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RESEARCH PAPER

Beauty in Mind: The Effects of Physical Attractiveness on Psychological Well-Being and Distress

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Abstract Attractive people enjoy many social and economic advantages. Most studies find effects of attractiveness on happiness or life satisfaction, but based on traditional cross-sectional approaches. We use a large longitudinal survey consisting of a sample of male and female high school graduates from Wisconsin followed from their late teens to their mid-1960s. The panel construction of the data and the fact that interviews of the siblings of the respondents are available allow us to analyze the effects of physical appearance on psychological well-being (human flourishing) and ill-being (distress and depression) conditioning on unobserved individual heterogeneity via random effects. We find a significant positive relationship between measures of physical attractiveness (greater facial attractiveness at high school, and lower BMI and greater height in middle age) and a measure of psychological well-being, and a significant negative relationship between measures of physical attractiveness and distress/depression. These effects are slightly smaller when we adjust for demographics and mental ability but, with the exception of

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height, remain significant. Our results suggest that attractiveness impacts psychological well-being and depression directly as well as through its effects on other life outcomes.

Keywords Physical attractiveness · Psychological well-being · Distress · Longitudinal survey · Random effects · Sibling differences

1 Introduction

Beauty is rewarding and rewarded. Brain imaging studies reveal that brain reward pathways fire at the sight of attractive strangers' faces (Aharon et al. 2001). Social psychologists have identified a "halo" effect of physical attractiveness leading to inferences that the attractive are more competent, confident, and socially skilled than the unattractive (Eagly et al. 1991; Hatfield and Sprecher 1986; Langlois et al. 2000; Feingold 1992). In labor markets, a "beauty premium" and "plainness penalty" is seen: attractive individuals are more likely to be hired, promoted, and to earn higher salaries than unattractive individuals (Hamermesh and Biddle 1994; Hosada et al. 2003). Attractive people are more likely to win arguments, persuade others to change their opinions, and be offered assistance. Compared with unattractive adults, they have more dating and more sexual experience [reviewed in Etcoff (1999)]. One would have to assume that attractive people are happier than other people. Afforded so many social and economic advantages, they must be happier.

Very few studies have adequately tested this assumption, and fewer have offered evidence that supports it. In a study of college students, Diener et al. (1995) found that facial attractiveness had marginal effects on overall happiness and life satisfaction. Looking within sub-domains, they found a small but significant effect on satisfaction with romantic life, but no effect on satisfaction with any of the other 33 sub-domains measured. A study of female fashion models found that they had slightly lower well-being and greater personality maladjustments than non-models matched for age and ethnicity, a result that may not be generalizable to the general population of attractive women (Meyer et al. 2007). While meta-analyses suggest that attractive adults have slightly better mental health and less social anxiety than unattractive adults (Feingold 1992; Langlois et al. 2000), a study of 1100 female twins found no relations between physical attractiveness and three separate measures of depression (McGovern et al. 1996). Reviewing the evidence on happiness and attractiveness, one researcher concluded that the "bottom line is that good looking people aren't any happier" (Lyubomirsky 2007). To date, most of the findings on attractiveness mirror a slew of other findings in well-being research that demonstrate that life circumstances explain little of the variance in happiness (Lyubomirsky et al. 2005).

A few studies have looked at specific "objective" body measurements associated with norms of attractiveness such as height and weight and their relation to happiness or depression. Deaton and Arora (2009) found that the taller are happier but the results are almost entirely explained by the association between height and both income and education. Barry et al. (2008) have shown that the risk of major depression significantly increases with BMI even when controlling for other risk factors, particularly for women.

In this study, we use the Wisconsin Longitudinal Study to test whether attractiveness is significantly linked to psychological well-being and distress/depression across the lifespan. We use the WLS for three reasons: it includes multiple sources of measurement of physical

attributes including observer ratings of facial attractiveness and self-reports of weight and height; it includes standardized measures of well-being and of depression; and it has detailed demographic information on respondents from their late teens until their mid-1960s. This long observational period allows us to analyze the effect of physical attractiveness on well-being and distress while taking into account mediators of well-being and ill-being such as marriage, divorce, unemployment and any unobserved individual heterogeneity. Finally, interviews of the siblings of the WLS respondents provide a way of accounting for unobserved family background effects common to siblings from the same family.

