

Comparing cognitive fusion and cognitive reappraisal as predictors of college student mental health

Jennifer Krafft^a

Jack Haeger^a

Michael E. Levin^a

Utah State University

Author Note

^a2810 Old Main Hill, Department of Psychology, Utah State University, Logan UT

Correspondence concerning this article should be addressed to Jennifer Krafft, 2810 Old Main Hill, Department of Psychology, Utah State University, Logan UT 84322.

Jennifer Krafft: jennifer.krafft@aggiemail.usu.edu

Jack Haeger, M.S.: jack.haeger@aggiemail.usu.edu

Michael E. Levin, Ph.D.: Michael.Levin@usu.edu

Abstract

Transdiagnostic cognitive behavioral interventions target different cognitive processes to promote mental health, including cognitive fusion and cognitive reappraisal. Determining the relative impact of cognitive fusion and reappraisal on a range of student mental health concerns could help interventions target psychopathological cognitive processes more effectively.

Therefore this study examined the longitudinal impact of cognitive fusion and reappraisal on mental health and functioning outcomes. A series of hierarchical regression models tested the effects of cognitive fusion and reappraisal in a sample of college students ($n = 339$). When controlling for reappraisal and baseline symptoms, fusion predicted distress, depression, generalized anxiety, social anxiety, hostility, academic distress, and student role problems one month later. Reappraisal predicted only student role problems longitudinally when controlling for fusion. These results suggest that cognitive fusion is a stronger predictor than reappraisal for a range of student mental health concerns and may be a particularly important target for improving student mental health.

Keywords: defusion; cognitive behavior therapy; acceptance and commitment therapy; college student mental health; mindfulness

Comparing cognitive fusion and cognitive reappraisal as predictors of college student
mental health

Transdiagnostic approaches to psychopathology have been growing more common as proponents argue that they can provide a more parsimonious conceptualization of psychopathology and therefore assessment and treatment, particularly in light of diagnostic overlap and comorbidity (Barlow, Allen, & Choate, 2004; Mansell, Harvey, Watkins, & Shafran, 2009). Several full transdiagnostic cognitive-behavioral interventions have been developed including Barlow's Unified Protocol (UP; Barlow et al., 2004) and acceptance and commitment therapy (ACT; Hayes, Strosahl, & Wilson, 2011). There is widespread agreement among cognitive-behavioral therapists that thought processes contribute to psychopathology, although there are diverse conceptualizations of how thoughts relate to dysfunctional behavior (e.g., Hayes et al., 2011; Hofmann & Asmundson, 2008).

Multiple cognitive processes have been proposed as transdiagnostic contributors to psychopathology, such as irrational misappraisals (Barlow et al., 2004) and cognitive fusion (Hayes et al., 2011), and corresponding transdiagnostic intervention techniques including reappraisal and defusion have also been proposed. Both cognitive fusion (Gillanders et al., 2014) and cognitive reappraisal (Gross & John, 2003) are associated with psychopathology in the expected directions. Cognitive reappraisal involves changing the content of thoughts in order to alter their emotional impact (Gross & John, 2003), generally by reconstructing negative thoughts in order to emphasize more positive or realistic aspects of a situation. For example, someone experiencing social anxiety might reevaluate the likelihood that others will judge her negatively, her ability to cope if she were judged negatively, or focus on positive aspects of the situation such as the opportunity to make new friends. Cognitive reappraisal is incorporated into

transdiagnostic cognitive-behavioral treatment approaches such as UP as a way to correct maladaptive thinking processes and support exposure to feared content (Barlow et al., 2004).

In contrast, cognitive defusion involves changing the function of thoughts in order to reduce their impact on behavior. When one is fused with thoughts, they are perceived as literally true rather than as thoughts that dominate over behavior (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). For example, when one is fused with the thought “I’m worthless” they may withdraw from social connections or personal challenges, while a person who can defuse from the thought “I’m worthless” may continue to pursue valued aims while still experiencing that thought. Defusion provides an alternative to fusion in which unhelpful thoughts are considered less believable, less important, or are experienced with more willingness even when their content is unchanged, resulting in more flexible behavior. Theoretically, cognitive fusion is expected to have a major impact on behavior, as it describes a general way of relating to thoughts that applies across diverse situations, and is equally relevant whether one’s thoughts are rational or irrational.

