

**Smartphones Undermine Well-Being More in Men than Women: A Pre-registered Mega-
Analysis**

Supplementary Online Materials

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Participants

The original preregistered number of participants was 1951. This number was found by taking the total possible participants after merging all the data sets. Upon closer evaluation, we found that 173 of these rows (99 rows from the Waiting Paradigms; 74 rows from the Parents with their Children Paradigm) were proxy rows meant to stand in for an absent member of a dyad for record-keeping purposes. After removing these empty rows, we had 1778 participants. The only paradigms that measured race/ethnicity were the Getting Directions Paradigm, The Week Ties Meal Paradigm, The Waiting Alone Paradigm, and the Waiting Together Paradigm.

Sensitivity Analysis as supplied by G*Power

First, we ran a sensitivity analysis to examine how much power we have for detecting effects across all paradigms. We used the max number of values possible for social connectedness and affect valence, which is 1778. We found that we could detect effects as small as $f^2 = 0.007$ with 95% power in models with up to 4 predictors across the full sample ($\alpha = .05$, two-tailed).

t tests - Linear multiple regression: Fixed model, single regression coefficient

Analysis: Sensitivity: Compute required effect size

Input:	Tail(s)	=	Two
	α err prob	=	0.05
	Power (1- β err prob)	=	0.95
	Total sample size	=	1778
	Number of predictors	=	4
Output:	Noncentrality parameter δ	=	3.6067718
	Critical t	=	1.9613029
	Df	=	1773
	Effect size f^2	=	0.007316537

Second, we examined our sensitivity to detect differences between the Parents with Children paradigm and the rest of the paradigms. We found that we have 95% power to detect small differences, *Cohen's q* = .21, in the effects of the phone condition between the parenting paradigms and the other paradigms ($\alpha = .05$ two-tailed).

z tests - Correlations: Two independent Pearson r's

Analysis: Sensitivity: Compute required effect size

Input:	Tail(s)	=	Two
	α err prob	=	0.05
	Power (1- β err prob)	=	0.95
	Sample size group 1	=	1291
	Sample size group 2	=	389
Output:	Critical z	=	1.9599640
	Effect size q	=	0.2091748

Third, we ran a sensitivity analysis that reflects the size of the interaction effect between Condition and Gender we can detect utilizing all paradigms. We found that we have 95% to detect small interaction effects, *Cohen's f* = .09 ($\alpha = .05$ two-tailed).

F tests - ANOVA: Fixed effects, special, main effects and interactions

Analysis: Sensitivity: Compute required effect size

Input:	α err prob	=	0.05
	Power (1- β err prob)	=	0.95
	Total sample size	=	1680
	Numerator df	=	1
	Number of groups	=	4
Output:	Noncentrality parameter λ	=	13.0096197
	Critical F	=	3.8470132
	Denominator df	=	1676
	Effect size f	=	0.0879990

Supplementary Tables

Summary

Tables S1 & S2 detail the results for the initial registered analysis for Affect Valence and Social Connectedness. These tables include stepwise OLS regressions as initially registered. These analyses included extra variables later dropped from our subsequent registration because the variables were not measured across all studies.

Table S3 details the Cronbach alpha scores for Affect Valence by paradigm. The only paradigm not included in these analyses is the *Parent's With Children* paradigm because it was measured on a 1-item scale.

Tables S4 & S5 detail the initial model for our registered analysis for Affect Valence and Social Connectedness using an MLM framework rather than an OLS framework as shown in Tables 2 and 4. Though the results are consistent with the OLS approach, the MLM approach failed to provide estimates of significance for the fixed effects of paradigm.

Tables S6 & S9 detail the initial OLS models conducted with a Condition x Gender x Paradigm interaction for Social Connectedness and Affect Valence. We found no significant 3-way interactions between condition, gender, and paradigm.

Tables S7 & S8 detail the simple effects on Social Connectedness, estimating the differences in the Phone Condition for Social Connectedness by Gender and estimating differences in Gender for Social Connectedness by Phone Condition.