2 Materials and Methods

The Wisconsin Longitudinal Survey (WLS) is a long-term study of a broadly representative sample of 10,137 white, non-Hispanic American men and women who graduated from Wisconsin high-schools in 1957 (Wisconsin Longitudinal Study, 1957–2011). Interviews with either the respondents or their parents were conducted six times over a period of more than 50 years (in 1957, 1964, 1975, 1992–1993, 2003–2005 and 2011) and, for a subsample of the WLS respondents, four times with a randomly selected sibling (in 1977, 1993–1994, 2004–2007 and 2011).

2.1 Attractiveness Measures

The high-school yearbook pictures of 8434 WLS participants were rated for attractiveness in 2008 by judges recruited from the Madison senior scholars program. Twelve judges (six men and six women, mean age 78.5) rated each photograph on an 11-point rating scale from "not at all" to "extremely" attractive. The reliability of the facial attractiveness ratings (Cronbach's alpha) is .87 (Hauser 2009). We use the normed average rating across the 12 judges. Our measure of BMI is based on self-reports obtained in 1992–1993 and 2003–2005 when subjects were approximately 54 and 65 years old. Finally, we include height in inches.

2.2 Psychological Well-being Measures

Wisconsin Longitudinal Survey respondents and the subsample of siblings were assessed using the Ryff six-factor model of well-being (RPWB; Ryff 1989; Ryff and Keyes 1995), theoretically derived dimensions of well-being focusing on the extent to which respondents endorse high levels of autonomy, environmental mastery, personal growth, positive relations with others, purpose in life and self-acceptance. The WLS respondents received a shortened version of the RPWB based on 42 (1993) and 31 items (2004). Psychological well-being applied in the paper is an aggregate scale of standardized scores on four of these measures: personal growth, purpose in life, self-acceptance and environmental mastery. while Ryff and Keyes (1995) suggest that a six factor structure is the best fit to the data, not all studies agree. Following Springer et al. (2006), we combined the four highly redundant subscales into one index of positive mental health. The other dimensions will be examined separately in future work. Our measure of psychological distress/depression is the Center for Epidemiologic Studies Psychological Distress/Depression Scale (CES-D) a common screening test of depressive feelings and behaviors during the past week (Radloff 1977). It consists of 20 items, standardized to have zero mean and unit standard deviation (SD).

We control for sex (female), years of completed schooling, retirement status, marital status, total household income in quintiles, homeownership, mental ability,[1] and objective health (a scale measuring the total number of illnesses that the respondent has ever experienced).

2.3 Analysis

We use two analysis samples. In the main sample we include the 8434 WLS respondents with a valid facial attractiveness rating. This sample consists of 4416 women and 4018 men. Respondents in this sample are observed twice (in 1993 and 2004). In the secondary sample, which we use for supplementary within-family analysis, we include WLS respondents for whom there is also information on a randomly selected sibling (i.e., a subsample of the main WLS sample). This sample includes sibling respondents with valid information on BMI (3183 observations) and height (3255 observations). The WLS respondent and sibling respondent in the secondary sample are both observed twice (in 1993 and 2004).

We exploit the availability of repeated observations of the well-being and distress/depression variables in 1993 and 2004 to address potential confounding from unobserved heterogeneity. Specifically, we estimate random effects (RE) models that control for unobserved individual characteristics that affect well-being and distress/depression. The RE model is a panel data model that uses repeated observations of the dependent and independent variables to control for the fact that some individuals for reasons unobserved by the researcher may be more prone to mental distress than others. One example of an unobserved factor could be genetic susceptibility to depression—a recent meta-analysis finds that individuals with the short variant of the serotonin transporter gene 5-HTTLPR have a higher tendency to experience depression after stressful incidents (Karg et al. 2011). The RE approach thus enables us to provide more robust estimates of the association between physical attractiveness and well-being and distress/depression than a traditional cross-sectional approach.

As a robustness check, we also run "sibling-differenced" RE models in which we use the secondary sample and calculate differences across siblings from the same family in both the dependent and the independent variables. The idea behind this approach is that, in addition to controlling for individual unobserved heterogeneity, we use the sibling-differenced variables to also control for family-level unobserved characteristics that affect physical attractiveness and well-being (such as common upbringing or genes). Since mixed (brother–sister) pairs can differ substantially in height and BMI, we standardize these variables within sexes i.e., transform them to Z-scores. In this way, all pairs of siblings can be included in the estimation. Facial attractiveness is only available for the main WLS respondent, however, which means that we cannot include this variable in the sibling-differences models.