Debate has emerged over how similar or distinct cognitive defusion and reappraisal are as strategies for coping with difficult thoughts (Arch & Craske, 2008; Hayes, 2008). Defusion and reappraisal may share some features, such as increasing awareness of thoughts that arise and how they impact one’s behavior. Conversely, defusion involves changing the relationship of thoughts to behavior, while reappraisal involves changing the content of thoughts, which would suggest that when fusion is low, reappraisal may not be needed as thoughts may not be viewed as barriers. These two conceptualizations also suggest very different intervention strategies. If targeting fusion is a therapeutic goal, one might use ACT or other mindfulness-based interventions and strive to alter how clients relate to thoughts in order to change the impact of thoughts on a client’s behavior (i.e., focusing on the context of thoughts). If targeting reappraisal

is paramount, a therapist might use cognitive therapy methods to teach their client to systematically notice their thoughts, evaluate whether the thoughts are accurate and/or helpful, and generate alternative thoughts (i.e., focusing on the content of thoughts) in order to facilitate behavior change.

Brief experimental interventions have found that both defusion and reappraisal can reduce distress (Barrera, Szafranski, Ratcliff, Garnaat, & Norton, 2016; Yovel, Mor, & Shakarov, 2014) and change problematic smoking behavior (Beadman et al., 2015). However, studies have found defusion superior to reappraisal in altering believability of negative thoughts and positive affect (Larsson, Hooper, Osborne, Bennett, & McHugh, 2016), problematic eating (Moffitt, Brinkworth, Noakes, & Mohr, 2012), and body image concerns (Deacon, Fawzy, Lickel, & Wolitzky-Taylor, 2011).

To the best of our knowledge, no previous studies have directly compared naturalistic use of reappraisal and fusion as longitudinal predictors of symptoms or functioning. Evaluating the impact of fusion and reappraisal on a range of mental health outcomes could help to clarify whether the two constructs are indeed predictive of psychopathology across different diagnoses, and whether fusion has greater impact in specific areas, as some experimental studies have suggested. Greater clarity on these questions could lead to refined transdiagnostic models of mental illness and allow therapists to determine how to best help their clients address difficult thoughts. In addition, studying the impact of both fusion and reappraisal on mental health and functioning in the same sample could help clarify the relationship between these two constructs, such as whether individuals who are more fused with their thoughts tend to reappraise less or more.

Therefore, we examined reappraisal and fusion as predictors of mental illness symptoms and functioning in a sample of undergraduate college students. Although the impact of reappraisal and fusion should also be tested further experimentally, examining individual levels of reappraisal and fusion in a naturalistic context can provide an initial evaluation of how trait-level ways of responding to thoughts affect mental health outcomes across diagnoses. We predicted that: 1) fusion would be a stronger predictor of mental health symptoms and problems in functioning over time as compared with reappraisal, 2) fusion would have larger correlations with mental health symptoms and problems in functioning compared with reappraisal, and 3) fusion and reappraisal would be positively correlated.

Methods

Participants

339 participants were recruited to participate in this study in exchange for research participation credit in their psychology courses. The mean age of participants was 21.73 with a standard deviation of 5.46 and a range of 18 to 55. The sample was 65.2% female and 34.8% male. The participants were generally homogeneous in ethnicity (94.6% not Hispanic or Latino, 5.4% Hispanic or Latino) and race (92.3% White, 3.2% Asian, 1.8% American Indian/Alaska Native, 0.9% Native Hawaiian/Pacific Islander, 0.9% Black, 2.1% other.)

Although the sample was unscreened, a significant proportion of respondents met cutoffs for distress (11.3%), depression (18.4%), social anxiety (21.7%), generalized anxiety (14.8%), academic distress (11.6%), and eating concerns (31.8%) on the CCAPS-34 at baseline (Locke et al., 2012).

Procedures

Participants were recruited through the Sona research participation platform. After providing informed consent participants completed a battery of assessments online, including several other self-report measures assessing demographics and mental health predictors and outcomes. A follow-up survey that assessed the same outcomes was completed four weeks after the initial survey, which was completed by 301 participants (88.79% of those who completed the initial survey). All procedures were approved by the Institutional Review Board of the authors' university. Random responding was screened with one final self-report question, "Overall, how would you describe your participation in this entire survey?" rated from 1 ("I answered every question carefully and honestly") to 5 ("I randomly responded and/or did not respond honestly to any questions"), and one participant was excluded for a high response on this item. This screening process has been used in previous studies (Levin, Lillis, & Hayes, 2012).