Table S1*Original Registered OLS Regressions: Affect Valence*

Model	(1)	(2)	(3)	(4)	(5)
	<i>b</i> (<i>se</i>)	<i>b</i> (<i>se</i>)	<i>b</i> (<i>se</i>)	<i>b</i> (<i>se</i>)	<i>b</i> (<i>se</i>)
(Intercept)	.03 (.03)	-.39 (.23)	-.45* (.23)	-.15 (.27)	-.16 (.27)
Condition (<i>Phone</i> =1; <i>No Phone</i> =0)	-.07 (.05)	-.05 (.06)	.03 (.07)	-.05 (.08)	-.05 (.08)
Gender (<i>Man</i> =1; <i>Woman</i> =0)		-.12 (.07)	.03 (.10)	-.01 (.12)	-.03 (.12)
Age		.03* (.01)	.03* (.01)	.02 (.01)	.02 (.01)
Other Race		-.07 (.14)	-.07 (.14)	-.21 (.16)	-.20 (.16)
Multiracial		-.03 (.17)	-.04 (.17)	-.17 (.20)	-.17 (.20)
Middle Eastern		-.16 (.16)	-.17 (.16)	-.31 (.18)	-.30 (.18)
Hispanic		-.16 (.10)	-.15 (.10)	-.21 (.12)	-.20 (.12)
First Nation		.12 (.15)	.10 (.15)	.04 (.15)	.06 (.16)
Asian		-.10 (.08)	-.10 (.08)	-.28** (.10)	-.28** (.10)
Black		-.63 (.71)	-.60 (.71)	-1.63 (1.01)	-1.65 (1.03)
Condition * Gender			-.31* (.14)	-.24 (.16)	-.22 (.17)
Phone Dependence				-.03 (.04)	-.01 (.06)
Condition * Phone Dependence					.00 (.09)
Gender * Phone Dependence					-.10 (.11)
Condition * Gender * Phone Dependence					.07 (.16)
N	1741	1031	1031	786	786
R2	.00	.02	.02	.03	.04
R2 Adj.	.00	.01	.01	.02	.02

*Note. The race/ethnicity reference category is white, and effects indicate comparison between each race and being White. * $p < .05$, ** $p < .01$, *** $p < .001$*

Table S2*Original Registered OLS Regressions: Social Connectedness*

Model	(1)	(2)	(3)	(4)	(5)
	<i>b</i> (<i>se</i>)	<i>b</i> (<i>se</i>)	<i>b</i> (<i>se</i>)	<i>b</i> (<i>se</i>)	<i>b</i> (<i>se</i>)
(Intercept)	.03 (.03)	-.39 (.23)	-.45* (.23)	-.15 (.26)	-.16 (.26)
Condition (<i>Phone</i> =1; <i>No Phone</i> =0)	-.26*** (.05)	-.21*** (.06)	-.15* (.07)	-.10 (.08)	-.11 (.08)
Gender (<i>Man</i> =1; <i>Woman</i> =0)		-.10 (.07)	.01 (.10)	-.03 (.12)	-.03 (.12)
Age		-.01 (.01)	-.01 (.01)	-.02* (.01)	-.02* (.01)
Other Race		-.02 (.14)	-.02 (.14)	-.04 (.16)	-.06 (.16)
Multiracial		-.14 (.16)	-.14 (.16)	-.37 (.20)	-.37 (.20)
Middle Eastern		-.14 (.16)	-.15 (.16)	-.28 (.18)	-.31 (.18)
Hispanic		-.19 (.10)	-.19 (.10)	-.28* (.11)	-.29* (.11)
First Nation		-.06 (.14)	-.07 (.14)	-.14 (.15)	-.15 (.15)
Asian		-.26** (.08)	-.26** (.08)	-.34*** (.10)	-.35*** (.10)
Black		-1.46* (.70)	-1.43* (.70)	-1.85 (1.00)	-1.62 (1.02)
Condition * Gender			-.22 (.14)	-.18 (.16)	-.17 (.17)
Phone Dependence				.00 (.04)	-.06 (.06)
Condition * Phone Dependence					.07 (.09)
Gender * Phone Dependence					.12 (.11)
Condition * Gender * Phone Dependence					-.01 (.16)
N	1756	1042	1042	795	795
R2	.02	.03	.03	.04	.04
R2 Adj.	.02	.02	.02	.03	.03

*Note. The race/ethnicity reference category is white, and effects indicate comparison between each race and being White. * $p < .05$, ** $p < .01$, *** $p < .001$*

Table S3*Cronbach Alpha Scores for Affect Valence by Paradigm.*

Paradigm/Data Set	Std. Alpha
Getting Directions	.89
Strong Ties Meals	.89
Weak Ties Meals	.85
Waiting Room Alone	.90
Waiting Room Together	.89

Note. We evaluated Cronbach's alpha at the paradigm level. The *Parent's with Children* paradigm measured affect valence on a 1-item scale, so we did not need to compile a scale or conduct a Cronbach alpha test.