3 Results

3.1 Findings

Table 1 presents descriptive statistics from our main and secondary WLS samples pooled over the two observation periods (1993 and 2004). Psychological well-being and depression measures, facial attractiveness, BMI and height (standardized within sexes) are

[1] Our proxy for mental ability is respondents' scores on the Henmon-Nelson test of mental ability when they were approximately 18 years old.

Table 1 Descriptive statistics

Sample	WLS respondents			WLS respondents and siblings		
	Mean	SD	N	Mean	SD	N
Psychological well-being scale[a]	31.409	5.102	13,571	31.487	5.036	6295
Depression (modified CES-D)[a]	15.289	15.018	13,465	14.929	14.536	6235
Physical attractiveness						
Facial attractiveness[a]	.013	1.257	16,868	–	–	–
Body mass index[a]	27.295	4.740	12,783	27.123	4.588	5641
Height in inches[b]	67.410	3.856	13,576	67.425	3.827	6510
Sex (female)[c]	51.6		20,634	51.0		17,556
Years of schooling	13.389	2.419	19,224	13.455	2.186	10,668
Dummy for retired[c]	41.4		15,171	38.9		8637
Married[c]	80.3		16,183	81.6		9195
Never married[c]	4.0		16,183	3.9		9195
Widowed[c]	4.8		16,183	4.4		9195
Divorced[c]	10.0		16,183	9.4		9195
No. illnesses	1.440	1.586	13,618	1.371	1.568	6421
Total family income, quintiles	5.496	2.872	15,671	5.696	2.819	8154
Homeowner[c]	91.0		15,466	91.4		7947
Mental ability	100.459	14.915	20,634	100.845	14.815	13,238
Brother pairs[c]	–	–	–	23.8		17,556
Sister pairs[c]	–	–	–	25.7		17,556

Means/percentages, standard deviations (SD) and number of observations

Descriptive statistics are for the pooled (1993 and 2004) waves

[a] Variable is standardized in the empirical analyses

[b] Variable is standardized within genders in the empirical analyses

[c] Percentages. The sample "WLS respondents" includes all WLS respondents with a valid observation of facial attractiveness. The sample "WLS respondents and siblings" includes all WLS respondents for whom the WLS also includes information on a randomly selected sibling. Descriptive statistics for this sample is for the WLS and sibling respondent

centered on zero. Mean BMI in the main sample is 27.3, in the overweight category. Mean height is 67.4 inches (women 64.7 inches, men 70.6 inches). 51.6 % of the WLS sample is female. Individuals on average have 13.4 years of schooling. More than 80 % of the respondents are married. On average, measured mental ability is 100.5. The distributions of the dependent and independent variables are very similar in the main and secondary sample.

Table 2 uses the main WLS sample in a random effects regression of well-being and ill-being on physical attractiveness. Separate regressions are run for each of the measures: psychological well-being and distress/depression. Two specifications are shown: column 1, physical attractiveness only, and column 2, adjusted for demographic variables and mental ability.

We find that greater facial attractiveness, lower BMI and greater height are associated with higher psychological well-being and lower depression. These effects are slightly smaller when we adjust for demographics and ability but, with the exception of height,

Table 2 Random effects regressions of psychological well-being outcomes

Model	Psychological well-being[a]		Depression	
	1	2	1	2
Facial attractiveness	.069 (.012)***	.055 (.012)***	−.057 (.012)***	−.038 (.012)**
Body mass index	−.098 (.011)***	−.074 (.011)***	.071 (.011)***	.057 (.011)***
Height in inches	.031 (.012)**	.017 (.012)	−.020 (.012)	−.009 (.012)
Sex (=female)		.165 (.024)***		.097 (.024)***
Years of schooling		.046 (.006)***		−.002 (.006)
Dummy for retired (ref. working)		.076 (.016)***		−.108 (.017)***
Never married (ref. married)		−.237 (.060)***		.132 (.059)*
Widowed		−.100 (.044)*		.419 (.046)***
Divorced		−.017 (.037)		.081 (.037)*
No. illnesses		−.040 (.006)***		.086 (.006)***
Total family income, quintiles		.031 (.004)***		−.016 (.004)***
Homeowner		.091 (.036)*		−.146 (.037)***
Mental ability		.001 (.001)		−.005 (.001)***
Proportion of variance within-individual	.616	.593	.556	.522
R^2 (between-individual)	.022	.082	.014	.101
Number of observations	9552	9552	9505	9505

