

Internet-delivered interpretation training reduces worry and anxiety in individuals with Generalized Anxiety Disorder: a randomized controlled experiment

Article (Supplemental Material)

Hirsch, Colette R, Krahe, Charlotte, Whyte, Jessica, Krzyzanowski, Hannah, Meeten, Frances, Norton, Sam and Mathews, Andrew (2021) Internet-delivered interpretation training reduces worry and anxiety in individuals with Generalized Anxiety Disorder: a randomized controlled experiment. *Journal of Consulting and Clinical Psychology*, 89 (7). pp. 575-589. ISSN 0022-006X

This version is available from Sussex Research Online: <http://sro.sussex.ac.uk/id/eprint/99922/>

This document is made available in accordance with publisher policies and may differ from the published version or from the version of record. If you wish to cite this item you are advised to consult the publisher's version. Please see the URL above for details on accessing the published version.

Copyright and reuse:

Sussex Research Online is a digital repository of the research output of the University.

Copyright and all moral rights to the version of the paper presented here belong to the individual author(s) and/or other copyright owners. To the extent reasonable and practicable, the material made available in SRO has been checked for eligibility before being made available.

Copies of full text items generally can be reproduced, displayed or performed and given to third parties in any format or medium for personal research or study, educational, or not-for-profit purposes without prior permission or charge, provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way.

Supplementary Materials

Internet-Delivered Interpretation Training Reduces Worry and Anxiety in Generalized Anxiety

Disorder: A Randomized Controlled Experiment

Hirsch, C. R., Krahe, C., Whyte, J., Krzyzanowski, H., Meeten, F., Norton, S., & Mathews, A. (in press). Internet-Delivered Interpretation Training Reduces Worry and Anxiety in Individuals with Generalized Anxiety Disorder: A Randomized Controlled Experiment. *Journal of Consulting and Clinical Psychology*.

Expectancy and acceptability ratings

Across diagnostic groups, there was no difference at T0 between CBM vs. control conditions regarding how logical ($t(184) = -.825, p = .411$; CBM: $M = 3.22, SE = .076$; control: $M = 3.13, SE = .084$) or useful ($t(184) = -.100, p = .921$; CBM: $M = 2.39, SE = .088$; control: $M = 2.38, SE = .099$) the program was expected to be. Again, at T2 there was no difference between conditions in regards to how logical participants had found the program to be ($t(184) = -.933, p = .352$, CBM: $M = 3.09, SE = .088$; control: $M = 2.97, SE = .091$). However, at this point the CBM condition rated the program as more useful than the control condition ($t(184) = -4.421, p = .000$, CBM: $M = 2.52, SE = .103$; control: $M = 1.87, SE = .105$). There was, however, no significant difference between groups in whether participants would recommend the program to a friend ($t(184) = -.1504, p = .134$, CBM: $M = 2.79, SE = .099$; control: $M = 2.57, SE = .110$). Overall, these ratings indicate that participants expected the program to be moderately logical and useful. They also show that the conditions were similar in this respect prior to training. However, *after* finishing the program, participants in the CBM condition reported the program to have been more useful than those in the control condition.

Additional questionnaire measure

The Spontaneous Use of Imagery Scale (SUIS; Reisberg, et al., 2003, Cronbach's $\alpha = .77$) was included at the first study visit to measure participants' tendencies to use mental imagery in their everyday lives.

Assimilation and imagination ratings

At the end of assignments 1 and 10 participants completed 8-items adapted from Standage et al., (2014) and Holmes et al., (2006) to explore the extent to which they assimilated the content of scenarios (e.g. "I was able to put myself into the situations, so that it seemed as though they were happening to me."), the ability to imagine themselves in the scenarios (e.g. "I was able to imagine the situations through my own eyes, as if looking out into the situation.") on visual analogue scales

WEB-BASED INTERPRETATION TRAINING FOR GENERALIZED ANXIETY DISORDER

ranging from 0-100. Ten participants were excluded from analysis due to having missing data for assessment 1 ($N=176$).

Cronbach's alpha for this rating scale was $\alpha = .83$, at time 1 and $\alpha = .85$ indicating excellent internal consistency. Within the per protocol sample, across diagnostic groups and controlling for visit 1, condition (control vs. CBM) did not predict mean rating at assessment 2, $\beta=-1.772$, $SE = 2.107$, $p = .402$. CBM and control conditions both endorsed having imagined themselves in the scenarios and identifying with the person in the scenarios, with no significant difference between groups $t(174) = .391$, $p = .696$, CBM; $M = 70.22$, $SE = 1.74$, Control; $M = 71.20$, $SE = 1.81$. Therefore, differences in assimilation or imagery cannot account for any differences between conditions.

