

Digital Appendix Systematic Cochrane Review and Meta-Analysis on Psychological Interventions to Foster Resilience in Healthcare Professionals

Appendix D16 Details on Assessment of Reporting/Publication Bias

Table D16.1

Assessment of Publication Bias for the Primary Outcomes (Except Anxiety due to < 10 Studies in the Meta-Analysis)

Outcome, time point (number of included studies)	Assessment of publication bias
Resilience, posttest (12 studies)	<ul style="list-style-type: none"> • A (standard and contour-enhanced)^a funnel plot was drawn (see Figure D16.1 and D16.2), which shows slight visual evidence for asymmetry; however, studies appear to be missing in areas of high statistical significance ($p < .01$) and therefore publication bias can be assumed as unlikely according to <i>Cochrane Handbook</i> (Page et al., 2019) • No statistical evidence for asymmetry (Egger's test: $t = -1.04$, $df = 10$, $p = .32$) • Results of grey literature (Loiselle (2018); no evidence for effect of negative direction) do not differ from other published studies (e.g., Klatt et al., 2015; Lebares et al., 2019; Mealer et al., 2014), which also found no evidence for effect; in addition, Loiselle (2018) is a very small study (33 participants) • Difficult to assess small-study effects due to lack of larger studies; however, overestimation of effects in smaller studies unlikely as the meta-analysis also included studies that had small sample sizes with non-significant results (e.g., Klatt et al., 2015; Schroeder et al., 2016) • No relevant conflicts of interest for included studies during the study period
Resilience, short-term follow-up (11 studies)	<ul style="list-style-type: none"> • A (standard) funnel plot was drawn (see Figure D16.3), which provides visual evidence for asymmetry. • Statistical evidence for asymmetry (Egger's test: $t = 4.01$, $df = 9$, $p = .003$) • Unlikely that asymmetry is due to publication bias for several reasons: <ul style="list-style-type: none"> ○ "negative" studies (i.e., statistically non-significant studies) also published; ○ studies appear to be missing in areas of high statistical significance ($p < .01$); and ○ results of one unpublished study (Cheung, 2014), although showing a (non-significant) tendency for decrease of resilience, does not differ from other published studies (e.g., Sood et al., 2014) • Visual asymmetry in funnel plot could not be explained by other forms of selection bias (language bias, location or database bias, multiple publication bias, provision of data bias, citation bias, outcome reporting bias for resilience); non-significant results in an unpublished study could indicate potential time lag bias (Cheung, 2014) • Meta-analysis is based on large number of small studies (10/11 studies)^b; for one small study (Chesak et al., 2015), potential conflict of interest indicated in the report; for two small studies (Sood et al., 2011; Sood et al., 2014), conflict of interest likely due to contribution of the same authors as in Chesak et al. (2015); however, insufficient evidence for publication bias, as these studies represent minority and Sood et al. (2014) also reports non-significant results

