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Examining the relationship between Public Speaking Anxiety, Distress Tolerance and  
Psychological Flexibility

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**Ethics Statement**

The study plan, interventions, personal information, and informed consent were reviewed and approved by the Ethical Committee of the University of Jyväskylä (Jyväskylä, Finland) on 5.23.2017.

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Abstract

Public speaking is an important skill for university students to learn and practice as they progress through education and into their careers. However, individuals often avoid facing public speaking, as they lack the skills to cope with the anxiety that arises when speaking in front of others. The current study aimed to investigate the relationship between public speaking anxiety, distress tolerance, and psychological flexibility. A sample of 95 college students completed psychological flexibility measures and self-ratings of public speaking anxiety before and after a public speaking challenge. A behavioral index of public speaking distress tolerance (i.e., speech duration) was also recorded. The results showed that self-reported public speaking anxiety correlates significantly with a number of aspects of psychological flexibility (i.e., openness to experiences, self-perspective skills, and cognitive fusion). These findings suggest that openness to experiences is a key factor in developing interventions to cope with self-reported public speaking anxiety for undergraduate students. However, if we want to increase speech duration as a behavioral index of distress tolerance, training skills related to behavioral awareness and valued actions might be more relevant. The results are discussed in terms of their relevance to the development of public speaking interventions for university students.

*Keywords:* public speaking anxiety; social anxiety; psychological flexibility; distress tolerance; speech challenge; behavioral assessment task.

### Introduction

Public speaking anxiety refers to the anxiety that an individual experiences when giving a speech or preparing to speak in front of others (Bodie, 2010). Anxiety related to speaking in public has been reported to be associated with educational impairments (e.g., school dropouts) (Schneier et al., 1994), lower income (Stein, Walker, & Forde, 1994), and less productivity at work or unemployment (Wittchen, Fuetsch, Sonntag, Müller, & Liebowitz, 2000). Public speaking anxiety is the most common form of social phobia, also known as social anxiety disorder (Ruscio et al., 2008), which is one of the most prevalent mental disorders (Stein & Stein, 2008). Social phobia is related to high rates of depression, substance abuse, incidences of suicidal ideation (Schneier, Johnson, Hornig, Liebowitz, & Weissman, 1992), and suicide attempts (Davidson, Hughes, George, & Blazer, 1993). In (hidden information), one in three university students acknowledged that public speaking is a severe problem for them (hidden reference), while 61% of students in (hidden information) reported a fear of public speaking (Dwyer & Davidson, 2012).

A growing body of research indicates that anxiety disorders are associated with psychological inflexibility, including a tendency to avoid physiological arousal in panic disorders (Zvolensky & Eifert, 2001). Psychological flexibility is characterized by a non-avoiding attitude toward anxiety and defined as the ability to be fully in contact with the present moment and persist or change behavior according to one's values (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). Experiential avoidance, in contrast to psychological flexibility, refers to attempts to alter internal private experiences that are difficult (i.e., thoughts, feelings, and physiological sensations), even when doing so is problematic and prevents people from acting according to what they most care about (Hayes et al., 2006). One way that experiential avoidance has been

measured behaviorally was to test participants' distress tolerance. Distress tolerance is the capacity to withstand unpleasant internal events (Smith et al., 2014). Typically, the act of tolerating aversive circumstances is operationalized as the time a person can be in contact with an aversive stimulus (Zvolensky, Vujanovic, Bernstein, & Leyro, 2010). Previous studies have empirically demonstrated that individuals with higher levels of self-reported experiential avoidance have lower distress tolerance (Feldner et al., 2006; Williams, 2012; Zettle et al., 2005).

While the effectiveness of Acceptance and Commitment Therapy (ACT) interventions in reducing public speaking anxiety has been shown, very little is known about what specific aspects of psychological flexibility are most relevant to include in these interventions. Previous studies have indicated that acceptance and defusion could be relevant aspects of psychological flexibility for public speaking anxiety (Block & Wulfert, 2000; England et al., 2012). However, these studies did not test the aspects of valued actions or behavioral awareness. Additionally, more knowledge is needed to ascertain whether the psychological processes of change are similar or different when the aim is to decrease public speaking anxiety or increase public speaking distress tolerance. This understanding could lead to more targeted and effective treatments that help individuals who struggle with anxiety related to speaking in public. In summary, given the facts that public speaking anxiety is prevalent among university students and there is a link between psychological flexibility and anxiety disorders, the current study aimed to investigate 1) whether public speaking anxiety is associated with psychological flexibility and to determine 2) what aspects of psychological flexibility are critical for inclusion in public speaking anxiety interventions. Further, we were interested in knowing 3) whether speech duration as a behavioral measure of public speaking distress tolerance correlates with self-reported measures

of public speaking anxiety and psychological flexibility. Furthermore, we were interested in 4) what aspects of psychological flexibility are relevant in public speaking distress tolerance. We predicted that high levels of public speaking anxiety are associated with low levels of psychological flexibility. We also expected that openness to experiences is a key facet for public speaking anxiety. We expected low levels of distress tolerance to be associated with high levels of self-reported public speaking anxiety and low levels of psychological flexibility. To the best of our knowledge, there are no studies to date that have investigated what aspects of psychological flexibility are relevant when looking into public speaking distress tolerance.