Table S4*Initial Model – Multi-Level Model Predicting Social Connectedness*

Fixed Effect	$\hat{\gamma}$	[95%CI]	<i>p</i>
(Intercept)	.01	-.20 – .22	.93
Condition (Phone=1; No Phone=0)	-.14*	-.25 – -.02	.02
Gender (Man=1; Woman=0)	.02	-.12 – .16	.79
Getting Directions	.12	NaN – NaN	NaN
Strong Ties Meal	-.09	NaN – NaN	NaN
Waiting Alone	-.06	NaN – NaN	NaN
Waiting Together	-.03	NaN – NaN	NaN
Parents with Children	.04	NaN – NaN	NaN
Age	.00	-.00 – .01	.35
Condition * Gender	-.32**	-.52 – -.11	.00
Condition * Getting Directions	-.20	-.41 – .01	.06
Condition * Strong Ties Meal	.16	-.06 – .38	.15
Condition * Waiting Alone	.11	-.19 – .41	.47
Condition * Waiting Together	.11	-.08 – .30	.25
Condition * Parents with Children	-.17	-.36 – .02	.07
Random Effects			
σ^2			.93
$\hat{\tau}_{00}$ – Paradigm			.00
$\hat{\tau}_{11}$ - Paradigm * Condition			.00
$\hat{\rho}_{01}$ – Paradigm			-.00
ICC			.00
N _{Paradigms}			6
Observations			1694
R ² _{Marginal}			.03
R ² _{Conditional}			.03

Note. Number of paradigms = 6, *N* = 1,694. CI = confidence interval. Deviation coding was used to determine differences in the paradigm. The *Weak Ties Meal* paradigm was used as the reference category for all paradigms. The significance of the fixed effects of each paradigm could not be estimated because paradigm is the clustering variable. **p*<.05; ***p*<.01

Table S5*Initial Model – Multi-Level Model Predicting Affect Valence*

Fixed Effect	$\hat{\gamma}$	[95%CI]	<i>p</i>
(Intercept)	-.09	-.31 – .12	.40
Condition (Phone=1; No Phone=0)	-.01	-.13 – .11	.83
Gender (Man=1; Woman=0)	-.05	-.20 – .10	.48
Getting Directions	-.10	NaN – NaN	NaN
Strong Ties Meal	-.00	NaN – NaN	NaN
Waiting Alone	.07	NaN – NaN	NaN
Waiting Together	.09	NaN – NaN	NaN
Parents with Children	-.07	NaN – NaN	NaN
Age	.01	-.00 – .01	.17
Condition * Gender	-.20	-.41 – .01	.06
Condition * Getting Directions	.25*	.04 – .47	.02
Condition * Strong Ties Meal	-.07	-.29 – .15	.55
Condition * Waiting Alone	-.10	-.40 – .20	.52
Condition * Waiting Together	-.09	-.29 – .10	.35
Condition * Parents with Children	-.00	-.19 – .19	.99
Random Effects			
σ^2			.99
$\hat{\tau}_{00}$ – Paradigm			.00
$\hat{\tau}_{11}$ – Paradigm * Condition			.00
$\hat{\rho}_{01}$ – Paradigm			-.00
ICC			.00
N _{Paradigms}			6
Observations			1680
R ² _{Marginal}			.01
R ² _{Conditional}			.01

Note. Number of paradigms = 6, *N* = 1,680. CI = confidence interval. Deviation coding was used to determine differences in the paradigm. The *Weak Ties Meal* paradigm was used as the reference category for all paradigms. The significance of the fixed effects of each paradigm could not be estimated because paradigm is the clustering variable. **p*<.05

Table S6*Ordinary Least Squares Regression Predicting Social Connectedness - Condition x Paradigm x Gender*

	β	b [95% CI]	t
(Intercept)	.00	.01 [-.20, .23]	.11
Age	.06	.00 [.00, .01]	1.06
Condition (Phone=1; No Phone=0)	.00	-.15* [-.27, -.03]	-2.47
Gender (Man=1; Woman=0)	-.03	-.03 [-.19, .12]	-0.43
Getting Directions	-.11	.09 [-.09, .27]	.99
Strong Ties Meal	-.02	-.1 [-.29, .09]	-1.04
Waiting Alone	.08	.08 [-.17, .33]	.61
Waiting Together	.02	-.09 [-.26, .07]	-1.11
Parents with Children	-.01	-.01 [-.19, .18]	-.07
Condition * Gender	-.09	-.29** [-.51, -.07]	-2.59
Condition * Getting Directions	.13	-.20 [-.44, .05]	-1.57
Condition * Strong Ties Meal	-.02	.07 [-.20, .34]	.51
Condition * Waiting Alone	-.03	.06 [-.30, .42]	.33
Condition * Waiting Together	-.05	.11 [-.12, .34]	.96
Condition * Parents with Children	-.05	-.04 [-.27, .18]	-.38
Gender * Getting Directions	.11	.12 [-.22, .46]	.70
Gender * Strong Ties Meal	.02	.02 [-.30, .34]	.14
Gender * Waiting Alone	-.08	-.39 [-.83, .04]	-1.79
Gender * Waiting Together	.04	.22 [-.08, .52]	1.46
Gender * Parents with Children	-.07	.10 [-.17, .38]	.75
Condition * Gender * Getting Directions	-.05	-.01 [-.49, .47]	-.04
Condition * Gender * Strong Ties Meal	.00	.28 [-.18, .74]	1.18
Condition * Gender * Waiting Alone	.00	.12 [-.52, .76]	.36
Condition * Gender * Waiting Together	.03	.04 [-.38, .46]	.18
Condition * Gender * Parents with Children	.07	-.39 [-.79, .01]	-1.92
R ²	.039		
R ² Adj.	.025		