Outcome, time point (number of included studies)	Assessment of publication bias
Depression, posttest (14 studies)	<ul style="list-style-type: none"> • Difficult to assess small-study effects due to lack of larger studies; however, overestimation of effects in smaller studies seems unlikely as the meta-analysis included studies that had small sample sizes, with significant (e.g., Bernburg et al., 2019; Chesak et al., 2015), as well as non-significant results (e.g., Mache et al., 2016; Sood et al., 2014); effect size did not differ according to study size due to true heterogeneity (Page et al., 2019), as there were no consistent clinical (e.g., population, setting, or delivery format of resilience training) or methodological differences between studies of different size, and since evidence was based largely on small studies • Alternative explanations of funnel plot asymmetry could refer to artefacts due to use of SMDs or chance (Page et al., 2019) • A (standard and contour-enhanced)^a funnel plot was drawn (see Figure D16.4 and D16.5), which is rather symmetric in shape and shows no visual evidence for asymmetry. • No statistical evidence for asymmetry (Egger's test: $t = -0.10$, $df = 12$, $p = .93$) • Loiselle (2018) (grey literature) provides a different direction of effect (non-significant tendency to depression increase) than the majority of published studies (decrease of depression) and West et al. (2015) (also grey literature); however, it is a small study (33 participants) and does not differ from published studies in terms of evidence for effect • Difficult to assess small-study effects due to lack of larger studies; however, overestimation of effects in smaller studies seems unlikely as the meta-analysis included studies that had small sample sizes, with significant (e.g., Alexander et al., 2015; Ireland et al., 2017; Mache et al., 2017), as well as non-significant results (e.g., Mealer et al., 2014; Schroeder et al., 2016; West et al., 2014) • No relevant conflicts of interest for included studies during the study period
(Perceived) stress, posttest (17 studies)	<ul style="list-style-type: none"> • A (standard and contour-enhanced)^a funnel plot was drawn (see Figure D16.6 and D16.7), which provides slight visual evidence for asymmetry; however, studies appear to be missing in areas of high statistical significance ($p < .01$) and therefore publication bias can be assumed as unlikely according to <i>Cochrane Handbook</i> (Page et al., 2019) • No statistical evidence for asymmetry (Egger's test: $t = -0.34$, $df = 15$, $p = .74$) • Results of grey literature (Loiselle (2018); no evidence for effect of negative direction) do not differ from other published studies (e.g. Bernburg et al., 2016; Calder Calisi, 2017) • Difficult to assess small-study effects due to lack of larger studies; however, overestimation of effects in smaller studies seems unlikely as the meta-analysis included studies that had small sample sizes, with significant (e.g., Bernburg et al., 2019; Lin et al., 2019; Mache et al., 2017), as well as non-significant results (e.g., Duchemin et al., 2015; Ireland et al., 2017; Schroeder et al., 2016) • No relevant conflicts of interest for included studies during the study period
(Perceived) stress, short-term follow-up (14 studies)	<ul style="list-style-type: none"> • A (standard) funnel plot was drawn (see Figure D16.8), which shows slight visual evidence for asymmetry; however, studies appear to be missing in areas of high statistical significance ($p < .01$) and therefore publication bias can be assumed as unlikely according to <i>Cochrane Handbook</i> (Page et al., 2019) • No statistical evidence for asymmetry (Egger's test: $t = -1.32$, $df = 12$, $p = .21$) • No grey literature that could have differed from published studies • Available evidence comes entirely from small studies with conflict of interest being likely for three studies (Chesak et al., 2015; Sood et al., 2011; Sood et al., 2014); although this pattern of results can suggest publication bias (Guyatt et al., 2011), it has to be considered that only a minority of studies included were concerned by conflicts of interest, and one study also reported non-significant findings (Sood et al., 2014)

Outcome, time point (number of included studies)	Assessment of publication bias
Well-being, posttest (13 studies)	<ul style="list-style-type: none"> • Difficult to assess small-study effects due to lack of larger studies; however, overestimation of effects in smaller studies seems unlikely as the meta-analysis included studies that had small sample sizes, with highly significant (e.g., Mache et al., 2017; Schroeder et al., 2016), as well as non-significant results (e.g., Mache et al., 2015; Mistretta et al., 2018) • Alternative explanations of funnel plot asymmetry could refer to artefacts due to use of SMDs or chance (Page et al., 2019) • A (standard and contour-enhanced)^a funnel plot was drawn (see Figure D16.9 and D16.10), which is rather symmetric in shape and shows no visual evidence for asymmetry. • No statistical evidence for asymmetry (Egger's test: $t = 1.91$, $df = 11$, $p = .08$) • Results of grey literature (West et al., 2015; no evidence for effect) do not differ from majority of published studies in this meta-analysis (e.g., Bernburg et al., 2016; Klatt et al., 2015) • Small study effects: <ul style="list-style-type: none"> ○ only one small study reported significant results in favor of resilience training (Duchemin et al., 2015), whereas other studies with small sample sizes found no significant effects; however Strijk et al. (2011), as the only large study in this analysis with 730 participants, reported non-significant result in the opposite direction (i.e., reduction of well-being); this difference could indicate a potential small-study effect; and ○ due to lack of larger studies, spurious inflation in smaller studies (e.g., due to poor methodological quality, more accurate implementation of resilience training, more restrictive and receptive study sample) could not be determined with certainty
Well-being, short-term follow-up (12 studies)	<ul style="list-style-type: none"> • No relevant conflicts of interest for included studies during the study period • A (standard) funnel plot was drawn (see Figure D16.11) which shows visual evidence for asymmetry. • Statistical evidence for asymmetry (Egger's test: $t = 2.43$, $df = 10$, $p = .04$) • Unlikely that asymmetry is due to publication bias for several reasons: <ul style="list-style-type: none"> ○ “negative” studies (i.e., statistically non-significant studies) also published; ○ studies appear to be missing in areas of high statistical significance ($p < .01$); and ○ results of one unpublished study (Cheung, 2014), although showing a (non-significant) tendency for decrease of well-being, do not differ from other published studies (e.g., Bernburg et al., 2016) • Visual asymmetry in funnel plot could not be explained by other forms of selection bias (language bias, location or database bias, multiple publication bias, provision of data bias, citation bias); non-significant results in unpublished study could indicate potential time lag bias (Cheung, 2014); one non-English study in the analysis published in local paper with English abstract (Hosseinnejad et al., 2018); no outcome reporting bias for well-being except for three studies where the authors did not report a prespecified time point or reported outcomes that had not been prespecified in trial registration (Hosseinnejad et al., 2018; Mistretta et al., 2018; West et al., 2014); non-significant results in unpublished study could indicate potential time lag bias (Cheung, 2014) • Meta-analysis is based on large number of small studies (11/12 studies)^b; potential conflicts of interest for two studies (Sood et al., 2011; Sood et al., 2014); however, no sufficient evidence for publication bias as these studies represent minority of studies and both report non-significant results • Small study effects:

