

Key Topics in Behavioral Sciences

Key Topics in Consumer Behavior

Key Topics in Behavioral Sciences

Key Topics in Behavioral Sciences is a series of high-quality volumes focused on cutting-edge topics across Psychology and the Behavioral Sciences. Featuring highly-cited and dynamic articles from across all of our wide-reaching Springer journals content, this interdisciplinary series will be of interest to a broad range of researchers and practitioners working in related academic fields of Psychology, Mental Health, Counseling, Cognitive Sciences, and Health.

Springer Behavioral & Health Sciences

Key Topics in Consumer Behavior

Springer Behavioral & Health Sciences
New York City, NY, USA

ISSN 2731-9067
Key Topics in Behavioral Sciences
ISBN 978-3-031-19909-7

© Springer Nature Switzerland AG 2022

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors, and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Foreword

The Springer Behavioral and Health Sciences Books team is proud to introduce our new series, *Key Topics in Behavioral Sciences*. This collection features cutting-edge research from across our Behavioral Sciences journals program. Each volume features the top-cited and downloaded material from our research portfolio.

With science moving at the speed of light, research findings are produced at a rate never seen before. Keeping up with the flow of information is one of the major challenges for researchers and professionals alike. In this new series, Springer offers a more direct route to important research for readers.

Curating articles from a variety of journals, these volumes are organized along topical lines, reflecting key issues that impact the behavioral science field. In the process we are providing exposure that exceeds the bounds of individual specialty publications that can enhance interdisciplinary inquiry. The series offers ground-breaking investigations representing material that has garnered substantial scientific attention.

The high profile subjects cover a range of topics that span the entire field, chosen for their relevance and timeliness. It is hoped that making key issues more accessible in an organized framework will provide a rich resource in a fast-moving scientific environment.

Contents

Foreword	v
Financial Stress and the Relative Income Hypothesis Among Black College Students	1
K. J. White Jr: Contemporary Family Therapy 2020, 2020: 42:25–32 (1, January 2020) DOI 10.1007/s10591-019-09531-8	
Luxury Consumption Tendency: Conceptualization, Scale Development and Validation	9
V. Dogan, B. Y. Ozkara, and M. Dogan: Current Psychology 2018, 2020: 39:934–952 (20 February 2018) DOI 10.1007/s12144-018-9813-y	
Does Socioeconomic Status Matter? Materialism and Self-Esteem: Longitudinal Evidence from China	29
R. Wang, H. Liu, and J. Jiang: Current Psychology 2020, 2022: 41:1559–1568 (14, March 2020) DOI 10.1007/s12144-020-00695-3	
Specific Virtues as Predictors of Smartphone Addiction among Chinese Undergraduates	39
L. Lian and X. You: Curr Psychol 2017, 2017: 36:376–384 (15 May 2017) DOI 10.1007/s12144-017-9612-x	
Investigating the factors that trigger airline industry purchase intention	49
M. E. Tarkang, U. V. Alola, R. Y. Nange, and A. Ozturen: Current Psychology 2020, 2022: 41:1716–1727 (29, May 2020) DOI 10.1007/s12144-020-00815-z	
The Ways of Altruism	61
G. Piccinini and A. W. Schulz: Evolutionary Psychological Science 2018, 2019: 5:58–70 (4, August 2018) DOI 10.1007/s40806-018-0167-3	
A Tale of Two Sample Sources: Do Results from Online Panel Data and Conventional Data Converge?	75
S. L. Walter, S. E. Seibert, D. Goering, and E. H. O’Boyle Jr: Journal of Business and Psychology 2018, 2019: 34:425–452 (21, July 2018) DOI 10.1007/s10869-018-9552-y	



Financial Stress and the Relative Income Hypothesis Among Black College Students

Kenneth J. White Jr.¹

Published online: 1 January 2020
© Springer Science+Business Media, LLC, part of Springer Nature 2020

Abstract

The majority of college students experience financial stress, but not all experience it with the same frequency or intensity. Research suggests Black students experience a greater intensity of financial stress than their White peers do. This study revealed a link between perception of relative consumption and financial stress among 965 Black students at 52 predominantly White colleges and universities in the United States. The relative income hypothesis (RIH) literature offers potential mediators of financial stress. The findings have implications for families, college students, therapists, financial educators, and school administrators.

Keywords Financial stress · Relative income hypothesis · College students · African American

Introduction

Given mounting higher education costs, many college students experience financial stress. Greater than 70% of all college students express feeling stress from their current financial situation; and financial stress is likely to be more intense for Black students (Grable and Joo 2006; Heckman et al. 2014; Montalto et al. 2016; Williams et al. 1997). These findings are contrary to the broader psychological stress literature, which concludes that Blacks experience stress at equal or lower levels than Whites (Thoits 2010). As a source of stress, financial matters affect Blacks greater than does other stressors.

Stress is less about cause and effect and more about one's perception of their ability to handle circumstances they encounter. Kasl (1984) defined stress as a perceived imbalance between a demand and the capability to handle the demand, particularly where failure to meet the demand has important perceived consequences. The basis of stress then is an individual's perception of lacking control and/or predictability in a given situation (Britt et al. 2016; Koolhaas et al. 2011). The stimulus or event that threatens control and/or

predictability is the stressor, and stress is the reaction to the stressor (Koolhaas et al. 2011). Two potential stressors leading to financial stress are: (1) comparing one's financial situation to the perceived financial situation of others, and (2) comparing one's current financial situation to their own past financial status.

To understand the relationship between “keeping up with the Joneses” and financial stress, this study used the framework of Duesenberry's (1949) relative income hypothesis (RIH). Duesenberry's RIH states that financial satisfaction is based on: (1) buying power compared to peer group, and (2) current purchasing power compared to past peak consumption levels (Duesenberry 1949; Friedman 1957; McBride 2001). Developing and maintaining networks of peers that provide emotional support can be a beneficial protection against stressors (Krycak et al. 2012), but individuals that compare their current situations to others and to their own pasts may actually be creating stressors through these two comparisons.

This study gauged financial stress through the lens of the RIH among Black students at 52 predominantly White colleges and universities in the United States (US). Specifically, does the RIH contribute to reported financial stress of Black college students? The hypothesis is that comparing consumption to peers and past levels of consumption will increase financial stress among Black college students.

This study adds to financial stress knowledge by: (1) by considering how key stressors in Montalto et al. (2016)

✉ Kenneth J. White Jr.
kjwhite@uga.edu

¹ Department of Financial Planning, Housing and Consumer Economics, University of Georgia, Dawson Hall, Athens, GA 30602, USA

specifically impact Black students in the data, and (2) extending the dependent and independent variables in Montalto et al. (2016) to more comprehensive indices rather than single item variables. Montalto et al. (2016) found racial differences persist in perceived relative consumption where Black students are more likely to self-report not having enough money to do the same activities as their peers. However, they considered the entire population of students and did not relate racial differences in perceived relative consumption specifically to financial stress among Black students.

This connection is important to identify not only because of the impact of stress on overall wellbeing (Kasl 1984; McEwen 2000; Vauclair et al. 2014) and academic achievement (Fosnacht and Calderone 2017; Letkiewicz et al. 2014), but also because of the importance of cultural competence when clinicians and financial educators work with clients from diverse backgrounds. Thus, focusing on Black students is appropriate for many reasons. First, Black students tend to accumulate higher levels of student loan debt and have lower levels of savings and wealth (Addo et al. 2016; Britt et al. 2016; Jackson and Reynolds 2013; Scott-Clayton and Li 2016). Second, Black young adults from all socioeconomic backgrounds face challenges with the labor market, mobility and economic security (Addo et al. 2016). Finally, Pew Center Research (2019) concludes that Blacks have different perceptions and views of advantage, disadvantage and equity in society (Horowitz et al. 2019). Black Americans are more likely to feel disadvantaged due to racism, multi-generational oppression, implicit bias and discrimination, which may manifest as financial stress (Range et al. 2018; Wilkins et al. 2013).

Purpose

This study's purpose was twofold. First, to explore the relationship between financial stress and the RIH among Black college students. Second, to discuss solutions from the RIH literature that may mitigate financial stress for Black students.

Methodology

Data

This study analyzed data from the 2014 National Student Financial Wellness Study (NSFWS), collected at The Ohio State University. Undergraduate students (N = 18,795) came from 52 participating 2-year public, 4-year public, and 4-year private, predominantly White, US colleges and universities. Participants took an online survey examining

financial attitudes, practices, knowledge, and overall financial wellness. There were 965 students with a recorded racial status of Black.

Measures

The dependent variable was an index created from the mean of the following three questions. Respondents answered using a 4-point scale, from 1 = *strongly disagree* to 4 = *strongly agree*. The single item questions were consistent with those used to measure financial stress in past research (Montalto et al. 2016; Prawitz et al. 2006; Thoits 2010).

- “I feel stressed about my personal finances in general,”
- “I worry about being able to pay my current monthly expenses,”
- “I worry about having enough money to pay for school.”

The independent variable of interest was an index created from the mean of the following two questions operationalized as proxies of the RIH. Respondents answered using a 4-point scale, from 1 = *strongly disagree* to 4 = *strongly agree*.

- “I have enough money to participate in most of the same activities as my peers do,”
- “I have enough money to participate in most activities that I enjoy.”

The covariates were age (coded “1” if traditional college age 18–23 years’ and “0” otherwise), gender, student’s employment status, mother’s college degree, father’s college degree, parents’ annual income, expected time until graduation, GPA, and school type.

Analysis

Prior to performing more complicated analyses, Spearman correlations were calculated to evaluate the relationships of the independent variables to the dependent variables. Spearman correlations are between -1 and 1 ; the closer to -1 or 1 , the stronger the relationship between the two variables. The multivariate analyses were done using a general linear model, with both continuous and categorical independent variables, and assumes normality of the outcome. The residuals of the financial stress index were approximately bell-shaped and symmetric; therefore, quite close to a normal distribution. The skewness (-0.369 , $SE=0.091$) and kurtosis (0.233 , $SE=0.181$) were within the acceptable ranges (skewness is between -1 and 1 ; kurtosis is between -2 and 2) for the assumption of normality (George and Mallery 2010). Thus, based on visual examinations of the residuals

and rules of thumb for skewness and kurtosis, the residuals were acceptable normal.

To examine homogeneity, the data were broken down into 10 equal groups according to the percentiles of the predicted values. An observation of the standard deviations and variances across the different groups showed that the ratio of the largest variance (0.7023) to the smallest variance (0.3138) was less than 3 which meets acceptable criteria for homogeneity (Dean et al. 1999). The general linear model was appropriate based on acceptable normality and homogeneity.

Results

The mean RIH index (2.55) for Black students was slightly greater than the median with 51% having enough money to do the same activities as peers and 59% having enough money to do activities they enjoy (Tables 1 and 2). The mean stress index for Black students was 2.86 with greater than 70% feeling stress from finances in general and 60% worrying about paying for monthly expenses and school (Tables 1 and 2). Noteworthy was the expected time to complete degree with 40% needing extra time versus 6% expecting to finish early (Table 2).

From Table 3, the correlations of the stress to money variables among Black students were moderate to large (all between -0.3 and -0.5). The strongest correlation was between students worrying about paying monthly expenses and the overall RIH index ($\rho = -0.498$). The weakest correlation was between students worrying about paying for school and their ability to consume relative to their peer group ($\rho = -0.388$). All of the correlations were negative and highly statistically significant ($p < 0.001$). This suggests as Black students perceive that their current financial status compares favorably to their peer group and past level of consumption, the less stressed they are, and vice versa.

From Table 4, for each one-point increase on the RIH index, the stress index decreased by 0.462 points. The four significant categorical variables were age, gender, employment status, and expected time to graduation. Black students of traditional college age had a stress index score 0.168

Table 1 Descriptive statistics

	Mean	SD	Min	Max	Reliability
RIH index	2.55	0.848	1	4	0.878
Activities as peers	2.49	0.899	1	4	
Activities I enjoy	2.60	0.885	1	4	
Stress index	2.86	0.838	1	4	0.847
General stress	3.01	0.917	1	4	
Pay monthly expenses	2.76	0.960	1	4	
Pay for school	2.82	1.016	1	4	

Table 2 Distributions of demographics (N=965)

	N	%
Having enough money to do activities with peers		
Strongly disagree	143	14.9
Disagree	323	33.8
Agree	367	38.3
Strongly agree	124	13.0
Having enough money to do activities one enjoys		
Strongly disagree	125	13.1
Disagree	263	27.5
Agree	433	45.3
Strongly agree	134	14.0
General stress		
Strongly disagree	72	7.5
Disagree	184	19.1
Agree	370	38.4
Strongly agree	337	35.0
Worry paying monthly expenses		
Strongly disagree	104	10.8
Disagree	275	28.6
Agree	332	34.5
Strongly agree	250	26.0
Worry paying for school		
Strongly disagree	117	12.2
Disagree	247	25.7
Agree	290	30.1
Strongly agree	308	32.0
Traditional age (18–23 years)	583	62.6
Male	236	24.6
Employment status		
Full-time	232	24.1
Part-time	462	48.0
Not employed	269	27.9
Mother has college education	273	28.4
Father has college education	248	25.9
Parents' annual income		
< \$40,000	272	28.5
\$40,000 to < \$100,000	234	24.5
\$100,000 +	81	8.5
Don't know or prefer not to answer	378	38.5
Expected time to degree completion		
On time	436	49.5
Extra time	355	40.3
Early	51	5.8
Other type of degree	38	4.3
GPA		
0.00 to 0.99	2	0.2
1.00 to 1.99	14	1.7
2.00 to 2.99	332	39.3
3.00 to 3.99	467	55.3
4.00	30	3.6

Table 2 (continued)

	<i>N</i>	%
Institution type		
4-Year public	657	68.1
4-Year private	115	11.9
2-Year public	193	20.0

points higher on average than similar students of non-traditional college age. Black male students had a stress index score 0.145 points lower on average than similar Black female students. There was a statistically significant difference between those employed full-time and those not employed, with those who work full-time having an average stress index 0.236 points higher than similar unemployed students; $p = 0.016$.

An Analysis of Variance (ANOVA) tested between-subjects effects for the stress index and the RIH index (Table 5). From this analysis, expected time to degree completion was significant in predicting financial stress ($mean\ square = 1.977$, $F = 3.762$, $sig. = 0.011$). A pairwise comparison (Table 6) found that Black students expecting to graduate early were significantly less likely to report financial stress than Black students needing extra time to complete their degree ($Coef. = -0.334$, $SE = 0.121$, $p = 0.036$).

Discussion and Conclusion

The results support the hypothesis that comparing consumption to peers and past levels of consumption will increase financial stress among Black college students. The significance of the RIH index is consistent with Britt et al. (2016), Montalto et al. (2016) and Heckman et al. (2014) where the stressor, “not having enough money to participate in the same activities as peers,” was the largest significant predictor of all students (not only the Black students) feeling stress from finances. Similar to students of all races in Montalto et al. (2016), Black students feel stress from perceived differences in consumption levels between themselves and peers. The peer environment significantly influenced feelings of financial stress among Black students. Consistent with Britt et al. (2016) and Cheung and Lucas (2016), Black students that perceive themselves to be worse off financially than peers are more likely to report feeling financial stress and vice versa. However, regardless of perception, students should realize that financial well-being often comes down to cash flow management, positive financial habits and seeking help when needed.

The significance of age is consistent with Montalto et al. (2016), where nontraditional age students were less likely to report financial stress. The significance of age is also consistent with Sturgeon et al. (2014) whereby an individual’s stage in the lifecycle influences financial stress. This is even consistent with the broader stress literature where the occurrence of all stress tends to be higher in younger adults, lower during the middle age years, and higher again in older

Table 3 Spearman correlations of stress variables with money variables

	Having enough money to do activities with peers	Having enough money to do activities one enjoys	RIH index
General stress			
<i>Corr. Coef</i>	– 0.387	– 0.407	– 0.417
<i>Sig. (2-tailed)</i>	<0.001	<0.001	<0.001
<i>N</i>	955	953	957
Worry paying monthly expenses			
<i>Corr. Coef</i>	– 0.474	– 0.478	– 0.498
<i>Sig. (2-tailed)</i>	<0.001	<0.001	<0.001
<i>N</i>	953	951	955
Worry paying for school			
<i>Corr. Coef</i>	– 0.309	– 0.318	– 0.326
<i>Sig. (2-tailed)</i>	<0.001	<0.001	<0.001
<i>N</i>	954	952	956
Stress index			
<i>Corr. Coef</i>	– 0.452	– 0.465	– 0.479
<i>Sig. (2-tailed)</i>	<0.001	<0.001	<0.001
<i>N</i>	952	950	954

Table 4 GLM results: stress index of black students (N=965)

Variable	Coef	Std. Err	p-value	Confidence interval	
				Lower	Upper
Constant	3.777	0.314	<0.001	3.161	4.392
RIH index	-0.462	0.033	<0.001	-0.527	-0.396
Traditional age 18–23	0.168	0.072	0.021	0.025	0.310
Male	-0.145	0.063	0.022	-0.269	-0.021
Employment status (not employed)					
Full-time	0.236	0.084	0.005	0.070	0.401
Part-time	0.133	0.066	0.044	0.003	0.262
Mother’s education (don’t know)					
No college degree	-0.139	0.248	0.574	-0.627	0.348
College degree	-0.199	0.252	0.430	-0.695	0.296
Father’s education (don’t know)					
No college degree	-0.116	0.099	0.242	-0.310	0.078
College degree	-0.138	0.110	0.210	-0.354	0.078
Parent’s annual income (prefer not to say)					
< \$40,000	-0.065	0.098	0.509	-0.257	0.127
\$40,000 to < \$100,000	0.055	0.101	0.586	-0.143	0.253
\$100,000+	0.129	0.127	0.310	-0.120	0.378
Don’t know	-0.005	0.099	0.956	-0.200	0.189
Expected time to complete degree (non-degree seeking)					
On time	0.088	0.149	0.554	-0.204	0.380
Needs extra time	0.230	0.148	0.120	-0.060	0.521
Early	-0.103	0.180	0.566	-0.457	0.250
GPA (4.00)					
0.00 to 0.99	0.669	0.536	0.212	-0.383	1.722
1.00 to 1.99	-0.067	0.246	0.785	-0.550	0.416
2.00 to 2.99	0.178	0.151	0.241	-0.119	0.475
3.00 to 3.99	0.057	0.148	0.701	-0.233	0.347
Institution type (2-year)					
4-Year public	0.147	0.078	0.059	-0.006	0.300
4-Year private	0.155	0.113	0.170	-0.066	0.377
Adjusted R-squared			0.251		

age (Thoits 2010). Britt et al. (2015) provides a potential explanation for this study’s findings in that freshmen may be managing their money for the first time, which causes

higher levels of stress. However, as they gain more experience managing money it becomes less stressful.

In terms of gender, males are less likely to report financial stress than females. Previous studies have found women tend to care more than men about relative income and consumption, so women experience more stress from comparative differences (Alpizar et al. 2005; Heckman et al. 2014; Montalto et al. 2016). Alpizar et al. (2005) provide two possible explanations: (1) comparisons to others are more important to groups who experience discrimination and unfair treatment, and (2) women tend to be more socially oriented and hence perceive things closely related to other people as important in life, including others’ consumption.

Employment status proved statistically significant in predicting stress from finances. It may be an indicator of socioeconomic status, where unemployed students do not need to work. In this case, the results would be consistent with Montalto et al. (2016), where lower and middle socioeconomic status students were more likely to report financial stress. It is also consistent with the conclusion of Singh and Bhayana (2015) that increasing income helps ease financial pressure.

The findings are also significant in light of the social nature of consumption. Not having money to do the same activities as peers creates an environment of anxiety, insecurity and isolation, which are pathways to stress resulting from a lack of financial resources (Jones et al. 2004). In fact, the RIH may serve as a proxy for social rank and actually suggest that social status is a predictor of financial stress (Alvarez-Cuadrado and Van Long 2011; Boyce et al. 2010). Social comparison and inequality stemming from the RIH leads to perceived unfairness and lack of trust (Cheung and Lucas 2016), which weakens social capital and increases stress (Vauclair et al. 2014). In light of the negative social implications, many of the solutions include methods for changing the individual and institutional culture around financial well-being.

Solutions revolve around fostering a sense of community that is altruistic and non-consumerist. A key step towards finding that community may require students first redefine their peer reference group (Gerdtham and Johannesson 2004; Kahneman et al. 2006). Increased social capital and a responsive social network may provide the support needed to mediate financial stress (Krycak et al. 2012; Sturgeon

Table 5 Results of model for overall stress index with RIH index: tests of between-subjects effects

Source	Type III Sum of squares	df	Mean square	F	Sig	Partial eta squared
RIH index	100.200	1	100.200	190.709	0.000	0.214
Traditional age	2.817	1	2.817	5.362	0.021	0.008
Gender	2.767	1	2.767	5.265	0.022	0.007
Employment status	4.394	2	2.197	4.182	0.016	0.012
Time to graduate	5.930	3	1.977	3.762	0.011	0.016

Table 6 Results of model for overall stress index with RIH index: effect of time to graduate pairwise comparisons

(I) Time to graduate	(J) Time to graduate	Mean difference (I–J)	Std. error	Sig	95% Confidence interval for difference	
					Lower bound	Upper bound
On time	Extra time	– 0.142	0.061	0.122	– 0.304	0.020
	Early	0.191	0.120	0.671	– 0.127	0.509
	Other type of degree	0.088	0.149	1.000	– 0.305	0.481
Extra time	On time	0.142	0.061	0.122	– 0.020	0.304
	Early	0.334	0.121	0.036	0.013	0.654
	Other type of degree	0.230	0.148	0.720	– 0.161	0.622
Early	On time	– 0.191	0.120	0.671	– 0.509	0.127
	Extra time	– 0.334	0.121	0.036	– 0.654	– 0.013
	Other type of degree	– 0.103	0.180	1.000	– 0.580	0.373
Other type of degree	On time	– 0.088	0.149	1.000	– 0.481	0.305
	Extra time	– 0.230	0.148	0.720	– 0.622	0.161
	Early	0.103	0.180	1.000	– 0.373	0.580

et al. 2014). Volunteering is a potential method for students to expand one's peer group (Putnam 2000; Coleman 1988; Vaclair et al. 2014). Through volunteering, students connect with others who value time as a gift equal to that of monetary or material goods. Students may also witness people whose lives are far more challenging than their own, giving them a sense of perspective on their stressors. Besides volunteering, social groups with a financial orientation may be of help. Groups such as freedom in retiring early (FIRE), which values financial savviness and discourages excessive spending, may reduce financial stress.

Students may also benefit from support through professional financial coaching, counseling, planning, therapy, and peer-to-peer financial coaching that offers reminders of positive financial behaviors (Graves and Savage 2015; Klontz et al. 2016; Lim et al. 2014; Shaulskiy et al. 2015; White and Heckman 2016). High school programs such as the National Endowment for Financial Education's (NEFE) High School Financial Planning Program®, campus peer-to-peer programs such as PowerCat at Kansas State University and Red to Black at Texas Tech University, and student financial wellness centers similar to those at University of Missouri and Utah Valley University, may encourage better financial behaviors, such as budgeting and saving that lessen the adverse impact of financial comparisons.