Parameter estimates with standard errors in parenthesis. WLS respondents sample

*** $p < .001$; ** $p < .01$; * $p < .05$

[a] Aggregate scale of scores on personal growth + purpose in life + self-acceptance + environmental mastery. Model 1 for each outcome includes the physical attractiveness variables while Model 2 includes the physical attractiveness and the control variables. No significant interactions between sex and the physical attractiveness variables

remain statistically significant. Furthermore, the effects of physical attractiveness on psychological well-being and depression are roughly comparable. A 1 SD increase in facial attractiveness is linked with an increase in psychological well-being of .069 and .055 SDs after adjusting for demographics and ability.[2] A 1 SD increase in adolescent BMI implies a

[2] Some research suggests that the effects of physical attractiveness on well-being need not be linear (Tovée et al. 2006; Courtiol et al. 2010). For example, taller men and women of average height are considered more attractive than short men and tall/short women. We tested for nonlinear effects of physical attractiveness by including square terms for all physical attractiveness variables. We found little evidence of non-linear effects, however.

.074 SD fall in well-being adjusting for controls, and a .057 SDs rise in depression adjusting for controls. Height has a positive effect on psychological well-being, but this effect is no longer statistically significant after adjusting for controls, which was also found by Deaton and Arora (2009). The effect of physical attractiveness is comparable to that of other correlates of psychological well-being and depression. For example, the effect on psychological well-being of a 1 SD increase in facial attractiveness is similar to the effect of moving up one quartile in the distribution of family income and, moreover, equivalent to about one-third of the gender difference in well-being.

The effects of the demographic variables on well-being and depression concur with the literature (Frey and Stutzer 2002). For example, we find a positive association between family income and well-being and a negative association between these measures and depression (see e.g. Diener and Biswas-Diener 2002; Diaz-Serrano 2009). Being female is associated with significantly higher well-being and a greater tendency towards depression, a paradox resolved by noting that studies find while gender accounts for less than 1 % of the variance in happiness, 13 % is accounted for by sex differences in affect intensity, with women reporting greater intensities of both positive and negative emotions (Fujita et al. 1991).[3] Relative to married individuals, those never married or widowed score lower on well-being and higher on depression. Poor health goes together with reduced individual well-being. Finally, a greater proportion of the variation in psychological well-being arises within individuals than between individuals (thus, suggesting over-time persistence in psychological well-being).

In Table 3, we use the secondary sample consisting of WLS respondents and their siblings in a robustness analysis to control for unobserved family-specific factors. In our RE models BMI effects (now based on adult BMI) on psychological well-being and depression get stronger after we difference out common family-level factors. A 1 SD increase in BMI is associated with a decrease in psychological well-being of .111 SDs adjusting for controls and an increase in the depression score of .091 SDs. Height in this model is, throughout, statistically insignificant. Overall, the results from the within-family RE models are similar to those presented above.[4]

4 Discussion

Our results have a number of implications. We find that physical attractiveness can be associated with a statistically significant influence on self-reported well-being and depression/distress in a large sample of WLS adults. Even when we account for education, marriage, widowhood, divorce, illnesses and income, all known correlates of subjective well-being and depression, the effects remain statistically significant for two out of three

[3] Interaction effects between gender and the physical attractiveness measures in the models in Table 2 were not significant.

[4] We have run additional analyses using the multiple imputation methods (Graham 2009) implemented in Stata to handle missing values on those of our explanatory variables that have the lowest number of observations (BMI, height, and number of illnesses, see Table 1). We have run all the models presented in Tables 2 and 3 using 20 imputations of missing values for these three variables (which means that we increase the effective sample size by about 1000 in the models presented in Table 2 and by about 700–800 in the models presented in Table 3). The effects of the attractiveness and control variables in these models are almost identical to the ones presented in Tables 2 and 3, which suggests that there is no systematic pattern in the missing values which influences our results (available on request).