## Method

### Participants

University students ( $n = 106$ ) were recruited from the Language Center and Department of Education of the (hidden information). More specifically, the participants were recruited from courses aimed at increasing communication skills. At the beginning of each course, the students were informed about the experiment. The instructions provided were as follows: “We are recruiting participants for an experiment about public speaking and communication skills. During the study, you will be asked to give a speech in front of a camera. You do not have to prepare anything beforehand.” Then, the module coordinator sent the students an online scheduling tool where they could sign up for participation. All participants were undergraduate students. All participants who signed up were included in the study; however, those who were taking psychogenic medication or did not fill in their personal information measurements were not included in the analyses ( $n = 10$ ). This yielded a final sample of 95 participants (50 females, 45 males) with an age range of 20–46 ( $M = 24.61$ ,  $SD = 4.77$ ). The amount of years they had



been studying at the university ranged from 1 to 8 ( $M = 2.61$ ,  $SD = 1.42$ ). The participants also came from different fields of study (IT = 31, education = 19, business and economics = 17, health science = 5, languages = 6, literature and history = 4, natural science (chemistry, physics, and mathematics) = 7, social work = 4, politics = 1, and music = 1).

### **Procedure**

The experiment was conducted individually at the Department of Psychology. The participants sat in an armchair in an experimental room that was equipped with a 65-inch TV screen, video camera, chair, pen, and the questionnaires. The researcher was in an adjacent room that was equipped with a 23-inch TV screen (through which the experimenter was able to view the participant throughout the experiment), a microphone that was connected to the speaker in the participant's room, one computer, and a laptop (the computer was used to play the audio-recorded instructions; the laptop was used to play the video-recorded audience that the participant saw on the TV screen).

First, the participants were asked to fill in the informed consent form and provide their background/personal information. Then, they proceeded to complete a self-report questionnaire (see Figure 1). Subsequently, the participants were cycled into the behavioral task, where they were instructed to give an impromptu 10-minute speech about themselves (weaknesses and strengths) in front of a camera placed at eye level. Behind the camera, there was a video-recorded audience on a 75-inch screen looking at the participant. The participants were allowed three minutes to plan their speech. The termination of the speech task before the end of a 10-minute period was assessed as avoidance behavior, and the total amount of time (speech duration) that the participants spoke was assessed as public speaking distress tolerance (Kishita, Muto, Ohtsuki, & Barnes-Holmes, 2014).

## Measures

The Personal Report of Communication Apprehension, Public Speaking Subscale (PRCA-PS; McCroskey, 1982) was used to measure public speaking anxiety. The PRCA-PS is a 6-item subscale (e.g., “While giving a speech, I get so nervous I forget facts I really know”). Each item is rated on a 1 (*strongly agree*) to 5 (*strongly disagree*) Likert point scale. Higher scores indicated greater apprehension toward speaking in public. The scores could range from a low of 6 to a high of 30. Moderate levels of public speaking anxiety could range from 13.75 to 20.75, while high levels ranged from 20.75 to 30. This scale was chosen because its validity and reliability are well-documented. The Cronbach’s alpha reliability for all items ranges from .93 to .95 (McCroskey, Beatty, Kearney, & Plax, 1985). In the present study, the subscale showed good internal consistency (Cronbach’s alpha = .85).

The Comprehensive Assessment of Acceptance and Commitment Therapy Processes (CompACT; Francis, Dawson, & Golijani-Moghaddam, 2016) is a 23-item self-reported questionnaire that assesses psychological flexibility (e.g., “I undertake things that are meaningful to me, even when I find it hard to do so”). The scale is a compound of three subscales (openness to experiences (CompACT-OE); behavioral awareness (CompACT-BA); valued actions (CompACT-VA)) and is scored on a 7-point Likert scale that ranges from 0 (*strongly disagree*) to 6 (*strongly agree*). The scale can be measured as a whole by adding all the items, with higher scores indicating greater psychological flexibility. The Cronbach’s alpha was first given as .91 for the overall CompACT score, .90 for CompACT-OE, .87 for CompACT-BA, and .90 for CompACT-VA. In this study, the Cronbach’s alpha was .90 for the total score, .87 for CompACT-OE, .85 for CompACT-BA, and .85 for CompACT-VA.