To address the significance of time to degree, families should consider opportunities for students to earn college credit while still in high school. Career counseling may also help students decide on career paths and maintain focus through college to minimize major changes and the need for extra time to graduate. Universities can focus on programs and policies that help students avoid academic disruption and stay on track to graduate on-time or early. Currently, the average time to degree completion for all students is

approximately 6 years. Only 5% of all students complete associate degrees in 2 years and 19% of all students complete bachelor's degrees in 4 years. Financial and academic support designed to promote pushing graduation times back to 2 years and 4 years should help Black students experience less financial stress.

Other potential solutions relate to healthier financial and work habits. The desire to match peers' perceived financial success may lead students to overwork, overconsume, and undersave (Alvarez-Cuadrado and Van Long 2011; Kockesen 2008). Therefore, automating savings may be beneficial in helping students maintain a healthy balance between hours worked, consumption and saving. Additionally, financial aid and student affairs organizations promoting a consistent message on campus that consuming more now means consuming less in the future may help foster savvier saving habits.

Ultimately, the RIH is about the perceptions of inequality and inequity. College is a time where students typically meet more people that are diverse and may interact with a wealthier peer group for the first time. While families have little control over wealth gaps and systemic inequality, families are able to utilize the solutions presented here along with other research on this topic to help guide the financial wellbeing of Black students.

Increasing the overall wellbeing of the community (U.S. campuses) does little to address the relative impact on students though. Universities should consider policies and programs aimed at closing the gap in the relative level of consumption such that students feel they have the resources to participate in activities that do not break their budget while on campus and are able to maintain a lifestyle consistent with their peers (Boyce et al. 2010; McBride 2001). For example, the University of Georgia is promoting "no

additional costs” courses aimed at fighting the increasing costs of college and keeping more financial resources in possession of students and families.

Research has posited that perceived relative income is as important as the absolute level of income when it comes to financial satisfaction (Cheung and Lucas 2016). To relieve stress related to the RIH, individuals should focus on an income framework where financial decisions involve absolute levels of income rather than perception (Boyce et al. 2010).

Clinical Implications

When working with Black clients (students), therapists should keep in mind that residual effects of slavery, multi-generational oppression, and a history of mistreatment has created cultural mistrust among Blacks which may manifest as a mistrust of therapists and clinicians (Horowitz et al. 2019; Wilkins et al. 2013). Therefore, culturally responsive practices are necessary when helping to pinpoint origins and objects of comparisons, and helping to identify a positive support network among peers, professionals and campus resources. It is also important for therapists to help Black students maintain optimism about their financial future by emphasizing that short-term investment in their academic achievement will lead to long-term returns on these investments in the form of future earnings (Fosnacht and Calderone 2017).

Marriage and family therapists should consider cross training in financial therapy. The Financial Therapy Association offers the Certified Financial Therapist-I™ (CFT-I™) designation designed for mental health professionals to acquire the financial and fiduciary skills necessary to assist clients with issues related to money. Financial stress can lead to adverse short-term decision-making (Fosnacht and Calderone 2017). Financial therapy can encourage healthy short-term behaviors, such as reducing expenses, saving, not overworking and making good investments that often lead to long-term well-being.

Study Limitations

Limitations of this study include the large percentage of female students (75%), absence of Historically Black Colleges and Universities represented in the data, and the definition of “peer group.” Given the results, additional support for women is appropriate since Black women tend to be more susceptible to financial stress. Furthermore, there are conflicting conclusions on who are “peer groups” in the relative income hypothesis (Alpizar et al. 2005). Some categorize by age, education and demographic backgrounds

(Frank 1985), others by geographic area (Alvarez-Cuadrado and Long 2011), and others consider peers as those only in higher income levels (Boyce et al. 2010). Finally, the data does not reveal if the students are receiving any therapy to cope with stress.

Future Research

Additional research is needed on this topic. First, qualitative research would provide more insight into stressors for Black students. Given the importance of the topic, allowing individuals to talk about their feelings would provide a more in-depth understanding of financial stress for Black students. Second, research on institutional policies to close income and wealth gaps will also provide additional knowledge on interventions for financial stress resulting from perceived inequality.

Funding The Robert Woods Johnson Foundation (Grant No. 74737) provided funding for this study. The author is independent of the funders.

References

- Addo, F. R., Houle, J. N., & Simon, D. (2016). Young, black, and (still) in the red: Parental wealth, race, and student loan debt. *Race and Social Problems*, 8(1), 64–76. <https://doi.org/10.1007/s12552-016-9162-0>.
- Alpizar, F., Carlsson, F., & Johansson-Stenman, O. (2005). How much do we care about absolute versus relative income and consumption? *Journal of Economic Behavior & Organization*, 56(3), 405–421. <https://doi.org/10.1016/j.jebo.2002.10.007>.
- Alvarez-Cuadrado, F., & Van Long, N. (2011). The relative income hypothesis. *Journal of Economic Dynamics and Control*, 35(9), 1489–1501. <https://doi.org/10.1016/j.jedc.2011.03.012>.
- Boyce, C. J., Brown, G. D., & Moore, S. C. (2010). Money and happiness: Rank of income, not income, affects life satisfaction. *Psychological Science*, 21(4), 471–475. <https://doi.org/10.1177/0956797610362671>.
- Britt, S. L., Canale, A., Fernatt, F., Stutz, K., & Tibbetts, R. (2015). Financial stress and financial counseling: Helping college students. *Journal of Financial Counseling and Planning*, 26(2), 172–186.
- Britt, S. L., Mendiola, M. R., Schink, G. H., Tibbetts, R. H., & Jones, S. H. (2016). Financial stress, coping strategy, and academic achievement of college students. *Journal of Financial Counseling and Planning*, 27(2), 172–183. <https://doi.org/10.1891/1052-3073.27.2.172>.
- Cheung, F., & Lucas, R. E. (2016). Income inequality is associated with stronger social comparison effects: The effect of relative income on life satisfaction. *Journal of Personality and Social Psychology*, 110(2), 332–341. <https://doi.org/10.1037/pspp0000059>.
- Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, 94, S95–S120.
- Dean, A., Voss, D., & Draguljić, D. (1999). *Design and analysis of experiments* (Vol. 1). New York: Springer.

- Duesenberry, J. S. (1949). *Income, saving, and the theory of consumer behavior*. Cambridge, MA: Harvard University Press.
- Fosnacht, K., & Calderone, S. M. (2017). Undergraduate financial stress, financial self-efficacy, and major choice: A multi-institutional study. *Journal of Financial Therapy*, 8(1), 107–123. <https://doi.org/10.4148/1944-9771.1129>.
- Frank, R. H. (1985). The demand for unobservable and other nonpositional goods. *The American Economic Review*, 75(1), 101–116.
- Friedman, M. (1957). Introduction to "A theory of the consumption function". In M. Friedman (Ed.), *A theory of the consumption function* (pp. 1–6). Princeton, NJ: Princeton University Press.
- George, D., & Mallery, M. (2010). *SPSS for Windows Step by Step: A Simple Guide and Reference, 17.0 update* (10th ed.). Boston: Pearson.
- Gerdtham, U. G., & Johannesson, M. (2004). Absolute income, relative income, income inequality, and mortality. *Journal of Human Resources*, 39(1), 228–247. <https://doi.org/10.2307/3559011>.
- Grable, J. E., & Joo, S. H. (2006). Student racial differences in credit card debt and financial behaviors and stress. *College Student Journal*, 40(2), 400–408.
- Graves, E., & Savage, S. (2015). Financial pasts, presents, and futures of community college students of a personal finance course. *Journal of Business & Finance Librarianship*, 20(1–2), 116–132. <https://doi.org/10.1080/08963568.2015.977132>.
- Heckman, S., Lim, H., & Montalto, C. (2014). Factors related to financial stress among college students. *Journal of Financial Therapy*, 5(1), 19–39. <https://doi.org/10.4148/1944-9771.1063>.
- Horowitz, J., Brown, A., & Cox, K. (2019). *Race in America 2019*. Washington, DC: Pew Research Center.
- Jackson, B. A., & Reynolds, J. R. (2013). The price of opportunity: Race, student loan debt, and college achievement. *Sociological Inquiry*, 83(3), 335–368. <https://doi.org/10.1111/soin.12012>.
- Jones, K., Duncan, C., & Twigg, L. (2004). Evaluating the absolute and relative income hypothesis in an exploratory analysis of deaths in the Health and Lifestyle Survey. In P. Boyle, S. Curtis, E. Graham, & E. Moor (Eds.), *The geography of health inequalities in the developed world: Views from Britain and North America* (pp. 219–244). London: Ashgate Press.
- Kahneman, D., Krueger, A. B., Schkade, D., Schwarz, N., & Stone, A. A. (2006). Would you be happier if you were richer? A focusing illusion. *Science*, 312(5782), 1908–1910. <https://doi.org/10.1126/science.1129688>.
- Kasl, S. V. (1984). Stress and health. *Annual Review of Public Health*, 5(1), 319–341. <https://doi.org/10.1146/annurev.pu.05.050184.001535>.
- Klontz, B. T., Van Zutphen, N., & Fries, K. (2016). Financial planner as healer: Maximizing the role of financial health physician. *Journal of Financial Planning*, 29(12), 52–59. <https://doi.org/10.4148/1944-9771.1076>.
- Kockesen, L. (2008). Relative income hypothesis. In W. A. Darity (Ed.), *International encyclopedia of the social sciences* (2nd ed., Vol. 9, pp. 153–154). Detroit: Macmillan Reference USA.
- Koolhaas, J. M., Bartolomucci, A., Buwalda, B. D., De Boer, S. F., Flügge, G., Korte, S. M., et al. (2011). Stress revisited: A critical evaluation of the stress concept. *Neuroscience & Biobehavioral Reviews*, 35(5), 1291–1301. <https://doi.org/10.1016/j.neubiorev.2011.02.003>.
- Krycak, R. C., Murdock, N. L., & Marszalek, J. M. (2012). Differentiation of self, stress, and emotional support as predictors of psychological distress. *Contemporary Family Therapy*, 34(4), 495–515. <https://doi.org/10.1007/s10591-012-9207-5>.
- Letkiewicz, J., Lim, H., Heckman, S., Bartholomae, S., Fox, J. J., & Montalto, C. P. (2014). The path to graduation: Factors predicting on-time graduation rates. *Journal of College Student Retention: Research, Theory & Practice*, 16(3), 351–371. <https://doi.org/10.2190/CS.16.3.c>.
- Lim, H., Heckman, S. J., Letkiewicz, J. C., & Montalto, C. P. (2014). Financial stress, self-efficacy, and financial help-seeking behavior of college students. *Journal of Financial Counseling and Planning*, 25(2), 148–160.
- McBride, M. (2001). Relative-income effects on subjective well-being in the cross-section. *Journal of Economic Behavior & Organization*, 45(3), 251–278. [https://doi.org/10.1016/S0167-2681\(01\)00145-7](https://doi.org/10.1016/S0167-2681(01)00145-7).
- McEwen, B. S. (2000). The neurobiology of stress: From serendipity to clinical relevance. *Brain Research*, 886(1–2), 172–189. [https://doi.org/10.1016/S0006-8993\(00\)02950-4](https://doi.org/10.1016/S0006-8993(00)02950-4).
- Montalto, C. P., Heckman, S., & Letkiewicz, J. (2016). Collegiate financial wellness: Understanding stress and worry. *Consumer Interests Annual*, 62.
- Prawitz, A. D., Garman, E. T., Sorhaindo, B., O'Neill, B., Kim, J., & Drentea, P. (2006). InCharge financial distress/financial well-being scale: Development, administration, and score interpretation. *Financial Counseling and Planning*, 17(1), 34–50. <https://doi.org/10.1037/t60365-000>.
- Putnam, R. D. (2000). Bowling alone: America's declining social capital. In L. Crothers & C. Lockhart (Eds.), *Culture and politics* (pp. 223–234). New York: Palgrave Macmillan.
- Range, B., Gutierrez, D., Gamboni, C., Hough, N. A., & Wojciak, A. (2018). Mass trauma in the African American community: Using multiculturalism to build resilient systems. *Contemporary Family Therapy*, 40(3), 284–298. <https://doi.org/10.1007/s10591-017-9449-3>.
- Scott-Clayton, J., & Li, J. (2016). Black-white disparity in student loan debt more than triples after graduation. *Economic Studies* (Vol. 2, No. 3). <https://vtechworks.lib.vt.edu/handle/10919/83265>
- Shaulskiy, S., Duckett, K., Kennedy-Phillips, L., & McDaniel, A. (2015). Exploring differences in college student financial wellness by institution type. *Journal of Student Affairs Research and Practice*, 52(3), 250–261. <https://doi.org/10.1080/19496591.2015.1035382>.
- Singh, M. D., & Bhayana, R. M. (2015). Straddling three worlds: Stress, culture and adaptation in South Asian couples. *Contemporary Family Therapy*, 37(1), 45–57. <https://doi.org/10.1007/s10591-014-9319-1>.
- Sturgeon, J. A., Zautra, A. J., & Okun, M. A. (2014). Associations between financial stress and interpersonal events: A daily diary study of middle-aged adults and their life circumstances. *Psychology and Aging*, 29(4), 803–813. <https://doi.org/10.1037/a0037961>.
- Thoits, P. A. (2010). Stress and health: Major findings and policy implications. *Journal of Health and Social Behavior*, 51, S41–53. <https://doi.org/10.1177/0022146510383499>.
- Vauclair, C. M., Marques, S., Lima, M. L., Abrams, D., Swift, H., & Bratt, C. (2014). Perceived age discrimination as a mediator of the association between income inequality and older people's self-rated health in the European region. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 70(6), 901–912. <https://doi.org/10.1093/geronb/gbu066>.
- White, K. J., Jr., & Heckman, S. (2016). Financial planner use among Black and Hispanic households. *Journal of Financial Planning*, 29(9), 40–49.
- Wilkins, E. J., Whiting, J. B., Watson, M. F., Russon, J. M., & Moncrief, A. M. (2013). Residual effects of slavery: What clinicians need to know. *Contemporary Family Therapy*, 35(1), 14–28. <https://doi.org/10.1007/s10591-012-9219-1>.
- Williams, D. R., Yu, Y., Jackson, J. S., & Anderson, N. B. (1997). Racial differences in physical and mental health: Socio-economic status, stress and discrimination. *Journal of Health Psychology*, 2(3), 335–351. <https://doi.org/10.1177/135910539700200305>.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Luxury Consumption Tendency: Conceptualization, Scale Development and Validation

Volkan Dogan¹ · Behcet Yalin Ozkara¹ · Merve Dogan²

Published online: 20 February 2018

© Springer Science+Business Media, LLC, part of Springer Nature 2018

Abstract

Luxury consumption is an appealing topic among researchers from the disciplines of psychology and marketing. Although past research on luxury consumption has provided a number of measurement tools to measure brand luxuriousness, attitudes toward the concept of luxury, perceptions of luxury, and prestige shopping preference, researchers lack a scale that measures the luxury consumption tendency using a consumer-centric approach. To this end, this paper introduces the luxury consumption tendency scale, which was produced following the conceptualization of the luxury consumption tendency. Across three studies (total $N = 1428$), we developed an 18-item luxury consumption tendency scale that consisted of five dimensions. In Study 1, we conducted exploratory survey research of 11 Turkish Ph.D. students, and then, exploratory factor analysis was performed with the survey data collected from 520 Turkish undergraduate students. In Study 2, confirmatory factor analysis was performed on the survey data collected from 808 Turkish adults. In Study 3, we tested the validity performance of the luxury consumption tendency scale through a between-subjects experimental design in which 100 U.S. adults were randomly assigned to one of two conditions: a low-construal level condition and a high-construal level condition. The following results were determined across the three studies: the content, concurrent, convergent, discriminant, and nomological validity performances were established through descriptive (Study 1), cross-sectional (Study 2), and experimental (Study 3) designs. Additionally, the luxury consumption tendency was found to be positively associated with conspicuous consumption and status consumption. Furthermore, we demonstrated that as the construal level increases, so does the luxury consumption tendency.

Keywords Construal level · Luxury consumption · Luxury consumption tendency · Luxury consumption tendency scale · Scale development

The concept of luxury dates back to Adam Smith (1776) who divided consumption into subcategories, namely, the categories of necessary, basic, affluent, and luxury. Compared to the eighteenth century, needless to say, more attention has been

paid to luxury consumption in society because of better living conditions. Poor living conditions have largely been surpassed. Put more simply, individuals can easily obtain vital products (e.g., water, cloth) in their daily lives. Over the years, individuals' attention has been shifted from basic products to luxury products because of their desire to construct and present the self. People are defining their 'selves' using their possessions so that possessions are the extensions of each person's self (Belk 1988). Luxury consumption is one of the prevalent practices of contemporary individuals used to extend their selves. Expenditures of consumers for luxury products increased by 50% between 1994 and 2004, while expenditures for non-luxury products increased by 7% (Keane and McMillan 2004). Additionally, luxury brands had a total market value of 263 billion US dollars globally in 2007 (Verdict 2007). Furthermore, luxury brands have been evaluated as the fastest growing and most profitable business sector over the last ten years (Han et al. 2010).

✉ Volkan Dogan
vlkndgn35@gmail.com; vodogan@ogu.edu.tr

Behcet Yalin Ozkara
bozkara@ogu.edu.tr; behcetozkara@gmail.com

Merve Dogan
merve_dogan@anadolu.edu.tr

¹ Department of Marketing, Faculty of Economics and Administrative Sciences, Eskisehir Osmangazi University, Meselik Campus, 26480 Eskisehir, Turkey

² Department of Tourism Management, Anadolu University, Yunus Emre Campus, 26470 Eskisehir, Turkey

As mentioned above, luxury consumption is a salient topic among consumers. This situation has resulted in the concept of luxury consumption drawing the attention of researchers, especially from the fields of marketing (Dubois and Duquesne 1993; Kastanakis and Balabanis 2014; Sung et al. 2015; Wiedmann et al. 2009; Wilcox et al. 2009; Wong and Ahuvia 1998). Past research on luxury has provided a number of different approaches toward the concept of luxury. To comprehend this cumulative knowledge, past research in the literature can be divided into three subtypes. First, a number of studies have examined how consumers perceive luxury brands (Kapferer 1998; Sung et al. 2015; Vigneron and Johnson 2004). To this end, these studies have benefited from the use of scales, which mainly focus on the measurement of the attributes of luxury brands. Specifically, Kapferer (1998) developed a nine-item scale in which participants rated the degree to which a specific brand has luxury attributes. Additionally, Vigneron and Johnson (2004) developed the *brand luxury index (BLI)*. Simply put, the BLI measures the perceived luxuriousness of a specific brand. Past research within this first literature subtype has used these two scales since these scales focus on measurement regarding a specific brand. Second, there is another literature subtype that has examined consumers' attitudes and perceptions toward the concept luxury (Dubois and Laurent 1994; Dubois et al. 2001; Hansen and Wänke 2011; Hennigs et al. 2012; Nelissen and Meijers 2011; Shukla and Purani 2012). To this end, Dubois and Laurent (1994) developed *attitudes toward the concept of luxury*, whereas Dubois et al. (2001) developed a scale to measure individuals' perceptions of luxury. Past research in this second literature subtype mainly used these two scales since these scales specifically measure the concept of luxury from the consumers' points of view. Third, a great number of past studies have focused on examining the motivations, antecedents, and consequences of purchasing luxury goods (Amatulli and Guido 2011; Husic and Cicic 2009; Kastanakis and Balabanis 2012; Kastanakis and Balabanis 2014; Vigneron and Johnson 1999). In this literature subtype, researchers used a prestige shopping preference scale (PRECON; Deeter-Schmelz et al. 2000) and a single-item, which was specifically designed to examine the purchasing of luxury goods. However, PRECON is limited to clothes consumption, and thus, it provides only a limited understanding.

As it can be inferred from above, past studies have contributed to our understanding of luxury consumption. However, the tendency toward luxury consumption has yet to be examined in the current paper. Notably, this paper is a first attempt to understand the luxury consumption tendency as a trait. Furthermore, across three studies, a luxury consumption tendency scale was developed in this paper. The luxury consumption tendency scale developed in this paper is distinct from the past measures of luxury consumption mentioned in the previous paragraph. Particularly, this luxury consumption tendency scale measures participants' tendencies toward luxury

consumption as a trait; past scales have not provided a trait-based approach toward luxury consumption.

To accomplish our research objective, we proposed five dimensions for the luxury consumption tendency, drawing on past research in the literature discussing luxury followed by the definition of the luxury consumption tendency. Subsequently, we developed a luxury consumption tendency scale based on our theoretical framework.

Luxury Consumption Tendency

Living our lives without consumption is almost impossible (Richins 1994). People consume throughout their lives, which makes sending messages to other people in society possible. It is even possible to develop an opinion about individuals by monitoring their consumption tendencies. Let us suppose, for example, that a person who regularly shops at Whole Foods Market would probably be evaluated as either a person who makes good money or a person who cares about food quality. At the same time, a person who regularly wears the same shirt would probably be evaluated as either a person who does not make good money or a person who is humble. Thus, what we consume provides clues about ourselves. Possessions that we own are an important part of the self (Belk 1988). People consume not only to fulfill their physiological needs but also to create their selves and to establish their roles in society (Chaudhuri and Majumdar 2006).

Luxury consumption is a consumption style that people might anticipate has some benefits. By engaging in luxury consumption, people can gain social advantages through following the consumption patterns of the social class of which they desire to be a part of (Kastanakis and Balabanis 2012). Given that the transition between social classes has become easier in today's modern society of consumption, the intensity of this desire cannot be ignored. Current societies have become 'societies without classes' (Kapferer and Bastien 2009), encouraging people to engage in luxury consumption. In other words, luxury consumption is no longer thought of as a consumption practice that belongs to a particular social class (Yeoman 2011). It could be argued that the easier the transitions between social classes are, the higher the possibility is that the consumption of luxury products will be evaluated as appealing.

People can obtain social and psychological benefits through luxury consumption practices (Shukla 2011); therefore, a comprehensive understanding of luxury consumption can be possible with psychological theories. The tend and befriend theory (Taylor 2012), which provides a framework to understanding luxury consumption, is one of these theories. According to the tend and befriend theory (Taylor 2012), when one is socially isolated or is under conditions of threat, the person seeks to affiliate himself/herself with others for protection and comfort. Luxury consumption practices are actions that provide social acceptance from social groups (Wang et al. 2012); as such,

when people are socially isolated or excluded by others, they might want to engage in luxury consumption to obtain social acceptance from others who regularly perform luxury consumption. This social acceptance might eliminate the previous social threat of social exclusion. Consistent with this view, a recent study showed that conspicuous consumption can help individuals overcome feelings of social rejection (Wan et al. 2014). To sum up, the tend and befriend theory (Taylor 2012) could potentially offer propositions and understanding about why social exclusion and luxury consumption are related.