Table 3 Within-family random effects regressions of psychological well-being outcomes

Model	Psychological well-being[a]		Depression	
	1	2	1	2
Facial attractiveness	–	–	–	–
Body mass index	−.116 (.019)***	−.111 (.019)***	.098 (.019)***	.091 (.019)***
Height in inches	.018 (.024)	.013 (.023)	−.004 (.023)	.002 (.022)
Sex (=female)		−.038 (.045)		−.036 (.048)
Years of schooling		.054 (.010)***		−.014 (.010)
Dummy for retired (ref. working)		.012 (.034)		.006 (.035)
Never married (ref. married)		−.140 (.094)		.221 (.091)*
Widowed		−.044 (.071)		.282 (.072)***
Divorced		−.080 (.060)		.081 (.059)
No. illnesses		−.029 (.009)***		.062 (.009)***
Total family income, quintiles		.031 (.006)***		−.024 (.006)***
Homeowner		.146 (.060)*		−.201 (.060)***
Mental ability		.001 (.006)		−.005 (.001)***
Brother pairs		−.013 (.065)		−.020 (.064)
Sister pairs		.030 (.062)		.074 (.061)
Proportion of variance within-individual	.586	.573	.508	.484
R^2 (between-individual)	.015	.058	.012	.075
Number of observations	3595	3595	3540	3540

Parameter estimates with standard errors in parenthesis. WLS respondents and siblings sample

*** $p < .001$; ** $p < .01$; * $p < .05$

[a] Aggregate scale of scores on personal growth + purpose in life + self-acceptance + environmental mastery. Model 1 for each outcome includes the physical attractiveness variables while Model 2 includes the physical attractiveness and the control variables

measures of attractiveness (facial attractiveness and BMI) on well-being and on distress/depression.

BMI exerts direct as well as indirect effects on well-being and depression that become even stronger once we account for unobserved family-level characteristics. BMI may impact well-being and depression through exposure to weight related stigma and discrimination, internalization of stigma, and social disadvantage or ostracism. Muennig (2008) suggests that the stress of being overweight or obese may even plausibly explain a portion of the BMI-health associations.

In contrast to Diener et al. (1995) we found statistically significant effects of facial attractiveness on well-being. Our study differed from theirs in a number of ways: we relied on high school rather than college year book photographs, a much bigger sample, on older raters, on different measurements of well-being, and on uncovering effects of physical attractiveness on well-being and depression measures using panel rather than cross-sectional methods.

Subjective well-being has been operationalized in two ways; as a hedonic state, captured by self-reports of positive affect, negative affect, and life satisfaction (used by Diener et al. 1995) or as eudaimonia, a state of flourishing captured by self-reports of aspirations, self-acceptance, growth, and control over life choices (WLS 1957–2005; Ryff 1989). The two types of measures are correlated but distinct. It is possible that the difference in the way we have operationalized well-being contributed meaningfully to our disparate results. It may be that physical attractiveness is less associated with day-to-day moods than with feelings of mastery and agency, states that are more affected by constraints on life choices or aspirations, and that would be fully manifest by middle age.

Our subjective well-being measure focused on feelings of self-confidence, positive self-regard and agency. Our results are consistent with previous studies that found attractive people to be more socially at ease (Feingold 1992), more assertive (Jackson and Huston 1975) and more likely to think they are in control of their own lives (Anderson 1978). In an experimental labor market Mobius and Rosenblat (2006) estimated that the confidence channel alone accounted for up to 20 % of the beauty premium.

Given the social and economic advantages of perceived facial attractiveness when young and body weight throughout life it is not surprising that these aspects of appearance may play a role in the development of positive self-regard, self-confidence and agency. Internalization or transmission of stereotypes can even lead to behaviors that are self-fulfilling prophecies. For example, in one study men spoke with women on the telephone whom they believed to be physically attractive or unattractive (always the same individual, but the men were given photographs of either attractive or unattractive individuals). Women who were perceived (unknown to them) to be physically attractive behaved in a more sociable, outgoing, and warm manner than did those perceived to be unattractive (Snyder et al. 1977). Interestingly judges rated the men as more outgoing, humorous, confident, and socially adept when they spoke to the "attractive women". Social warmth and confidence or its lack emerged as a reciprocal gesture.

