

**Showering and Loneliness: Participants from the University of Texas, Austin**

**Jason D. Ferrell, Samuel D. Gosling, and M. Brent Donnellan**

**Analyses conducted by Brent Donnellan. Contact Jason D. Ferrell for Raw Data.**

*Notes about the sequence of replication attempt: These data were collected and initial analyses undertaken entirely independently by Sam Gosling and Jason Ferrell. On November 4<sup>th</sup> 2013, Gosling and Ferrell shared the findings with Brent Donnellan and John Bargh. Donnellan offered to write up the findings for PsychFileDrawer. This report is the result.*

**Sample and Procedure**

Participants were 365 college students who received course credit as part of a large Introductory Psychology course at the University of Texas, Austin during the Fall Semester of 2013 (64.5% women; 93.1% of participants were between the ages of 17 and 21 and only 2.3% were 26 or older). Showering/Bathing measures were taken from Bargh and Shalev (2012). On the recommendation of John Bargh (personal communication Oct 23, 2013), we changed “bath” to “bath/shower” to make it clear we were not referring only to baths per se. The specific questions (and answer options) were: *How often do you usually take a bath/shower?* (More than 3 times a day; 3 times a day; 2 times a day; Once a day; Once every other day; 2-3 times a week; Once a week; Less than once a week); *What temperature do you use for the water when you take a bath/shower?* (very hot; hot; warm; lukewarm; cold; very cold); and *About how much time do you spend in the bath/shower?* (Less than 2 minutes; 2-5 minutes; 5-10 minutes; 10-15 minutes; 15-20 minutes; 20-30 minutes; Over 30 minutes).

Participants completed the 3 item loneliness scale developed by Hughes, Waite, Hawkey, and Cacioppo (2004) based on the Revised UCLA Loneliness Scale (Russell, Peplau, & Cutrona, 1980) using a 4-point scale (1=Never to 4=Often). Previous work by Hughes et al.

(2004) reported that the short scale was strongly associated the Revised UCLA scale ( $r = .82$ ,  $n = 299$ ).

The loneliness scale and showering/bathing items were administered approximately 1 week apart. The Physical Warmth index was created by standardizing the three bathing/showering items and averaging them into a composite after the frequency and temperature items were reverse coded so that higher scores indicate more frequent baths/showers and warmer baths/showers ( $\alpha = .03$ ). The standardization procedure was applied only to the subsample with loneliness scores and responses to the showering/bathing items ( $N = 365$ ).

### Results and Discussion

Table 1 reports the relevant correlations and 95% confidence intervals. There was no evidence for an association between loneliness ( $M = 2.56$ ;  $SD = .80$ ,  $\alpha = .85$ ) and the Physical Warmth Index ( $r = -.03$ ,  $p = .535$ ,  $n = 365$ ; 95% CI =  $-.14$  to  $.07$ ). The hypothesis relevant correlation between the water temperature item and the loneliness scale was not statistically distinguishable from zero ( $r = -.08$ ,  $p = .141$ ,  $n = 365$ , 95% CI =  $-.18$  to  $.03$ ). These results generally replicate the results reported in Donnellan, Lucas, and Cesario (in press) and do not replicate the correlation between water temperature and trait loneliness reported in Study 1a of Bargh and Shalev (2012). As noted above, these data were collected by independent investigators distinct from the Bargh and Shalev (2012) and Donnellan et al. (in press) teams. Moreover, as shown in Table 2, the distributions of the showering/bathing items were generally consistent with those reported in Donnellan et al. (in press) and provided no indication that a large number of college students report bathing/showering less than once per week.

### Supplemental Adult Attachment Analyses

There has been a suggestion that attachment styles may moderate the connection between hot/cold embodiment findings and behavioral outcomes (e.g., IJzerman, Karremans, Thomsen, & Schubert, 2013). One concern is that the original IJzerman et al. work relied on a categorical approach to operationalize attachment styles despite compelling psychometric evidence that dimensional approaches are superior in childhood (Fraley & Spieker, 2003) and adulthood (e.g. Fraley & Waller, 1998). Moreover, there is no indication in the original Bargh and Shalev (2012) paper that adult attachment variable moderate the associations between loneliness and showering/bathing habits. Nonetheless, the UT dataset provides a unique opportunity to test whether attachment variables are relevant because a subset of participants provided responses to the Wei, Russell, Mallinckrodt, and Vogel (2007) Experiences in Close Relationship Scale-Short Form questionnaire (N = 334).

Supplemental Table 1A provides a complete correlation table. As seen in Table 1A, attachment dimensions were related to loneliness but unrelated to showering/bathing habits with the exception of a negative correlation between anxiety and frequency. We tested a series of three different regression models to evaluate whether attachment variables moderate the relations of focal interest for all DVs (i.e., the composite index and the individual items). Model 1 predicted the relevant DVs from loneliness, attachment anxiety, and the interaction between anxiety and loneliness. Model 2 predicted the relevant DVs from loneliness, attachment avoidance, and the interaction between avoidance and loneliness. Model 3 predicted the relevant DVs from loneliness, anxiety, avoidance, the three two-way interactions, and the single three-way interaction. We used the standard alpha level of .05 for these analyses.

None of the 12 analyses produced a statistically significant overall regression model and none of the interactions were statistically significant when considered individually (see Table 1B for a summary). In short, we found no evidence that attachment styles moderated the relations between loneliness and showering/bathing habits. An important caveat is that interactions with continuous variable in naturalistic studies often require extremely large samples to provide adequate statistical power. Nonetheless, these analyses provide no reason to suspect that self-report adult attachment variables are moderators of the effects in question.