On the other hand, the compensatory control theory (Kay et al. 2009) can provide reasons as to why luxury consumption is desired following a lack of power and deprivation of personal control (Rucker and Galinsky 2008). The compensatory control theory posits that people compensate for their lack of personal control by enhancing an external source of control (Alper and Sumer 2017). Past research has found that the external source of control can be a belief in a controlling God (Kay et al. 2010a), endorsing the controlling capacity of the government (Kay et al. 2010b), identification with a national culture (Shepherd et al. 2011), or system justification (Kay and Friesen 2011). We believe that luxury consumption could be another external source of control that people enhance when they experience a deprivation of personal control. Because luxury products and services have the potential to provide social power to their owners (Rucker and Galinsky 2008) and since people intrinsically tend to perform luxury consumption as a response to this deprivation of personal control. It could, therefore, be inferred that people with low self-control tend to buy luxury products and services (Baumeister 2002) since they are deprived of personal control or are experiencing a lack of power. In summary, luxury consumption is a way of obtaining social power that people desire to compensate for their deprivation of personal control.

Luxury is about prestige and symbols, which are abstract concepts. Thus, it is possible to defend the notion that luxury has a mainly abstract (e.g., prestige, symbols) nature. The construal level theory (Trope and Liberman 2010) can offer an understanding of the abstract nature of the concept of luxury since the theory posits that people can have either a mainly abstract mindset (high-construal level) or a concrete mindset (low-construal level). People with high construal levels tend to focus on the abstract and central part of phenomena, whereas people with low construal levels tend to focus on the concrete details of phenomena. Therefore, we contend that people with high-construal levels are more interested in luxury consumption than people with low-construal levels are. Construal levels are not only trait variable but also can be manipulated momentarily. In particular, why-oriented questions (questions beginning with why) increase people's construal levels, whereas how-oriented questions (questions beginning with how) decrease people's construal levels (Liberman et al. 2007b). By manipulating people with why-oriented questions,

which increase construal levels, people might be motivated toward luxury consumption.

The phenomenon of luxury consumption has drawn remarkable attention from researchers of consumer behavior. However, their attempts at understanding luxury consumption have been mainly restricted to brand-oriented and concept-oriented approaches. Put more simply, a great deal of previous research has focused on how consumers perceive brand luxuriousness (Hansen and Wänke 2011; Vigneron and Johnson 2004), what makes a brand considered luxury (Kapferer 1998), how big consumers' attitudes toward the concept of luxury are (Dubois et al. 2001), what the antecedents and consequences of luxury consumption are (Amatulli and Guido 2011; Husic and Cicic 2009; Kastanakis and Balabanis 2011), and what kind of personality the luxury brands have (Sung et al. 2015). Therefore, past research on luxury consumption has failed to evaluate luxury consumption as a trait of the consumer and, thus, the literature lacks in evaluating luxury consumption from a consumer-centric approach.

To evaluate luxury consumption with a consumer-centric approach, we first introduced the concept of *luxury consumption tendency*. We defined the *luxury consumption tendency* as 'the extent of an individual's tendency toward the consumption of unique and expensive products/services, with their symbolic meanings that are arbitrarily desired for some reason such as to send a message to his/her surroundings, to display owned status to others, to promote the self, to render the self as distinct from its surroundings and to move toward higher social classes'. As can be concluded from the above definition, we evaluate the luxury consumption tendency as a trait of the consumer. This approach is consistent with past research practices on an array of different types of consumption, in which researchers evaluated specific consumption practices as traits (Chaudhuri et al. 2011; Eastman et al. 1999). Surprisingly, luxury consumption tendency has yet to be defined and examined in the current literature. Although cultural orientation (Wong and Ahuvia 1998), the goals of consumers (Escalas and Bettman 2003), and in-store environments (Sung et al. 2015) shape luxury consumption, we believe that consumers have an intrinsic tendency toward luxury consumption. Indeed, we claim that low-income consumers could have higher luxury consumption tendencies since this intrinsic tendency is independent from an extrinsic reality (income level).

To summarize, the luxury consumption tendency is a trait that has an intrinsic tendency toward luxury consumption.

Dimensions of Luxury Consumption Tendency

To recall, the current study proposes that the luxury consumption tendency is a trait variable. However, this proposition

does not emphasize that luxury consumption cannot be shaped by situational factors. We accept that luxury is shaped by both trait and situational conditions. At the same time, we believe that situational conditions are a boundary condition for the trait nature of the luxury consumption tendency. Furthermore, to draw the boundaries of the scale developed in the current paper, we prefer to examine the luxury consumption tendency as a trait variable. This approach has consistencies with past research on scale development. Particularly, the status consumption tendency scale (Eastman et al. 1999) and the conspicuous consumption tendency scale (Chaudhuri et al. 2011) were developed with this approach, which evaluated the constructs as trait variables, as we do in this paper.

In the current paper, the luxury consumption tendency is evaluated as a multidimensional construct. Drawing on past work on luxury consumption, we segmented the luxury consumption tendency into the following sections.

Uniqueness

People might use brands to shape their selves (Belk 1988). Luxury brands provide special benefits to individuals in terms of expressing their ideal selves (Dubois and Laurent 1994; Gil et al. 2012). One of these special benefits is the feeling that the self is unique. Uniqueness appears to be one of the values provided to consumers through luxury products (Kapferer 1997; Ruvio 2008). Therefore, luxury products are designed with a focus on perfection (Vigneron and Johnson 1999).

Luxury consumption is a special kind of prestige-seeking consumer behavior since prestige is a feature of the concept of luxury. Past research on prestige-seeking consumer behavior has demonstrated that uniqueness, or snobbiness, is one motivation of prestige-seeking consumption (Vigneron and Johnson 1999), indicating that the feeling of uniqueness motivates consumers to buy luxury products. Uniqueness also provides benefits pertaining to self-enhancement. Consumers may want to increase their self-esteem to reduce the discrepancy between their current self and their ideal self. To this end, a luxury brand can serve this purpose. Put more simply, self-enhancement goals motivate consumers to buy luxury brands (Escalas and Bettman 2003).

Uniqueness is also what makes brands luxurious. Luxury brands can be described using two perceptions, namely, personal-oriented perceptions and non-personal oriented perceptions. Under the non-personal oriented perception, Vigneron and Johnson (2004) proposed the uniqueness factor. On the other hand, Wiedmann et al. (2009) claimed that uniqueness is one of the luxury values since consumers aim to feel exclusivity through owning luxury products. Furthermore, uniqueness could be considered a need that is met through luxury consumption (Tian et al. 2001). Particularly, the uniqueness dimension of the luxury consumption tendency makes it

possible to understand the snob nature of luxury consumption (Kastanakis and Balabanis 2014).

Luxury consumption plays an important role in helping individuals to make their selves unique and to reach their ideal selves. This motivation is imposed upon consumers through advertisements in today's modern consumption societies (Belk and Pollay 1985). Given that individuals engage in luxury consumption with the aim of differentiating themselves from the rest of the society that they do not want to be similar to, it is probably safe to say that uniqueness is one of the dimensions of the luxury consumption tendency. Moreover, uniqueness is a value that consumers obtain through the consumption of luxury brands that is driven by their luxury consumption tendencies (Wiedmann et al. 2009).

Expensiveness

Luxury products and services are both relatively more expensive than basic products and services (Dubois and Duquesne 1993). The primary reason for this cost difference is that luxury products are designed with a focus on being both hedonic and perfect rather than being affordable (Vigneron and Johnson 1999). It is also known that people pay higher prices for luxury brands that offer prestige to impress their surroundings (Mason 1981). On the other hand, it is also possible to infer that luxury products should be expensive because individuals with higher incomes have a high tendency to buy luxury products and services (Dubois and Duquesne 1993).

The expensive nature of luxury products and services can provide an explanation for the self-protection benefits of luxury consumption. Self-protection is one of the functions of the luxury consumption tendency (Escalas and Bettman 2003), and expensiveness prevents consumers from obtaining luxury products and services easily. This prevention provides self-protection for consumers who regularly buy luxury products and services. Furthermore, expensiveness is frequently associated with quality. Put more simply, expensiveness creates a sense of high quality, which is one of the attributes of luxury products and services (Vigneron and Johnson 2004). Moreover, exploratory past research on luxury attitudes showed that consumers perceive luxury as referring to expensive commodities (Dubois et al. 2001).

Luxury products and services are inevitably expensive (Nueno and Quelch 1998), such that expensiveness should be a dimension of the luxury consumption tendency. Luxury goods provide a feeling of being different from others, that is, the brands with high prices provide this feeling (Dubois et al. 2001). Expensive luxury products can also send subtle signals to consumers. Although these signals are hardly identifiable, consumers are able to notice them (Berger and Heath 2007). This communication through subtle signals is somewhat similar to coded communication, such as the Morse alphabet.

Consumers evaluate brands with high price tags as luxury products (Wiedmann et al. 2009); thus, expensiveness is a remarkable part of the luxury consumption process. In addition, consumers see luxury goods as costly signals (Griskevicius et al. 2007). Consistent with the above, it is probably safe to say that expensiveness has become an almost mandatory characteristic for a product to be classified as a luxury product. Therefore, we propose that expensiveness is another dimension of the luxury consumption tendency.

Symbolic Meaning

Broadly speaking, people purchase luxury products for their hedonic rewards (Bian and Forsythe 2012). Additionally, many people utilize the social meanings and signs of luxury brands (Han et al. 2010). In today's contemporary world, products and services are referenced with their symbolic meanings rather than their physical details (Levy 1959). It is probably safe to argue that luxury products and services carry more symbolic meanings than basic products and services do. Thus, the origin of luxury consumption is saturated in terms of symbolic meaning (Dubois and Laurent 1994). An individual may express his/her ideal self through the luxury consumption process. Similarly, Vickers and Renand (2003) referred to luxury products as a symbol of personal social identity.

One of the salient motivations of luxury consumption is the hedonistic and symbolic meaning of luxury products (Vigneron and Johnson 1999). That is, luxury products and services are designed by emphasizing their symbolic benefits. The symbolic meanings of luxury brands are intangible utilities that feed consumers who are pursuing symbolic gains. Consumers can convey symbolic messages through owning luxury products and services. In a sense, conveying these symbolic messages could be a need for people from high social classes. This situation could be interpreted as hedonism, which is evaluated as one of the personally-oriented motivations of luxury consumption (Vigneron and Johnson 2004). The hedonistic nature of luxury consumption reveals consumers' hedonic pleasures. Consumers' hedonic pleasures might signal their social class such that consumers could diverge themselves from others through their specific hedonic pleasures. Indeed, these hedonic pleasures would meet hedonic needs. Past research on luxury value has claimed that hedonic value is a dimension of the luxury value (Wiedmann et al. 2009) that is proposed by luxury products and services.

The hedonic pleasures of consumers collectively create the concept of fashion. Fashion is also one of the central motivations of luxury consumption (Husic and Cicic 2009). By following a specific fashion trend, consumers are able to define themselves in line with their desired social classes. Broadly speaking, the burden of social class is produced by symbolic practices rather than physical practices (Bourdieu 1984). Furthermore, these symbolic practices lead to self-fulfillment,

which is one of the hidden determinants of luxury consumption (Amatulli and Guido 2011).

Accordingly, it is not possible to have luxury products and services without symbolic meanings. Additionally, examining the luxury consumption tendency without taking symbolic motivations into account would be inappropriate. Therefore, we propose that the luxury consumption tendency should be conceptualized with a symbolic meaning dimension.

Arbitrary Desire

Sekora (1977: 23) defines luxury as “something that is not needed”. Meanwhile, Webster (2002) defines it as “non-essential items or services that contribute to luxurious living; an indulgence or convenience beyond the indispensable minimum”. The definitions above collectively emphasize the arbitrary nature of luxury. The lack of need is an element that is associated with luxury (Berthon et al. 2009). The concept of need should be examined in two different ways. First, physical need focuses on the survival process of human beings, and thus, it is not related to luxury consumption. In contrast, social need focuses on social capital, which can assure people's social belongings. For instance, if a person is a member of a higher social class, purchasing luxury goods would be a social need. From the point of view of social need, luxury would be considered as a kind of need. Luxury has a meaning that does not include the concept of necessity and that can be associated with lavishness. Engaging in luxury consumption is not a necessary action for pursuing a physical life for any social classes within the society. It is known that luxury products are purchased to satisfy a symbolic appetite rather than to fulfill a functional need (Darian 1998). For example, purchasing luxury brands for children is one of the salient strategies among families that is used to exhibit their financial status (Husic and Cicic 2009). Owning luxury brands may have different meanings for different individuals from different social classes. Social classes each have their own internal cultural patterns/values such that they may affect the tendency to purchase luxury products and services (Dubois and Duquesne 1993). However, although luxury is a major aspect of today's modern consumption society, luxury consumption does not satisfy an obligatory functional need. It is obvious that luxury consumption is desired because it allows movement up the social class ladder and across vague social class borders.

The arbitrary nature of luxury consumption focuses on its social side. Needless to say, luxury consumption is shaped by social motivation (Vigneron and Johnson 1999). Social motivations of luxury consumption include the transition between social classes through luxury consumption. Society consists of social stratifications or social classes, in which people can transfer among them. Luxury consumption is one of the practices used to achieve this transition. A consumer's desire to move toward higher social classes in order for their selves to

benefit from the desired image of the higher social class. In particular, consumers have a personal orientation toward belonging to a desired social group or class. To this end, consumers purchase luxury brands (Tsai 2005). That is, consumers would prefer to shop in a mall, which is preferred by consumers from the desired social class (Husic and Cicic 2009).

A recent research on luxury value posited that hedonic value is a dimension of luxury value (Wiedmann et al. 2009). Hedonic value focuses on hedonic utilities rather than on functional utilities. Hedonic utilities meet arbitrary desires, whereas functional utilities meet necessary needs. That is, luxury consumption has attributes that stem from the arbitrary desires of consumers. For the majority of people from an array of different social classes, luxury consumption is not a physical need but is rather a social need. This social need has an arbitrary nature. People can survive without meeting social needs; however, they frequently desire to engage in luxury consumption. This desire reveals the arbitrary desire aspect of the luxury consumption tendency. Put more simply, luxury consumption mainly stems from desires and social needs instead of from physical needs. Therefore, examining the luxury consumption tendency without taking arbitrary desires into account would make the analysis deficient.

Belonging to an Exclusive Minority

Kapferer (1998) proposed that luxury brands belong to the minority due to their nature. However, luxury brands do not cover only the highest social class. In other words, the idea that luxury brands no longer belong to an exclusive minority has been defended by many researchers (Kapferer and Bastien 2009; Yeoman 2011). The reason for this contradiction is thought to be due to society evolving toward being a society of consumption (Ritzer 1983). With the advent of shopping malls, the vertical bazaars of modernity, the aims of brands regarding the maximization of their profit through stock turnover and sales volume have reflected the consumption habits of the consumers (Kose 2009). Luxury brands have tried to adapt this new marketing strategy through their advertisements in a way that widens their target consumers in terms of social classes. The ideal self that is represented in the advertisements tempt the consumers. Broadly speaking, these advertisements emphasize that the path to reach the ideal self involves owning luxury products or services. Transitions between the social classes are also possible with luxury consumption (Belk and Pollay 1985). Nevertheless, although the democratization of luxury has started to occur (Kapferer 2006), luxury consumption is still a prevalent strategy used to become part of an exclusive minority.

Intrinsically, people need to belong (Baumeister and Leary 1995). This intrinsic need might stem from an evolutionary or an identity-related reason. The evolutionary reason refers to

the situation in which nature forces human beings to be a part of a gathering to increase the probability of staying alive since cooperation is an essential part of human history. On the other hand, the identity-related reason refers the idea that people extend themselves (Belk 1988); thus, a group could provide a good ground to achieve this. Put another way, people extend themselves through the groups to which they belong. Their group would be based on the proximity of blood, leisure preferences, or consumption practices. That is, a consumer would desire to be a part of a group through their luxury consumption practices.

Luxury consumption is somewhat similar to a key that opens a door, making the transition between social classes possible. A person's desired group can be a higher social class. To be a member of their desired group, a person would need to mimic the consumption practices of the people from the desired group. This situation has been referred to as *bandwagon* (Vigneron and Johnson 1999) or *patron status* (Husic and Cicic 2009) in luxury consumption literature, as those two factors were found to affect luxury consumption (Husic and Cicic 2009; Vigneron and Johnson 1999). Moreover, Kastanakis and Balabanis (2012) proposed that a bandwagon is an antecedent of luxury consumption behavior.

Taken together, we claim that the luxury consumption tendency has a dimension of the desire to belong to an exclusive minority.

Study 1

In Study 1, we created and purified an initial item pool. The initial item pool was created according to interviews and conceptual backgrounds. Following the creation of this initial item pool, we tested the items to purify them.

Method

Participants Exploratory survey research was conducted with eleven Turkish Ph.D. students (five females). Four of them were pursuing marketing Ph.D. degrees, whereas seven of them were pursuing Ph.D. degrees in different branches of the social sciences. These eleven Ph.D. students were from either Eskisehir Osmangazi University (Turkey) or Anadolu University (Turkey), both of which are located in Turkey.

Following the exploratory survey research, the survey data were collected from 520 Turkish undergraduate students. Forty-eight participants provided incomplete responses (missing data) and were, therefore, excluded from further analyses. Consequently, the purification of the initial item pool was conducted with the survey data from 502 Turkish undergraduate students (163 females), ranging from 17 to 27 years ($M = 19.7$, $SD = 1.43$). The average income of the participants was

TRY 930 (SD = 117.25). The participants were students of Eskisehir Osmangazi University (Turkey).

Materials and Procedure As mentioned above, first, exploratory survey research was administered to eleven Ph.D. students. During the exploratory survey research, eleven Ph.D. students were asked to answer the three following questions: ‘How do you define luxury?’, ‘What comes to your mind when you think about luxury?’, and ‘What are the main characteristics of luxury products/brands?’. Participants observed these three questions in the survey, and they provided their answers in blank spaces. Additionally, participants were asked and responded to the exploratory survey research questions in Turkish. We benefited from their answers in that they created the initial item pool, which consisted of 40 items. According to the responses of the participants, we created themes for each question. These themes were created along with the discussions of the researchers regarding the responses of the participants.

Following the creation of the item pool, according to the exploratory survey research and the conceptual background, we requested help from fifteen Turkish adults, whose native language was Turkish, to rate our items as to whether they were clear and understandable. These fifteen native Turkish speakers evaluated the 40 items using a 10-point scale ($0 = insufficient$, $10 = sufficient$). The data resulting from these evaluations were analyzed with Lawshe’s (1975) content validity coefficient, which produces a value between -1 and $+1$. We calculated the cut-off coefficient for 15 experts within a 95% confidence interval to be .49 (Lawshe 1975). Ten items had coefficients less than this cut-off value and were, thus, removed due to a lack of being clear and understandable.

Following the language-related test of the initial item pool, the remaining 30 items were sent to the researchers, each of whom had a Ph.D. in the field of marketing, to evaluate whether these 30 items demonstrated content validity or not. Our definition of the luxury consumption tendency, which was ‘*the extent of an individual’s tendency regarding the consumption of unique and expensive products/services with symbolic meanings that are arbitrarily desired for some reason, such as to send a message to their surroundings, to display owned status to others, to promote the self, to render the self as distinct from its surroundings and/or to move toward upper social classes*’, was sent with these 30 items. Put more simply, the experts evaluated the items according to their degrees of overlap with this definition. Expert researchers rated these 30 items using a 10-point scale ($0 = item\ does\ not\ capture\ the\ phenomenon$, $10 = item\ captures\ the\ phenomenon\ very\ well$). Again, we used Lawshe’s (1975) content validity coefficient methodology to evaluate each item’s performance. Based on the content validity coefficients, five items were removed due to their low validity coefficients, which were less than the calculated cut-off value.

To summarize, fifteen items were removed according to the results of the linguistic and content validity tests. Therefore, we conducted a scale purification study with twenty-five items. The scale purification data were collected through a paper-pencil survey at Eskisehir Osmangazi University. Participants responded to the luxury consumption tendency scale (hereafter LCTS) items using a 5-point scale ($1 = strongly\ disagree$, $3 = neither\ agree\ nor\ disagree$, $5 = strongly\ agree$). The scale, which was created for measuring the luxury consumption tendency, consisted of only twenty-five items.

Results

To provide some findings of the factorial structure of the LCTS, we performed exploratory and confirmatory factor analyses following the inter-item correlation analysis among the items (see Table 1).

The exploratory factor analysis (EFA) results demonstrated that the sampling adequacy was good enough ($KMO = .91$; approx. $\chi^2 = 4993.04$; $p < .01$). Furthermore, the EFA revealed a five-factor solution with 60.24% explained variance. The EFA was conducted with a maximum-likelihood approach and promax rotation. Although the goodness-of-fit test result was significant, we interpreted this result based on a relatively high sample size such that the significant result did not evaluate in a bad manner. Put more simply, the chi-square to df ratio was acceptable ($\chi^2 = 504.81$; $df = 185$; $\chi^2/df = 2.72$; $p = .01$).

From the perspective of the factor loading structure, six items were removed due to low loadings or cross-loading problems. Internal consistency performances of the dimensions of the LCTS were acceptable, that is, all the dimensions’ alpha levels were higher than .70, which is the recommended value (Nunnally 1978). Additionally, the average extracted variance values for all the dimensions were higher than .50, which is also recommended (Hair et al. 2009). The details are summarized in Table 1.

Following the EFA, we conducted a confirmatory factor analysis with the maximum-likelihood approach (CFA)¹ to check whether the data fit with our five-factor model. In accordance with the criteria proposed by Hu and Bentler (1999),² the results of the CFA demonstrated that the data fit with the five-factor model ($\chi^2 = 242.50$; $df = 132$; $\chi^2/df = 1.83$; $p = .01$; $GFI = .96$; $CFI = .97$; $TLI = .97$; $RMSEA = .04$). Moreover, to rule out an alternative factorial structure for the LCTS, we tested a unidimensional (one-factor) model, which in turn, demonstrated non-acceptable fit indices ($\chi^2/df = 10.48$; $p = .01$; $GFI = .72$; $CFI = .66$;

¹ We used the analysis of moment structures (AMOS) through the Statistical Package for the Social Sciences (SPSS) 21.0 package program.

² CFI, GFI, and TLI should be higher than .95; RMSEA should be less than .06; χ^2/df should be less than 3.

Table 1 Means, standard deviations, and EFA results for study 1

	Mean	SD	Loading	CA	AVE
Uniqueness_2	3.13	1.11	.81	.79	.51
Uniqueness_3	3.43	1.09	.74		
Uniqueness_1	3.16	1.14	.67		
Uniqueness_5	2.83	1.26	.64		
Uniqueness_6	3.47	1.05	.45 (CL)		
Uniqueness_4	2.45	1.13	.41		
Expensiveness_2	2.24	1.18	.79	.85	.52
Expensiveness_5	2.44	1.16	.76		
Expensiveness_3	2.45	1.23	.75		
Expensiveness_4	2.24	1.13	.66		
Expensiveness_1	1.98	1.09	.61		
Symbolic meaning_3	2.82	1.20	.88	.82	.55
Symbolic meaning_4	2.78	1.19	.82		
Symbolic meaning_2	2.66	1.14	.64		
Symbolic meaning_1	2.64	1.18	.58		
Symbolic meaning_5	2.50	1.06	.51 (CL)		
Arbitrary desire_3	2.67	1.24	.85	.78	.57
Arbitrary desire_2	2.47	1.22	.81		
Arbitrary desire_4	2.62	1.29	.59		
Arbitrary desire_1	2.86	1.66	.37 (CL)		
Belonging to an exclusive minority_4	2.62	1.29	.86	.77	.56
Belonging to an exclusive minority_3	2.63	1.23	.74		
Belonging to an exclusive minority_5	2.32	1.15	.63		
Belonging to an exclusive minority_1	2.41	1.21	.29 (CL)		
Belonging to an exclusive minority_2	2.47	1.22	.30 (CL)		

Bold loadings represent removed items. The CA values were calculated with the remaining 19 items. CA Cronbach’s alpha; AVE average variance extracted; CL cross-loading problem

TLI = .62; RMSEA = .14). This finding supported that the five-factor solution had a better fit with the data than the one-factor solution did.

