Commentary

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Heightened Sensitivity to Temperature Cues in Individuals With High Anxious Attachment: Real or Elusive Phenomenon?

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In his recent article, 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 his first study, Vess found that individuals with high (but not low) levels of anxious attachment reported heightened preferences for warm foods when attachment concerns were activated (i.e., by reflecting on a romantic breakup). These findings suggest novel approaches for investigating how anxious individuals regulate feelings of intimacy, as well as for designing temperature-related interventions directed toward anxious individuals when distressed. Further, these findings show that attachment concerns may be reliably activated with fairly simple manipulations using online samples.

We are sympathetic with Vess's theoretical integration, but we 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 only one study (i.e., Vess's Study 1; $N = 56$) found an association between activation of the attachment concerns of anxious individuals and heightened sensitivity to temperature cues, it is unknown whether 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's Study 1. We contacted Vess to acquire procedural and methodological details, quadrupled the original sample size to ensure high statistical power,[2] and preregistered 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 the experimental conditions, study title used for recruitment, and instructions for the dependent 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).

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, and we incorporated these factors in our second replication attempt.

Following Vess's 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-slopes analyses were then executed using dummy coding. We did not replicate Vess's finding in either sample (see Table 1).[5] Inconsistent with what Vess reported, in both of our samples, the nonsignificant positive relation between anxious attachment and preferences for warm refreshments was numerically larger in the ordinary-event condition than in the romantic-breakup condition.

Our findings are difficult to reconcile with Vess's 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's in terms of age—Sample 1: mean age = 33.07 years ($SD = 11.80$); Sample 2: mean age = 32.95 years ($SD = 12.34$) vs. Vess's study: mean age = 33.50 years ($SD = 11.09$)—and sex (63.5% and 54.1% females in our samples vs. 57.1% in Vess's study). Composite scores of the warm and neutral food items had respective reliabilities of $\alpha = .62$ and $\alpha = .72$ in Sample 1 and $\alpha = .52$ and $\alpha = .70$ in Sample 2, compared with $\alpha = .65$ and $\alpha = .66$ in Vess's study. Reliabilities of the anxious and avoidant subscales were high (respectively, $\alpha = .78$ and $\alpha = .82$ in Sample 1 and $\alpha = .77$ and

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Table 1. Simple-Slope and Interaction Effects in Vess's (2012) Study 1 and the Current Studies

		Romantic-breakup condition		Ordinary-event condition		Interaction effect						
Study	*N*	*n*	β	*n*	β	β	95% CI	*t*	*df*	*p*	Effect size (Cohen's f^2)	Power
Vess (2012, Study 1)	56	28	0.44	28	−0.19	−0.42	—	2.26	49	.028	.0734	51.1%
Current studies												
Sample 1	219	105	0.069	114	0.099	0.022	[−0.12, 0.15]	0.221	214	.826	.000228	97.9%
Sample 2	233	125	0.107	108	0.154	0.031	[−0.11, 0.15]	0.358	228	.720	.000563	98.5%
Overall	452	—	—	—	—	0.021	[−0.077, 0.11]	0.323	447	.746	.000234	—

Note: The overall standardized interaction effect was calculated based on our combined samples. *Power* is the probability of detecting Vess's interaction effect (or a larger effect), if it exists, based on the effect-size estimate in his original study. Sample size in Vess's conditions was assumed to be 28. CI = confidence interval.

α = .80 in Sample 2; Vess did not report reliability estimates for the attachment-measure subscales). Both of our replication attempts were also preregistered,[6] which rules out selective reporting being responsible for our results.

It is important to note that 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 Logue and Smith (1986). Consistent with Logue and Smith, our results showed that women liked vegetables, fruits, candy, and wine more than did men, whereas men liked meats, chili pepper, and beer more than did women. Also, older individuals liked coffee and vegetables more than did younger individuals (see the Supplemental Material available online for items and full results).

The results of Vess's Study 1 are potentially important given (a) the novel insights they provide 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.

Author Contributions

L. Campbell conceived the initial idea for the study. E. P. LeBel prepared and submitted the institutional review board protocol, prepared the study materials, posted the study online, and conducted all the analyses. E. P. LeBel drafted the original manuscript, with L. Campbell drafting the introduction and contributing significant edits and revisions.

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Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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Supplemental Material

Additional supporting information may be found at http://pss.sagepub.com/content/by/supplemental-data

Notes

1. We sought to replicate only Vess's Study 1 finding given our interest in understanding the mechanisms underlying outcomes associated with the activation and inactivation of attachment concerns of anxious individuals (e.g., Campbell & Marshall, 2011). Understanding the mechanisms underlying Vess's Study 2 finding (the impact of semantically activating the concept of warmth on anxiously attached individuals' relationship satisfaction) is a different investigation altogether.
2. We determined that a sample size of 180 would be required to achieve a power of .95 (using G-Power 3.1; Faul, Erdfelder, Buchner, & Lang, 2009), given Vess's *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 Open Science Framework Web site at http://opensciencefra mework.org/project/QsNVB/ and http://opensciencefra mework.org/project/YpPuR/.
4. Following Vess, we also executed the same regression predicting neutral-temperature refreshment ratings. We replicated the null effects he reported for these refreshments in both of our samples (*p*s > .43).
5. We excluded 8 participants who indicated that they had previously participated in an online study entitled "Visualization and Consumer Choices" (either our first replication attempt or Vess's original study). Including these 8 participants yielded the same pattern of results (critical interaction coefficient, β = 0.059, *p* > .49).

6. Details of both replication attempts can be confirmed by cross-referencing the preregistered replication protocols for our first and second replication attempts, which are available at http://opensciencеframework.org/project/nydrb/files/ReplicationProtocol_for_Vess2012_-_LeBel.doc and http://opensciencеframework.org/project/Cju65/files/ReplicationProtocol_for_Vess2012_Replication_2_-_LeBel.doc, respectively.

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