Table S1

Example scenarios and comprehension questions for CBM and CONTROL conditions

Condition	Trial Type	Example Scenario	Question	Correct Response	Feedback given if correct	Feedback given if incorrect
CBM	Ambiguous	Your father hasn't been to the GP in years, so you convince him to go and see a doctor for a check-up. After the appointment, you call him to find out how it went. He starts to tell you about the appointment, and you think you know what the doctor will have said.	Did the doctor say your father is in poor health?	No	Yes	No
	Positive	You and your friend are planning a trip away for the summer and have found an offer online that is within your price range. Thinking about going on the trip that is within your budget, you know the trip will be nice	Do you think you will enjoy the trip?	Yes	Yes	Yes
CONTROL	Ambiguous	You are shopping in a department store and decide to take the lift to the top floor. While you are on your way up, you feel the lift start to come to a stop, and you can realise why this is.	Have you reached your floor?	Yes	No	No
	Fact	Your brother and you had an argument yesterday. At home in the evening, you sent him an email to smooth things over. As you are thinking about this today, the phone rings and you can tell how things are with him from his tone of voice.	Did your brother email you back?	No	No	Yes

Note. Questions relating to the scenarios in the control condition either focused on the ambiguity (ambiguity-focused question on ambiguous trials) or on a factual element of the scenario (fact-focused question on fact trials), respectively.

WEB-BASED INTERPRETATION TRAINING FOR GENERALIZED ANXIETY DISORDER

Table S2

Overview of measures administered at each time point

Timepoint	Outcome	Measures administered
T0 Baseline	Interpretation bias	SST; RT
	Negative thought intrusions, worry and anxiety	BFT; PSWQ trait, PSWQ weekly
	Secondary symptom measures of rumination, trait RNT and depression	GAD-7, PHQ-9, RRS, RTQ-T
	Additional	SUIS; expectancy ratings
T1 1-month	Interpretation bias	SST; RT
	Negative thought intrusions, worry and anxiety	BFT; PSWQ trait, PSWQ weekly
	Secondary symptom measures of rumination, trait RNT and depression	RRS, PHQ-9, GAD-7, RTQ-T
	Additional	Acceptability ratings; assimilation and imagination ratings; adverse events form
T2 2-months	Worry and anxiety	PSWQ trait, PSWQ weekly
	Secondary symptom measures of rumination, trait RNT and depression	RRS, PHQ-9, GAD-7, RTQ-T
	Additional	Adverse events form
T3 4-months	Worry and anxiety	PSWQ trait, PSWQ weekly
	Secondary symptom measures of rumination, trait RNT and depression	RRS, PHQ-9, GAD-7, RTQ-T
	Additional	Adverse events form

Note. SST = Scrambled Sentences Test; RT = Recognition Test; BFT = Breathing focus task; PSWQ trait = Penn State Worry Questionnaire; PSWQ weekly = Penn State Worry Questionnaire- past week; GAD-7 = Generalized Anxiety Disorder scale (measure of anxiety); PHQ-9 = Patient Health Questionnaire (measure of depression); RRS = Ruminative Response Scale; RTQ-T = Repetitive Thinking Questionnaire- trait; SUIS = Spontaneous Use of Imagery Scale

Table S3

Number of participants completing up to a given number of assignments in per-protocol (n=186) and intention to treat samples (n=208)

Number of assignments completed)	Number of participants in Per-Protocol analysis	Number of participants in Intention to Treat analysis
0	0	3
1	0	1
2	0	1
3	0	2
4	0	2
5	0	1
6	0	1
7	0	1
8	3	4
9	3	3
10	180	189

Table S4

Number (and percentage) of participants whose anxiety (GAD7) clinically improved, did not change, and clinically deteriorated at follow-up presented by condition for the per-protocol sample