Furthermore, we conducted a CFA for each dimension of the LCTS to ensure a factor structure of each dimension. As we predicted, the CFA results demonstrated that *uniqueness* ($\chi^2 = 2.50$; $df = 2$; $\chi^2/df = 1.25$; $p = .17$; GFI = .99; CFI = .99; TLI = .99; RMSEA = .03), *expensiveness* ($\chi^2 = 2.34$; $df = 2$; $\chi^2/df = 1.17$; $p = .13$; GFI = .99; CFI = .99; TLI = .99; RMSEA = .04), and *symbolic meaning* ($\chi^2 = 1.42$; $df = 2$; $\chi^2/df = 0.71$; $p = .25$; GFI = .99; CFI = .99; TLI = .99; RMSEA = .02) each had a one-factor solution. The CFA for the dimensions of *arbitrary desire* and *belonging to an exclusive minority* could not be conducted since they both had three items.

To summarize, the results of Study 1 helped to create the LCTS, which consisted of five factors and 19 items.

Brief Discussion for Study 1

Study 1 provided preliminary support for our five-factor model of the luxury consumption tendency. According to the

results of the exploratory and confirmatory factor analyses, the initial item pool, which consisted of 40 items, was reduced to 19 items. Thus, the LCTS was developed within the Turkish culture. The scale included five factors and 19 items.

One might wonder, however, whether the scale was applicable for diverse samples since Study 1 was restricted to undergraduate students. To test whether the scale had a reliability and validity for diverse samples, Study 2 used generalizable survey data collected from 808 Turkish adults.

Study 2

Study 1 provided the LCTS, which consisted of five factors and 19 items. However, the findings of Study 1 were limited to the characteristics of the sample, namely, the student sample. Therefore, testing the LCTS with a more diverse sample was required to assess the generalization performance of the scale. To this end, Study 2 included a test of the LCTS with a more diverse sample. Moreover, Study 2 provided some evidence regarding the validity performance of the LCTS.

To provide convergent validity evidence of the LCTS, we checked whether conspicuous consumption and status consumption were associated with the LCTS. In particular, we hypothesized that conspicuous consumption (H_1) and status consumption (H_2) would be positively associated with the luxury consumption tendency. These hypotheses were based on our theorization that conspicuous, status, and luxury consumption stem from people's desires toward self-enhancement. According to the theory of basic human values (Schwartz 2012), self-enhancement is one of the basic motivations of human beings. For instance, when people achieve their goals or obtain power, the value of their selves increases in their own eyes. Thus, achievement and power are ways in which people experience self-enhancement. Furthermore, the feeling of achievement is obtainable through luxury products (O'Cass and McEwen 2004). That is, purchasing luxury and expensive products might provide a feeling of achievement since these products have the potential to hierarchically promote their owners (Wong and Ahuvia 1998). Obtaining a higher hierarchical position through a lavish lifestyle leads to obtaining social power over others.

Status consumption (Eastman et al. 1999), conspicuous consumption (Chaudhuri et al. 2011), and luxury consumption (Wong and Ahuvia 1998) are sources of feelings of achievement and the sense of having power. Thus, these consumption tendencies are based on the desire for self-enhancement because the self is intended to be highlighted during these consumption practices. Indeed, past research linked these three consumption tendencies via self-enhancement. Among this research, Kastanakis and Balabanis (2012) found that status consumption is positively associated with luxury consumption behavior. On the other hand, conspicuous consumption was found to be positively related to status consumption (O'Cass and McEwen 2004). These findings suggested that the LCTS should be positively related to conspicuous consumption and status consumption.

- The luxury consumption tendency is positively associated with conspicuous consumption.
- The luxury consumption tendency is positively associated with status consumption.

Method

Participants To accomplish our research objective, data were collected from 820 Turkish adults through an internet-based survey. However, 12 participants provided incomplete responses (incomplete data) and were, therefore, excluded from further analyses. Consequently, our final sample size consisted of 808 Turkish adults (420 females). The participants were recruited through a market research company. The participants ranged in age from 22 to 60 years ($M = 29.04$,

$SD = 4.07$). The average income of the participants was TRY 2125 ($SD = 510.50$).

Materials and Procedure As mentioned above, the data were collected through an online survey. The participants first read the informed consent form and were requested to confirm this form to move forward. In the informed consent form, participants were informed that the aim of this study was to make a cross-cultural comparison of consumption practices, which was not the real aim of this study. We shared wrong information about the aim of the study since having an opinion about the real aim of the study might have biased the responses.

Following the completion of the informed consent form, participants were asked to respond to the 19-item LCTS, which was developed in Study 1, a five-item status consumption scale (Eastman et al. 1999), and an 11-item conspicuous consumption scale (Chaudhuri et al. 2011) using a 5-point scale ($1 = strongly disagree$, $3 = neither disagree nor agree$, $5 = strongly agree$).

To prevent an order effect, the order of the scales was counterbalanced among the participants. Lastly, before being debriefed about the aim of the study, participants were asked what they thought the study was about to test for any possible problems with demand characteristics (Orne 1962; Rosenthal and Rosnow 2009). None of the participants were aware of the hypotheses of the current study.

Results

First, to check whether the data supported the five-factor model of the LCTS, an exploratory factor analysis and a confirmatory factor analysis were conducted. The results are summarized in Tables 2 and 3.

The exploratory factor analysis (EFA) results demonstrated that the sampling adequacy was good enough ($KMO = .86$; approx. $\chi^2 = 7433.79$; $p < .01$). Furthermore, the EFA revealed the five-factor solution with 67.96% explained variance. The EFA was conducted with a maximum-likelihood approach and promax rotation. Although the goodness-of-fit test result was significant, we interpreted this result based on a relatively high sample size so that the significant result did not evaluate in a bad manner. Put more simply, the chi-square to df ratio was acceptable ($\chi^2 = 550.31$; $df = 86$; $\chi^2/df = 6.39$; $p = .01$).

According to the factor structure results, one item from the dimension of expensiveness (expensiveness_1) was removed due to low-loading and the cross-loading problem (see Table 2). The internal consistency performances of the dimensions of the LCTS were acceptable, namely, all the dimensions' alpha levels were higher than .70, which is the recommended value (Nunnally 1978). Additionally, all the correlation coefficients among the factors

Table 2 Means, standard deviations, and EFA Results for study 2

	Mean	SD	Loading	Mean	SD	α
Uniqueness_2	3.15	1.06	.80	3.20	.80	.78
Uniqueness_3	3.71	0.96	.73			
Uniqueness_1	3.42	1.07	.71			
Uniqueness_5	2.52	1.10	.53			
Expensiveness_2	2.00	0.99	.83			
Expensiveness_3	2.17	1.11	.82	2.18	.84	.82
Expensiveness_5	2.29	1.01	.70			
Expensiveness_4	2.29	1.06	.56			
Expensiveness_1	1.79	0.84	.42 (CL)			
Symbolic meaning_3	2.42	1.14	.91			
Symbolic meaning_4	2.39	1.13	.89	2.36	.96	.88
Symbolic meaning_2	2.33	1.09	.71			
Symbolic meaning_1	2.32	1.11	.68			
Arbitrary desire_2	2.20	1.11	.88			
Arbitrary desire_3	2.10	1.06	.76			
Arbitrary desire_4	2.19	1.01	.65	2.16	.90	.80
Belonging to an exclusive minority_4	2.14	1.07	.86			
Belonging to an exclusive minority_3	2.25	1.08	.80			
Belonging to an exclusive minority_5	2.00	1.00	.74			

Bold loadings represent removed items.

CL cross-loading problem

of the LCTS were positively significant, indicating that those five factors constituted a higher-level construct, namely, the LCTS (see Table 3).

Furthermore, we conducted a CFA³ with a maximum-likelihood estimation for each dimension of the LCTS to ensure a factor structure of each dimension. As we predicted, the CFA results demonstrated that *uniqueness* ($\chi^2 = 3.50$; $df = 2$; $\chi^2/df = 1.75$; $p = .17$; $GFI = .99$; $CFI = .99$; $TLI = .99$; $RMSEA = .03$), *expensiveness* ($\chi^2 = 2.24$; $df = 2$; $\chi^2/df = 1.12$; $p = .13$; $GFI = .99$; $CFI = .99$; $TLI = .99$; $RMSEA = .05$), and *symbolic meaning* ($\chi^2 = 1.31$; $df = 2$; $\chi^2/df = 0.65$; $p = .25$; $GFI = .99$; $CFI = .99$; $TLI = .99$; $RMSEA = .02$) each had a one-factor solution. CFA for the dimensions of *arbitrary desire* and *belonging to an exclusive minority* could not be conducted since they both had three items. Additionally, we tested the measurement model, which represented the 5-factor LCTS, with CFA. In accordance with the criteria that is recommended by Hu and Bentler (1999),⁴ the CFA results showed that the data fit with the 5-factor model for the LCTS ($\chi^2 = 255.80$; $df = 125$; $\chi^2/df = 2.04$; $p = .01$; $GFI = .97$; $CFI = .98$; $TLI = .97$; $RMSEA = .04$). Furthermore, to rule out alternative factorial structures for the LCTS, we tested a unidimensional (one-factor) model, which in turn, revealed non-acceptable fit indices ($\chi^2/df = 26.54$; $p = .01$; $GFI = .64$; $CFI = .52$;

$TLI = .45$; $RMSEA = .17$). This finding supported that the five-factor solution had a better fit with the data than the one-factor solution did.

To examine the convergent and discriminant validity performances of the LCTS, a measurement model was performed. The LCTS, status consumption scale, and conspicuous consumption scale were lent to be correlated in the measurement model. As it appears in Table 4, all the AVE values for the five factors of the LCTS were found to be higher than the recommended value of .50 (Fornell and Larcker 1981). This finding indicated that the LCTS had a convergent validity. On the other hand, the AVE values of all the factors of the LCTS were greater than the squared latent factor correlation between a pair of constructs (Fornell and Larcker 1981). This finding, therefore, indicated that the LCTS also had discriminant validity. It is possible to say that the LCTS had construct validity since the LCTS demonstrated satisfactory convergent and discriminant validity performances (Bagozzi et al. 1991). As expected, the LCTS was found to be related to conspicuous consumption ($r = .51$, $p < .01$), implying that H_1 was supported. In addition, the LCTS was found to be related to status consumption ($r = .50$, $p < .01$), implying that H_2 was supported. These two findings suggested that the LCTS had a good concurrent validity performance (Bagozzi et al. 1991). In addition, all the factors of the LCTS demonstrated satisfactory reliability performances since the composite reliabilities of them were higher than the recommended value of .70 (Fornell and Larcker 1981).

We also tested whether the LCTS was invariant for gender. Put another way, we wondered whether the factorial structure

³ We used the analysis of moment structures (AMOS) through the Statistical Package for the Social Sciences (SPSS) 21.0 package program.

⁴ CFI, GFI, and TLI should be higher than .95; RMSEA should be less than .06; χ^2/df should be less than 3.

Table 3 Correlation matrix for the factors of LCTS (study 2)

Dimensions	LCTS	U	E	SM	AD	B
LCTS						
Uniqueness (U)	.60					
Expensiveness (E)	.71	.25				
Symbolic meaning (SM)	.75	.29	.48			
Arbitrary desire (AD)	.66	.26	.33	.31		
Belonging to an exclusive minority (B)	.74	.35	.41	.44	.37	

$p < 0.01$ (All the p -values for the correlation coefficients were less than .01)

of the LCTS was equivalent across gender. To this end, we conducted multigroup SEM with the maximum-likelihood approach in which gender was a grouping variable. We found that the unconstrained model ($\chi^2/df = 2.10$; $p = .01$; GFI = .95; CFI = .96; TLI = .96; RMSEA = .04) was acceptable across gender, suggesting that the LCTS had a configural invariance across gender. Furthermore, the differences between the unconstrained and constrained models ($\chi^2/df = 2.04$; $p = .01$; GFI = .97; CFI = .98; TLI = .97; RMSEA = .04) were non-significant ($\Delta\chi^2 = 11.01$; $\Delta df = 12$; $p = .52$), indicating that the factorial structure of the LCTS had both configural and metric invariance across gender. Put more simply, both the factorial structure of the LCTS (configural invariance) and the factorial loadings of the LCTS (metric invariance) were the same for males and females.

Brief Discussion for Study 2

Study 2 provided further evidence of the reliability and validity of the LCTS. The results of Study 2 demonstrated that the LCTS had satisfactory reliability and validity performances in a diverse sample consisting of 808 Turkish adults. Moreover, the LCTS was found to be positively correlated with conspicuous and status consumption. The results also showed that the LCTS was invariant for gender.

Although both Study 1 and Study 2 provided evidence that supported the five-factor model of the LCTS, these studies are restricted to having a cross-sectional nature. In other words, Study 1 and Study 2 would have both benefited from cross-sectional data collected through a survey, which would have precluded us from concluding causal implications regarding the luxury consumption tendency. To overcome this weakness, Study 3 adopted a between-subjects experimental design that was conducted with participants from the U.S.

Study 3

The results of Study 2 revealed that the LCTS had satisfactory discriminant validity, convergent validity, construct validity,

concurrent validity, and reliability performances. However, the findings of Study 2 lacked nomological validity evidence and were limited to the Turkish sample. To provide nomological validity, we conducted an experiment in which the effect of a construal level on the LCTS was tested. Specifically, we hypothesized that as the construal level increases, the luxury consumption tendency would also increase. Put more simply, we based the logic of our hypothesis on the construal level theory (Trope and Liberman 2010).

According to the construal level theory, people might construe a specific object to either a concrete (low) level or an abstract (high) level. Furthermore, people who have a low construal level focus on the concrete details of the object, whereas people who have a high construal level focus on the abstract philosophy of the object (Trope and Liberman 2012). Let us suppose, for example, that one may construe the concept of luxury with either a low (concrete) level or high (abstract) construal level. In the former scenario, luxury can be perceived as products that are sold in a prestigious store or mall. In the latter scenario, luxury can be perceived as status or prestige. Recent research demonstrated that consumers define luxury goods using abstract language (Hansen and Wänke 2011). Furthermore, the same research showed that abstract product descriptions are perceived as luxurious among consumers. Drawing on this finding and on the construal level theory, we hypothesized that as the construal level increases, so does the luxury consumption tendency.

- The construal level has a positive effect on the luxury consumption tendency.

To this end, we adopted a between-subjects experimental design in Study 3. The results of Study 3 would allow a causal inference to be made regarding the luxury consumption tendency. As was mentioned before, Study 1 and Study 2 adopted non-experimental designs, which precluded us from obtaining causal inferences; therefore, we especially preferred the experimental design used in Study 3. Furthermore, the LCTS was developed in the Turkish language and needed to be tested in a culture where English is the native language, such as in the United States of America. To this end, we administered the English version of the LCTS in Study 3.

Table 4 Descriptive statistics for the factors, reliability estimates, and latent factor correlations (study 2)

Dimensions	M	SD	CR	AVE	LCTS	SC	CC
LCTS	2.41	.61	–				
Uniqueness (U)	3.20	.80	.79	.53	.60	.31	.35
Expensiveness (E)	2.18	.84	.82	.55	.71	.64	.52
Symbolic meaning (SM)	2.36	.96	.88	.65	.75	.72	.60
Arbitrary desire (AD)	2.16	.90	.81	.59	.66	.50	.48
Belonging to an exclusive minority (B)	2.13	.91	.84	.63	.74	.55	.57
Status consumption (SC)	1.90	.72	.74	.54	.50	(.81)	
Conspicuous consumption (CC)	1.98	.69	.89	.51	.51	.31	(.88)

** $p < 0.01$, Coefficient alphas are reported with parentheses, CR composite reliability; AVE average variance extracted

Method

Participants We conducted a between-subjects experimental design with two conditions, namely, a low construal-level condition and a high construal-level condition. To this end, we recruited 110 participants from the U.S. (55 participants per condition) through Amazon Mturk in which participation in the study was restricted to the United States of America. However, four participants (two participants per condition) provided incomplete responses (incomplete data), and six participants (three participants per condition) failed at the attention check question. Therefore, ten participants were excluded from further analyses. Consequently, we continued with the remaining 100 participants (50 participants per condition). The age of the participants ranged from 20 to 79 years ($M = 37.18$, $SD = 13.13$). The average annual income of the participants was \$41,286 ($SD = 27,176$).

Materials and Procedure First, participants read the informed consent form and were requested to confirm this form to move forward. In the informed consent form, participants were informed that the aim of the study was to make a cross-cultural comparison of the luxury consumption tendency, which was not the real aim of this study. We shared wrong information about the aim of the study since having an opinion about the real aim of the study might have biased the responses. This practice, which is known as a cover story, is prevalent among previous psychological experiments (Chang et al. 2015). However, the participants were debriefed about the real aim of the study. We believe that this debriefing was conducted in an ethical manner.

Following the completion of the informed consent form, participants were randomly assigned to either the low construal-level condition or the high construal-level condition. Participants between the conditions were not different in terms of age ($\chi^2 = 38.84$, $p = .43$), gender ($\chi^2 = 0.40$, $p = .84$), or income ($\chi^2 = 56.00$, $p = .29$), suggesting that the random assignment process was not biased. After providing informed

consent, the participants were asked to respond to three questions depending on the condition they were assigned to. Participants assigned to the low construal-level condition responded to the following questions: How do people exercise?, How do people go on a vacation?, How do people earn money?. On the other hand, participants assigned to the high construal-level condition responded to the following questions: Why do people exercise?, Why do people go on a vacation?, Why do people earn money?. To summarize, we manipulated the construal levels of the participants with how (low construal-level condition) and why (high construal-level condition) questions. This approach is widely used for manipulating construal levels (Freitas et al. 2004; Fujita et al. 2006; Trope and Liberman 2012). The participants were instructed to provide a response with at least 150 characters. Following this manipulation, the participants responded to the English version of the eighteen-item LCTS, which was translated into English using a back-translation method (Brislin 1970). The participants reported their responses to the LCTS using a 5-point scale ($1 = strongly disagree$, $3 = neither disagree nor agree$, $5 = strongly agree$). After responding to the LCTS, the participants were asked to respond to the Behavioral Identification Form (BIF; Vallacher and Wegner 1987), which consists of twenty-five questions with binary response options. The BIF is widely used to measure trait construal levels (Trope and Liberman 2010). To test whether the manipulation was successful or not, we compared the BIF means of the conditions. We found that participants in the high construal-level condition had higher BIF values than participants in the low construal-level condition ($t(98) = 5.74$, $p < .01$), suggesting that the manipulation was successful. Lastly, the participants were asked to report their demographics.

To prevent an order effect, the order of the scales were counterbalanced among participants. The participants were also asked what they thought the study was about to test for a possible problem with demand characteristics (Orne 1962; Rosenthal and Rosnow 2009). None of the participants were aware of the hypotheses of the current study.

Results

To check that the data supported the five-factor LCTS, we first conducted an exploratory factor analysis (EFA). An EFA using the maximum-likelihood approach and promax rotation revealed a five-factor solution for the LCTS, which was expected (KMO = .80, approx. $\chi^2 = 1194.47$, and $p < .01$, explained variance = 76.22%, $\chi^2 = 114.47$, $df = 73$, $\chi^2/df = 1.56$, $p < .01$). The results are summarized in Table 5.

As it appears in Table 5, all the loadings were higher than .50, which is the recommended value (Hair et al. 2009). Furthermore, all the Cronbach alpha values were higher than .70, which was evaluated as a cut-off value for internal consistency (Nunnally 1978).

Additionally, all the correlation coefficients among the factors of the LCTS were positively significant, indicating that those five factors constituted a higher-level construct, namely, the LCTS (see Table 6).

Furthermore, we conducted a CFA⁵ with a maximum-likelihood estimation for each dimension of the LCTS to ensure a factor structure of each dimension. As we predicted, the CFA results demonstrated that *uniqueness* ($\chi^2 = 0.92$; $df = 2$; $\chi^2/df = 0.46$; $p = .63$; GFI = .99; CFI = .99; TLI = .99; RMSEA = .01), *expensiveness* ($\chi^2 = 0.60$; $df = 1$; $\chi^2/df = 0.60$; $p = .45$; GFI = .99; CFI = .99; TLI = .99; RMSEA = .01), and *symbolic meaning* ($\chi^2 = 1.50$; $df = 2$; $\chi^2/df = 0.75$; $p = .23$; GFI = .99; CFI = .99; TLI = .99; RMSEA = .01) each had a one-factor solution. CFA for the dimensions of *arbitrary desire* and *belonging to an exclusive minority* could not be conducted since they both had three items. Additionally, the CFA was performed for testing the measurement model, which represents the 5-factor LCTS. According to the criteria proposed by Hu and Bentler (1999), the results showed that the data fit with the 5-factor model for the LCTS ($\chi^2 = 140.80$; $df = 125$; $\chi^2/df = 1.12$; $p = .51$; GFI = .89; CFI = .98; TLI = .97; RMSEA = .04).

Last and importantly, we tested our hypothesis, which stated that individuals who had high construal-levels would have a greater luxury consumption tendency than the individuals who had a low construal-level. To this end, we conducted an independent samples t-test in which the differences between the LCTS means of the conditions were tested. The results showed that the participants in the high construal-level condition ($M = 2.74$, $SD = .76$) had a greater luxury consumption tendency than did the participants in the low construal level ($M = 2.44$, $SD = .61$, $t(98) = 1.558$, $p < .05$), which supported our hypothesis. This finding also provided evidence regarding the nomological validity of the LCTS. Put more simply, this

hypothesis was based on the construal-level theory so the LCTS was used in a model, which was theoretically grounded. Therefore, the LCTS was placed in a theoretical network in which the hypothesis was supported; thus, it is possible to say that the LCTS has nomological validity.

Brief Discussion for Study 3

Study 3 provided causal evidence regarding the relationship between the construal level and the luxury consumption tendency. The results showed that as the construal level increased, so did the luxury consumption tendency. Particularly, the participants with a high construal level had a greater luxury consumption tendency than the participants with a low construal level. This finding suggested that the construal level theory can provide a novel understanding of the luxury consumption tendency.

Moreover, the LCTS, which was originally developed in Turkish culture, demonstrated satisfactory reliability and validity performances on the data collected from the U.S. participants. This finding indicates that the LCTS is applicable for the U.S. culture.