Measures

Cognitive Fusion Questionnaire (CFQ; Gillanders et al., 2014). The CFQ is a 7-item measure of cognitive fusion. A sample item is "I tend to get very entangled in my thoughts." Each item is rated on a 7-point scale and higher scores indicate higher levels of cognitive fusion. The CFQ has excellent internal consistency and good temporal stability as well as good evidence of construct validity in college students (Gillanders et al., 2014). Internal consistency for the present sample was $\alpha = .95$.

Fusion is a dimensional construct (Gillanders et al., 2014), and as such the CFQ may be considered a measure of both fusion and defusion (indicated by low fusion scores). However, all items on the measure are worded to measure fusion directly, and reverse scored items written to measure defusion loaded on a separate factor in validation analyses (no reverse scored items were retained in the final version; Gillanders et al., 2014).

Emotion Regulation Questionnaire-Cognitive Reappraisal (ERQ-CR; Gross & John, 2003). The ERQ measures use of emotion regulation strategies. The 6-item subscale measuring cognitive reappraisal was used in the present study. A sample item is “I control my emotions by changing the way I’m thinking about the situation I’m in.” Each item is rated on a 7-point scale and higher scores indicate greater use of reappraisal. The cognitive reappraisal subscale has adequate reliability and validity in undergraduate college students (Gross & John, 2003). Internal consistency for the present sample was $\alpha = 0.89$.

Ruminative Thought Style Questionnaire (RTSQ; Brinker & Dozois, 2009). A revised 15-item version of the RTSQ (Tanner, Voon, Hasking, & Martin, 2013) was used to measure use of rumination. A sample item is “I find that my mind goes over things again and again.” Each item is scored on a 7-point scale and higher scores indicate higher levels of rumination. The RTSQ has had high internal consistency and good test-retest reliability and convergent validity in past studies (Brinker & Dozois, 2009; Tanner, et al., 2013). Internal consistency in the present sample was $\alpha = .94$.

Counseling Center Assessment of Psychological Symptoms, 34-item version (CCAPS-34; Locke et al., 2012). The 34-item version of the CCAPS was administered to assess mental health problems across a range of domains. This measure generates subscale scores indicating distress, depression, generalized anxiety, social anxiety, hostility, eating concerns, and academic distress. Six items from the 64-item version of the CCAPS were also administered to assess family distress. Each item is rated on a 5-point scale, subscale scores are computed based on the average of individual items, and higher scores indicate higher distress. The CCAPS-34 has good internal consistency and convergent validity in college students (Locke et al., 2012). Internal consistency in the present study ranged from $\alpha = .76$ to $\alpha = .92$. As reported above, the

CCAPS can be used to calculate cutoff scores for its subscales that indicate a high probability of a clinical problem in that area (Center for Collegiate Mental Health, 2012).

Social Adjustment Scale-Self Report (SAS-SR; Weissman & Bothwell, 1976). The SAS-SR measures functioning in several life domains. In the present study, the 6-item student role and 9-item social and leisure activity subscales were administered. A sample student role item is “Have you been able to keep up with your class work in the last 2 weeks?” A sample social and leisure activity item is “Have you felt lonely and wished for more friends during the last 2 weeks?” Each item is rated on a 5-point scale, mean scores are calculated for each subscale, and higher scores indicate greater levels of impairment. The SAS-SR has had adequate reliability and validity in past studies (Weissman & Bothwell, 1976). Internal consistency was marginal in the present study (student $\alpha = 0.68$, social/leisure $\alpha = .61$).

Results

Descriptive statistics

Means and standard deviations for all study variables at baseline are presented in Table 1. Prior to conducting analyses variables were inspected for their distribution. Depression, hostility, family distress, and problems in student functioning were all distributed non-normally in this sample and all demonstrated acceptable normality after a square root transformation. The transformed variables were used for all further analyses.