	T1		T2		T3	
GAD7	Control	CBM	Control	CBM	Control	CBM
	Mean (%)	Mean (%)	Mean (%)	Mean (%)	Mean (%)	Mean (%)
Improved	40 (38.10)	55 (53.40)	63 (60.00)	75 (73.53)	60 (57.69)	80 (78.43)
No change	60 (57.14)	47 (45.63)	36 (34.29)	26 (25.49)	40 (38.46)	18 (17.65)
Deteriorated	5 (4.76)	1 (0.97)	6 (5.71)	1 (0.98)	4 (3.85)	4 (3.92)

Note. GAD-7 = Generalised Anxiety Disorder scale (measure of anxiety); Control = Control condition; CBM = Cognitive bias modification of interpretation condition. T1 = post completion of intervention; T2 = 1-month post completion of intervention; T3 = 3 -months post completion of intervention

WEB-BASED INTERPRETATION TRAINING FOR GENERALIZED ANXIETY DISORDER

Table S5

Correlations between interpretation bias and symptom measures at post-intervention timepoints for the per-protocol sample

		T1						T2				T3				
Variable	N	Condition	RT	SST	PSWQ	GAD-7	RTQ-T	PSWQ_W	PSWQ	GAD-7	RTQ-T	PSWQ_W	PSWQ	GAD-7	RTQ-T	PSWQ_W
Condition	186	1.00														
RT	185	0.52	1.00													
SST	177	<i>0.24</i>	0.52	1.00												
PSWQ	186	-0.16	-0.22	-0.35	1.00											
T1 GAD-7	186	-0.20	-0.31	-0.45	0.56	1.00										
RTQ-T	186	<i>-0.17</i>	-0.26	-0.35	0.53	0.58	1.00									
PSWQ_W	186	-0.23	-0.34	-0.47	0.65	0.69	0.56	1.00								
PSWQ	186	-0.30	-0.36	-0.32	0.60	0.43	0.39	0.54	1.00							
GAD-7	186	-0.23	-0.29	-0.38	0.47	0.66	0.48	0.50	0.55	1.00						
T2 RTQ-T	186	<i>-0.17</i>	-0.31	-0.36	0.47	0.46	0.66	0.53	0.55	0.55	1.00					
PSWQ_W	186	-0.26	-0.31	-0.32	0.47	0.48	0.43	0.65	0.67	0.67	0.56	1.00				
T3 PSWQ	184	<i>-0.18</i>	-0.26	-0.21	0.55	0.38	0.27	0.57	0.70	0.46	0.41	0.63	1.00			