General Discussion

The purpose of this paper was to develop a LCTS to conceptualize the luxury consumption tendency with a trait-based approach. To this end, three studies were conducted. In Study 1, we conducted exploratory survey research with eleven Turkish Ph.D. students, and then, exploratory factor analysis was performed with 520 Turkish undergraduate students. The results of Study 1 produced the five-factor LCTS, consistent with our theoretical background. In Study 2, confirmatory factor analysis was performed with 808 diverse Turkish adults. The results of the confirmatory factor analysis demonstrated that the data supported the five-factor LCTS. Furthermore, the results of Study 2 showed that the luxury consumption tendency was found to be positively associated with status consumption and conspicuous consumption, indicating that the LCTS demonstrated convergent and discriminant validity. In Study 3, we tested the validity performance of the LCTS among U.S. participants and provided nomological validity evidence regarding the LCTS. To this end, we conducted a between-subjects design (two conditions) experiment with 100 participants from the US. The results of Study 3 showed that participants in a high construal-level condition had a greater luxury consumption tendency than did participants in a low construal-level condition, which supported our hypothesis based on the construal level theory.

⁵ We used the analysis of moment structures (AMOS) through the Statistical Package for the Social Science (SPSS) 21.0 package program. This program was used to conduct the confirmatory factor analysis.

Table 5 Means, standard deviations, and EFA results for STUDY 3

	Mean	SD	Loading	Mean	SD	α
Uniqueness_2	3.65	0.90	.87	3.46	.79	.87
Uniqueness_3	3.59	0.96	.95			
Uniqueness_1	3.31	1.07	.95			
Uniqueness_5	3.29	1.10	.91			
Expensiveness_2	2.61	0.99	1.17	2.37	.89	.80
Expensiveness_3	1.93	1.11	1.02			
Expensiveness_5	2.51	1.01	1.10			
Expensiveness_4	2.45	1.06	1.18			
Symbolic meaning_3	2.66	1.14	1.17	2.37	1.02	.88
Symbolic meaning_4	2.51	1.13	1.21			
Symbolic meaning_2	2.26	1.09	1.20			
Symbolic meaning_1	2.06	1.11	1.16			
Arbitrary desire_2	2.68	1.11	1.22	2.43	1.05	.85
Arbitrary desire_3	2.15	1.06	1.13			
Arbitrary desire_4	2.47	1.01	1.22			
Belonging to an exclusive minority_4	2.20	1.07	1.23	2.59	.70	.92
Belonging to an exclusive minority_3	2.41	1.08	1.13			
Belonging to an exclusive minority_5	2.37	1.00	1.24			

Theoretical Contributions

The theoretical contribution of this paper was fourfold. First, this paper was a conceptual and empirical attempt to understand the luxury consumption tendency with a trait-based approach. Put another way, the luxury consumption tendency had yet to be examined as a trait by the time of the current paper. Past research on luxury consumption have examined how consumers perceive luxury brands (Kapferer 1998; Sung et al. 2015; Vigneron and Johnson 2004), what consumers’ attitudes and perceptions are toward the concept of luxury (Dubois and Laurent 1994; Dubois et al. 2001; Hansen and Wanke 2011; Hennigs et al. 2012; Nelissen and Meijers 2011), and what the antecedents and consequences are of purchasing luxury goods (Amatulli and Guido 2011; Husic and Cicic 2009; Kastanakis and Balabanis 2012; Kastanakis and Balabanis 2014; Vigneron and Johnson 1999). The current paper contributes to the growing literature on luxury consumption by proposing that the luxury consumption tendency is a trait, that people can have a certain degree of. Following the defining of the luxury consumption tendency for

the first time, we evaluated the concept of luxury consumption from the consumer’s point of view. Specifically, we claimed that the luxury consumption tendency is somewhat similar to a personality trait, which can be shaped by an environmental context. Therefore, the concept of luxury consumption should be conceptualized as the interaction between the luxury consumption tendency and environmental conditions. Indeed, we evaluated environmental conditions as a boundary condition for the effect of the luxury consumption tendency on luxury consumption. Particularly, the consumers with high luxury consumption tendencies may not actualize luxury consumption due to a lack of enough purchasing power or a lack of motivation toward a particular luxury product.

Second, we conceptualized the luxury consumption tendency as a multidimensional phenomenon. The dimensions were uniqueness, expensiveness, symbolic meaning, arbitrary desire, and belonging to an exclusive minority. These five dimensions composed the luxury consumption tendency. Based on the concept of work in luxury consumption, we extensively reviewed past research on luxury consumption, which helped us to generate a five-dimension model of the luxury consumption

Table 6 Correlation matrix for the factors of LCTS (study 3)

Dimensions	LCTS	U	E	SM	AD	B
LCTS						
Uniqueness (U)	.65					
Expensiveness (E)	.79	.42				
Symbolic meaning (SM)	.71	.36	.48			
Arbitrary desire (AD)	.65	.29	.40	.26		
Belonging to an exclusive minority (B)	.78	.41	.58	.44	.34	

$p < 0.01$ (All the p -values were less than .01)

tendency. We claimed that these five dimensions could be evaluated as the antecedents of the luxury consumption. Thus, this paper adds to the specific past knowledge on the antecedents of luxury consumption (Husic and Cicic 2009; Vigneron and Johnson 1999). We also believe that the relationships between the dimensions of the luxury consumption tendency are worth discussion.⁶ Consistently, the relationships among the dimensions of expensiveness, symbolic meaning, and belonging to an exclusive minority were highly correlated across Study 2 and Study 3. These results indicated that expensive luxury products would be heavily loaded with symbolic meanings, which, in turn, would provide a sense of belonging to an exclusive minority. Moreover, symbolic meaning would be an essential requirement for belonging to an exclusive minority.

Third, the current paper contributes to the literature on luxury consumption by providing a LCTS. Across the three studies, consisting of a descriptive design (Study 1), a cross-sectional design (Study 2), and an experimental design (Study 3), we established a five-dimension LCTS scale across Turkish and U.S. participants. This scale was found to have a consumer-centric approach and is the first scale to measure the luxury consumption tendency of people. Previous scale development attempts in the luxury consumption literature produced the brand luxury index (BLI; Vigneron and Johnson 2004), attitudes toward the concept of luxury scale (Dubois and Laurent 1994), perceptions on luxury scale (Dubois et al. 2001), and prestige shopping preference scale (PRECON; Deeter-Schmelz et al. 2000). Although these scales contributed to the literature on luxury consumption, they lacked a consumer-centric approach to measuring luxury consumption. Specifically, the brand luxury index has a brand-centric approach in which participants report their perception regarding the degree of luxuriousness of a particular brand. The attitudes toward the concept of luxury scale and the perceptions of luxury scale utilize a concept-centric approach in which participants report their attitudes and perceptions related to the concept of luxury. The prestige shopping preference scale focuses on prestige consumption through the consumption of clothes, and thus, its measurement is restricted to only the consumption of clothes. However, the LCTS provides a consumer-centric approach to measuring the luxury consumption tendency of people as a trait.

Last and most importantly, the LCTS, which was developed in the current paper, has the potential to increase the theoretical understanding of individual differences in luxury consumptive behavior by facilitating the operationalization of the relevant concepts. In other words, theoretical models aimed at understanding why people perform luxury consumption can be empirically analyzed through the LCTS. From the point of view of psychological theories, the tend and befriend theory (Taylor 2012) can provide an explanation of why

people under conditions of threat are inclined to engage in luxury consumption. According to this theory, when one is socially isolated or is under threat, he/she will seek to affiliate himself/herself with others to obtain social protection. Thus, individual differences in the luxury consumption tendency might arise from differences in the degree of social isolation. That is, when people are socially isolated or excluded by others, they might want to engage in luxury consumption practices to obtain social acceptance from others who regularly perform luxury consumption. On the other hand, the compensatory control theory (Kay et al. 2009) can explain why people are inclined to engage in luxury consumption when they experience a lack of power. Luxury products and services are somewhat similar to external sources of control; therefore, the consumption of luxury items may compensate for their perceived lack of power (Rucker and Galinsky 2008). Furthermore, the gist of the concept of luxury can be conceptualized in how people construe luxury products and services. To this end, the construal level theory (Trope and Liberman 2010), which posits that people can construe objects or experiences either in an abstract way (high-construal level) or in a concrete way (low-construal level), can offer a fruitful background on the concept of luxury. According to the results of Study 3, the higher the construal level was, the higher the luxury consumption tendency was. Thus, representing the luxury products and services without mentioning their abstract nature can lead a deficient comprehension of the nature of the concept of luxury.

Limitations and Future Research Suggestions

This paper is not without limitations. First, the LCTS was developed using only two different cultures, namely, those of Turkey and the United States of America. Therefore, the scale needs cross-cultural validation from multiple cultures. Second, the samples were not collected via probabilistic sampling. Therefore, generalizations of the results of this paper should be cautious. Third, the current paper did not provide evidence regarding the predictive validity performance of the LCTS.

The aforementioned limitations come with opportunities for future research. First, a predictive performance comparison among the LCTS and the previously developed scales should be performed in the future. Second, future research can also examine the idea that when the luxury consumption tendency consistently predicts luxury consumption behavior, then what the boundary conditions of this prediction are. Put more simply, how the luxury consumption tendency interacts with purchasing power or environmental contexts (e.g., shopping alone, in-store design, luxury brand logo, crowdedness of the store) to predict luxury consumption behavior. Future research can also dig deeper into the relationship between the construal-level and the luxury consumption tendency. In

⁶ The authors would like to thank the reviewers for this suggestion.

particular, future research should examine how and why this relationship occurs. To this end, mediator or moderator variables can be offered in the future. Moreover, in a recent study, the perception of luxury was found to be a culture-dependent construct (Shukla and Purani 2012). To dig deeper into this finding, a cross-cultural comparison of the luxury consumption tendency can be performed in future research and then, differences can be explained by the construal level theory since there are cultural differences in the construal-level theory (Lieberman et al. 2007a).

Conclusion

Overall, the current paper introduced an 18-item LCTS (See Appendix) following the conceptualization of the luxury

consumption tendency. Across three studies we provided convergent evidence that the LCTS is reliable and valid.

Compliance with Ethical Standards

Conflict of Interest Both authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in the studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or with comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Appendix

Table 7 Luxury consumption tendency scale (LCTS)

Uniqueness	
Uniqueness_1	I buy a product/service since it is different from other products/services. (<i>Bir ürünü/hizmeti diğerlerinden farklı olduğu için satın alırım.</i>)
Uniqueness_2	In my purchase decisions, I consider whether the product/service has unique features. (<i>Satın alma kararlarımda ilgili ürünün/hizmetin benzersiz özelliklere sahip olmasını gözetirim.</i>)
Uniqueness_3	I am interested in products/services that have unique features that other products/services do not have. (<i>Diğer ürünlerden/hizmetlerden farklı özelliklere sahip ürünlere karşı ilgi duyuyorum.</i>)
Uniqueness_5	I desire to purchase a product/service that is specially produced for me. (<i>Satın aldığım bir ürünün/hizmetin yalnızca bana özel olmasını arzuluyorum.</i>)
Expensiveness	
Expensiveness_2	I happily buy expensive products/services. (<i>Pahalı ürünleri/hizmetleri satın almaktan mutluluk duyuyorum.</i>)
Expensiveness_3	I do not care about finding the best deal/price. (<i>Ucuz ürünleri/hizmetleri bulmak benim için çok önemli değildir.</i>)
Expensiveness_4	I do not prefer to buy low-priced products/services. (<i>Ucuz ürünleri/hizmetleri satın almayı tercih etmem.</i>)
Expensiveness_5	I prefer an expensive product/service over a cheap product. (<i>Pahalı bir ürünü/hizmeti ucuz bir ürüne/hizmete tercih ederim.</i>)
Symbolic meaning	
Symbolic meaning_1	I care more about what a product/service symbolizes than its functional features. (<i>Bir ürünün/hizmetin fonksiyonel özelliklerinden ziyade sembolik özelliklerini önemserim.</i>)
Symbolic meaning_2	I would buy a product/service if it has a luxury symbolic meaning for the people around me. (<i>İçinde yaşadığım toplumda lüks sembolik anlama sahip ürün/hizmeti satın alırım.</i>)
Symbolic meaning_3	When I am buying products/services, I consider what these products/services make sense to people around me. (<i>Ürünleri/hizmetleri satın alırken etrafımdaki insanlar için ne ifade ettiğini göz önünde bulundururum.</i>)
Symbolic meaning_4	Whether the product/service make senses to other people around me is important for me. (<i>Bir ürünün/hizmetin başkaları için ne ifade ettiği benim için önemlidir.</i>)
Arbitrary desire	
Arbitrary desire_2	I shop according to my desires, even when I do not need to shop. (<i>Hiç ihtiyacım olmadığı halde sadece istediğim için alışveriş yaparım.</i>)
Arbitrary desire_3	When I am buying products/services, I do not question whether I need this product/service. (<i>Arzuladığım bir ürüne/hizmete ihtiyacımın olup olmadığını sorgulamam.</i>)
Arbitrary desire_4	I usually buy products/services that I do not need physically but rather emotionally.

Table 7 (continued)

Uniqueness	
	(Fiziksel ihtiyaç duymaktan daha çok duygusal ihtiyaç duyduğum ürünleri/hizmetleri satın alırım.)
Belonging to an exclusive minority	
Belonging to an exclusive minority_3	I do not enjoy buying a product/service that can be bought by the vast majority of society. (Birçok kişinin satın alabileceği bir ürünü/hizmeti satın almaktan hoşlanmam.)
Belonging to an exclusive minority_4	It bothers me when many of the people around me have a product/service that I have. (Sahip olduğum bir ürüne/hizmete diğer birçok insanın sahip olması beni rahatsız eder.)
Belonging to an exclusive minority_5	I would like to feel that I belong to an exclusive minority through products/services I purchase. (Satın aldığım ürünler/hizmetler aracılığıyla kendimi azınlık bir gruba ait hissetmekten hoşlanırım.)

Table contains English (Turkish) style reporting format

References

- Alper, S., & Sumer, N. (2017). Control deprivation decreases, not increases, belief in a controlling god for people with independent self-construal. *Current Psychology*. <https://doi.org/10.1007/s12144-017-9710-9>.
- Amatulli, C., & Guido, G. (2011). Determinants of purchasing intention for fashion luxury goods in the Italian market: A laddering approach. *Journal of Fashion Marketing and Management: An International Journal*, 15(1), 123–136. <https://doi.org/10.1108/1361202111112386>.
- Bagozzi, R. P., Yi, Y., & Phillips, L. W. (1991). Assessing construct validity in organizational research. *Administrative Science Quarterly*, 36(3), 421–458. <https://doi.org/10.2307/2393203>.
- Baumeister, R. F. (2002). Yielding to temptation: Self-control failure, impulsive purchasing, and consumer behavior. *Journal of Consumer Research*, 28(4), 670–676. <https://doi.org/10.1086/338209>.
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, 117(3), 497–529. <https://doi.org/10.1037/0033-2909.117.3.497>.
- Belk, R. W. (1988). Possessions and the extended self. *Journal of Consumer Research*, 2(2), 139–168. <https://doi.org/10.1086/209154>.
- Belk, R. W., & Pollay, R. W. (1985). Images of ourselves: The good life in twentieth century advertising. *Journal of Consumer Research*, 11(4), 887–897. <https://doi.org/10.1086/209024>.
- Berger, J., & Heath, C. (2007). Where consumers diverge from others: Identity signaling and product domains. *Journal of Consumer Research*, 34(2), 121–134. <https://doi.org/10.1086/519142>.
- Berthon, P., Pitt, L., Parent, M., & Berthon, J.-P. (2009). Aesthetics and ephemerality: Observing and preserving the luxury brand. *California Management Review*, 52(1), 45–66. <https://doi.org/10.1525/CMR.2009.52.1.45>.
- Bian, Q., & Forsythe, S. (2012). Purchase intention for luxury brands: A cross cultural comparison. *Journal of Business Research*, 65(10), 1443–1451. <https://doi.org/10.1016/j.jbusres.2011.10.010>.
- Bourdieu, P. (1984). *Distinctions: A social critique of the judgment of taste*. Cambridge University Press, Cambridge.
- Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*, 1(3), 185–216. <https://doi.org/10.1177/135910457000100301>.
- Chang, H., Zhang, L., & Xie, G. X. (2015). Message framing in green advertising: The effect of construal level and consumer environmental concern. *International Journal of Advertising*, 34(1), 158–176.
- Chaudhuri, H. R., & Majumdar, S. (2006). Of diamonds and desires: Understanding conspicuous consumption from a contemporary marketing perspective. *Academy of Marketing Science Review*, 11, 1–18.
- Chaudhuri, H. R., Mazumdar, S., & Ghoshal, A. (2011). Conspicuous consumption orientation: Conceptualisation, scale development and validation. *Journal of Consumer Behaviour*, 10, 216–224. <https://doi.org/10.1002/cb.364>.
- Darian, J. C. (1998). Parent-child decision making in children's clothing stores. *International Journal of Retail & Distribution Management*, 26(11), 421–428. <https://doi.org/10.1108/09590559810246377>.
- Deeter-Schmelz, D. R., Moore, J. N., & Goebel, D. J. (2000). Prestige clothing shopping by consumers: A confirmatory assessment and refinement of the PRECON scale with managerial implications. *Journal of Marketing Theory and Practice*, 8(4), 43–58. <https://doi.org/10.1080/10696679.2000.11501879>.
- Dubois, B., & Duquesne, P. (1993). The market for luxury goods: Income versus culture. *European Journal of Marketing*, 27(1), 35–44. <https://doi.org/10.1108/03090569310024530>.
- Dubois, B., & Laurent, G. (1994). Attitudes toward the concept of luxury: An exploratory analysis. *Asia-Pacific Advances in Consumer Research*, 1(2), 273–278.
- Dubois, B., Laurent, G., & Czellar, S. (2001). Consumer rapport to luxury: Analysing complex and ambivalent attitudes. In *Working paper 736*. Jouy-en-Josas: HEC School of Management.
- Eastman, J. K., Goldsmith, R. E., & Flynn, L. R. (1999). Status consumption in consumer behavior: Scale development and validation. *Journal of Marketing Theory and Practice*, 7(3), 41–52. <https://doi.org/10.1080/10696679.1999.11501839>.
- Escalas, J. E., & Bettman, J. R. (2003). You are what they eat: The influence of reference groups on consumers' connections to brands. *Journal of Consumer Psychology*, 13(3), 339–348. https://doi.org/10.1207/s15327663jcp1303_14.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50. <https://doi.org/10.2307/3151312>.
- Freitas, A. L., Gollwitzer, P., & Trope, Y. (2004). The influence of abstract and concrete mindsets on anticipating and guiding others' self-regulatory efforts. *Journal of Experimental Social Psychology*, 40(6), 739–752. <https://doi.org/10.1016/j.jesp.2004.04.003>.
- Fujita, K., Trope, Y., Liberman, N., & Levin-Sagi, M. (2006). Construal levels and self-control. *Journal of Personality and Social Psychology*, 90(3), 351. <https://doi.org/10.1037/e633962013-107>.
- Gil, L. A., Kwon, K., Good, L., & Johnson, W. L. (2012). Impact of self on attitudes toward luxury brands among teens. *Journal of Business Research*, 65(10), 1425–1433. <https://doi.org/10.1016/j.jbusres.2011.10.008>.