Outcome, time point (number of included studies)	Assessment of publication bias
	<ul style="list-style-type: none"> ○ only Hosseinejad et al. (2018) found significant increase of well-being, which differed from non-significant result of the only one larger study included (Cheung, 2014); ○ insufficient evidence for small-study effect since other studies with small sample sizes (e.g., Mache et al., 2016; Sood et al., 2014) also reported no significant effect; and ○ effect size did not differ according to study size due to true heterogeneity (Page et al., 2019), as there were no consistent clinical (e.g., population, setting, or delivery format of resilience training) or methodological differences between studies of different size, and since evidence was largely based on small studies <ul style="list-style-type: none"> ● Alternative explanations of funnel plot asymmetry could refer to artefacts due to use of SMDs or chance (Page et al., 2019)

Note. *df* = degrees of freedom; *p* = *p* value of Egger's test; SMD: standardized mean difference; *t*: *t* value of Egger's test.

^a Contour-enhanced funnel plots only for primary outcomes at postintervention (main analyses of this review).

^b According to the GRADE approach (Guyatt et al., 2011), publication bias should be suspected when available evidence comes from a number of small studies, most of which have been commercially funded or when conflicts of interest are assumed.

Figure D16.1

Funnel Plot Resilience Posttest

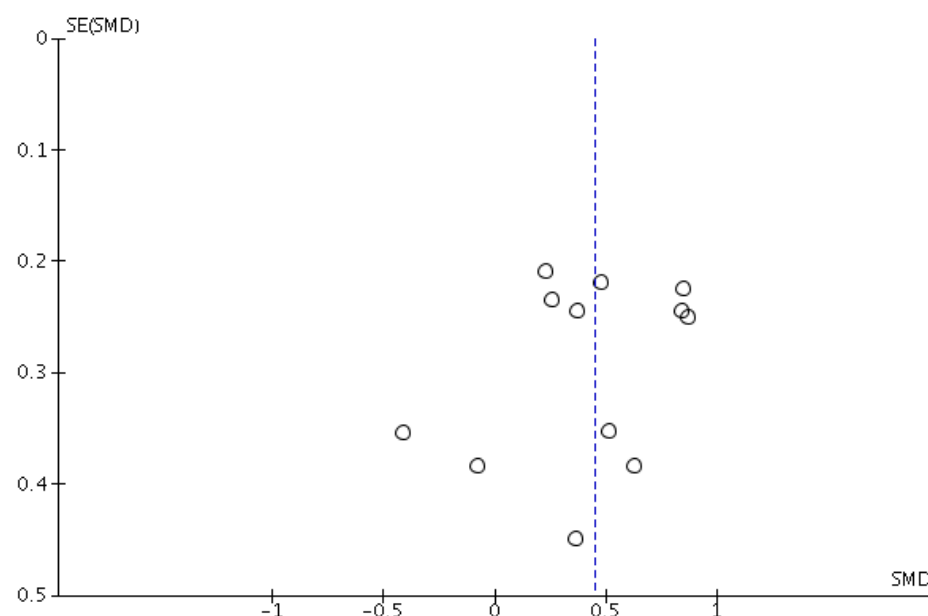


Figure D16.2

Contour-Enhanced Funnel Plot Resilience Posttest

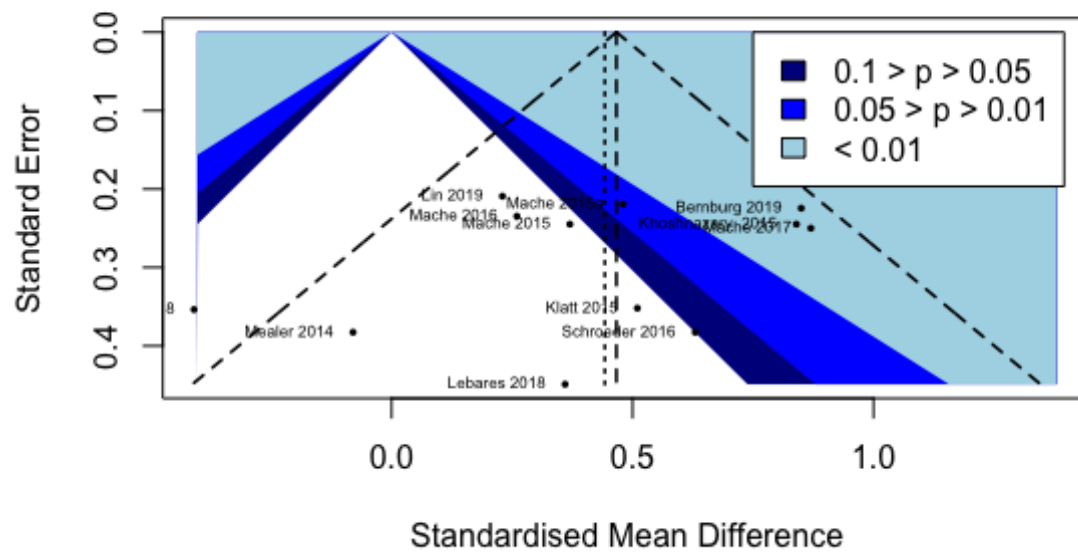
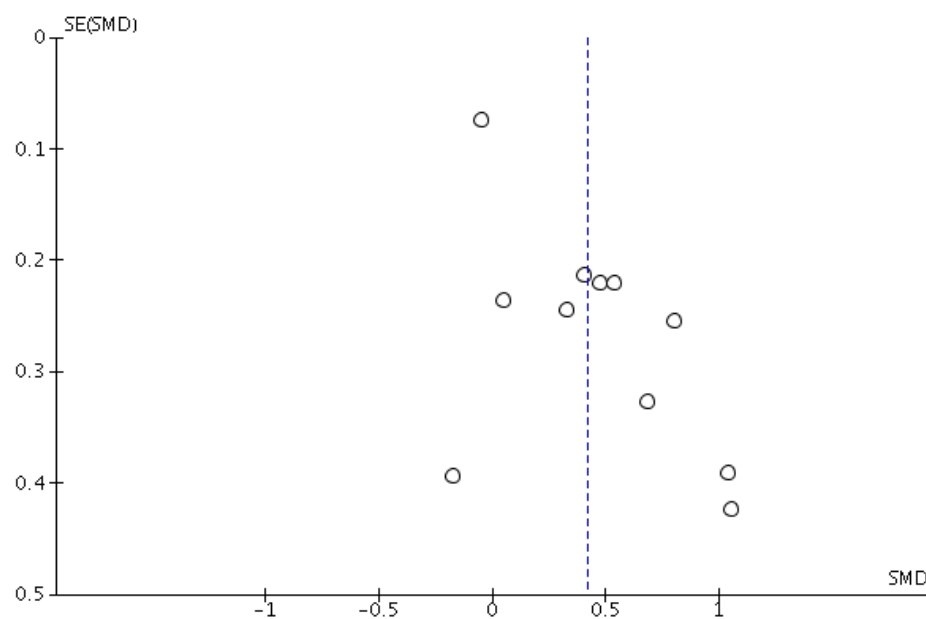


Figure D16.3

Funnel Plot Resilience Short-Term FU¹ (≤ 3 Months Postintervention)



¹ follow-up.