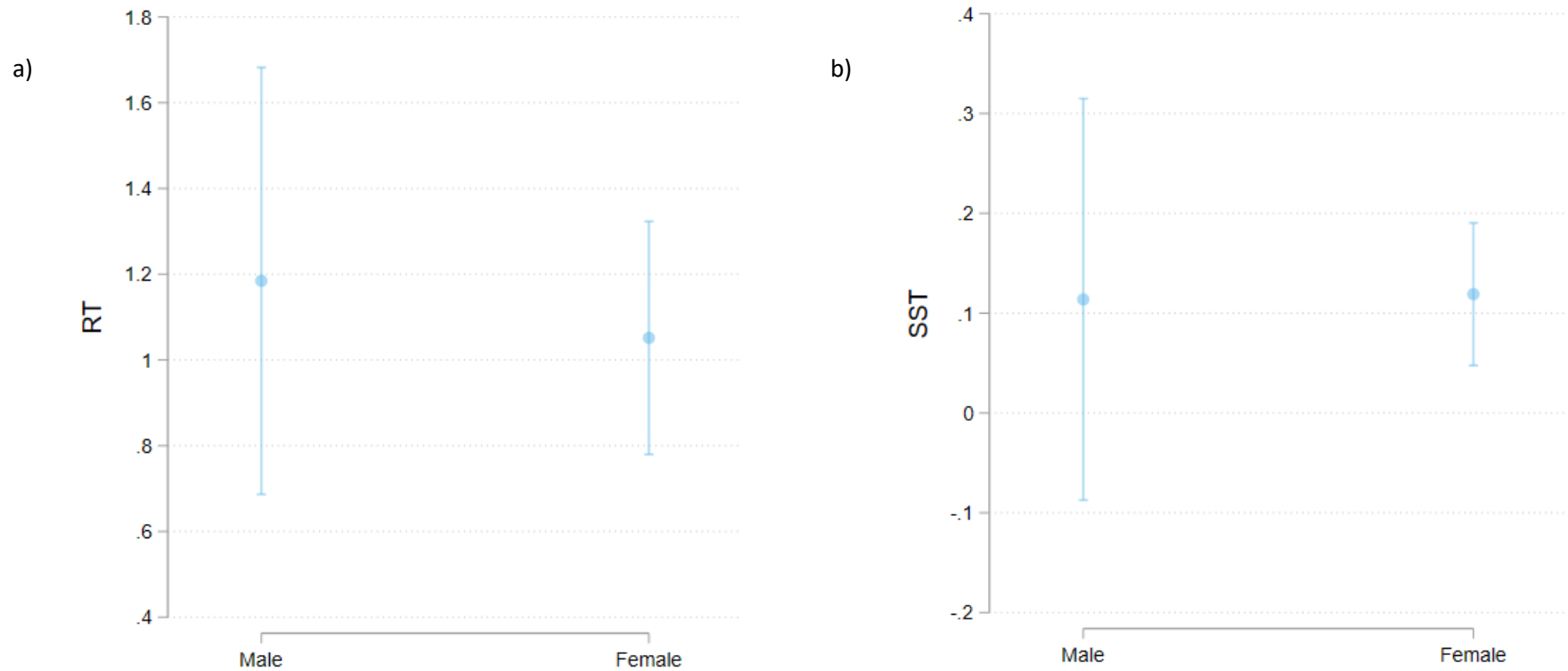
WEB-BASED INTERPRETATION TRAINING FOR GENERALIZED ANXIETY DISORDER

GAD-7	184	<i>-0.17</i>	-0.25	-0.28	0.34	0.48	0.27	0.48	0.49	0.56	0.41	0.53	0.62	1.00		
RTQ-T	184	-0.09	-0.28	-0.28	0.42	0.39	0.56	0.51	0.49	0.42	0.64	0.47	0.58	0.55	1.00	
PSWQ_W	184	-0.20	-0.28	-0.27	0.47	0.38	0.34	0.60	0.63	0.49	0.43	0.69	0.77	0.72	0.62	1.00

Note. This study employed a 4-assessment intervention: T1 = post completion of intervention; T2 = 1-month post completion of intervention; T3 = 3 -months post completion of intervention; RT = Recognition Test; SST = Scrambled Sentences Test; GAD-7 = Generalized Anxiety Disorder scale (measure of anxiety); PSWQ = Penn State Worry Questionnaire; PSWQ_W = Penn State Worry Questionnaire- past week; RTQ-T = Repetitive Thinking Questionnaire- trait. Values in *italics* denote $p < .05$; values in **bold** denote $p < .01$.

Figure S1

Treatment effect by gender in the per-protocol sample (n=186)