- Griskevicius, V., Tybur, J. M., Sundie, J. M., Cialdini, R. B., Miller, G. F., & Kenrick, D. T. (2007). Blatant benevolence and conspicuous consumption: When romantic motives elicit strategic costly signals. *Journal of Personality and Social Psychology*, 93(1), 85–102. <https://doi.org/10.1037/e633982013-262>.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2009). *Multivariate data analysis* (7rd ed.). Pearson Prentice Hall: Upper Saddle River.
- Han, Y. J., Nunes, J. C., & Dreze, X. (2010). Signaling status with luxury goods: The role of brand prominence. *Journal of Marketing*, 74, 15–30. <https://doi.org/10.1509/jmkg.74.4.15>.
- Hansen, J., & Wänke, M. (2011). The abstractness of luxury. *Journal of Economic Psychology*, 32(5), 789–796. <https://doi.org/10.1016/j.joep.2011.05.005>.
- Hennigs, N., Wiedmann, K. P., Klarmann, C., Strehlau, S., Godey, B., Pederzoli, D., et al. (2012). What is the value of luxury? A cross-cultural consumer perspective. *Psychology and Marketing*, 29(12), 1018–1034. <https://doi.org/10.1002/mar.20583>.
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55. <https://doi.org/10.1080/10705519909540118>.
- Husic, M., & Cicic, M. (2009). Luxury consumption factors. *Journal of Fashion Marketing and Management*, 13(2), 231–245.
- Kapferer, J.-N. (1997). Managing luxury brands. *Journal of Brand Management*, 4(4), 251–260. https://doi.org/10.1007/978-3-319-51127-6_5.
- Kapferer, J.-N. (1998). Why are we seduced by luxury brands? *Journal of Brand Management*, 6(1), 44–49. <https://doi.org/10.1057/bm.1998.43>.
- Kapferer, J.-N. (2006). The two business cultures of luxury brands. In J. E. Schroeder & M. Salzer-Mörling (Eds.), *Brand Culture*. Oxon: Routledge.
- Kapferer, J.-N., & Bastien, V. (2009). The specificity of luxury management: Turning marketing upside down. *Journal of Brand Management*, 16, 311–322.
- Kastanakis, M., & Balabanis, G. (2011). Bandwagon, snob and veblen effects in luxury consumption. In D. W. Dahl, G. V. Johar, & S. M. J. van Osselaer (Eds.), *Advances in Consumer Research*, 38 (pp. 609–611). Association for Consumer Research: Duluth.
- Kastanakis, M. N., & Balabanis, G. (2012). Between the mass and the class: Antecedents of the “bandwagon” luxury consumption behavior. *Journal of Business Research*, 65(10), 1399–1407. <https://doi.org/10.1016/j.jbusres.2011.10.005>.
- Kastanakis, M. N., & Balabanis, G. (2014). Explaining variation in conspicuous luxury consumption: An individual differences' perspective. *Journal of Business Research*, 67(10), 2147–2154. <https://doi.org/10.1016/j.jbusres.2014.04.024>.
- Kay, A. C., & Friesen, J. (2011). On social stability and social change: Understanding when system justification does and does not occur. *Current Directions in Psychological Science*, 20(6), 360–364. <https://doi.org/10.1177/0963721411422059>.
- Kay, A. C., Whitson, J. A., Gaucher, D., & Galinsky, A. D. (2009). Compensatory control: Achieving order through the mind, our institutions, and the heavens. *Current Directions in Psychological Science*, 18(5), 264–268. <https://doi.org/10.1111/j.1467-8721.2009.01649.x>.
- Kay, A. C., Gaucher, D., McGregor, I., & Nash, K. (2010a). Religious belief as compensatory control. *Personality and Social Psychology Review*, 14(1), 37–48. <https://doi.org/10.1177/1088868309353750>.
- Kay, A. C., Shepherd, S., Blatz, C. W., Chua, S. N., & Galinsky, A. D. (2010b). For god (or) country: The hydraulic relation between government instability and belief in religious sources of control. *Journal of Personality and Social Psychology*, 99(5), 725–739. <https://doi.org/10.1037/a0021140>.
- Keane, M. J., & McMillan, Z. (2004). Above and beyond. *Brand Strategy*, 187, 30–40.
- Kose, Y. (2009). Vertical bazaars of modernity: Western department stores and their staff in Istanbul (1889–1921). *International Review of Social History*, 54, 91–114. <https://doi.org/10.1017/s0020859009990253>.
- Lawshe, C. H. (1975). A quantitative approach to content validity. *Personnel Psychology*, 28, 563–575. <https://doi.org/10.1111/j.1744-6570.1975.tb01393.x>.
- Levy, S. J. (1959). Symbols for sale. *Harvard Business Review*, 37, 117–124. <https://doi.org/10.4135/9781452231372.n18>.
- Liberman, N., Trope, Y., & Stephan, E. (2007a). Psychological distance. *Social Psychology: Handbook of Basic Principles*, 2, 353–383. <https://doi.org/10.1037/e633942013-052>.
- Liberman, N., Trope, Y., & Wakslak, C. (2007b). Construal level theory and consumer behavior. *Journal of Consumer Psychology*, 17(2), 113–117. [https://doi.org/10.1016/s1057-7408\(07\)70017-7](https://doi.org/10.1016/s1057-7408(07)70017-7).
- Mason, R. M. (1981). *Conspicuous consumption - a study of exceptional consumer behavior*. Farnborough: Gower.
- Nelissen, R. M., & Meijers, M. H. (2011). Social benefits of luxury brands as costly signals of wealth and status. *Evolution and Human Behavior*, 32(5), 343–355. <https://doi.org/10.1016/j.evolhumbehav.2010.12.002>.
- Nueno, J. L., & Quelch, J. A. (1998). The mass marketing of luxury. *Business Horizons*, 41(6), 61–68. [https://doi.org/10.1016/s0007-6813\(98\)90023-4](https://doi.org/10.1016/s0007-6813(98)90023-4).
- Nunnally, J. (1978). *Psychometric methods*. New York: McGraw-Hill.
- O’Cass, A., & McEwen, H. (2004). Exploring consumer status and conspicuous consumption. *Journal of Consumer Behaviour*, 4(1), 25–39. <https://doi.org/10.1002/cb.155>.
- Orne, M. T. (1962). On the social psychology of the psychological experiment: With particular reference to demand characteristics and their implications. *American Psychologist*, 17(11), 776–783. <https://doi.org/10.1037/h0043424>.
- Richins, M. L. (1994). Special possessions and the expression of material values. *Journal of Consumer Research*, 21, 522–533. <https://doi.org/10.1086/209415>.
- Ritzer, G. (1983). The “McDonaldization” of society. *The Journal of American Culture*, 6(1), 100–107. <https://doi.org/10.1002/9780470773369.ch27>.
- Rosenthal, R., & Rosnow, R. L. (2009). *Artifacts in behavioral research: Robert Rosenthal and Ralph L. Oxford University Press, Oxford: Rosnow’s Classic Books*.
- Rucker, D. D., & Galinsky, A. D. (2008). Desire to acquire: Powerlessness and compensatory consumption. *Journal of Consumer Research*, 35(2), 257–267. <https://doi.org/10.1086/588569>.
- Ruvio, A. (2008). Unique like everybody else? The dual role of consumers' need for uniqueness. *Psychology and Marketing*, 25(5), 444–464. <https://doi.org/10.1002/mar.20219>.
- Schwartz, S. H. (2012). An overview of the Schwartz theory of basic values. *Online Readings in Psychology and Culture*, 2(1). <https://doi.org/10.9707/2307-0919.1116>.
- Sekora, J. (1977). *Luxury: The concept in western thought, Eden to Smollett*. Baltimore: The Johns Hopkins University Press.
- Shepherd, S., Kay, A. C., Landau, M. J., & Keefer, L. A. (2011). Evidence for the specificity of control motivations in worldview defense: Distinguishing compensatory control from uncertainty management and terror management processes. *Journal of Experimental Social Psychology*, 47(5), 949–958. <https://doi.org/10.1016/j.jesp.2011.03.026>.
- Shukla, P. (2011). Impact of interpersonal influences, brand origin and brand image on luxury purchase intentions: Measuring interfunctional interactions and a cross-national comparison. *Journal of World Business*, 46, 242–252. <https://doi.org/10.1016/j.jwb.2010.11.002>.
- Shukla, P., & Purani, K. (2012). Comparing the importance of luxury value perceptions in crossnational contexts. *Journal of Business Research*, 65(10), 1417–1424. <https://doi.org/10.1016/j.jbusres.2011.10.007>.

- Smith, A. (1776). *An inquiry into the nature and causes of the wealth of nations*. London: W. Strahan & T. Cadell.
- Sung, Y., Choi, S. M., Ahn, H., & Song, Y. A. (2015). Dimensions of luxury brand personality: Scale development and validation. *Psychology and Marketing*, 32(1), 121–132. <https://doi.org/10.1002/mar.20767>.
- Taylor, S. E. (2012). Tend and befriend theory. In P. van Lange, A. Kruglanski, & E. T. Higgins (Eds.), *Handbook of theories in social psychology* (pp. 32–49). Thousand Oaks: Sage Publications.
- Tian, K. T., Bearden, W. O., & Hunter, G. L. (2001). Consumers' need for uniqueness: Scale development and validation. *Journal of Consumer Research*, 28(1), 50–66. <https://doi.org/10.1086/321947>.
- Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. *Psychological Review*, 117(2), 440–463. <https://doi.org/10.1037/a0020319>.
- Trope, Y., & Liberman, N. (2012). Construal level theory. In P. Van Lange, A. W. Kruglanski, & E. T. Higgins (Eds.), *Handbook of theories of social psychology* (pp. 118–134). London: Sage.
- Tsai, S. P. (2005). Impact of personal orientation on luxury-brand purchase value. *International Journal of Market Research*, 47(4), 429–454. <https://doi.org/10.1016/j.jwb.2010.11.002>.
- Vallacher, R. R., & Wegner, D. M. (1987). What do people think they're doing? Action identification and human behavior. *Psychological Review*, 94(1), 3–15. <https://doi.org/10.1037//0033-295x.94.1.3>.
- Verdict. (2007). Global luxury retailing. Sector Report.
- Vickers, J. S., & Renand, F. (2003). The marketing of luxury goods: An exploratory study - three conceptual dimensions. *The Marketing Review*, 3(4), 459–478. <https://doi.org/10.1362/146934703771910071>.
- Vigneron, F., & Johnson, L. (1999). A review and a conceptual framework of prestige-seeking consumer behavior. *Academy of Marketing Science Review*, 99(1), 1–15.
- Vigneron, F., & Johnson, L. (2004). Measuring perceptions of brand luxury. *Journal of Brand Management*, 11(6), 484–506. <https://doi.org/10.1057/palgrave.bm.2540194>.
- Wan, E. W., Xu, J., & Ding, Y. (2014). To be or not to be unique? The effect of social exclusion on consumer choice. *Journal of Consumer Research*, 40(6), 1109–1122. <https://doi.org/10.1086/674197>.
- Wang, J., Zhu, R., & Shiv, B. (2012). The lonely consumer: Loner or conformer? *Journal of Consumer Research*, 38(6), 1116–1128. <https://doi.org/10.1086/661552>.
- Webster's Third New International Dictionary (2002). Merriam-Webster, New York.
- Wiedmann, K.-P., Hennigs, N., & Siebels, A. (2009). Value-based segmentation of luxury consumption behavior. *Psychology and Marketing*, 26(7), 625–651. <https://doi.org/10.1002/mar.20292>.
- Wilcox, K., Kim, H. M., & Sen, S. (2009). Why do consumers buy counterfeit luxury brands? *Journal of Marketing Research*, 46, 247–259. <https://doi.org/10.1509/jmkr.46.2.247>.
- Wong, N. Y., & Ahuvia, A. C. (1998). Personal taste and family face: Luxury consumption in confucian and western societies. *Psychology and Marketing*, 15, 423–441. [https://doi.org/10.1002/\(sici\)1520-6793\(199808\)15:5<423::aid-mar2>3.0.co;2-9](https://doi.org/10.1002/(sici)1520-6793(199808)15:5<423::aid-mar2>3.0.co;2-9).
- Yeoman, I. (2011). The changing behaviours of luxury consumption. *Journal of Revenue and Pricing Management*, 10, 47–50. <https://doi.org/10.1057/rpm.2010.43>.



Does Socioeconomic Status Matter? Materialism and Self-Esteem: Longitudinal Evidence from China

Rong Wang¹ · Hongyun Liu² · Jiang Jiang²

Published online: 14 March 2020

© Springer Science+Business Media, LLC, part of Springer Nature 2020

Abstract

While dialogue regarding the materialism–self-esteem relation continues, the longitudinal empirical evidence is limited. More importantly, the boundary conditions of this relation have received scant attention. Given individual differences in the landscape of resources, we tracked participants for 2 years to examine the effect of materialism on their self-esteem in the long run as well as the moderating role of socioeconomic status (SES) in the focal relation. A total of 430 Chinese undergraduates responded to questionnaires that assessed our core variables in three waves. Cross-lagged models were analyzed using structural equation modeling and model comparisons. The results revealed that materialism decreased self-esteem longitudinally, and this detrimental effect was contingent on the availability of personal resources. Specifically, materialism exerts little influence on self-esteem among people with high SES.

Keywords Materialism · Self-esteem · Socioeconomic status · Longitudinal study

Introduction

While post-materialism (i.e., values that develop among wealthy people and emphasize ideal interests such as protecting the environment) has attracted attention from both governments and researchers in developed countries (Mostafa 2013), materialism still occupies a dominant place in developing countries whose economy is growing quickly, such as China. Materialism has been broadly defined by psychologists, economists, and sociologists. Inglehart (1981) conceptualized materialism and post-materialism as a single continuum. Materialism represents an economic orientation of

giving precedence to order, stability, and economic and military strength over concern for post-materialistic goals such as freedom, ideas, equality and environmental protection. Belk (1985) viewed materialism as a human characteristic and as part of personality. Materialism originates from human traits such as envy, nongenerosity, possessiveness, and preservation (Belk 1985; Ger and Belk 1996). In recent decades, an increasing number of studies have considered materialism to be located in people's value and/or goal systems (e.g., Kasser and Ahuvia 2002). That is, materialism gives priority to extrinsic values and goals such as financial success and an appealing image. Since materialism is most commonly assessed by the Material Values Scale (MVS) (e.g., Brown et al. 2016), we follow Richins and Dawson (1992) and define materialism in the current study as “a set of centrally held beliefs about the importance of possessions” (p. 308).

Materialistic people believe that material possessions are likely to bring happiness and a good life; thus, the relation between materialism and well-being has emerged as a topic of great academic interest. However, in Dittmar et al.'s (2014) meta-analytical study, materialism was found to be negatively associated with well-being. Considerable evidence has also indicated that materialism negatively influences a diverse array of domains, including interpersonal relationships, consumer behaviors, and even self-concept (Jiang et al. 2016; Li et al. 2018).

Self-concept has long been a main stream of materialism research, and comprehensive self-concept-related theories

Rong Wang and Hongyun Liu contributed equally to this work.

✉ Jiang Jiang
jjiang@bnu.edu.cn

Rong Wang
wangrong815@szu.edu.cn

Hongyun Liu
hylu@bnu.edu.cn

¹ College of Management, Shenzhen University, Shenzhen, China

² Beijing Key Laboratory of Applied Experimental Psychology, National Demonstration Center for Experimental Psychology Education (Beijing Normal University), Faculty of Psychology, Beijing Normal University, Beijing, China

have recently emerged in this field (Donnelly et al. 2016; Shrum et al. 2013). For example, Donnelly et al. (2016) attempted to explain key patterns of materialistic people's behavior from the perspective of self-awareness by proposing escape theory. The researchers considered that materialism tends to be infused with self-blame and other negative self-views (e.g., feelings of inadequacy, self-doubt, and low self-esteem), which activate highly aversive self-awareness. Impulsive, shortsighted, and irrational behavior patterns are likely to be triggered to help individuals escape from dysphoric moods and cognitive deconstructions associated with aversive self-awareness. The identity motives theory has also grounded materialism-related research on the self (Rustagi and Shrum 2018; Shrum et al. 2013). This theory views materialism as “the extent to which people engage in identity maintenance and construction through symbolic consumption” (Shrum et al. 2013, p.1180). Relying on the symbolic value of acquisitions to validate one's identity undoubtedly leads to vulnerability and instability (Donnelly et al. 2016). In the current research, we aimed to expand the body of self-concept-related literature and theories by linking materialism to self-esteem, which refers to “the extent to which one prizes, values, approves, or likes oneself” (Blascovich and Tomaka 1991, p. 115).

Materialism and Self-Esteem

Some previous studies have examined the association between materialism and self-esteem, and they have generally delineated three pathways. First, the compensatory effect of materialism on low self-esteem has been hypothesized and examined in an attempt to explain why people turn to materialistic values (e.g., Chaplin and John 2007; Kim et al. 2017; Park et al. 2017; Ruvio et al. 2013). That is, materialism seems to be a strategy people use to cope with threatened self-esteem. People can regain a positive self-image via the signaling function of material possessions. Second, another line of research has regarded self-esteem (including low general self-esteem and high contingent self-esteem) as a potential consequence of materialism (e.g., Kasser et al. 2014; Reeves et al. 2012; Teng et al. 2016). Specifically, due to upward social comparison tendencies (Dittmar et al. 2014), high standards of material possession satisfaction (Donnelly et al. 2016), and reliance on the feedback of external factors (Teng et al. 2016), people with high materialism are likely to hold negative and fragile self-appraisals. Third, the above two types of studies also inspire researchers to uncover the bidirectional relations between materialism and self-esteem (Li et al. 2018).

Although dialogue regarding the materialism–self-esteem relation continues, there are still two important issues deserving further exploration. First, relatively scant attention has been paid to the boundary conditions of the materialism–

self-esteem link (Dittmar et al. 2014; Zhang and Hawk 2019). It is not clear whether the influences of materialism on self-esteem are stable or contingent on certain factors. For example, due to inconsistent research findings (e.g., Lekes et al. 2010; Martos and Kopp 2012), Dittmar et al. (2014) viewed self-esteem as one index of personal well-being and revealed that the strength of the detrimental effect on well-being depends on demographic factors (e.g., gender and age), value context (i.e., whether materialistic values and goals are endorsed by the environment), and economic indicators (e.g., economic growth and wealth differentials). By conducting a series of experiments, Zhang and Hawk (2019) found that self-esteem negatively predicted materialistic values only when participants held low levels of interdependent self-construal.

Second, in terms of methodology, there are two fundamental problems with experimental paradigms and cross-sectional data used in most previous studies (e.g., Jiang et al. 2015; Kim et al. 2017; Teng et al. 2016). On the one hand, correlations cannot establish causality, and inferences derived from cross-sectional data are often fallacious. It is difficult to determine whether self-esteem is an outcome or a cause of materialism (Baumeister et al. 2003; Cole and Maxwell 2003). As suggested by existing findings, when we assume that materialism impairs people's self-esteem, there is also a possibility that self-esteem deficits motivate people to pursue materialism. On the other hand, experimental designs uncover the materialism–self-esteem relation in a temporary context, so the long-term effect of materialism on self-esteem requires further exploration (Li et al. 2018). Longitudinal data have considerable analytical advantages over one-time surveys or experimental designs. For example, longitudinal data help identify causality to deepen the understanding of what causes certain changes to occur (Lynn 2009). The casual relation between variables may need time to unfold, and we do not expect that the magnitude of hypothesized causal effects remains constant over time (Selig and Preacher 2009). Longitudinal studies effectively avoid such pitfalls. Thus, due to sparse longitudinal evidence of materialism and its relation with self-esteem, improvements in study designs are warranted (Kasser 2016).

The Moderating Role of Socioeconomic Status

Worldwide, economies are growing with inequality in wealth. As an example, China's wealth inequality problem is highlighted, especially after 2002. The Gini coefficient of the distribution of wealth increased from .54 in 2002 to .74 in 2010 (Li and Wan 2015). To some extent, the landscape of resources already available in an individual's life (called “socioeconomic status”, SES) determines the perceived importance of material resources (Lee et al. 2018). SES is sometimes interchangeable with social class, referring to either

objective material resources (usually represented by income, educational level and occupation) or subjectively perceived social status vis-à-vis others in society (Kraus et al. 2012).

According to the social cognitive theory of social class (Kraus et al. 2012), social class leads to predictable social cognitive thought patterns. Specifically, individuals with high SES hold solipsistic social cognitive tendencies, making them focus on their internal states, goals and emotions. This internal cognitive orientation emphasizes self-expression and self-development (Kraus et al. 2012; Lee et al. 2018). Low-SES individuals, in contrast, tend to exhibit externally oriented cognitive patterns, which emphasize external, uncontrollable social forces and the individuals surrounding them. The different cognitive patterns imply different ways in which people define and maintain the “self”. High-SES people who perceive the social environment through the lens of solipsism tend to maintain their self-esteem through the attainment of internal goals such as personal success and validation of their abilities. However, low-SES people with contextualism thinking styles have a stronger tendency to rely on the attainment of external goals such as material possessions for self-esteem maintenance (Manstead 2018; Zhang and Hawk 2019). Thus, the detrimental effect of materialism on self-esteem is likely to be amplified among low-SES people.

Moreover, unrealistically high standards about material satisfaction are the root cause of why materialism leads to negative self-appraisal (Donnelly et al. 2016). From the goal-attainment perspective (Locke and Latham 1990), people of higher social classes own abundant resources. They should be in a better position to fulfill their material desires than lower-SES people living with fewer resources and more material-related concerns. There are reasons to believe that low-SES people have more chances to experience dissatisfaction from material possessions and are more likely to suffer deficits in self-esteem from high materialism orientations than their high-SES counterparts.

The Current Study

The current study aimed to explore the effect of materialism on self-esteem longitudinally by employing a cross-lagged design to complement the conclusions drawn from previous

cross-sectional and experimental studies. We included SES in the research model as a potential moderator to shed light on how the strength of the materialism-self-esteem relation relies on individuals’ resource availability. Specifically, a cross-lagged model (see Fig. 1) was built based on a three-wave longitudinal survey to explore the effect of materialism on self-esteem. The potential moderating role of SES in the focal relation was examined via model comparisons.

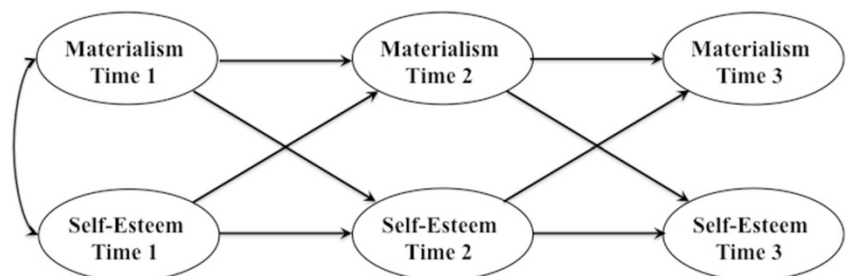
Method

Participants and Procedure

Participants were recruited among undergraduate students from a university in China. A three-wave longitudinal design was used. The sample size of each wave was as follows: 652 in Wave 1 (276 males and 376 females; $M_{age} = 19.09$ years, $SD_{age} = .93$ years), 538 in Wave 2 (212 males and 326 females; $M_{age} = 19.63$ years, $SD_{age} = .90$ years), and 560 in Wave 3 (213 males and 347 females; $M_{age} = 20.49$ years, $SD_{age} = .92$ years). In total, 430 students (148 males and 282 females) ranging in age from 17 to 24 years ($M = 20.48$ years, $SD = .93$ years) completed all three waves of the survey.

We approached the target participants, obtained their consent forms, and collected their demographic information during the first semester of year one. Participants reported their yearly family income in the initial survey. Then, in the second semester (i.e., approximately five months later), the first wave of surveys was distributed to the participants who agreed to participate in our research. The second and third waves of data were collected during the first semester of year two and year three, respectively. In each wave, participants completed the MVS and Rosenberg’s (1965) Self-Esteem Scale. Due to the short interval between our initial investigation and Wave 1, participants responded to demographic questions (including age, gender, etc.) only in Waves 2 and 3. A unique code was used to match each wave of data. To ensure that participation was completely voluntary, a stipend (approximately \$1) was given to those who finished each survey as a token of appreciation.

Fig. 1 The cross-lagged model hypothesized in the current study



Measures

Materialism We employed the MVS (Richins and Dawson 1992) to assess materialism. The MVS includes 18 items with three dimensions (success, centrality, and happiness). All items were rated based on a five-point scale from 1 “strongly disagree” to 5 “strongly agree.” An example item is “I admire people who own expensive homes, cars, and clothes”. Higher scores indicate higher levels of materialism. Cronbach’s α coefficients were .71, .75, and .76 for the three waves, respectively.

Self-Esteem Self-esteem was measured using Rosenberg’s (1965) Self-Esteem Scale, which is a 10-item, four-point scale with responses ranging from 1 (strongly disagree) to 4 (strongly agree). An example item is “I take a positive attitude toward myself.” A higher score indicates higher self-esteem. This scale showed high stability, and Cronbach’s α coefficient for all waves was .84.

SES Consistent with previous studies (e.g., Williams et al. 1997), we assessed objective SES by using yearly family income as a representative index. Participants reported their yearly family income based on one item with 9 levels from 1 = “less than 3000 RMB” to 9 = “more than 200,001 RMB” (7.0 RMB equals approximately 1 USD).

Results

Attrition Analysis

First, we compared the levels of materialism and self-esteem in Wave 1 between the participants who completed all three waves ($N = 430$) and those who missed at least one of the three waves ($N = 308$). There was no significant difference in materialism ($t = .94, p = .35$) and self-esteem ($t = -.08, p = .94$) between the two groups. The effect sizes in the above analyses were also very small (materialism: Cohen’s $d = .08$; self-esteem: Cohen’s $d = -.01$). Second, we found significant gender differences (Wave 1: $\chi^2 = 7.88, df = 1, p = .005$; Wave 2: $\chi^2 = 19.48, df = 1, p = .00$; Wave 3: $\chi^2 = 36.09, df = 1, p = .00$) but non-significant age differences (Wave 1: $t = .46, p = .65$; Wave 2: $t = .98, p = .32$; Wave 3: $t = -1.26, p = .21$) between participants who dropped out and participants who continued in the study. The above results indicated that data were not missing completely at random, and it is unlikely that the missing data greatly influenced the results. Therefore, we used the full information maximum likelihood (FIML) estimation approach to address the missing data (Little and Rubin 2002; Muthén et al. 1987). FIML computes a case-wise likelihood function by only using the variables observed for a certain case. Specifically, missing data is replaced with probable values according to the linear relationship between the variable with missing data and other variables.

Descriptive Analysis

The means, standard deviations and inter-correlations of the studied variables in each wave are presented in Table 1. In line with the hypothesis, the concurrent correlation between materialism and self-esteem was significant at each wave (Wave 1: $r = -.17, p < .001$; Wave 2: $r = -.20, p < .001$; Wave 3: $r = -.15, p < .01$).