Figure D16.4

Funnel Plot Depression Posttest

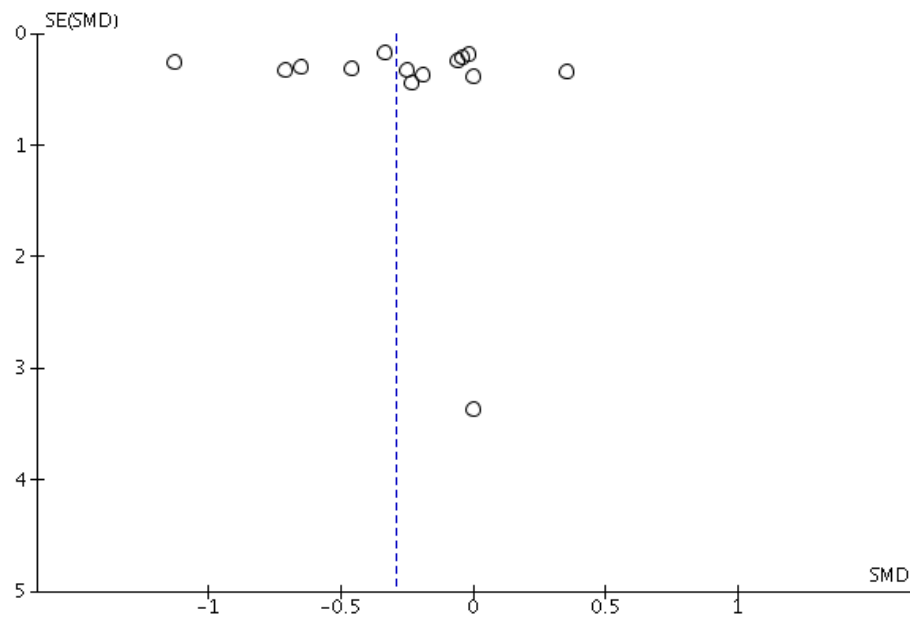


Figure D16.5

Contour-Enhanced Funnel Plot Depression Posttest

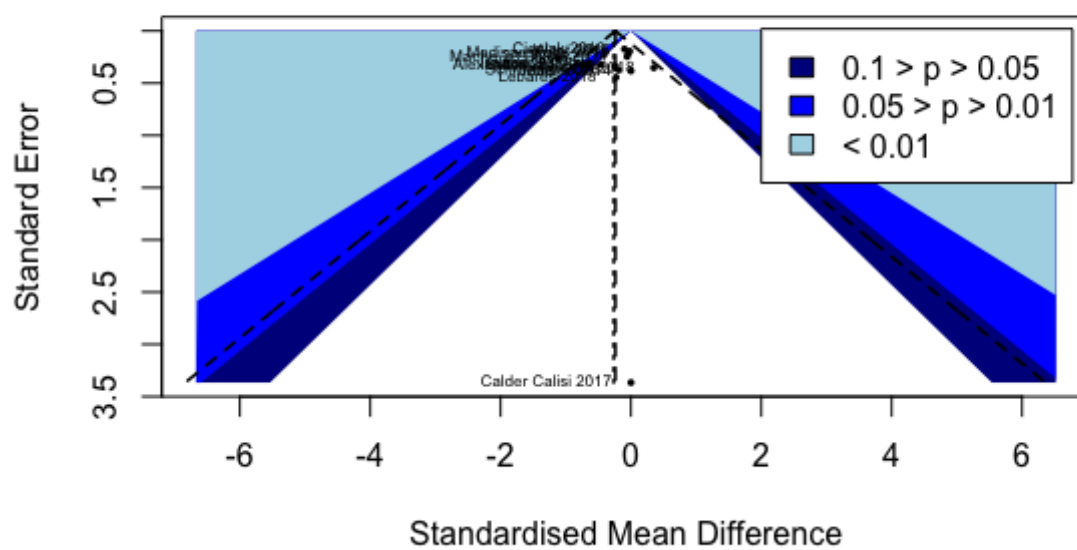


Figure D16.6

Funnel Plot (Perceived) Stress Posttest