Note. Number of paradigms = 6, $N = 1,694$. CI = confidence interval. Deviation coding was used to determine differences in the paradigm. The *Weak Ties Meal* paradigm was used as the reference category for all paradigms. * $p < .05$

Table S7*Simple Effects of Phone Condition on Social Connectedness By Gender Across Paradigm*

Moderator levels	Contrast	<i>d</i>	<i>b</i> [95% CI]	<i>t</i>
Female	Phone - No Phone	-.15*	-.15 [-.29, -.01]	-2.05
Male	Phone - No Phone	-.47***	-.46 [-.65, -.27]	-4.71

Note. Simple effects are estimated controlling for the other independent variables in Model 3.* $p < .05$; *** $p < .001$ **Table S8***Simple Effects of Gender on Social Connectedness by Phone Condition Across Paradigms*

Moderator levels	Contrast	<i>d</i>	<i>b</i> [95% CI]	<i>t</i>
No Phone	Female - Male	-.02	-.02 [-.16, .12]	-.26
Phone	Female - Male	.30***	.29 [.15, .44]	3.98

Note. Simple effects are estimated after controlling for age and gender in Model 3.*** $p < .001$

Table S9*Ordinary Least Squares Regression Predicting Affect Valance - Condition x Paradigm x Gender*

	β	b [95% CI]	t
(Intercept)	.00	-.10 [-.32, .13]	-.85
Age	.06	.01 [.00, .01]	1.45
Condition (Phone=1; No Phone=0)	.00	.00 [-.13, .12]	-.08
Gender (Man=1; Woman=0)	-.03	-.06 [-.22, .10]	-.76
Getting Directions	-.11	-.20* [-.39, -.02]	-2.13
Strong Ties Meal	-.02	-.03 [-.23, .17]	-.32
Waiting Alone	.08	.17 [-.08, .43]	1.32
Waiting Together	.02	.04 [-.13, .21]	.45
Parents with Children	-.01	-.01 [-.20, .19]	-.08
Condition * Gender	-.09	-.26* [-.48, -.03]	-2.24
Condition * Getting Directions	.13	.32* [.07, .58]	2.51
Condition * Strong Ties Meal	-.02	-.06 [-.33, .22]	-.41
Condition * Waiting Alone	-.03	-.10 [-.47, .27]	-.53
Condition * Waiting Together	-.05	-.12 [-.35, .11]	-1.01
Condition * Parents with Children	-.05	-.10 [-.34, .13]	-.87
Gender * Getting Directions	.11	.39* [.03, .74]	2.14
Gender * Strong Ties Meal	.02	.06 [-.27, .39]	.37
Gender * Waiting Alone	-.08	-.32 [-.76, .13]	-1.40
Gender * Waiting Together	.04	.14 [-.16, .45]	.91
Gender * Parents with Children	-.07	-.2 [-.48, .08]	-1.37
Condition * Gender * Getting Directions	-.05	-.27 [-.76, .22]	-1.07
Condition * Gender * Strong Ties Meal	.00	.00 [-.47, .48]	.01
Condition * Gender * Waiting Alone	.00	.00 [-.66, .65]	.00
Condition * Gender * Waiting Together	.03	.14 [-.29, .57]	.62
Condition * Gender * Parents with Children	.07	.32 [-.09, .73]	1.54
R2	.021		
R2 Adj.	.007		

Note. Number of paradigms = 6, $N = 1,680$. CI = confidence interval. Deviation coding was used to determine differences in the paradigm. The *Weak Ties Meal* paradigm was used as the reference category for all paradigms. * $p < .05$