The 3-Dimensional Reno Inventory of Self-Perspective (3D-RISP; Jeffcoat, 2015) is a 13-item self-reported questionnaire that measures the self in the ACT models of psychological flexibility and pathology (e.g., “Negative thoughts are harmful to me”). The scale is comprised of three subscales: entangled (fusion with self-content), centered (the ability to take a centered self-perspective), and transcendent (verbal awareness of the transcendent nature of that perspective). Each item is rated on a 7-point Likert scale (0 = *never*, 7 = *always*). The scores range from 13 to 91. Higher scores indicate more self-perspective, low scores deficits in self-perspective skills and pathological fusion with self-content. Previous studies have shown good internal consistency in two large samples ( $\alpha = .86$  and  $\alpha = .79$ ). In the current study, the Cronbach’s alpha was .88 for the total 3D-RISP score, .85 for entangled, .83 for centered, and .73 for transcendent.

The State Cognitive Fusion Questionnaire (SCFQ; Bolderston et al., 2018) is the state version of the Cognitive Fusion Questionnaire (CFQ; Gillanders et al., 2014). The SCFQ is a 7-item self-reported questionnaire that measures cognitive fusion in the present moment instead of in general. Each item (e.g., “I get so caught up in my thoughts that I am unable to do the things that I most want to do”) is rated on a 7-point Likert scale (1 = *never true*, 7 = *always true*). Higher scores reflect greater fusion and lower scores greater defusion. The scale has demonstrated an excellent internal reliability in a large sample ( $\alpha = .95$ ). In the present study, the Cronbach’s alpha was .78.

To assess public speaking distress tolerance (Levin, Haeger, & Smith, 2017), the participants were instructed as follows to give an impromptu speech: “I would like to invite you to give a 10-minute speech about yourself, your strengths and weaknesses. I hope that you can speak for as long as possible. I will let you know when the time is up. If you decide to end your

speech earlier, please say out loud, 'I want to stop.' Try to continue the speech if you can, even if you're not sure what you would say next. You can stop if necessary if you are anxious and you cannot continue. Now you have three minutes to think about what you want to say in your speech. If you want you can write down what you want to say." This instruction has been commonly used in the literature (England et al., 2012; Hofmann, Moscovitch, Kim, & Taylor, 2004; Hofmann, Newman, Ehlers, & Walton, 1995; Levin et al., 2017). The duration of the speech provided a behavioral measure of avoidance. The maximum time for the speech was 10 minutes. Previous studies have suggested that finishing a speech before the allotted time is over can be understood as an attempt to escape the anxiety caused by the act of giving a speech (England et al., 2012; Levin et al., 2017). Accordingly, we interpreted speech duration as a behavioral measure of public speaking distress tolerance.

### **Analyses**

All statistical analyses were performed using IBM SPSS Statistics 24. Pearson correlations were used to test the relationship between study variables. A correlation between  $r = 0.10-0.30$  was considered small, medium/moderate between  $r = 0.31-0.50$ , and high between  $r = 0.51-1$  (Cohen, 1992). For those variables that were not normally distributed, we applied a non-parametric statistical analysis (Spearman's correlation). In addition, linear regression analyses were performed to further investigate which aspects of psychological flexibility (independent variables) are most relevant to coping with self-reported public speaking anxiety (dependent variable), as well as public speaking distress tolerance (dependent variable). The  $F$ -test was used to examine whether the independent variable predicts the dependent variable.  $R^2$  was used to calculate how much variance in the dependent variable can be explained by the independent variable. Additionally,  $t$ -tests were used to determine the significance of the

predictor, and beta coefficients were used to determine the magnitude and the direction of the relationship.

## Results

In this sample, 50% of the participants reported having a high level of public speaking anxiety, 41.5% a moderate level, and 8.5% a low level. In the general student population of (hidden information), 33% of students reported that speaking in public is a severe problem for them (hidden reference). Therefore, it seems that in our sample, there is a higher number of participants in the higher ranges of anxiety related to speaking in public. In the current study, the maximum potential length of the speech was 10 min, and the mean time that the participants used for the speech was 7.45 min ( $SD = 2.53$ ; Table 1). This is in accordance with Hofmann et al. (1995). They used a similar task and found that participants who lacked public speaking anxiety spoke longer (9.2 min) compared to the participants in our study.

