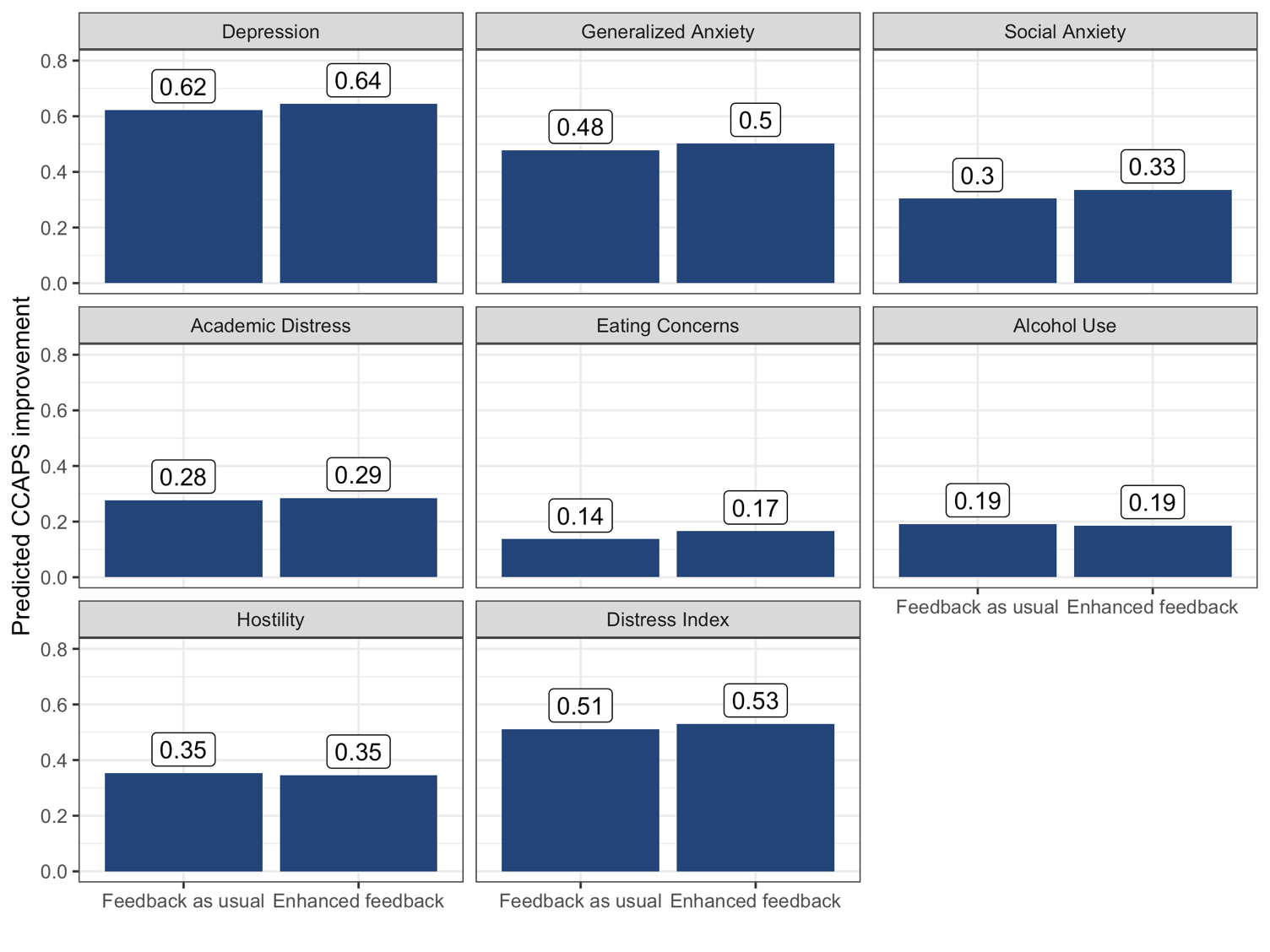
### Figure 1

#### Proportion of Clients Off Track at Each Session



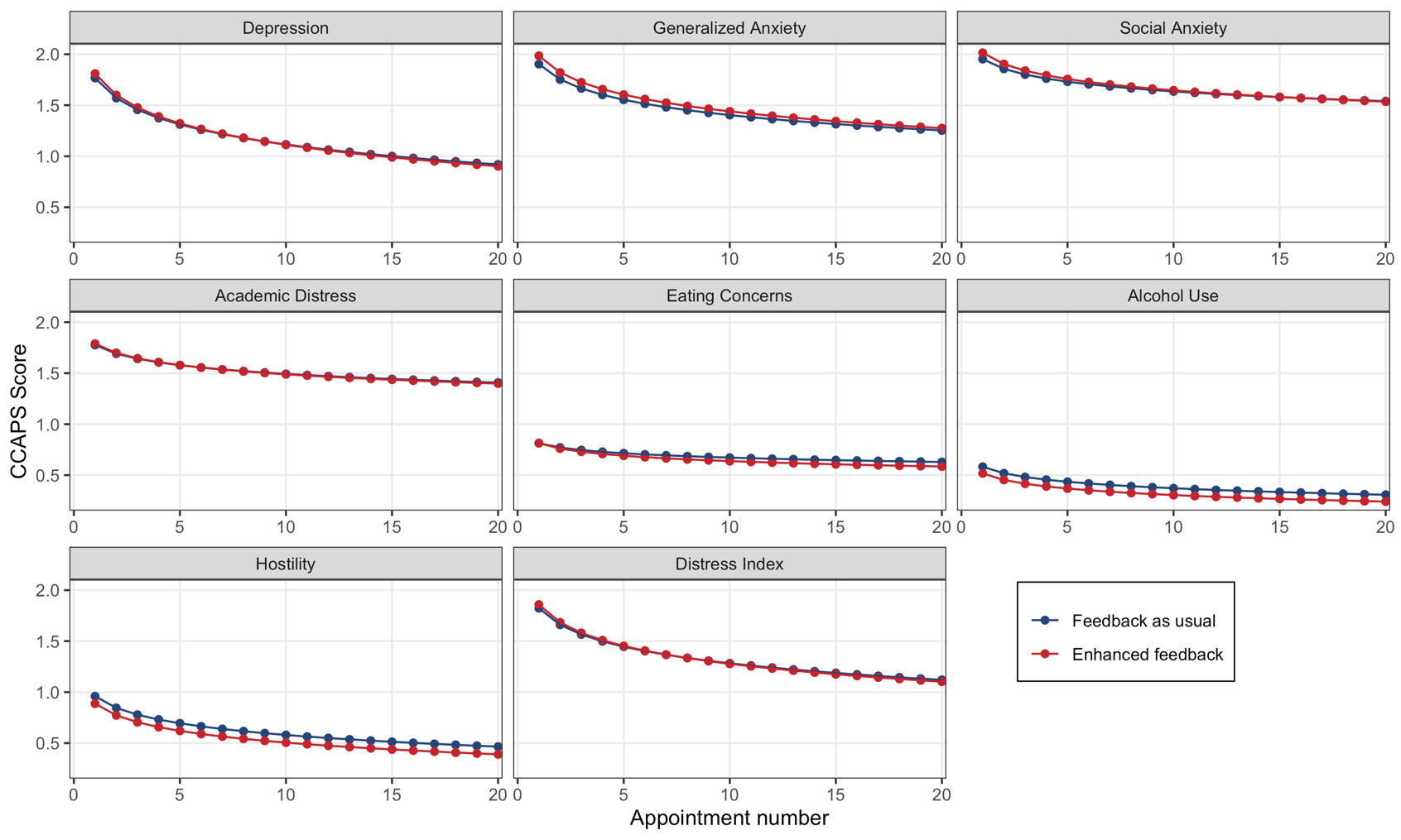
### Figure 2

#### Predicted CCAPS Change by Feedback Condition



### Figure 3

#### Predicted CCAPS Change Trajectories by Feedback Condition



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**Appendix A**

Original CCAPS Report without Feedback



**Appendix B**

Updated CCAPS Report with Feedback and Off Track Alerts