Hypotheses Testing

A series of structural equation modeling (SEM) analyses were conducted after we controlled for age and gender. Specifically, we first tested the longitudinal invariance of materialism and self-esteem. Then, we examined the structural relationships between materialism and self-esteem and the model stability across the three waves. Finally, we used multiple-group analyses to investigate whether the link between materialism and self-esteem varied across the different levels of SES.

Analyses of Invariance

To test the longitudinal invariance of materialism and self-esteem, we built two sets of models for each variable (i.e., Models –a and Models –b, see Table 2). In Models –a, the construct structure was the same in three waves (i.e., equal form); in Models –b, we further constrained the factor loadings to be equal across three waves (i.e., equal factor loadings). Models –a and Models –b were compared according to the results of chi-square tests. The statistically non-significant results were obtained for materialism and self-esteem (materialism: $\Delta\chi^2 = 28.67, \Delta df = 36, p = .80$; self-esteem: $\Delta\chi^2 = 30.43, \Delta df = 20, p = .06$), indicating the longitudinal invariance of the measured variables.

Analyses Examining the Cross-Lagged Paths between Materialism and Self-Esteem

In this section, we compared 6 different models (see Table 3). Following Cole and Maxwell (2003), we first defined the cross-lagged structural model as shown in Fig. 1 (i.e., Model 1). Then, Models 2 and 3 were further built based on Model 1: in Model 2, the cross-lagged paths from self-esteem to materialism were deleted; and in Model 3, we dropped the cross-lagged paths from materialism to self-esteem. Model comparison results revealed a non-significant difference between Model 1 and Model 2 ($\Delta\chi^2 = 2.64, \Delta df = 2, p = .27$; accepted Model 2). However, dropping the cross-lagged paths from materialism to self-esteem resulted in substantially worse fit ($\Delta\chi^2 = 12.57, \Delta df = 2, p = .00$; rejected Model 3). The above findings provide initial evidence for the predictive effect of materialism on self-esteem.

Table 1 Descriptive Statistics and Variable Inter-correlations

Variable	1	2	3	4	5	6	7
1 T1 Materialism							
2 T1 Self-esteem	-.17***						
3 T2 Materialism	.66***	-.11*					
4 T2 Self-esteem	-.13**	.55***	-.20***				
5 T3 Materialism	.50***	-.07	.65***	-.10*			
6 T3 Self-esteem	-.20***	.49***	-.24***	.61***	-.15**		
7 SES	.09*	.14**	.09	.15***	.05	.10*	
<i>M</i>	2.80	3.11	2.86	3.11	2.89	3.08	3.67
<i>SD</i>	.38	.38	.40	.36	.41	.37	.98

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

T1 = Time 1; T2 = Time 2; T3 = Time 3

SES = Socioeconomic Status

In Models 4–6, we tested the model stability across the three waves by adding constraints. Specifically, in Model 4, we constrained the auto-regression paths of materialism (e.g., Materialism 1 to Materialism 2) to be equal based on Model 2. In model 5, the auto-regression paths of self-esteem (e.g., Self-esteem 1 to Self-esteem 2) were constrained to be equal based on Model 2. The chi-square tests showed that the difference between Model 2 and Model 5 was non-significant ($\Delta\chi^2 = .13$, $\Delta df = 1$, $p = .72$; accepted Model 5), while the difference between Model 2 and Model 4 was significant ($\Delta\chi^2 = 7.03$, $\Delta df = 1$, $p = .008$; rejected Model 4). We observed that the path coefficient from Materialism 1 to Materialism 2 was slightly larger than that from Materialism 2 to Materialism 3. However, the auto-correlations were stable for self-esteem across time. Finally, based on Model 5 we built Model 6, in which the cross-lagged paths from materialism to self-esteem were constrained to be equal. The non-significant model comparison results suggested Model 6 to be our final structural model ($\Delta\chi^2 = 1.02$, $\Delta df = 1$, $p = .31$; accepted Model 6). As seen in Fig. 2, both the path from Materialism 1 to Self-esteem 2 ($\beta = -.08$, $SE = .03$, $p = .001$) and the path from Materialism 2 to Self-esteem 3 ($\beta = -.09$, $SE = .03$, $p = .001$) were significant.

Analyses Examining the Moderating Role of SES

We separated the whole sample into high- and low- SES groups according to the mean score (i.e., $M_{SES} = 2.80$). Then, the measurement and structure were compared between the two groups. In terms of measurement, the factor loadings in both groups were constrained to be equal (Model 6–1, see Table 4): $\chi^2 = 24.42$, $df = 28$, CFI = 1.00, TLI = 1.00, SRMR = .04. There was no significant difference between the constrained model and the non-constrained model: $\Delta\chi^2 = 12.31$, $\Delta df = 14$, $p = .58$, indicating that the measurement of materialism and self-esteem were the same for participants in the high- and low- SES groups. Based on Model 6–1, we further limited the cross-lagged paths from materialism to self-esteem to be invariable in the two groups (Model 6–2, see Table 4): $\chi^2 = 28.32$, $df = 29$, CFI = 1.00, TLI = 1.00, SRMR = .04. A chi-square difference test revealed a significant result: $\Delta\chi^2 = 3.90$, $\Delta df = 1$, $p = .048$. Therefore, the significant group difference in structure suggested that the negative relation between materialism and self-esteem was different in the high- and low- SES groups (Cheung and Rensvold 2002). Specifically, the path from Materialism 1 to Self-esteem 2 (low SES: $\beta = -.16$, $SE = .04$, $p = .00$; high SES: $\beta = -.07$, $SE = .04$, $p = .04$) and the path from Materialism 2 to Self-esteem 3 (low SES: $\beta = -.15$, $SE = .04$, $p = .00$; high

Table 2 Results for Analyses of Invariance

Variable	Factor and model	χ^2	<i>df</i>	$\Delta\chi^2$	Δdf	RMSEA	CFI	TLI	SRMR
Materialism	Model 1a: Equal form	355.43	153			.05	.92	.90	.04
	Model 1b: Equal factor loading	384.10	189	28.67	36	.05	.92	.91	.05
Self-esteem	Model 1a: Equal form	379.35	96			.07	.95	.93	.05
	Model 1b: Equal factor loading	409.78	116	30.43	20	.07	.95	.94	.06

Note. RMSEA = Root-Mean-Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; SRMR = Standardized Root-Mean-Square Residual

Table 3 Analyses Examining the Influence of Materialism on Self-esteem

	χ^2	df	RMSEA	CFI	TLI	SRMR
Model 1	8.22	10	.00	1.00	1.00	.01
Model 2	10.86	12	.00	1.00	1.00	.02
Model 3	20.79	12	.04	.99	.98	.04
Model 4	17.89	13	.03	.99	.99	.05
Model 5	10.99	13	.00	1.00	1.00	.02
Model 6	12.01	14	.00	1.00	1.00	.02

Note. RMSEA = Root-Mean-Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; SRMR = Standardized Root-Mean-Square Residual

SES: $\beta = -.08$, $SE = .04$, $p = .04$) were stronger in the low-SES group than in the high-SES group. The above findings indicated that compared to their low-SES counterparts, the high-SES participants were less susceptible to the negative effect of materialism on self-esteem.

Supplementary Analyses

Two additional analyses were performed. First, to exclude the possibility that the vulnerability of self-esteem among low-SES participants was caused by their innate materialism orientation, we further compared the materialism levels between the low- and high-SES groups in the three waves. The results showed that the differences in materialism between the two groups were not significant across the three waves (Wave 1: $t = 1.57$, $p = .12$, Cohen’s $d = -.13$; Wave 2: $t = 1.75$, $p = .08$, Cohen’s $d = -.17$; Wave 3: $t = .90$, $p = .37$, Cohen’s $d = -.08$).

Second, the cross-lagged paths from self-esteem to materialism were deleted in our final structural model. However, considering that previous research has suggested the compensatory effect of materialism on low self-esteem, additional analyses were conducted to test the path coefficients from self-esteem to materialism. We found that the cross-lagged paths from self-esteem to materialism were non-significant in the high- and low-SES groups: the path from Self-esteem 1 to Materialism 2 (low SES: $\beta = .007$, $SE = .03$, $p = .807$; high SES: $\beta = .006$, $SE = .026$, $p = .807$) and the path from

Table 4 Results of Multiple Group Analyses

Moderator	Model	χ^2	df	RMSEA	CFI	TLI	SRMR
SES	Model 6–1	24.42	28	.00	1.00	1.01	.04
	Model 6–2	28.32	29	.00	1.00	1.00	.04

Note. RMSEA = Root-Mean-Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; SRMR = Standardized Root-Mean-Square Residual

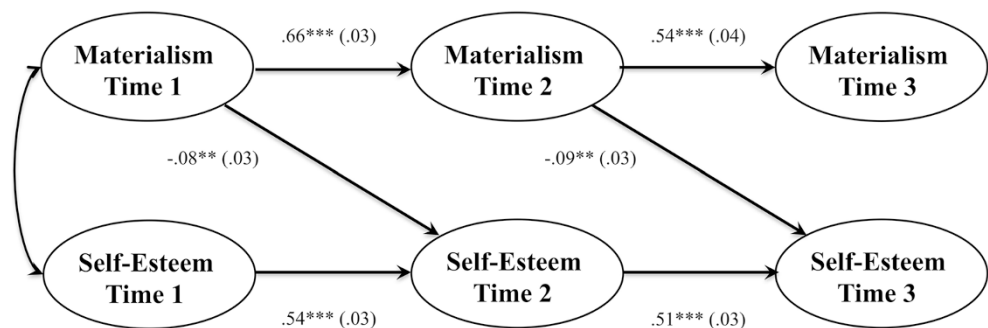
Self-esteem 2 to Materialism 3 (low SES: $\beta = .006$, $SE = .03$, $p = .807$; high SES: $\beta = .006$, $SE = .025$, $p = .807$).

Discussion

Extant research has taken steps to examine the relation between materialism and self-esteem (Jiang et al. 2015; Kasser et al. 2014; Lee et al. 2018). Considering the limited longitudinal evidence as well as the unexplored boundary conditions of this relation, we conducted a three-wave longitudinal survey to explore the link between materialism and self-esteem and the influence of social class on the strength of this relation. The findings show that materialism decreases self-esteem in the long term. More importantly, when individuals belong to the high-SES group, abundant resources are helpful in reducing the harm of materialism to self-esteem.

People always wish to maintain a view of themselves as good, capable and adequate. Nevertheless, empirical evidence has revealed that materialism decreases self-esteem. Some research includes self-esteem in the well-being system (Kasser et al. 2014), which allows an examination of explanatory mechanisms under the framework of social determination theory (SDT) (Deci and Ryan 2000). Specifically, it is likely that when people attach great importance to extrinsic goals, their basic psychological needs (i.e., autonomy, relatedness, and competence) are impaired and they are susceptible to the risk of negative self-appraisal (Dittmar et al. 2014). In addition to SDT, the aforementioned escape theory of materialism suggests that people with high materialism are prone to aversive self-awareness from which they seek to escape (Donnelly et al. 2016). The current study provides additional evidence

Fig. 2 The final structural model. ** $p < .01$; *** $p < .001$



of the negative effect of materialism on self-esteem, especially from a longitudinal perspective. Admittedly, Kasser et al. (2014) also explored how materialism influences self-esteem by using a longitudinal design (see Study 4). However, focusing on adolescent samples with ages ranging from 10 to 17, they used intervention programs to manipulate materialism and did not explore the boundary conditions of the materialism-self-esteem relation. We attempted to make further contributions in the present research, based on the work of Kasser et al. (2014).

Different from those correlational and experimental studies (Nagpaul and Pang 2017; Park and John 2011), we found that the long-term influence of self-esteem on materialism was non-significant. A cross-sectional survey raises questions about the direction of causality, while an experimental design leads to low ecological validity and explores only the temporary compensation effect of materialism on self-esteem. We responded to the requirement of longitudinal evidence mentioned by previous research (e.g., Jiang et al. 2015; Park et al. 2017). Our findings reveal that an excessive pursuit of material wealth is chronically harmful to self-esteem. More importantly, as mentioned, we found that deleting the cross-lagged paths from self-esteem to materialism simplified the model without significant changes to model fitness. Moreover, while testing the cross-lagged paths from self-esteem to materialism in both low- and high-SES groups, non-significant path coefficients were observed. The above evidence indicates that the promoting effect of self-esteem deficits on materialism may be short term.

Our findings also suggest that materialism is less likely to impair self-esteem for people with higher SES. We assessed participants' SES based on their objective experience (i.e., family income), which reflected their social status and amount of available resources. Objective resources not only distinguish social hierarchy but also shape cognitions and behaviors that signal social class (Kraus et al. 2011). According to the identity motives theory (Shrum et al. 2013), materialistic people tend to identify themselves through symbolic consumption, leading to vulnerability and instability of their self-concept. Nevertheless, Piff (2014) suggested that a higher social class is associated with greater entitlement and narcissism. Entitled and narcissistic individuals value increased control over their lives, independence and self-focus, which help reduce their exposure to external influences and eliminate negative influences of materialism on their self-concept. That is, adequate resources make material objects less likely to function as symbols of identity and self-expression among higher-SES people. Even when they hold high levels of materialism, materialistic values will do little harm to their self-esteem. It has also been suggested that social comparison between one's own wealth and the wealth of others is salient among individuals who prioritize materialistic goals, making a materialistic orientation problematic for their well-being, including their self-esteem (Dittmar et al. 2014). When greater resources

enjoyed by higher-SES people result in a stronger focus on the self and less concern for others (Manstead 2018), there are reduced opportunities for materialism to harm self-esteem.

Dittmar et al.'s (2014) meta-analytical study found that personal income and household income were not significant moderators determining the size of the link between materialism and well-being. In their study, subjective well-being, positive/negative self-appraisals, and poor mental health were included as three different categories of well-being. However, personal well-being is a broader concept than self-esteem, which is just one representative index of positive self-appraisal. Dittmar et al. (2014) provide supportive evidence for the SDT view emphasizing importance of basic psychological needs for human well-being, regardless of whether individuals are wealthy or poor. By focusing on self-esteem and its link with materialism, this study specifies and deepens the findings of Dittmar et al. (2014), especially with regard to the moderating effect of personal economic status.

Previous studies consider SES as one of the motivators of materialism (e.g., Li et al. 2018; Roberts et al. 2003). We acknowledge the potential predictive effect of SES on materialism. Nevertheless, SES was found to exert no influence on materialism in our research, which may be due to the following possible reasons. First, it has been suggested that youths tend to be materialistic when they grow up in economically deprived environments (e.g., Goldberg et al. 2003). However, inconsistent findings exist. In Li et al.'s (2018) study, social class was negatively related to trait materialism, but the coefficient was non-significant ($r = -.16, ns.$). Some studies have indicated no correlation between materialism and participants' SES (e.g., Christopher et al. 2004; Roberts et al. 2003). Karabati and Cemalcilar (2010) even suggested that students in the higher-SES group were significantly higher in overall materialism. Second, the non-significant relation between SES and materialism in the present research was caused by methodological reasons to some extent. Unlike previous research that manipulated social class and simultaneously or immediately thereafter assessed state materialism (e.g., Li et al. 2018), a longitudinal design was employed in our research. Specifically, after reporting levels of family yearly income (i.e., the indicator of SES), participants did not finish the first wave survey until five months later. It is believed that a time interval can greatly reduce the covariation between variables (Podsakoff et al. 2003). Third, Ahuvia and Wong (2002) distinguished personal values materialism from personality materialism. Personal values materialism, the focus of our research, stresses the importance of owning material possessions (Richins and Dawson 1992). Personality materialism defines materialism as a personality trait (Belk 1985). Generally, the influence of resource deprivation on materialism should be stronger for personality materialism than for personal values materialism (Ahuvia and Wong 2002). Fourth, it is possible that the variations in participants'

materialism are explained by other important factors, such as culture. For example, Jiang et al. (2016) showed that a disciplinary culture endorsing materialistic values accelerated the development of materialism.

Given economic development and generational intergenerational population replacement, it has been suggested that the gradual shift from materialistic values (e.g., the desire for economic and physical security) to post-materialistic values (e.g., the desire for freedom and self-expression) is a global phenomenon (Abramson and Inglehart 2009). The present study focused on materialism and examined the hypotheses in the Chinese context. We believe our research findings have cultural universality. First, most people are neither outright materialists nor outright post-materialists. Bean and Papadakis (1994) argued that materialism and post-materialism should be flexible alternatives rather than polarized priorities. While promoting economic conditions is one of the focuses for most countries, especially developing countries such as China, India, and Mexico, materialistic values play important roles in people's lives all over the world. For example, Twenge and Kasser (2013) tracked the trends in the desire for expensive material items among American youths between 1976 and 2007 and found that youth materialism increased over the generations. Second, participants in the current research were undergraduates. Though there are potential age-group differences in values due to the aforementioned intergenerational population replacement issue, all citizens share a common culture to some extent (Abramson and Inglehart 1987). However, the present study corroborated that self-esteem is an avenue to self-concept. Admittedly, Chinese people have a tendency to rely on others to validate their identity, creating vulnerability and instability (Oyserman et al. 2002). Moreover, it is believed that the meaning of social class varies across cultures and political systems (Kraus et al. 2012). Thus, we still recommend cross-national studies in the future to integrate concerns about cultural differences.

Limitations and Future Directions

The current study has some limitations. First, we measured participants' general self-esteem in three waves to explore how materialism influenced their self-concept in the long run. It has been found that contingent self-esteem, especially extrinsically orientated contingent self-esteem, is closely related to materialism (Nagpaul and Pang 2017). Thus, from the self-concept perspective of materialism, future research can take other self-concept-related variables (e.g., contingent self-esteem, self-concept clarity and self-discrepancy) into account and enrich the research model (Mittal 2015; Noguti and Bokeyar 2014). Second, a longitudinal survey design was employed in the current study; however, in terms of methodology, we have two recommendations for future researchers. On

the one hand, following previous practice in the area of materialism (Jiang et al. 2015), experiments can be used to replicate our findings. For example, in addition to using objective indexes such as educational levels, family income and occupations to assess SES, participants' subjectively perceived SES can be directly manipulated (Kraus et al. 2010). On the other hand, we assessed materialism by using Richins and Dawson's (1992) MVS, which has been widely used in previous research. There are different ways to define and measure materialism in the academic area. Kasser and Ryan's (1993, 1996) Aspiration Index (AI) measures a broad set of material goals, including image, fame and financial success. AI yields two different types of materialism assessments: absolute measures, reflecting participants' ratings of the importance of materialistic goals, and relative measures, assessing how important materialistic goals are compared with other goals (Dittmar et al. 2014). While AI and MVS emphasize the cognitive values associated with materialism, Ger and Belk's (1996) measure of materialism, a trait-like measure of materialistic attitudes and beliefs, captures people's materialistic emotional reactions. We encourage further comparison of results between studies with different definitions and measurements.

Acknowledgements This work was supported by the National Natural Science Foundation of China (No. 71702108, No. 31571152); and the National Social Science Foundation of China (No. 13BSH055).

Compliance with Ethical Standards

Conflict of Interest The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Ethics Statement All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Prior to the research, ethical approval was obtained from the Academic Ethics Committee of the University. All individual participants were required to read and sign the informed consent before participating in this research.

References

- Abramson, P. R., & Inglehart, R. (1987). Generational replacement and the future of post-materialist values. *The Journal of Politics*, 49(1), 231–241.
- Abramson, P. R., & Inglehart, R. F. (2009). *Value change in global perspective*. Ann Arbor: University of Michigan Press.
- Ahuvia, A. C., & Wong, N. Y. (2002). Personality and values based materialism: Their relationship and origins. *Journal of Consumer Psychology*, 12(4), 389–402.
- Baumeister, R. F., Campbell, J. D., Krueger, J. I., & Vohs, K. D. (2003). Does high self-esteem cause better performance, interpersonal success, happiness, or healthier lifestyles? *Psychological Science in the Public Interest*, 4(1), 1–44.