In relation to this study, the results showed that higher levels of public speaking anxiety (PRCA-PS) moderately correlated with lower levels of psychological flexibility (CompACT;  $r = -.41$ ,  $p < 0.01$ ,  $n = 95$ ; Table 2) and lower levels of openness to experiences (CompACT-OE;  $r = -.45$ ,  $p < 0.01$ ,  $n = 95$ ). Additionally, higher levels of public speaking anxiety (PRCA-PS) were related to lower levels of behavioral awareness (CompACT-BA;  $r = -.23$ ,  $p < 0.05$ ,  $n = 95$ ) and lower levels of valued actions (CompACT-VA;  $r = -.26$ ,  $p < 0.05$ ,  $n = 95$ ), as these correlations were small. In addition, higher levels of public speaking anxiety moderately correlated with higher levels of cognitive fusion (SCFQ;  $r = .33$ ,  $p < 0.01$ ,  $n = 94$ ), lower levels of distress tolerance (speech duration;  $r = -.29$ ,  $p < 0.01$ ,  $n = 94$ ), and lower levels of self-perspective skills (3D-RISP;  $r = -.46$ ,  $p < 0.01$ ,  $n = 94$ ). The 3D-RISP is a compound of three subscales:

transcendent, centered, and entangled. There was no significant correlation between public speaking anxiety and the transcendent subscale; however, higher levels of public speaking anxiety (PRCA-PS) moderately correlated with higher levels of entangled (3D-RISP-en;  $r = .43$ ,  $p < 0.01$ ,  $n = 94$ ) and lower levels of centered (3D-RISP-ce;  $r = -.45$ ,  $p < 0.01$ ,  $n = 94$ ).

To further investigate what aspects of psychological flexibility are critical in public speaking anxiety interventions, we performed linear regression analyses. As an inclusion criterion, we only selected variables that significantly correlated with public speaking anxiety. We also excluded variables that highly correlated with the CompACT and its subscales (CompACT-OE, CompACT-BA, and CompACT-VA) in view of the fact that they measure the same construct. Thus, the SCFQ and the 3D-RISP and its subscales (centered, entangled, and transcendent) were excluded. Only the three CompACT subscales were included in the regression analysis given that all of them significantly correlated with self-reported public speaking anxiety. From this, only openness to experiences (CompACT-OE) remained a significant predictor of public speaking anxiety (PRCA) (Std.  $\beta = -0.458$ ,  $p < 0.001$ ; Table 3). This variable accounted for 20% of the total variability ( $R^2 = 0.201$ ).

In relation to public speaking distress tolerance (i.e., speech duration), the data showed that higher levels of psychological flexibility (CompACT) correlated with lower levels of distress tolerance ( $r = .24$ ,  $p < 0.05$ ,  $n = 94$ ), though this correlation was small. Of the three CompACT subscales, two had low significant correlations with speech duration; these were behavioral awareness and valued actions (CompACT-BA and CompACT-VA, respectively). However, openness to experiences (CompACT-OE), self-perspective skills (3D-RISP), and cognitive fusion (SCFQ) did not correlate with speech duration. These results are presented in Table 2. For this reason, only behavioral awareness and valued actions were included in the

regression analysis. Behavioral awareness was a significant predictor in the first step (Std.  $\beta = 0.275$ ,  $p = 0.007$ ; Table 3). This variable accounted for 7.6% of total variability ( $R^2 = 0.076$ ). When we added valued actions to the model, the  $R^2$  change was not significant. In the second step, the standardized  $\beta$  values for these two variables were not significant. It is important to acknowledge that the residual distribution was not normally distributed. Therefore, the  $p$  values of the regression analysis for the speech duration are not completely accurate.

### Discussion

These results indicate a negative moderate correlation between public speaking anxiety and the behavioral measure of public speaking distress tolerance (i.e., speech duration), suggesting that students who report high levels of public speaking anxiety also give shorter presentations (i.e., low distress tolerance), possibly as an avoidance strategy. In line with this, previous studies have empirically demonstrated that individuals with lower distress tolerance had higher levels of experiential avoidance (Feldner et al., 2006; Zettle et al., 2005). Moreover, in the current study, those participants whose psychological flexibility was lower also had lower distress tolerance and reported higher levels of public speaking anxiety. These results highlight the role of psychological flexibility among university students when training their public speaking skills. However, further studies are needed to demonstrate whether public speaking anxiety can be changed via increased psychological flexibility skills. It needs to be observed that increasing the time of the speech may not be an important outcome per se, but rather the increase of distress tolerance, reflecting a more general skill associated with avoidance strategies.