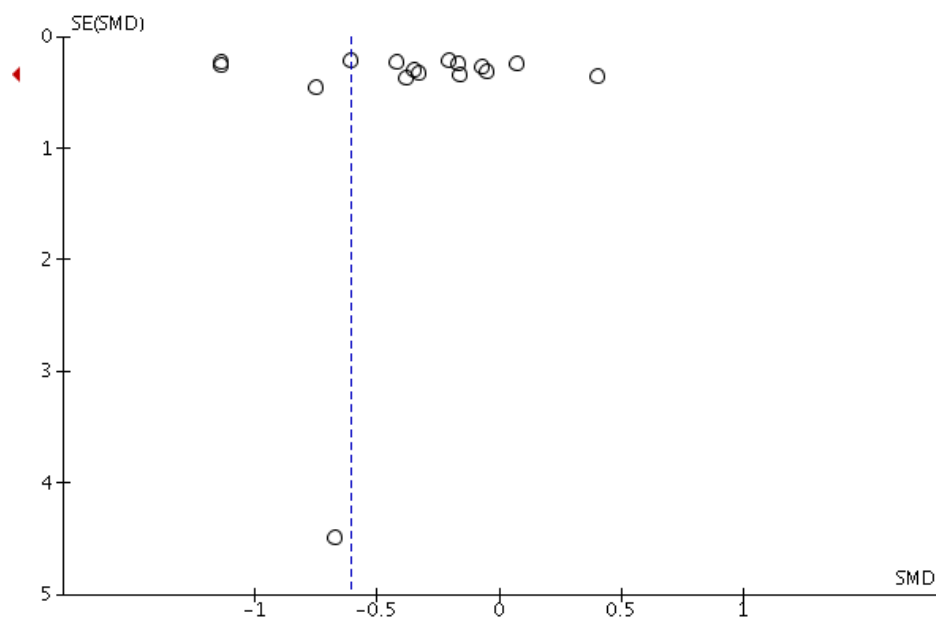


Figure D16.7

Contour-Enhanced Funnel Plot (Perceived) Stress Posttest

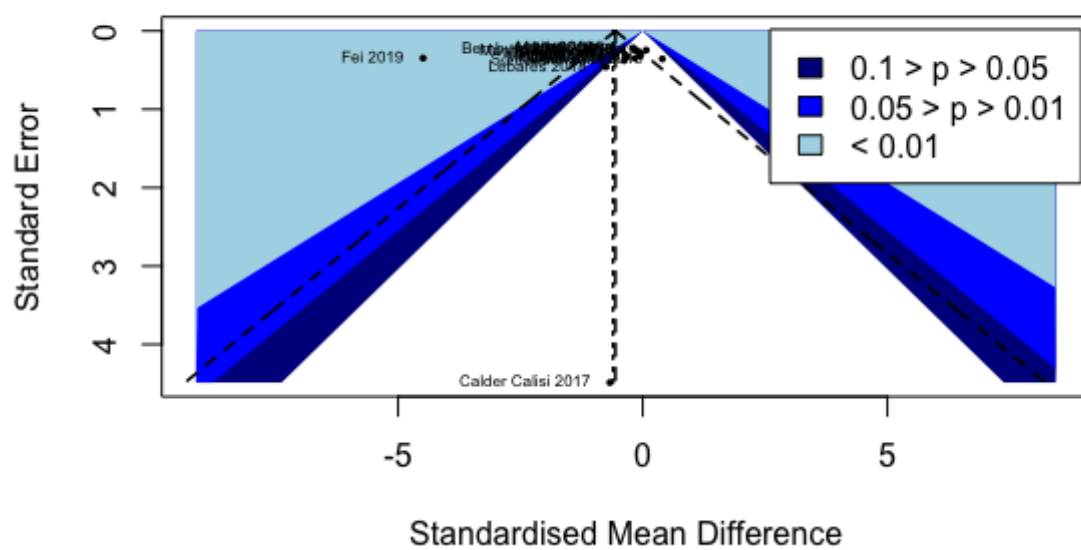


Figure D16.8

Funnel Plot (Perceived) Stress Short-Term FU (≤ 3 Months Postintervention)