[INSERT TABLE 1 AROUND HERE]

Correlations

Zero-order correlations were calculated for all study variables at baseline (see Table 2). Cognitive fusion was significantly correlated with rumination and reappraisal, as well as all distress and functioning variables with statistical significance $p < .01$. Higher cognitive fusion

was associated with less use of reappraisal ($r = -.35$) and increased rumination ($r = .69$). Higher cognitive fusion was associated with greater distress and problems in functioning with medium to large correlation coefficients ranging from .38 to .77.

Cognitive reappraisal was also significantly associated with rumination ($r = -.22$), such that those who reappraise more tend to ruminate less. There were significant small to medium negative correlations for use of reappraisal with distress and problems in functioning, with correlation coefficients ranging from -.13 to -.39 (all $ps < .05$).

Correlations between outcomes of interest with cognitive fusion and cognitive reappraisal were compared using recommended methods to determine if the difference in correlation size was significant (Meng, Rosenthal, & Rubin, 1992). The direction of all correlations with reappraisal was reversed prior to analyses to account for reappraisal measuring a putatively adaptive process, while cognitive fusion is measuring a putatively maladaptive process. Detailed results are reported in Table 2. The analyses indicated that cognitive fusion had significantly larger relationships with rumination, distress, depression, generalized anxiety, social anxiety, hostility, eating problems, academic distress, social role problems, and family distress when compared with cognitive reappraisal (all $ps < .05$). There was not a significant difference in the size of correlations with reappraisal and fusion for student role problems ($ps > .05$).

[INSERT TABLE 2 AROUND HERE]

Longitudinal regression models

A series of hierarchical regression models were computed testing cognitive fusion and cognitive reappraisal as predictors of outcome variables. Dependent variables at baseline were entered as the initial predictors in each model, followed by cognitive fusion and reappraisal

entered together in the next step. The results of these models are presented in Table 3. Tolerance values all exceeded .4, indicating no problematic multicollinearity.

In this series of hierarchical regression models, cognitive fusion significantly predicted distress ($\beta = .153, p = .006$), depression ($\beta = .202, p < .001$), generalized anxiety ($\beta = .166, p = .001$), social anxiety ($\beta = .167, p < .001$), academic distress ($\beta = .196, p < .001$), and hostility one month later ($\beta = .097, p = .038$), while controlling for reappraisal as well as the corresponding symptoms at baseline. In contrast, reappraisal was not a significant longitudinal predictor of any of these outcomes while controlling for cognitive fusion and baseline symptoms ($ps > .05$).

Both cognitive fusion and cognitive reappraisal emerged as significant longitudinal predictors of student role problems one month later as measured with the SAS-SR (fusion: $\beta = .111, p = .035$; reappraisal: $\beta = -.105, p = .04$). Finally, neither cognitive fusion nor reappraisal significantly predicted social role problems or family distress one month later when controlling for the same variables at baseline (all $ps > .05$).

Fusion and reappraisal together accounted for significant additional variance in the follow-up outcomes at the $p < 0.05$ level in the models predicting distress ($\Delta R^2 = 0.012$), depression ($\Delta R^2 = 0.025$), generalized anxiety ($\Delta R^2 = 0.016$), social anxiety ($\Delta R^2 = .02$), academic distress ($\Delta R^2 = .031$), and student role problems ($\Delta R^2 = .025$).

[INSERT TABLE 3 AROUND HERE]

Discussion

Although both fusion and reappraisal were associated with all outcomes studied, fusion shared larger correlations than reappraisal with nearly all outcomes (rumination, distress, depression, generalized anxiety, social anxiety, hostility, eating problems, academic distress,

family distress, and social/leisure problems). In addition, fusion predicted distress, depression, generalized anxiety, social anxiety, hostility, academic distress, and student role problems over time controlling for baseline symptoms and reappraisal, while reappraisal only predicted student role problems when controlling for baseline functioning and fusion.

These findings support the idea that fusion is closely connected to a broad set of outcomes across diagnoses and is a useful transdiagnostic treatment target. One possible interpretation of this is that fusion has broader effects because fusion describes a general way of relating to thoughts, while reappraisal inherently involves the content of thoughts and therefore may be more relevant to some domains than others. The correlation between fusion and rumination was large, replicating the findings of Gillanders et al. (2014) and suggesting that targeting fusion could potentially be particularly useful for those who ruminate. The larger relationship between fusion and symptoms as compared to reappraisal is also consistent with past research showing that maladaptive coping strategies tend to be more predictive of psychopathology than adaptive coping strategies (Aldao, Nolen-Hoeksema, & Schweizer, 2010). It is unclear if this pattern is due to true differences or to measurement issues such as process and symptom measures both capturing distress.