In relation to the facets of psychological flexibility that are critical for coping with public speaking anxiety, the data showed that openness to experiences (a compound of defusion and acceptance skills) seems to be the key aspect of psychological flexibility for self-reported public

speaking anxiety. Therefore, the current data highlights the usefulness of skills such as taking perspective of thoughts, feelings, and sensations (defusion) and increasing willingness to experience them without trying to control or avoid them (acceptance). However, openness to experiences was unrelated to speech duration (i.e., public speaking distress tolerance), though the latter did correlate significantly with behavioral awareness and engagement in valued actions in the CompACT. The regression analysis indicated that behavioral awareness explained approximately 8% of the variance, while when valued actions was added in the model, the  $R^2$  change was only 1%. However, since the residual distribution was not normally distributed, the p values of the regression analysis for speech duration are not completely accurate; thus, it could be possible that valued actions are also relevant. Therefore, the current findings suggest that being aware of one's own behavior and experiencing a presentation as a meaningful activity may need to be emphasized when training students to increase their distress tolerance related to public speaking. On the other hand, if the aim is to decrease self-perceived public speaking anxiety, the focus might be on training students to be open to their own experiences, that is, thoughts and feelings.

There are several limitations to the current study. First, the participants spoke in front of a video-recorded audience, not a live audience. Therefore, this situation did not capture in vivo public speaking anxiety. Another limitation surrounds the generalization of these findings to clinical groups, as only university students participated in the study. However, this cohort was selected due to the high incidence of public speaking anxiety in this population. A third limitation is related to the scales used, as only one scale was used to measure the main variable (public speaking anxiety). However, it is worth mentioning that this scale has been broadly used in the literature. Additionally, a behavioral measure of public speaking distress tolerance was



incorporated. A fourth limitation concerns speech duration. We interpreted speech duration to represent a behavioral measure of public speaking distress tolerance. However, it is possible that the length of the speech was affected by other variables, such as previous experience and speech ability in general. Finally, psychological flexibility was measured with a new scale, the CompACT, which has demonstrated good psychometric properties, but has not been broadly used yet. On the other hand, the CompACT holds an advantage over the AAQ (Acceptance and Action Questionnaire), which is the most broadly used scale in the literature to measure psychological flexibility. Given that the CompACT allows the separation of different aspects of psychological flexibility (i.e., openness to experiences, behavioral awareness, and valued actions), it could potentially direct us to know what the most relevant features of psychological flexibility to pay attention to are when developing interventions.

This study's findings comprise a number of aspects that could prove relevant in clinical implications. Given that public speaking anxiety is related to psychological flexibility, it could be expected that psychological interventions focused on increasing psychological flexibility might result in decreased public speaking anxiety and increased distress tolerance. Moreover, the psychological flexibility aspect of being open to one's own experiences seems to be relevant to the reduction of self-reported public speaking anxiety. Therefore, it might be important to design interventions that target shaping openness to one's experiences (cognitive defusion and acceptance) to help clients cope more effectively with public speaking anxiety. In addition, our behavioral measure of public speaking distress tolerance (speech duration) correlated with psychological flexibility (CompACT), as well as with the subscales of behavioral awareness and valued actions, but it did not correlate with openness to one's own experiences or cognitive defusion. Therefore, it seems that training the skill of being open to one's own thoughts and

feelings could be a key factor in decreasing self-reported public speaking anxiety. However, if we want to increase speech duration as a behavioral index of distress tolerance, training skills related to behavioral awareness and valued actions might be more relevant. Thus, these results highlight the possibility that training different aspects of psychological flexibility are associated with different behavioral outcomes. In summary, the current data provided interesting insights into the relationship between public speaking anxiety, as measured by a psychometric tool, behavioral task, and psychological flexibility. Future investigations are needed to replicate and validate the conclusions that can be drawn from this study and assess whether these conclusions can be generalized to and across anxiety in general.

### References

- Block, J. A., & Wulfert, E. (2000). Acceptance or change: Treating socially anxious college students with ACT or CBGT. *The Behavior Analyst Today*, 1(2), 3.
- Bodie, G. D. (2010). A racing heart, rattling knees, and ruminative thoughts: Defining, explaining, and treating public speaking anxiety. *Communication Education*, 59, 70-105. doi:10.1080/03634520903443849
- Bolderston, H., Gillanders, D. T., Turner, G., Taylor, H. C., Ní Mhaoileoin, D., & Coleman, A. (2018). *The initial validation of the state version of the cognitive fusion questionnaire*. doi:10.1016/j.jcbs.2018.04.002
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112(1), 155.
- Davidson, J. R., Hughes, D. L., George, L. K., & Blazer, D. G. (1993). The epidemiology of social phobia: Findings from the Duke Epidemiological Catchment Area Study. *Psychological Medicine*, 23(3), 709-718.
- Dwyer, K. K., & Davidson, M. M. (2012). Is public speaking really more feared than death? *Communication Research Reports*, 29(2), 99-107.
- England, E. L., Herbert, J. D., Forman, E. M., Rabin, S. J., Juarascio, A., & Goldstein, S. P. (2012). Acceptance-based exposure therapy for public speaking anxiety. *Journal of Contextual Behavioral Science*, 1(1-2), 66-72.
- Feldner, M. T., Hekmat, H., Zvolensky, M. J., Vowles, K. E., Secrist, Z., & Leen-Feldner, E. W. (2006). The role of experiential avoidance in acute pain tolerance: A laboratory test. *Journal of Behavior Therapy and Experimental Psychiatry*, 37(2), 146-158. <http://doi.org/10.1016/j.jbtep.2005.03.002>