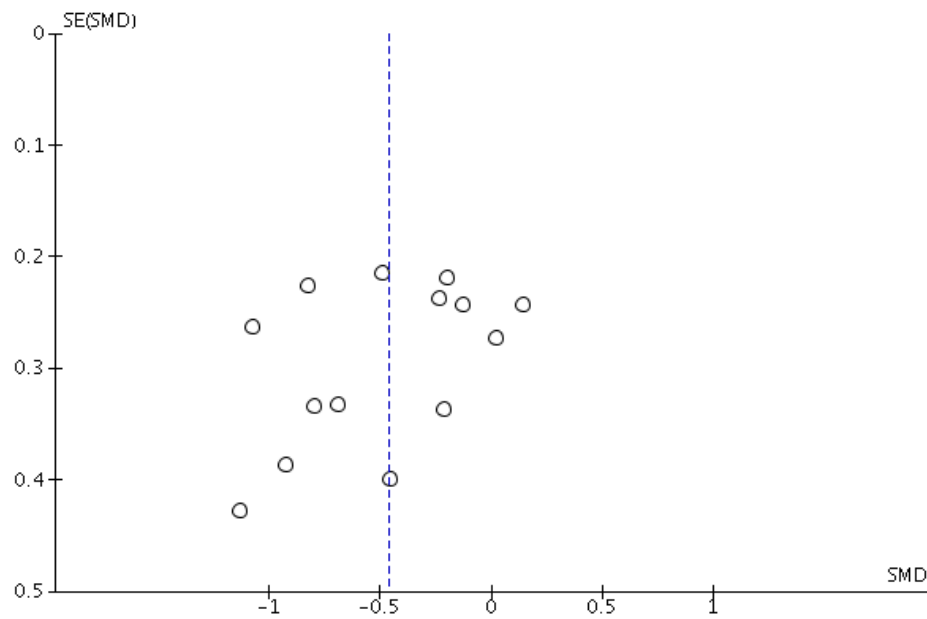


Figure D16.9

Funnel Plot Well-Being Posttest

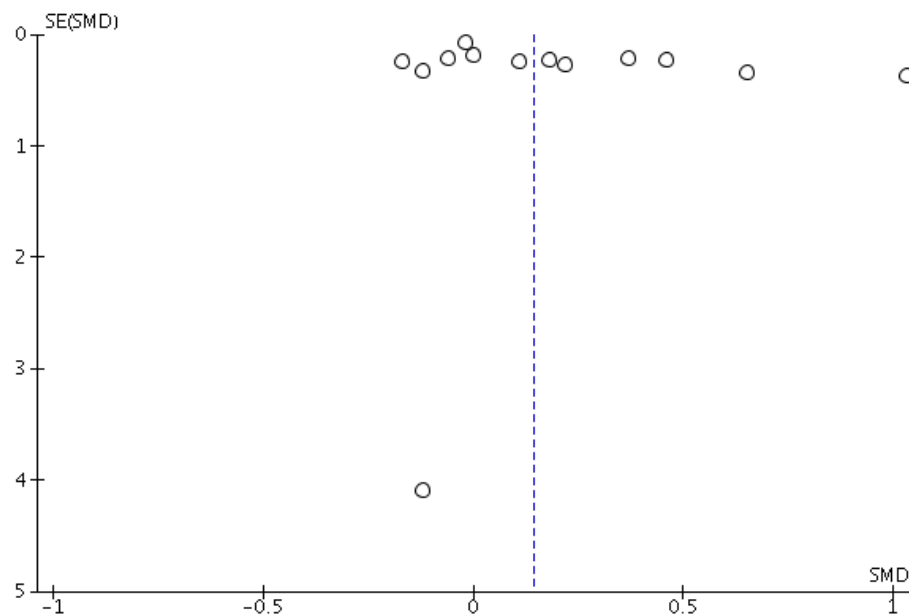


Figure D16.10

Contour-Enhanced Funnel Plot Well-Being Posttest