In the present sample, higher fusion was associated with less reappraisal. This finding was unexpected, as we predicted that individuals who are more fused would see more need to change their thoughts with methods such as reappraisal. One way to understand this finding is that the process of reappraisal may require or support some degree of defusion, because it is necessary to notice one's thought process and recognize the possibility of having alternative thoughts (i.e., take a step back from one's thoughts) in order to reappraise (Arch & Craske, 2008). This possibility should be tested in future research in an intervention context (for instance,

by testing if defusion interventions lead to an increase in use of reappraisal or vice versa). On the other hand, the correlation between fusion and reappraisal ($r = -.35$) is of medium size, which supports the argument that fusion and reappraisal are indeed distinct constructs, particularly in light of the other findings of this study.

Overall, our findings suggest that fusion is a broader and more consistent predictor than reappraisal, especially in regard to psychopathology, in a non-intervention context. Specifically, fusion significantly predicted mental health issues such as distress, depression, generalized anxiety, social anxiety, academic distress, student role problems, and hostility when controlling for reappraisal. These findings support the importance of evaluating and targeting fusion across a range of diagnoses and problem areas, given the breadth of areas that fusion can predict. However, fusion may be less relevant in certain areas, such as eating problems. This finding is consistent with previous research suggesting that cognitive coping strategies are more predictive in certain areas such as depression and anxiety compared to eating problems (Aldao et al., 2010). Fusion and reappraisal both seem to be weak predictors in interpersonal domains based on the present results, suggesting that interpersonal concerns may be impacted more by other unmeasured individual or contextual factors. Alternatively, it is also possible that general measures of fusion and reappraisal do not successfully assess these processes as they relate to certain domain areas such as eating problems or interpersonal domains. In addition, while fusion was a statistically significant predictor of several outcomes over time, R^2 change values indicated that baseline fusion accounted for no more than 3% of the variance in any outcome assessed. Although being able to predict change in these outcomes is clinically important, fusion alone appears to account for a small proportion of this change and should be considered alongside other risk factors.

Fusion and reappraisal are connected to distinct treatment approaches, with different treatment goals. The goal of ACT is to support valued living regardless of internal experiences such as distressing thoughts and feelings (Hayes et al., 2006). In contrast, many other cognitive behavioral therapies such as Barlow's Unified Protocol focus on improving psychosocial functioning through symptom change (Ellard, Fairholme, Boisseau, Farchione, & Barlow, 2010). The results suggest the importance of targeting how individuals relate to thoughts (i.e., fusion) in the context of either treatment approach, whether it is to then change these thoughts or simply take action independent of these thoughts.

Limitations

First, this study was limited by the use of a non-clinical sample and the lack of a randomized control trial (RCT) design comparing active interventions of defusion vs. reappraisal. Despite significant predictive findings observed within fusion and, to a lesser extent, reappraisal measures, the R^2 change values were relatively small. Such values are expected for longitudinal prediction research, but this speaks to the need for intervention research to determine the magnitude of change over a longer period of time. It is also relevant to note that the undergraduate psychology student sample used in this study could limit the generalizability of these findings, given that these participants were younger, ethnically homogeneous and likely higher in intellectual ability, socioeconomic status, and psychological mindedness compared to the general population. Measures of fusion and reappraisal both rely on insight into one's own psychological processes, which is correlated with education level (Nyklíček & Denollet, 2009), and therefore it is unclear if these findings would hold in a less-educated sample. In addition, the sample was not treatment-seeking, which could limit generalizability of these findings to clinical populations given that treatment-seeking participants may be more distressed and struggle with

fusion or reappraisal processes in more significant or unique ways. This study must be replicated with more diverse samples, particularly treatment-seeking samples and samples with more variation in educational level, in order to ensure that these findings apply to the population more broadly.