## References

- Fraley, R. C., & Spieker, S. J. (2003). Are infant attachment patterns continuously or categorically distributed? A taxometric analysis of strange situation behavior. *Developmental psychology, 39*, 387–404.
- Fraley, R. C., & Waller, N. G. (1998). Adult attachment patterns: A test of the typological model. In J. A. Simpson & W. S. Rholes (Eds.), *Attachment theory and close relationships* (pp. 77-114). New York: Guilford Press.
- Fraley, R. C., Waller, N. G., & Brennan, K. A. (2000). An item-response theory analysis of self-report measures of adult attachment. *Journal of Personality and Social Psychology, 78*, 350-365.
- Hughes, M. E., Waite, L. J., Hawkey, L. C., & Cacioppo, J. T. (2004). A short scale for measuring loneliness in large surveys: Results from two population-based studies. *Research in Aging, 26*, 655-672.
- IJzerman, H., Karremans, J. C., Thomsen, L., & Schubert, T. W. (2013). How attachment styles modulate communal cues of physical warmth. *Social Psychology, 44*, 160-166.
- Russell, D., Peplau, L. A., & Cutrona, C. E. (1980). The Revised UCLA Loneliness Scale: Concurrent and discriminant validity evidence. *Journal of Personality and Social Psychology, 39*, 472–80.
- Wei, M., Russell, D. W., Mallinckrodt, B., & Vogel, D. L. (2007). The Experiences in Close Relationship Scale (ECR)-short form: Reliability, validity, and factor structure. *Journal of Personality Assessment, 88*, 187-204.

**Table 1: Correlations between Trait Loneliness and Bathing/Showering Items – UT Sample**

	<b>Frequency</b>	<b>Temperature</b>	<b>Duration</b>	<b>Index</b>	<b>N</b>
<b>UT</b>	-.065	-.077	.085	-.033	365
<b>95% CI</b>	-.17 to .04	-.18 to .03	-.02 to .19	-.14 to .07	

**Table 2: Distributions of Showering/Bathing Items with Recent MSU Data for Comparison Purposes***How often do you usually take a bath/shower?*

<b>Value</b>	<b>Response</b>	<b>U of T</b>	<b>Attentive MSU (Spring 2014)</b>
1	More than 3 times a day	0.8%	-
2	3 times a day	-	0.4%
3	2 times a day	13.2%	11.1%
4	Once a day	69.0%	64.7%
5	Once every other day	11.0%	19.7%
6	2-3 times a week	4.9%	4.1%
7	Once a week	0.5%	-
8	Less than once a week	0.5%	-
	Sample Size	365	532

*What temperature do you use for the water when you take a bath/shower?*

<b>Value</b>	<b>Response</b>	<b>U of T</b>	<b>Attentive MSU (Spring 2014)</b>
1	Very hot	9.9%	10.5%
2	Hot	61.1%	63.9%
3	Warm	26.0%	23.7%
4	Lukewarm	2.2%	1.5%
5	Cold	0.5%	0.4%
6	Very Cold	0.3%	-
	Sample Size	365	532

*About how much time do you spend in the bath/shower?*

<b>Value</b>	<b>Response</b>	<b>U of T</b>	<b>Attentive MSU (Spring 2014)</b>
1	Less than 2 minutes	-	-
2	2-5 minutes	1.6%	1.7%
3	5-10 minutes	14.2%	21.1%
4	10-15 minutes	30.1%	36.1%
5	15-20 minutes	29.9%	25.4%
6	20-30 minutes	18.6%	12.8%
7	Over 30 minutes	5.5%	3.0%
	Sample Size	365	532

**Supplemental Table 1A: Loneliness, Attachment, and Showering/Bathing Habits (Pairwise Deletion)**

	1	2	3	4	5	6	7
1. Loneliness	-						
2. Avoidance	.187*	-					
3. Anxiety	.334*	.142*	-				
4. Frequency	-.065	-.046	-.127*	-			
5. Temperature	-.077	-.026	-.054	.144*	-		
6. Duration	.085	.001	.045	-.123*	.011	-	
7. Index	-.033	-.042	-.080	.583*	.660*	.507*	-
Mean	2.56	2.91	3.82	4.91	4.77	4.66	0.00
SD	0.80	1.08	1.08	0.80	0.70	1.15	0.58

\*  $p < .05$

*Supplemental Table 2A: p-Values for the Attachment by Loneliness Interactions*

<b>Model</b>	<b>Frequency</b>	<b>Temperature</b>	<b>Duration</b>	<b>Index</b>
Model 1	.71	.31	.67	.90
Model 2	.68	.10	.25	.59
Model 3	.17	.88	.74	.48

Notes: All variables converted to z-scores prior to computing interaction terms. DVs were also standardized. N = 334. No overall  $R^2$  for any model was statistically significant.

Model 1: DV = anxiety + loneliness + interaction (loneliness\*anxiety).

Model 2: DV = avoidance + loneliness + interaction (loneliness\*avoidance).

Model 3: DV = anxiety + avoidance +loneliness + (lone\*anxiety) + (lone\*avoidance) + (anxiety\*avoidance) + (anxiety\*avoidance\*lone). The reported *p*-value is for the 3-way interaction. No interaction effects were statistically reliable for Model 3.