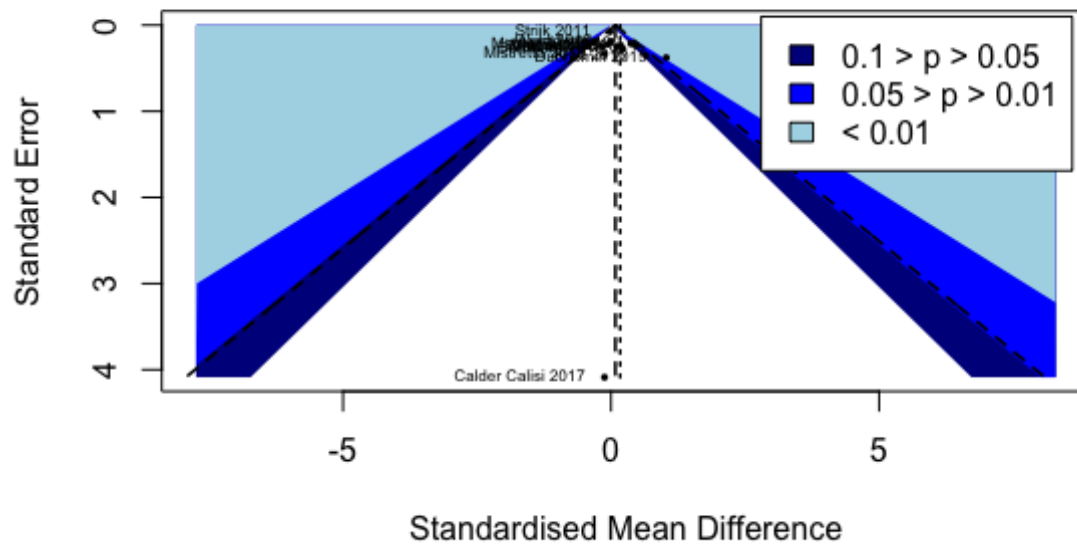
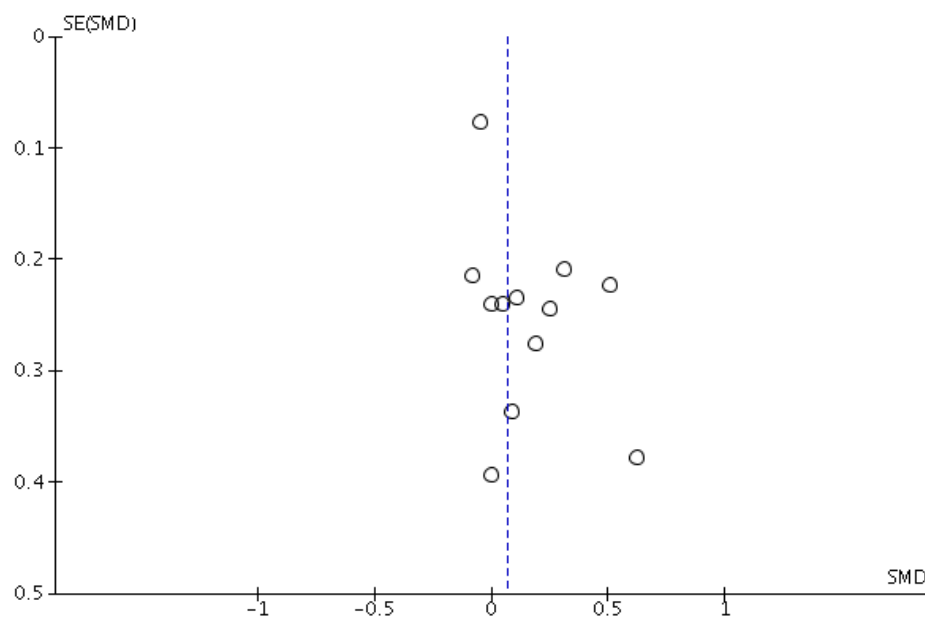


Figure D16.11

Funnel Plot Well-Being Short-Term FU (≤ 3 Months Postintervention)



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