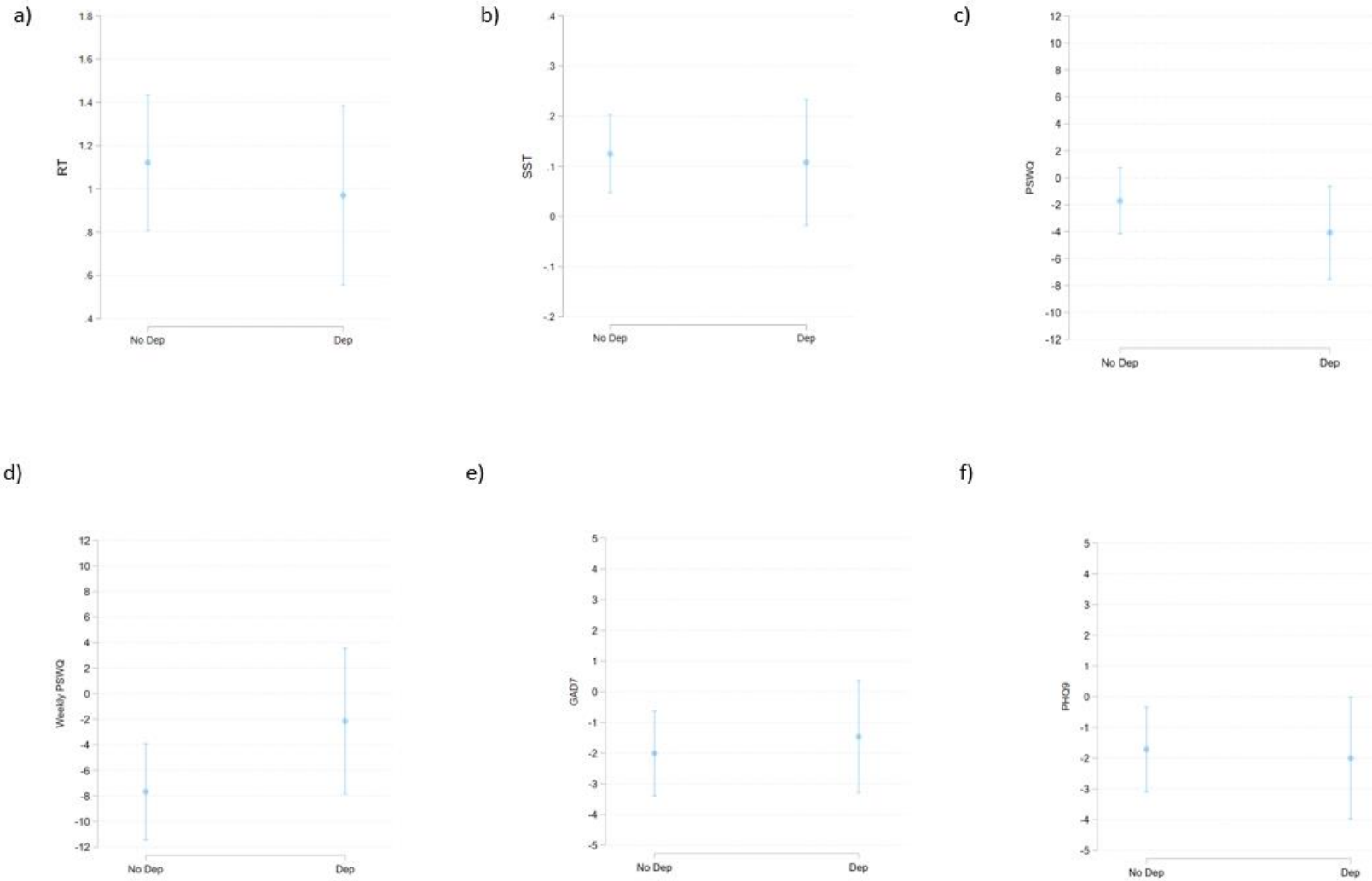


Note. RT = Recognition test; SST = Scrambled Sentences Test

The treatment effect did not vary significantly by gender for either the a) RT ($p = .645$) or b) SST ($p = .962$).

Figure S2

Treatment effect by clinical group (GAD without depressive disorder vs GAD with depressive disorder) in the per-protocol sample (n = 186)

