Heightened sensitivity to temperature cues in highly anxiously attached individuals: Real or elusive phenomenon?

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Authors' Note

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Vess (2012) was the first to integrate research on attachment anxiety with research linking physical temperature to perceptions of intimacy (i.e., intimacy is associated with physical warmth whereas social isolation is associated with coldness; IJzerman & Semin, 2009; Zhong & Leonardelli, 2008). In study 1, Vess found that more, compared to less, anxiously attached individuals reported heightened preferences for warm foods when attachment concerns were activated (i.e., reflecting on a romantic breakup), but not in a control condition. Importantly, these findings suggest novel approaches for investigating how anxious individuals regulate feelings of intimacy, as well as temperature related interventions directed toward anxious individuals when distressed, and show that attachment concerns may be reliably activated with fairly simple manipulations using online samples.

We are sympathetic with Vess' theoretical integration, but wanted to directly replicate these results guided by the following rationale. A goal of science is to amass cumulative knowledge about natural phenomena, and after discovering that a phenomenon is reproducible one seeks to understand what explains that phenomenon. Given that one study (N = 56) has reported an association between activation of the attachment concerns of anxious individuals and heightened sensitivity to temperature cues, it is unknown if this phenomenon is reproducible. We therefore attempted to replicate this finding before seeking to explain it.[1]

In two samples we used the same procedures, measures, sampling type, and population used in Vess' Study 1. We contacted Vess to acquire all procedural and methodological details, quadrupled the original sample size to ensure high statistical power[2], and pre-registered the studies prior to data collection (Wagenmakers, Wetzels, Borsboom, van der Maas, & Kievit, 2012).[3]

For our first attempt, Vess provided the cover story used, instructions and wording for experimental conditions, study title used for recruitment, and the instructions for the dependent

[1]We only sought to replicate Vess' Study 1 finding given our interest in understanding the mechanisms underlying outcomes associated with the (in)activation of attachment concerns of anxious individuals (e.g., Campbell & Marshall, 2011). Understanding the mechanisms underlying Vess' Study 2 finding (impact of semantically activating the concept of warmth on anxiously attached individuals' relationship satisfaction) is a different investigation altogether.

[2]We determined a required sample size of 180 to achieve power of .95 (using G-Power 3.1; Faul, Erdfelder, Buchner, & Lang, 2009), given Vess' *t*-value of 2.26 which corresponds to an *F*-value of 5.11 which corresponds to a Cohen's *f* of .271 or f^2 of .0734 (Cohen, 1988).

[3]All project materials, raw data, and syntax files for both of our replication attempts are available on the OpenScienceFramework.org at http://opensciencefframework.org/project/QsNVB/ and http://opensciencefframework.org/project/YpPuR/.

variable. We used the same sample type (online via Amazon's Mechanical Turk), sampling frame (adults ranging from 18 to 65 years of age), and compensation ($0.35 USD).

For our second attempt, Vess graciously reviewed the procedural and methodological details of our first attempt. He noted a few minor differences between our first study and his study that we implemented in our second replication attempt.

Following Vess' analytic approach, we regressed warm-temperature desirability ratings onto life event condition (dummy-coded), attachment-anxiety (mean-centered), and their interaction term, controlling for attachment avoidance (also mean-centered).[4] Simple slope analyses were then executed using dummy coding. We did not replicate Vess' finding in either sample (see Table 1).[5] Opposite of what Vess reported, in both samples the non-significant positive relation between anxious attachment and preferences for warm refreshments was numerically larger in the ordinary event compared to romantic breakup condition.

Table 1. Simple slopes and interaction effects in Vess (2012, Study 1) and current studies

		Romantic breakup		Ordinary event		Interaction effect					
Study	N	n	β	n	β	β	95% C. I.	*t*	*p*	Effect size (f^2)	Power
Vess (2012, Study 1)	56	28	.44	28	-.19	-.42	-	2.26	.028	.0734	51.1%
Current studies											
Sample 1	219	105	.069	114	.099	.022	[-.12, .15]	.221	.826	.000228	97.9%
Sample 2	233	125	.107	108	.154	.031	[-.11, .15]	.358	.720	.000563	98.5%
Overall	452	-	-	-	-	.021	[-.077, .11]	.323	.746	.000234	-

Note. Overall standardized interaction effect was calculated based on our combined samples. Effect size estimates are Cohen's f^2 (Cohen, 1988). *Power* is the probability of detecting Vess' interaction effect (or larger) if it exists based on the effect size estimate in his original study. C. I. = confidence interval. Sample size within Vess' conditions assumed to be n = 28 (information not reported in article).

Our findings are difficult to reconcile with Vess' for several reasons. Our samples were high-powered and we were faithful to all procedural and methodological details of the original study. The demographics of our samples closely matched those of Vess in terms of age (mean $age_{sample1}$ = 33.07 [*SD* = 11.80] and mean $age_{sample2}$ = 32.95 [*SD* = 12.34] vs. mean $age_{Vess\ sample}$ = 33.50 [*SD* = 11.09]) and sex (63.5% and 54.1% females in our samples vs. 57.1% in Vess' sample). Composite scores of the warm and neutral food items had reliabilities of α = .62 and α

[4]Following Vess, the same regression was also executed predicting neutral-temperature refreshment ratings. We replicated null effects he reported for these refreshments in both samples (*p*s > .43).

[5]Excluded from analyses were 8 participants indicating they had previously participated in an online study entitled "Visualization and Consumer Choices" (either our first replication attempt or Vess' original study). Including these eight participants revealed the same pattern of results (critical interaction coefficient, β = .059, *p* > .49).

= .72 in sample 1 and α = .52 and α = .70 in sample 2 compared to α = .65 and α = .66 in Vess' sample. Reliabilities of the anxious and avoidant subscales were high (α = .78 and α = .82 in sample 1 and α = .77 and α = .80 in sample 2) (Vess did not report reliability estimates for the attachment measure subscales). Both replication attempts were also pre-registered[6], ruling out selective reporting being responsible for our results.

Importantly, we did replicate past findings on human food preferences. At the end of each study participants indicated their liking for an additional 14 refreshments taken from Logan and Smith (1986). Consistent with Logan and Smith, women liked vegetables, fruits, candy, and wine more than men whereas men liked meats, chili pepper, and beer more than women. Also, older individuals liked coffee and vegetables more than younger individuals (see supplementary materials for items and full results).

The results of Vess' study 1 are potentially important given (a) the novel insights into adult attachment processes and (b) the methodological pragmatic implication of activating the attachment system using online samples. Our findings, however, do not provide empirical support for the notion that activating the attachment system of more anxious individuals increases sensitivity to temperature cues, although it is possible that this theoretical idea reflects a reproducible phenomenon under a different set of operationalizations. We therefore advise researchers to proceed with caution when exploring links between anxious attachment and temperature experiences in potentially relationship threatening contexts.

[6]Details of both replication attempts can be confirmed by cross-referencing the pre-registered replication protocols for replication attempt #1 and #2 available at http://opensciencefframework.org/project/nydrb/files/ReplicationProtocol_for_Vess2012_-_LeBel.doc and http://opensciencefframework.org/project/Cju65/files/ReplicationProtocol_for_Vess2012_Replication_2_-_LeBel.doc, respectively.

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