Second, this study was limited by the primary outcome measures of the CFQ and ERQ-CR. While the ERQ-CR assesses the psychologically healthy process of cognitive reappraisal, the CFQ measures symptoms of the psychopathological process of fusion (as opposed to the psychologically healthy process of defusion). By comparing a pathological process (fusion) and psychologically healthy process (reappraisal), it is possible that the differences that emerged between reappraisal and fusion could be attributable to comparing an adaptive and maladaptive process. A more direct test would compare processes of defusion and reappraisal, however as of the writing of this article, there is only one measure of defusion available, the Drexel Defusion Scale (Forman et al., 2012) and it has potential limitations such as requiring respondents to read and comprehend an extended definition of defusion. In the future, research would benefit from a replication of this study with a well-validated measure of defusion to ensure that these results are not due to potential measurement issues.

Conclusion

There is a growing effort to develop unified methods of understanding psychological suffering and wellbeing (Hayes & Hofmann, 2018; Klepac et al., 2012). This study adds to the expanding body of research that aims to compare different core processes of change across theories and types of interventions, the findings of which could aid in moving the field towards a transdiagnostic, transtheoretical future. Results from the current study indicated that fusion shared larger correlations and served as a broader, more consistent predictor across pathological

outcomes compared to reappraisal. As such, fusion may be a more relevant process to evaluate and target in clinical work across a range of diagnoses, although these results require replication with a clinical sample and active intervention.

Statement of interest

The authors report no conflict of interest.

References

- Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review, 30*, 217–237. doi: 10.1016/j.cpr.2009.11.004
- Arch, J. J., & Craske, M. G. (2008). Acceptance and commitment therapy and cognitive behavioral therapy for anxiety disorders: Different treatments, similar mechanisms? *Clinical Psychology: Science and Practice, 15*, 263–279. doi:10.1111/j.1468-2850.2008.00137.x
- Barlow, D. H., Allen, L. B., & Choate, M. L. (2004). Toward a unified treatment for emotional disorders. *Behavior Therapy, 35*, 205–230. doi:10.1016/S0005-7894(04)80036-4
- Barrera, T. L., Szafranski, D. D., Ratcliff, C. G., Garnaat, S. L., & Norton, P. J. (2016). An experimental comparison of techniques: Cognitive defusion, cognitive restructuring, and in-vivo exposure for social anxiety. *Behavioural and Cognitive Psychotherapy, 44*, 249-254. doi:10.1017/S1352465814000630
- Beadman, M., Das, R. K., Freeman, T. P., Scragg, P., West, R., & Kamboj, S. K. (2015). A comparison of emotion regulation strategies in response to craving cognitions: Effects on smoking behaviour, craving and affect in dependent smokers. *Behaviour Research and Therapy, 69*, 29-39. doi:10.1016/j.brat.2015.03.013
- Brinker, J. K., & Dozois, D. J. A. (2009). Ruminative thought style and depressed mood. *Journal of Clinical Psychology, 65*, 1–19. doi:10.1002/jclp.20542
- Center for Collegiate Mental Health. (2012). *CCAPS 2012 Technical Manual*. University Park, PA: Pennsylvania State University.
- Deacon, B. J., Fawzy, T. I., Lickel, J. J., & Wolitzky-Taylor, K. B. (2011). Cognitive defusion versus cognitive restructuring in the treatment of negative self-referential thoughts: An

investigation of process and outcome. *Journal of Cognitive Psychotherapy*, 25, 218.

doi:10.1891/0889-8391.25.3.218

Ellard, K. K., Fairholme, C. P., Boisseau, C. L., Farchione, T. J., & Barlow, D. H. (2010).

Unified protocol for the transdiagnostic treatment of emotional disorders: Protocol development and initial outcome data. *Cognitive and Behavioral Practice*, 17, 88–101.

doi:10.1016/j.cbpra.2009.06.002

Forman, E. M., Herbert, J. D., Juarascio, A. S., Yeomans, P. D., Zebell, J. A., Goetter, E. M., &

Moitra, E. (2012). The Drexel Defusion Scale: A new measure of experiential distancing.

Journal of Contextual Behavioral Science, 1, 55–65. doi:10.1016/j.jcbs.2012.09.001

Gillanders, D. T., Bolderston, H., Bond, F. W., Dempster, M., Flaxman, P. E., Campbell, L., ...