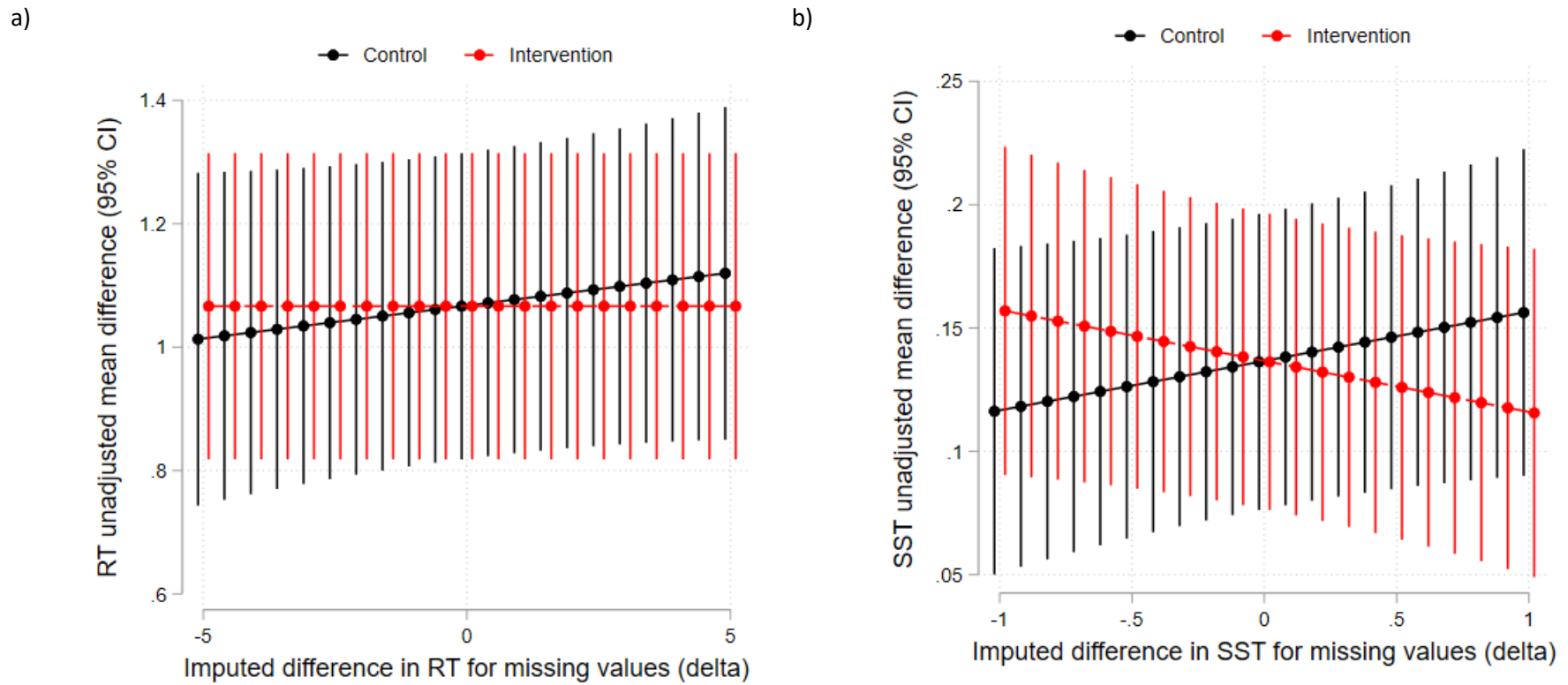


WEB-BASED INTERPRETATION TRAINING FOR GENERALIZED ANXIETY DISORDER

Note. No Dep = GAD without depressive disorder; Dep = GAD with depressive disorder; RT = Recognition Test; SST = Scrambled Sentences Test; PSWQ = Penn State Worry Questionnaire; GAD7 = Generalised Anxiety Disorder scale (measure of anxiety); PHQ9 = Patient Health Questionnaire (measure of depression). The treatment effect did not vary significantly by clinical group for a) RT ($p = .57$), b) SST ($p = .82$), c) PSWQ (trait) ($p = .27$), d) weekly-PSWQ ($p = .11$), e) GAD7 ($p = .64$), or f) PHQ9 ($p = .82$).

Figure S3

Pattern mixture models indicating the effect of missing data for a) RT and b) SST



Note. Under no reasonable scenario would the non-random missing data across either group reduce the group difference to non-significant.

References

- Hirsch, C. R., Krahé, C., Whyte, J., Loizou, S., Bridge, L., Norton, S., & Mathews, A. (2018). Interpretation training to target repetitive negative thinking in generalized anxiety disorder and depression. *Journal of Consulting and Clinical Psychology, 86*(12), 1017. <https://doi.org/10.1037/ccp0000310>
- Holmes, E. A., Mathews, A., Dalgleish, T., & Mackintosh, B. (2006). Positive interpretation training: Effects of mental imagery versus verbal training on positive mood. *Behavior Therapy, 37*(3), 237-247. <https://doi.org/10.1016/j.beth.2006.02.002>
- Reisberg, D., Pearson, D. G., & Kosslyn, S. M. (2003). Intuitions and introspections about imagery: The role of imagery experience in shaping an investigator's theoretical views. *Applied Cognitive Psychology: The Official Journal of the Society for Applied Research in Memory and Cognition, 17*(2), 147-160. <https://doi.org/10.1002/acp.858>
- Standage, H., Harris, J., & Fox, E. (2014). The influence of social comparison on cognitive bias modification and emotional vulnerability. *Emotion, 14*(1), 170. <https://doi.org/10.1037/a0034226>
- White, I. R., & Thompson, S. G. (2005). Adjusting for partially missing baseline measurements in randomized trials. *Statistics in medicine, 24*(7), 993-1007. <https://doi.org/10.1002/sim.1981>
- Williams, A. D., O'Moore, K., Blackwell, S. E., Smith, J., Holmes, E. A., & Andrews, G. (2015). Positive imagery cognitive bias modification (CBM) and internet-based cognitive behavioral therapy (iCBT): A randomized controlled trial. *Journal of Affective Disorders, 178*, 131-141. <https://doi.org/10.1016/j.jad.2015.02.026>