- Francis, A. W., Dawson, D. L., & Golijani-Moghaddam, N. (2016). The development and validation of the comprehensive assessment of acceptance and commitment therapy processes (CompACT). *Journal of Contextual Behavioral Science*, 5(3), 134-145.
- Gillanders, D. T., Bolderston, H., Bond, F. W., Dempster, M., Flaxman, P. E., Campbell, L., ... Masley, S. (2014). The development and initial validation of the cognitive fusion questionnaire. *Behavior Therapy*, 45(1), 83-101.
- 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), 1-25.
- Hofmann, S. G., Moscovitch, D. A., Kim, H. J., & Taylor, A. N. (2004). Changes in self-perception during treatment of social phobia. *Journal of Consulting and Clinical Psychology*, 72(4), 588.
- Hofmann, S. G., Newman, M. G., Ehlers, A., & Walton, R. (1995). Psychophysiological differences between subgroups of social phobia. *Journal of Abnormal Psychology*, 104, 224-231.
- Jeffcoat, T. R. (2015). *Development of the Reno inventory of Self-Perspective (RISP): Measuring self in the ACT model.* (Unpublished doctoral dissertation). University of Nevada, Reno.
- Kishita, N., Muto, T., Ohtsuki, T., & Barnes-Holmes, D. (2014). Measuring the effect of cognitive defusion using the implicit relational assessment procedure: An experimental analysis with a highly socially anxious sample. *Journal of Contextual Behavioral Science*, 3(1), 8-15.

- Levin, M. E., Haeger, J., & Smith, G. S. (2017). Examining the role of implicit emotional judgments in social anxiety and experiential avoidance. *Journal of Psychopathology and Behavioral Assessment*, *39*(2), 264-278.
- McCroskey, J. C. (1982). *An introduction to rhetorical communication* (4th ed.). Englewood Cliffs, NJ: Prentice-Hall.
- McCroskey, J. C., Beatty, M. J., Kearney, P., & Plax, T. G. (1985). The content validity of the PRCA-24 as a measure of communication apprehension across communication contexts. *Communication Quarterly*, *33*(3), 165-173. doi:10.1080/01463378509369595.
- Ruscio, A. M., Brown, T. A., Chiu, W. T., Sareen, J., Stein, M. B., & Kessler, R. C. (2008). Social fears and social phobia in the USA: Results from the national comorbidity survey replication. *Psychological Medicine*, *38*(1), 15-28.
- Schneier, F. R., Heckelman, L. R., Garfinkel, R., Campeas, R., Fallon, B. A., Gitow, A., ... Liebowitz, M. R. (1994). Functional impairment in social phobia. *The Journal of Clinical Psychiatry*, *55*, 322-331.
- Schneier, F. R., Johnson, J., Hornig, C. D., Liebowitz, M. R., & Weissman, M. M. (1992). Social phobia: Comorbidity and morbidity in an epidemiologic sample. *Archives of General Psychiatry*, *49*, 282-288.
- Smith, B. M., Villatte, J. L., Ong, C. W., Butcher, G. M., Twohig, M. P., Levin, M. E., & Hayes, S. C. (2014). The influence of a personal values intervention on cold pressor-induced distress tolerance. *Behavior Modification*, *43*(5), 688-710.
- Stein, M. B., & Stein, D. J. (2008). Social anxiety disorder. *The Lancet*, *371*(9618), 1115-1125. doi: 10.1016/S0140-6736(08)60488-2

- Stein, M. B., Walker, J. R., & Forde, D. R. (1994). Setting diagnostic thresholds for social phobia: considerations from a community survey of social anxiety. *American Journal of Psychiatry* **151**, 408–412.
- Williams, A. D. (2012). Distress tolerance and experiential avoidance in compulsive acquisition behaviours. *Australian Journal of Psychology*, *64*(4), 217-224.
- Wittchen, H. U., Fuetsch, M., Sonntag, H., Müller, N., & Liebowitz, M. (2000). Disability and quality of life in pure and comorbid social phobia: Findings from a controlled study. *European Psychiatry*, *15*, 46-58. doi:10.1016/s0924-9338(00)00211-x
- Zettle, R. D., Hocker, T. R., Mick, K. A., Scofield, B. E., Petersen, C. L., Song, H., & Sudarjanto, R. P. (2005). Differential strategies in coping with pain as a function of level of experiential avoidance. *The Psychological Record*, *55*, 511-524.
- Zvolensky, M. J., & Eifert, G. H. (2001). A review of psychological factors/processes affecting anxious responding during voluntary hyperventilation and inhalations of carbon dioxide-enriched air. *Clinical Psychology Review*, *21*(3), 375-400.
- Zvolensky, M. J., Vujanovic, A. A., Bernstein, A., & Leyro, T. (2010). Distress tolerance: Theory, measurement, and relations to psychopathology. *Current Directions in Psychological Science*, *19*(6), 406-410. <http://doi.org/10.1177/0963721410388642>

Table 1. Descriptive statistics.