Remington, B. (2014). The development and initial validation of the Cognitive Fusion

Questionnaire. *Behavior Therapy*, 45, 83–101. doi:10.1016/j.beth.2013.09.001

Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes:

Implications for affect, relationships, and well-being, 85, 348–362. doi:10.1037/0022-

3514.85.2.348

Hayes, S. C. (2008). Climbing our hills: A beginning conversation on the comparison of

acceptance and commitment therapy and traditional cognitive behavioral therapy. *Clinical*

Psychology: Science and Practice, 15, 286–295. doi:10.1111/j.1468-2850.2008.00139.x

Hayes, S. C., & Hofmann, S. G. (Eds.). (2018). *Process-Based CBT: The Science and Core*

Clinical Competencies of Cognitive Behavioral Therapy. Oakland, CA: New Harbinger

Publications.

Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and

Commitment Therapy: Model, processes and outcomes. *Behaviour Research and Therapy*,

44, 1–25. doi:10.1016/j.brat.2005.06.006

Hayes, S. C., Strosahl, K., & Wilson, K. G. (2011). *Acceptance and Commitment Therapy,*

Second Edition: The Process and Practice of Mindful Change. New York: Guilford Press.

Hofmann, S. G., & Asmundson, G. J. G. (2008). Acceptance and mindfulness-based therapy :

New wave or old hat? *Clinical Psychology Review, 28,* 1–16. doi:10.1016/j.cpr.2007.09.003

Klepac, R. K., Ronan, G. F., Andrasik, F., Arnold, K. D., Belar, C. D., Berry, S. L., ... & Herbert,

J. D. (2012). Guidelines for cognitive behavioral training within doctoral psychology

programs in the United States: Report of the Inter-organizational Task Force on Cognitive

and Behavioral Psychology Doctoral Education. *Behavior Therapy, 43,* 687-697. doi:

10.1016/j.beth.2012.05.002

Larsson, A., Hooper, N., Osborne, L. A., Bennett, P., & McHugh, L. (2016). Using brief

cognitive restructuring and cognitive defusion techniques to cope with negative

thoughts. *Behavior Modification, 40,* 452-482. doi: 10.1177/0145445515621488.

Levin, M. E., Lillis, J., & Hayes, S. C. (2012). When is online pornography viewing problematic

among college males? Examining the moderating role of experiential avoidance. *Sexual*

Addiction & Compulsivity, 19, 168–180. doi:10.1080/10720162.2012.657150

Locke, B. D., McAleavey, A. a., Zhao, Y., Lei, P.-W., Hayes, J. A., Castonguay, L. G., ... Lin,

Y.-C. (2012). Development and initial validation of the Counseling Center Assessment of

Psychological Symptoms-34. *Measurement and Evaluation in Counseling and*

Development, 45, 151–169. doi:10.1177/0748175611432642

Mansell, W., Harvey, A., Watkins, E., & Shafran, R. (2009). Conceptual foundations of the

transdiagnostic approach to CBT. *Journal of Cognitive Psychotherapy, 23,* 6–19.

doi:10.1891/0889-8391.23.1.6

- Meng, X.-L., Rosenthal, R., & Rubin, D. B. (1992). Comparing correlated correlation coefficients. *Psychological Bulletin*, *111*, 172–175. doi:10.1037/0033-2909.111.1.172
- Moffitt, R., Brinkworth, G., Noakes, M., & Mohr, P. (2012). A comparison of cognitive restructuring and cognitive defusion as strategies for resisting a craved food. *Psychology & Health*, *27*, 74-90. doi:10.1080/08870446.2012.694436
- Nyklíček, I., & Denollet, J. (2009). Development and evaluation of the Balanced Index of Psychological Mindedness (BIPM). *Psychological Assessment*, *21*, 32-44. doi:10.1037/a0014418
- Tanner, A., Voon, D., Hasking, P., & Martin, G. (2013). Underlying structure of ruminative thinking: Factor analysis of the ruminative thought style questionnaire. *Cognitive Therapy and Research*, *37*, 633–646. doi:10.1007/s10608-012-9492-1
- Weissman, M. M., & Bothwell, S. (1976). Assessment of social adjustment by patient self-report. *Archives of General Psychiatry*, *33*, 1111–1115. doi:10.1001/archpsyc.1981.01780360066006
- Yovel, I., Mor, N., & Shakarov, H. (2014). Examination of the core cognitive components of cognitive behavioral therapy and acceptance and commitment therapy: An analogue investigation. *Behavior Therapy*, *45*, 482-494. doi:10.1016/j.beth.2014.02.007