5 Limitations

Minorities are not well-represented in the WLS database. Subjects were mainly of German, English, Irish, Scandinavian, Polish, or Czech ancestry. There were only a small number of African–American, Hispanic, or Asian subjects.

The WLS raters of facial attractiveness were on average 50 years older than the Diener et al. (1995) raters. Older judges' facial ratings tend to be higher than those for younger adults perhaps because they think all young people are attractive or because they respond more positively in general (Meland 2002; Ebner 2008). However, the WLS raters came from roughly the same cohort as the participants and were more likely to rate the photographs in a way similar to peers at the time would have. They would also be better able to recognize subtle differences in hair and grooming styles that would affect ratings.

One can ask whether something other than the attractiveness of facial features accounts for our findings. It could be that happy people smile more or do more to enhance their appearance, and that their photographs are rated as more attractive for these reasons. Harker and Keltner (2001) found that the display of a genuine smile in a college yearbook photograph predicted well-being outcomes two and three decades later. However, previous research using the WLS faces did not replicate that finding, (Freese et al. 2007) making smiling unlikely to account for our findings.

Diener et al. (1995) suggested that part of the small relations they found between facial attractiveness and subjective well-being may have been because happy people enhanced their appearance more: effects were reduced when the subject's usual cosmetics, hairstyles and clothing were removed or covered. People higher in the personality traits of agreeableness and extroversion are judged more attractive than people lower in these qualities, and crucially, the effect may be mediated by a "well-groomed appearance" (Meyer et al. 2007). Unfortunately this hypothesis cannot be addressed with this database.

Our effect sizes are small but comparable to those of demographic factors.

We acknowledge that well-being and depression are impacted more powerfully by many other factors. One to be explored in a future paper is social relations beyond marriage, divorce and widowhood (which were explored here). Research indicates that warm and trusting social relationships are closely tied with subjective well-being (Diener and Seligman 2002) but theorists question whether positive social relationships are a core characteristic of eudaimonic well-being or a correlate of it (Waterman 2008). We will analyze data from Ryff's "personal relationships" factor along with WLS data on friendships and relations with others throughout life to hone in on this question we suggest that beauty may not be an advantage on this well-being factor, particularly in a person's relationships with members of the same sex. Several studies have found that others may avoid, derogate or have negative biases toward attractive individuals of the same sex, male or female (Agthe et al. 2011).

6 Conclusion

We suggest that attractiveness impacts well-being and depression in a number of ways, both directly and indirectly. It confers social advantages, leads to conscious and unconscious positive expectations of the attractive and negative stereotypes of the unattractive, and it has effects on important life outcomes we looked at eudaimonic happiness, a concept dating back to Aristotle, which philosophers describe as feeling of "being where one wants to be, doing what one wants to do," (Norton 1976, p. 216) and as a "centeredness in one's action, identity, strength of purpose and competence" (Waterman 2008, p. 236). We suggest that greater societal action aimed at lowering appearance discrimination in the workplace and elsewhere, combined with advocacy of programs to support enhanced body satisfaction, and avoidance of messages that decrease body satisfaction would help to increase subjective well-being for many.

To the long list of the factors associated with physical attractiveness, we must add two others—positive mental well-being and (lower risk of) depression. Both have effects on life outcomes making attractiveness an issue of importance and concern.

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Appendix

See Table 4.

Table 4 Correlations between main variables

	H54	H65	D54	D65	FA	BMI54	BMI65
Happiness age 54 (H54)							
Happiness age 65 (H65)	.595						
Depression age 54 (D54)	−.575	−.409					
Depression age 65 (D65)	−.398	−.537	.529				
Facial attractiveness (FA)	.081	.060	−.065	−.043			
BMI age 54 (BMI54)	−.094	−.128	.070	.086	−.092		
BMI age 65 (BMI65)	−.072	−.128	.056	.089	−.083	.834	
Height (H)	.038	.039	−.019^{ns}	−.017^{ns}	.023^{ns}	−.057	−.023^{ns}

WLS respondents sample

All correlations significant at $p < 0.05$ or better unless stated otherwise

^{ns} Not statistically significant

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