	Minimum	Maximum	Mean (SD)	95% confidence interval	
				Lower	Upper
PRCA-PS	11	30	20.5 (4.75)	19.56	21.54
CompACT	45	132	88.13 (19.93)	84.07	92.14
CompACT-OE	15	59	34.80 (10.84)	32.72	37.03
CompACT-BA	5	30	17.43 (5.97)	16.20	18.66
CompACT-VA	19	48	35.89 (7.07)	34.51	37.31
3D-RISP	37	89	63.31 (10.82)	61.50	65.70
3D-RISP-tr	2	14	10.71 (2.44)	10.24	11.21
3D-RISP-ce	12	28	19.58 (3.55)	18.91	20.36
3D-RISP-en	15	48	33.02 (6.88)	31.86	34.60
SCFQ	7	88	26.92 (12.01)	24.35	29.03
Speech Duration	1:12	10:00	7:45 (2:53)	7:06	8:20

*Note.* PRCA-PS (public speaking anxiety); CompACT (psychological flexibility); CompACT-OE (Openness to Experience); CompACT-VA (Valued Action); CompACT-BA (Behavioral Awareness); 3D-RISP (self-perspective skills); 3D-RISP-tr (transcendent); 3D-RISP-ce (centered); 3D-RISP-en (entangled), SCFQ (State Cognitive Fusion Questionnaire) and Speech Duration.

Table 2. Correlations between public speaking anxiety (PRCA-PS), psychological flexibility (CompACT), Openness Experiences (CompACT-OE), Valued Action (CompACT-VA), Behavioral Awareness (CompACT-BA), self-perspective (3D-RISP), transcendent (3D-RISP-tr), centered (3D-RISP-ce), entangled (3D-RISP-en), Cognitive Fusion (SCFQ) and Speech Duration.

	CompACT	CompACT-OE	CompACT-VA	CompACT-BA	3D-RISP	3D-RISP-tr	3D-RISP-ce	3D-RISP-en	SCFQ	Speech Duration
PRCA-PS	-.41**	-.45**	-.26*	-.23*	-.46**	-.18	-.45**	.43**	.33**	-.29**
CompACT	1	.89**	.77**	.80**	.81**	.40**	.69**	-.77**	-.69**	.24*
CompACT-OE		1	.48**	.59**	.81**	.31**	.75**	-.78**	-.71**	.15
CompACT-VA			1	.52**	.61**	.39**	.48**	-.56**	-.40**	.25*
CompACT-BA				1	.50**	.31**	.38**	-.48**	-.52**	.26*
3D-RISP					1	.50**	.87**	-.94**	-.68**	.18
3D-RISP-tr						1	.29**	-.29**	-.21*	.32**
3D-RISP-ce							1	-.75**	-.61**	.08
3D-RISP-en								1	.69**	-.17
SCFQ									1	-.02

\* The correlation is significant at the 0.05 level.

\*\* The correlation is significant at the 0.01 level



Table 3. Stepwise regression analysis. Role of different aspects of psychological flexibility in predicting public speaking anxiety and distress tolerance. PRCA-PS (public speaking anxiety); Speech Duration (behavioral measure of distress tolerance); CompACT-OE (Openness to Experiences); CompACT-VA (Valued Action); CompACT-BA (Behavioral Awareness).