Table 1. Descriptive statistics at baseline

Variable	M	SD
Fusion	22.83	10.33
Reappraisal	30.76	6.93
Rumination	62.91	19.41
Distress	1.07	0.72
Depression	0.92	0.93
Generalized Anxiety	1.15	0.83
Social Anxiety	1.70	0.93
Hostility	0.50	0.57
Eating	1.09	1.06
Academic distress	1.26	0.87
Family distress	0.86	0.81
Student problems	1.76	0.47
Social problems	2.10	0.56

Note: Descriptive statistics are for variables before transformation.

Table 2. Correlations and Z-tests comparing correlation coefficients

Outcome	Fusion <i>r</i>	Reappraisal <i>r</i>	<i>Z</i>
Rumination	.69***	-.22***	9.01***
Distress	.77***	-.39***	8.62***
Depression	.72***	-.35***	7.65***
Gen. anxiety	.69***	-.31***	7.85***
Soc. anxiety	.60***	-.28***	5.93***
Hostility	.45***	-.28***	3.07**
Eating problems	.42***	-.13*	4.88***
Academic distress	.54***	-.36***	3.33***
Family distress	.46***	-.26***	3.38***
Student role problems	.38***	-.34***	0.72
Social/leisure problems	.63***	-.35***	5.46***

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

Table 3. Hierarchical linear regression models predicting outcomes at follow-up

Step	Variable	β	t	p	R^2	R^2 change	p
Prediction of T2 distress							
1	T1 distress	.796	22.55	<.001	.634		
2	T1 distress	.661	11.78	<.001	.645	.012	.009
	T1 fusion	.153	2.78	.006			
	T1 reappraisal	-.044	-1.17	.245			
Prediction of T2 depression							
1	T1 depression	.760	20.02	<.001	.577		
2	T1 depression	.596	11.18	<.001	.602	.025	<.001
	T1 fusion	.202	3.78	<.001			
	T1 reappraisal	-.058	-1.48	.141			
Prediction of T2 generalized anxiety							
1	T1 generalized anxiety	.772	20.82	<.001	.596		
2	T1 generalized anxiety	.650	12.91	<.001	.612	.016	.003
	T1 fusion	.166	3.25	.001			
	T1 reappraisal	-.025	-.63	.529			
Prediction of T2 social anxiety							
1	T1 social anxiety	.841	26.67	<.001	.707		
2	T1 social anxiety	.736	19.28	<.001	.727	.020	<.001
	T1 fusion	.167	4.26	<.001			
	T1 reappraisal	-.021	-.66	.509			
Prediction of T2 hostility							
1	T1 hostility	.709	17.21	<.001	.502		
2	T1 hostility	.664	14.63	<.001	.511	.009	.069
	T1 fusion	.097	2.08	.038			
	T1 reappraisal	-.019	-.44	.663			
Prediction of T2 eating problems							
1	T1 eating problems	.755	19.77	<.001	.571		
2	T1 eating problems	.728	17.51	<.001	.578	.008	.076
	T1 fusion	.047	1.08	.280			
	T1 reappraisal	-.063	-1.56	.120			
Prediction of T2 academic distress							
1	T1 academic distress	.687	16.05	<.001	.471		

2	T1 academic distress	.559	10.85	<.001	.503	.031	<.001
	T1 fusion	.196	3.88	<.001			
	T1 reappraisal	-.050	-1.09	.275			

 Prediction of T2 family distress

1	T1 family distress	.784	21.47	<.001	.615		
2	T1 family distress	.776	18.67	<.001	.615	.000	.900
	T1 fusion	.009	.22	.83			
	T1 reappraisal	-.013	-.33	.74			

 Prediction of T2 student role problems

1	T1 student problems	.586	12.35	<.001	.343		
2	T1 student problems	.508	9.74	<.001	.368	.025	.004
	T1 fusion	.111	2.12	.035			
	T1 reappraisal	-.105	-2.07	.040			

 Prediction of T2 social/leisure problems

1	T1 social problems	.695	16.57	<.001	.483		
2	T1 social problems	.638	11.54	<.001	.488	.005	.245
	T1 fusion	.065	1.18	.241			
	T1 reappraisal	-.044	-.98	.327			