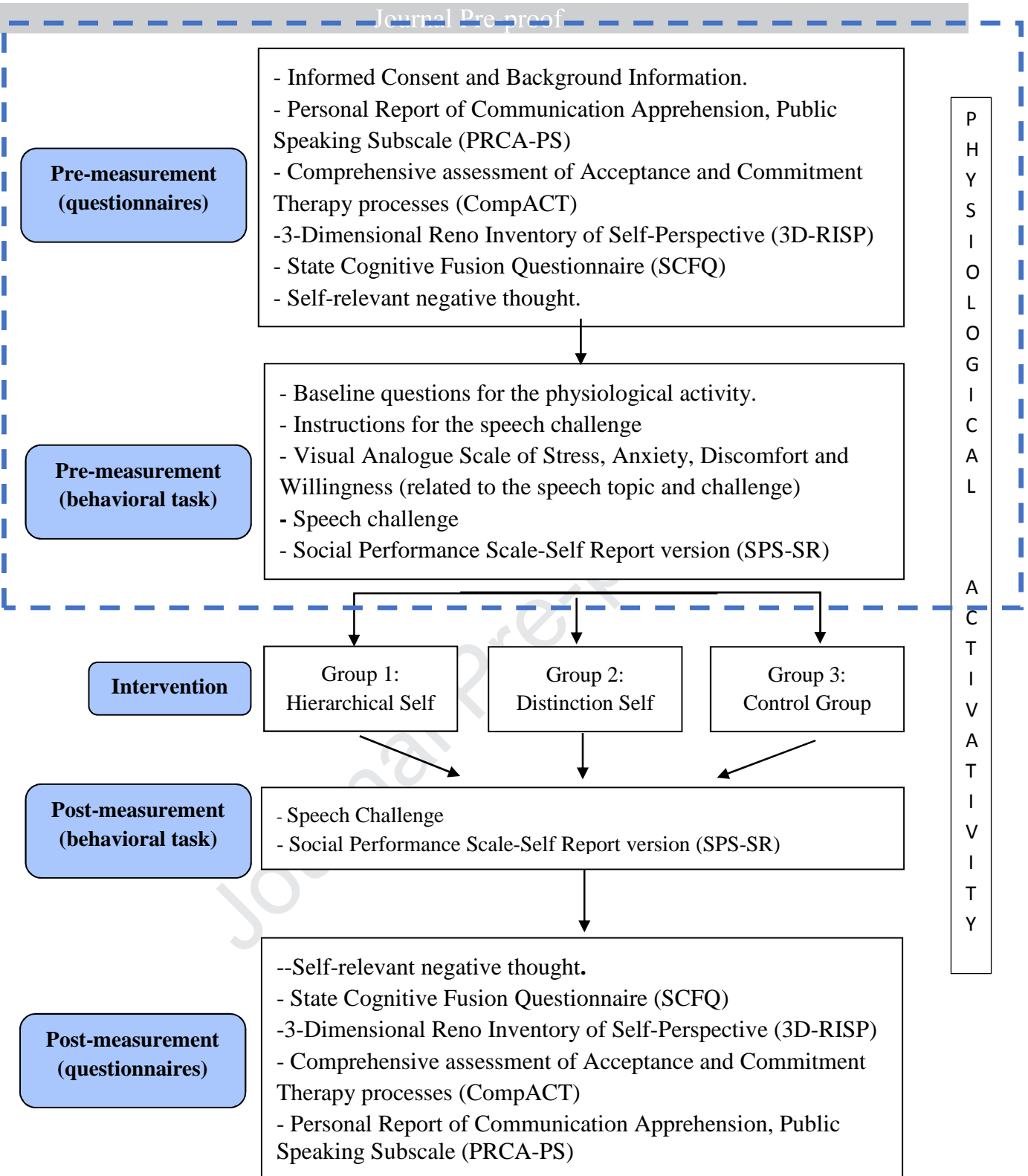
Dependent Variables	Significant predictors (independent variables)	Std $\beta$	$R^2$	Adjusted $R^2$	$R^2$ Change
<b>PRCA-PS</b>					
	1. Step CompACT-OE	-0.458***	0.201***	0.192	0.201***
	2. Step CompACT-VA	-0.082	0.203***	0.186	0.002
	3. Step CompACT-BA	0.083	0.207***	0.181	0.004
<b>Speech Duration</b>					
	1. Step CompACT-BA	0.212	0.076**	0.066	0.076**
	2. Step CompACT-VA	0.122	0.087*	0.067	0.011

Note: \*\*\*  $p < .001$ ; \*\*  $p < .01$ ; \*  $p < .05$ .

[1] For the regressions, only those variables (aspects of psychological flexibility) that significantly correlated ( $p < .05$ ) with public speaking anxiety and the speech duration were utilized.

[2] Standardized Coefficients  $\beta$  are from last step.

[3] Significant F change is represented with \* in the  $R^2$  Change.



**Figure 1.** Procedure. Data framed with blue lines represents the section of the experiment that has been included in this research article.

## Highlights

- Psychological Flexibility correlated with public speaking anxiety.
- Openness to your own experiences seems to be relevant for public speaking anxiety.
- Openness to your own experiences was unrelated to distress tolerance.

Journal Pre-proof

**Conflict of interest disclosure statement**

All the authors (Ana Gallego, Louise McHugh, Matthieu Villatte, and Raimo Lappalainen) declare that they have no conflict of interest to disclose.

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All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1964 and its later amendments. Informed consent was obtained from all patients for being included in the study.

Sincerely,

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