- Bean, C., & Papadakis, E. (1994). Polarized priorities or flexible alternatives? Dimensionality in Inglehart's materialism—Postmaterialism scale. *International Journal of Public Opinion Research*, 6(3), 264–288.
- Belk, R. W. (1985). Materialism: Trait aspects of living in the material world. *Journal of Consumer Research*, 12(3), 265–280.
- Blascovich, J., & Tomaka, J. (1991). Measures of self-esteem. In J. P. Robinson, P. R. Shaver, & L. S. Wrightsman (Eds.), *Measures of personality and social psychological attitudes* (pp. 115–160). New York: Academic.
- Brown, K. W., Kasser, T., Ryan, R. M., & Konow, J. (2016). Materialism, spending, and affect: An event-sampling study of marketplace behavior and its affective costs. *Journal of Happiness Studies*, 17(6), 2277–2292.
- Chaplin, L. N., & John, D. R. (2007). Growing up in a material world: Age differences in materialism in children and adolescents. *Journal of Consumer Research*, 34(4), 480–493.
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9(2), 233–255.
- Christopher, A. N., Marek, P., & Carroll, S. M. (2004). Materialism and attitudes toward money: An exploratory investigation. *Individual Differences Research*, 2(2), 109–117.
- Cole, D. A., & Maxwell, S. E. (2003). Testing mediational models with longitudinal data: Questions and tips in the use of structural equation modeling. *Journal of Abnormal Psychology*, 112(4), 558–577.
- Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227–268.
- Dittmar, H., Bond, R., Hurst, M., & Kasser, T. (2014). The relationship between materialism and personal well-being: A meta-analysis. *Journal of Personality and Social Psychology*, 107(5), 879–924.
- Donnelly, G. E., Ksendzova, M., Howell, R. T., Vohs, K. D., & Baumeister, R. F. (2016). Buying to blunt negative feelings: Materialistic escape from the self. *Review of General Psychology*, 20(3), 272–316.
- Ger, G., & Belk, R. W. (1996). Cross-cultural differences in materialism. *Journal of Economic Psychology*, 17(1), 55–77.
- Goldberg, M. E., Gorn, G. J., Peracchio, L. A., & Bamossy, G. (2003). Understanding materialism among youth. *Journal of Consumer Psychology*, 13(3), 278–288.
- Inglehart, R. (1981). Post-materialism in an environment of insecurity. *American Political Science Review*, 75(4), 880–900.
- Jiang, J., Zhang, Y., Ke, Y., Hawk, S. T., & Qiu, H. (2015). Can't buy me friendship? Peer rejection and adolescent materialism: Implicit self-esteem as a mediator. *Journal of Experimental Social Psychology*, 58, 48–55.
- Jiang, J., Song, Y., Ke, Y., Wang, R., & Liu, H. (2016). Is disciplinary culture a moderator between materialism and subjective well-being? A three-wave longitudinal study. *Journal of Happiness Studies*, 17(4), 1391–1408.
- Karabati, S., & Cemalcilar, Z. (2010). Values, materialism, and well-being: A study with Turkish university students. *Journal of Economic Psychology*, 31(4), 624–633.
- Kasser, T. (2016). Materialistic values and goals. *Annual Review of Psychology*, 67, 489–514.
- Kasser, T., & Ahuvia, A. (2002). Materialistic values and well-being in business students. *European Journal of Social Psychology*, 32(1), 137–146.
- Kasser, T., & Ryan, R. M. (1993). A dark side of the American dream: Correlates of financial success as a central life aspiration. *Journal of Personality and Social Psychology*, 65(2), 410–422.
- Kasser, T., & Ryan, R. M. (1996). Further examining the American dream: Differential correlates of intrinsic and extrinsic goals. *Personality and Social Psychology Bulletin*, 22(3), 280–287.
- Kasser, T., Rosenblum, K. L., Sameroff, A. J., Deci, E. L., Niemiec, C. P., Ryan, R. M., et al. (2014). Changes in materialism, changes in psychological well-being: Evidence from three longitudinal studies and an intervention experiment. *Motivation and Emotion*, 38(1), 1–22.
- Kim, H., Callan, M. J., Gheorghiu, A. I., & Matthews, W. J. (2017). Social comparison, personal relative deprivation, and materialism. *British Journal of Social Psychology*, 56(2), 373–392.
- Kraus, M. W., Côté, S., & Keltner, D. (2010). Social class, contextualism, and empathic accuracy. *Psychological Science*, 21(11), 1716–1723.
- Kraus, M. W., Piff, P. K., & Keltner, D. (2011). Social class as culture. *Current Directions in Psychological Science*, 20(4), 246–250.
- Kraus, M. W., Piff, P. K., Mendoza-Denton, R., Rheinschmidt, M. L., & Keltner, D. (2012). Social class, solipsism, and contextualism: How the rich are different from the poor. *Psychological Review*, 119(3), 546–572.
- Lee, J. C., Hall, D. L., & Wood, W. (2018). Experiential or material purchases? Social class determines purchase happiness. *Psychological Science*, 29(7), 1031–1039.
- Lekes, N., Gingras, I., Philippe, F. L., Koestner, R., & Fang, J. (2010). Parental autonomy-support, intrinsic life goals, and well-being among adolescents in China and North America. *Journal of Youth and Adolescence*, 39(8), 858–869.
- Li, S., & Wan, H. (2015). Evolution of wealth inequality in China. *China Economic Journal*, 8(3), 264–287.
- Li, J., Lu, M., Xia, T., & Guo, Y. (2018). Materialism as compensation for self-esteem among lower-class students. *Personality and Individual Differences*, 131, 191–196.
- Little, R. J., & Rubin, D. B. (2002). *Statistical analysis with missing data*. Hoboken, NJ: J Wiley & Sons.
- Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting and task performance*. Englewood Cliffs, NJ: Prentice Hall.
- Lynn, P. (2009). *Methods for longitudinal surveys* (pp. 1–19). Chichester: Wiley.
- Manstead, A. S. (2018). The psychology of social class: How socioeconomic status impacts thought, feelings, and behaviour. *British Journal of Social Psychology*, 57(2), 267–291.
- Martos, T., & Kopp, M. S. (2012). Life goals and well-being: Does financial status matter? Evidence from a representative Hungarian sample. *Social Indicators Research*, 105(3), 561–568.
- Mittal, B. (2015). Self-concept clarity: Exploring its role in consumer behavior. *Journal of Economic Psychology*, 46, 98–110.
- Mostafa, M. M. (2013). Wealth, post-materialism and consumers' pro-environmental intentions: A multilevel analysis across 25 nations. *Sustainable Development*, 21(6), 385–399.
- Muthén, B., Kaplan, D., & Hollis, M. (1987). On structural equation modeling with data that are not missing completely at random. *Psychometrika*, 52(3), 431–462.
- Nagpaul, T., & Pang, J. S. (2017). Extrinsic and intrinsic contingent self-esteem and materialism: A correlational and experimental investigation. *Psychology & Marketing*, 34(6), 610–622.
- Noguti, V., & Bokeyar, A. L. (2014). Who am I? The relationship between self-concept uncertainty and materialism. *International Journal of Psychology*, 49(5), 323–333.
- Oyserman, D., Coon, H. M., & Kemmelmeier, M. (2002). Rethinking individualism and collectivism: Evaluation of theoretical assumptions and meta-analyses. *Psychological Bulletin*, 128(1), 3–72.
- Park, J. K., & John, D. R. (2011). More than meets the eye: The influence of implicit and explicit self-esteem on materialism. *Journal of Consumer Psychology*, 21(1), 73–87.
- Park, L. E., Ward, D. E., & Naragon-Gainey, K. (2017). It's all about the money (for some): Consequences of financially contingent self-worth. *Personality and Social Psychology Bulletin*, 43(5), 601–622.
- Piff, P. K. (2014). Wealth and the inflated self. *Personality and Social Psychology Bulletin*, 40(1), 34–43.

- Reeves, R. A., Baker, G. A., & Truluck, C. S. (2012). Celebrity worship, materialism, compulsive buying, and the empty self. *Psychology & Marketing, 29*(9), 674–679.
- Richins, M. L., & Dawson, S. (1992). A consumer values orientation for materialism and its measurement: Scale development and validation. *Journal of Consumer Research, 19*(3), 303–316.
- Roberts, J. A., Manolis, C., & Tanner Jr, J. F. (2003). Family structure, materialism, and compulsive buying: A reinquiry and extension. *Journal of the Academy of Marketing Science, 31*(3), 300–311.
- Rosenberg, M. (1965). Measurement of self-esteem. In M. Rosenberg (Ed.), *Society and the adolescent self image*. New York, NY: Princeton University Press.
- Rustagi, N., & Shrum, L. J. (2018). Materialism: Conceptualizations, antecedents, and consequences. In M. R. Solomon, & T. M. Lowrey (Eds.), *The Routledge companion to consumer behavior* (pp. 21–37). New York: Routledge.
- Ruvio, A., Somer, E., & Rindfleisch, A. (2013). When bad gets worse: The amplifying effect of materialism on traumatic stress and maladaptive consumption. *Journal of the Academy of Marketing Science, 42*(1), 90–101.
- Selig, J. P., & Preacher, K. J. (2009). Mediation models for longitudinal data in developmental research. *Research in Human Development, 6*(2–3), 144–164.
- Shrum, L. J., Wong, N., Arif, F., Chugani, S. K., Gunz, A., Lowrey, T. M., et al. (2013). Reconceptualizing materialism as identity goal pursuits: Functions, processes, and consequences. *Journal of Business Research, 66*(8), 1179–1185.
- Teng, F., You, J., Poon, K.-T., Yang, Y., You, J., & Jiang, Y. (2016). Materialism predicts young Chinese women's self-objectification and body surveillance. *Sex Roles, 76*(7–8), 448–459.
- Twenge, J. M., & Kasser, T. (2013). Generational changes in materialism and work centrality, 1976-2007: Associations with temporal changes in societal insecurity and materialistic role modeling. *Personality and Social Psychology Bulletin, 39*(7), 883–897.
- Williams, D. R., Yu, Y., Jackson, J. S., & Anderson, N. B. (1997). Racial differences in physical and mental health: Socio-economic status, stress and discrimination. *Journal of Health Psychology, 2*(3), 335–351.
- Zhang, Y., & Hawk, S. T. (2019). Considering the self in the link between self-esteem and materialistic values: The moderating role of self-construal. *Frontiers in Psychology, 10*, 1375.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Specific Virtues as Predictors of Smartphone Addiction among Chinese Undergraduates

Ling Lian^{1,2} · Xuqun You^{1,2}

Published online: 15 May 2017
© Springer Science+Business Media New York 2017

Abstract Smartphones are important communication and technological tools that have become an indispensable part of university students' lives. Although empirical research has evaluated factors that influence Smartphone addiction, few studies have explored positive and potentially protective factors such as virtues that may increase the efficacy of future Smartphone addiction prevention programs. Thus, this study examined the relationship between three key virtues (i.e., relationship, vitality, and conscientiousness) and Smartphone addiction as well as evaluated the specific contributions of these virtues as applied to Smartphone use among Chinese university students. A total of 682 undergraduates (aged 18–24 years) from three universities completed the 96-item Chinese Virtues Questionnaire and Mobile Phone Addiction Index. Results showed that three virtues were significantly correlated with Smartphone addiction. Specifically, conscientiousness and relationship virtues negatively predicted Smartphone addiction and explained 82.61% of addiction-related variance. Vitality positively predicted Smartphone addiction and accounted for the remaining 17.39% variance. Thus, this study demonstrated that conscientiousness and relationship virtues were potential protective factors for Smartphone addiction, while vitality led to increased vulnerability. Gender-related differences were also discovered. Specifically, male students may be more sensitive to the conscientiousness virtue, while female students may show

increased sensitivity to the relationship virtue. Consequently, future efforts to prevent Smartphone addiction could focus on how to enhance conscientiousness and relationship virtues and how to reduce the vitality virtue.

Keywords Virtues · Smartphone addiction · CVQ-96 · MPAI · University students · Prevention

Introduction

Smartphone use has increased dramatically in recent years. According to the International Telecommunications Union, there were more than 7 billion mobile cellular subscriptions at the end of 2015. This data accounts for 97% of the world's population. In China, the total number of Smartphone users reached 1.306 billion in 2015. Although Smartphone use has been growing in the general population, university students are particularly affected and an increasing number feel reliant on and inseparable from their Smartphones (Lepp et al. 2015).

Over time, Smartphone use has resulted in changes to daily routines, habits, social behaviors, emancipative values, family relations, and social interactions (Alt 2016; Samaha and Hawi 2016). A growing number of studies report that uncontrolled Smartphone use is associated with sleep disturbances, work intrusion, depression, dangerous behaviors (e.g., phone use while driving), and pathological symptoms (Thomé et al. 2011; White et al. 2004). In this study, the term Smartphone addiction refers to an inability to control Smartphone use (Walsh et al. 2010). The symptoms of Smartphone addiction include an inability to control cravings, anxiety and feeling lost, withdrawal and escape, and productivity loss (Huang et al. 2014). Therefore, Smartphone addiction is sometimes called *nomophobia*, which is an abbreviation for “no mobile phone phobia.” In other words, it literally refers to

✉ Xuqun You
youxuqun@yeah.net

¹ School of Psychology, Shaanxi Normal University, 199 South Chang'an Road, Xi'an, Shaanxi Province 710062, China

² Shaanxi Provincial Key Laboratory of Behavior and Cognitive Neuroscience, 199 South Chang'an Road, Xi'an 710062, China

individuals' feelings of fear related to being unable to use their Smartphones (Emanuel et al. 2015).

In the past decade, the amount of research about Smartphone addiction has grown substantially. For example, the prevalence rate of university student Smartphone addiction is estimated to be between about 10% and 48% (Aljomaa et al. 2016; Billieux et al. 2015). Subsequently, this high proportion and trend toward rapid growth in addiction rates has created urgency for further exploration of the causes and psychological mechanisms underlying Smartphone addiction.

It should be noted that the extremely wide range in estimated Smartphone addiction rates is primarily due to a lack of an appropriate theoretical rationale underlying the majority of studies within the field (Billieux et al. 2015). That is, uncontrolled Smartphone use is too frequently conceptualized as a behavioral addiction. As a result, the screening tools that are developed have been adapted from literature pertaining to substance use and pathological gambling. However, this does not account for the specifics of Smartphone addiction. In other words, most existing studies have focused on descriptions of behaviors and consequences associated with uncontrolled Smartphone use (Yu et al. 2013). Thus far, only a few studies have focused on the causes of Smartphone addiction (Aljomaa et al. 2016; van Deursen et al. 2015). Furthermore, the majority of studies emphasize negative relationship and intrapersonal factors rather than initiating and conducting research from a positive or proactive perspective (Billieux et al. 2015).

Virtues

Virtues are a core concept in positive psychology and refer to “a property of the whole person and the life that person leads” (Peterson and Seligman 2004, p. 87). The virtues system was developed as a 2-tier model, with the first tier including 24 character strengths (e.g., kindness, gratitude, love, zest, and self-regulation) and the second including 6 universal virtues (i.e., knowledge/wisdom, courage, humanity, justice, temperance, and transcendence) (Dahlsgaard et al. 2005). Although abundant studies have consistently shown that these character strengths significantly enhance mental health and reduce unhealthy behaviors in different cultures (Gillham et al. 2011), relatively few have investigated first-tier character strengths as second-tier virtues (Linkins et al. 2015). Perhaps one reason is that this virtue structure does not account for cultural variability. Additionally, existing studies have reported that the virtue structure is uni- or multi-dimensional (i.e., three-, four-, five- and six-factor structures) (Toner et al. 2012).

To address this problem, Duan et al. (2012) applied a combined etic-emic approach to reduce culturally inappropriate items. For instance, when assessing “self-regulation”, “I have no trouble eating healthy foods” is invalid within Chinese culture. Additionally, the item “At least once a day, I stop

and count my blessings” was excluded as a measure of the “gratitude” as the result of its strong religious connotations. Subsequently, a 96-item Chinese Virtues Questionnaire (CVQ-96) was developed. The CVQ-96 items were selected from the Values in Action Inventory of Strengths (VIA-IS), which was originally developed to measure the 24 character strengths. Subsequently, Duan et al.'s (2013) study utilizing exploratory and confirmatory factor analyses suggested three well-established and culturally meaningful virtues: relationship, vitality, and conscientiousness. The relationship virtue reflects the positive cognitions, emotions, and behaviors associated with social interactions. The vitality virtue emphasizes positive qualities such as curiosity, creativity, and zest for a fulfilling life. Finally, the conscientiousness virtue is intrapersonal and involves exhibition of willpower and self-control.

Virtues and Smartphone Addiction

Some theorists assert that virtues are positive traits reflected in thoughts, emotions, and behaviors (Peterson and Seligman 2004). According to problem-behavior theory (Jessor 1987), the personality system is one of three psychosocial systems (i.e., personality, perceived environment, and behavior) that can be used to either explain problem behavior instigation or control against it. The variables in this system are personal beliefs, expectations, values, attitudes, and orientations toward the self and others. Consistently, virtues manifest positive personality traits in social interactions, positive personal qualities, and willpower. Thus, the levels of these traits can significantly affect an individual's degree of Smartphone dependence. Moreover, several past studies indicate that individuals with Smartphone addiction are more likely to report lower degrees of the relationship virtue (Chung 2011; Geser 2006) and a general lack of the conscientiousness virtue (Zhang et al. 2014).

However, there are currently no consistent conclusions about the effects of the vitality virtue on addictive behaviors. Akin (2012) reported that subjective vitality negatively predicted addictive behaviors in university students. Although Zhang et al. (2014) used a different measure of vitality, this study indicated that vitality was instead a positive predictor of addictive behaviors. This inconsistency implies variability in the role of vitality with respect to addictive behaviors, and highlights the inconclusively of previous results. Therefore, it is evident that further study is required to examine the relationship between virtues and addictive behaviors.

Previous studies linking Smartphone addiction to the three key virtues have investigated virtues separately and assessed them as outcome variables. For example, Chiu (2014) found that many students who frequently used Smartphones had poor relationships. However, the complex association

between the roles of the three virtues and Smartphone addiction means that simultaneous investigation may provide more clarity. Past studies also reported that gender influenced levels of certain character strengths, with females tending to score higher than males for specific strengths (e.g., kindness, love, gratitude) (Toner et al. 2012). Thus, the current study could add to existing literature by exploring this issue in more depth. This is not only consistent with past research utilizing different perspectives, but can also guide further research on these constructs.

Study Purpose

As noted, previous Smartphone addiction research has emphasized associated negative factors and outcomes. However, the present study aimed to expand on previous literature by examining virtues as protective factors. To do so, we first explored the association between three virtues (i.e., relationship, vitality, and conscientiousness) and Smartphone addiction. Subsequently, we used dominance analysis to assess the relative importance and specific contributions of these virtues. Finally, we assessed if there were gender differences with respect to levels of the different virtues.

Overall, the purpose of the current study was to clarify how the three key virtues contributed to Smartphone addiction. This exploration could facilitate a virtue-based approach to the issue as well as deepen the theoretical foundation underlying Smartphone addiction. Additionally, it has significant practical implications for the creation of the prevention and intervention programs that are required to address this ever-increasing problem. Therefore, the current study can not only provide insight into future study within this field, but also highlight practical and effective ways to prevent or reduce university students' Smartphone addiction.

Study Hypotheses

In the current study, we proposed the following hypotheses: (1) the conscientiousness virtue will negatively predict Smartphone addiction because addicted individuals are more likely to report decreased conscientiousness. (2) The vitality virtue will positively predict Smartphone addiction because high levels of the vitality are associated with increased addictive behaviors. (3) The relationship virtue will negatively predict Smartphone addiction because it emphasizes positive behaviors, while Smartphone addiction reflects negative behaviors. (4) Male students will score higher than female students on vitality and conscientiousness virtues. However, female students will score higher on relationship virtue than male students because gender influenced levels of certain virtues.

Method

Participants

A total of 682 participants were included (398 males and 284 females). Students were recruited through public notice channels (e.g., the university bulletin board) or via class announcements. All participants were enrolled at one of three universities in western China and were in their first to third year of study. Participants were eligible to participate if they owned a Smartphone for one year or longer. Participants' mean age was 19.34 years ($SD = 1.26$; age range = 18–24 years), and additional information about participant characteristics is provided in Table 1.

Measures

Virtues

Virtues were evaluated using the CVQ-96 (Duan et al. 2012). This questionnaire consists of 96 virtue-related items (32 for relationship, 40 for vitality, and 24 for conscientiousness, respectively). Examples of items are: "I always keep my promises" (relationship), "I have a lot of interests" (vitality), and "I exercise regularly" (conscientiousness). Participants responded on a 5-point Likert-type scale ranging from 1 (*very much unlike me*) to 5 (*very much like me*). The mean virtue scores were calculated, with higher scores reflecting a higher degree of each virtue. The CVQ-96 has been demonstrated to be a reliable and valid measurement for assessing virtues in Chinese populations (Duan et al. 2013). In the present study, the Cronbach's alpha coefficients for the internal consistency of the CVQ-96 were .91 for the overall questionnaire, and .87 for relationship, .89 for vitality, and .84 for conscientiousness subscales.

Table 1 Participant characteristics

	Male		Female	
	<i>n</i>	%	<i>n</i>	%
Average length of time of owning a Smartphone				
1 year	135	33.9	76	26.8
2 years	108	27.1	103	36.3
3 years	104	26.1	62	21.8
4 years or longer	51	12.9	43	15.1
Year in university				
1st year	151	37.9	88	31.0
2nd year	186	46.7	155	54.6
3rd year	61	15.3	41	14.4

Smartphone Addiction

Smartphone addiction was assessed using the Mobile Phone Addiction Index (MPAI) scale (Huang et al. 2014). This scale was developed based on Leung's (2008) Internet Addiction Scale. It assesses 4 factors related to Smartphone addiction including inability to control cravings (7 items), anxiety and feeling lost (4 items), withdrawal and escape (3 items), and productivity loss (3 items). Examples of items are: "You always feel that you do not have enough time to use your Smartphone" (inability to control cravings), "You think it's hard to shut down your Smartphone" (anxiety and feeling lost), "When you feel lonely, you have used your Smartphone to communicate with others" (withdrawal and escape), and "Sometimes you'd rather use a Smartphone than completing a more urgent task" (productivity loss). Participants responded on a 5-point Likert-type scale ranging from 1 (*never*) to 5 (*always*). A mean total score and scores for each dimension were obtained, with higher scores indicating higher addiction severity. The MPAI has been demonstrated to exhibit excellent psychometric properties in Chinese populations (Deng et al. 2015). In the present study, the Cronbach's alpha coefficients for the total index and the 4 dimensions were .89, .80, .82, .82, and .76, respectively.

Procedure

A number of methods were adopted to prevent common methodological biases. Three questionnaire packages (A, B, and C) were prepared for the three universities (i.e., one university received package A, one package B, and one package C). Each package included demographic questions, the CVQ-96, and the MPAI. All participants first completed the demographic questions, followed by the CVQ-96 and MPAI instruments. The ordering of the items in the instruments differed depending on the particular package. Following the provision of informed consent, participants completed the pencil-and-paper questionnaires, which were immediately returned and collected by psychological professionals to ensure appropriate protocol was followed. Students from approximately 8 classes at each university responded, and the questionnaire took approximately 15 min to complete.

Data Analysis

In the preliminary analysis, we calculated mean scores for the total scale and subscale values for virtues and Smartphone addiction. Additionally, we calculated descriptive statistics and performed Pearson correlation analyses. We also performed comparisons of virtues between genders and between High Smartphone Addiction (HA) and Low Smartphone Addiction (LA) groups using *t*-tests. Thereafter, we conducted

multivariate regression and dominance analyses. Data analyses were performed using SPSS version 20.0.

Results

Descriptive Statistics and Difference Analysis

After sorting by the overall mean Smartphone addiction scores, 211 students (those who scored in the highest 27%) were defined as the HA group, and 188 students (those who scored in the lowest 27%) were categorized as the LA group. The descriptive statistics for gender, university year, HA and LA addiction groups, and virtues are shown in Table 2. Results revealed that males scored significantly higher than females on vitality ($t(680) = 2.51, p = .012$) and conscientiousness ($t(680) = 4.17, p < .001$) virtues. However, males scored lower than females on the relationship virtue ($t(680) = -3.01, p = .002$). Additionally, the HA group scored significantly lower than the LA group on relationship ($t(397) = -2.74, p = .003$) and conscientiousness ($t(397) = -5.46, p < .001$) virtues. However, the HA group scored higher than the LA group on the vitality ($t(397) = 2.33, p = .002$) and Smartphone addiction ($t(397) = 48.95, p < .001$).

A one-way analysis of variance (ANOVA) showed significant differences for vitality ($F(2672) = 4.40, p = .013$) and conscientiousness ($F(2672) = 10.94, p < .001$) virtues as well as Smartphone addiction ($F(2672) = 5.44, p = .005$) by university year. Post-hoc tests indicated that first year students scored significantly lower than second ($p = .005$) and third ($p = .026$) year students on Smartphone addiction. However, differences in Smartphone addiction between second and third year students were non-significant ($p = .996$).

Bivariate Correlations and Regression Analyses

Table 3 shows the Pearson correlation coefficients for males and females. For males, relationship ($p = .002$) and conscientiousness ($p < .001$) virtues were negatively correlated with Smartphone addiction, while vitality ($p = .003$) was positively correlated with Smartphone addiction. For females, relationship ($p = .002$) and conscientiousness ($p = .001$) virtues were significantly and negatively correlated with Smartphone addiction.

To protect against multicollinearity, all variables were initially mean centralized. Results of regression analysis indicated that age and gender (step 1) were non-significant predictors of Smartphone addiction. In step 2, it was found that conscientiousness ($\beta = -.20, p < .001$) and relationship ($\beta = -.10, p = .028$) virtues negatively predicted Smartphone addiction, while vitality ($\beta = .11, p = .022$) positively predicted Smartphone addiction.

Table 2 Means and standard deviations for gender, university year, and Smartphone addiction groups *M(SD)*

	Gender		Year in university				Addiction	
	Male	Female	1st	2nd	3rd	High	Low	
Relationship virtue	3.72(.38)	3.80(.39)	3.80(.39)	3.87(.38)	3.82(.38)	3.71(.36)	3.83(.41)	
Vitality virtue	3.45(.41)	3.40(.37)	3.47(.40)	3.39(.34)	3.54(.41)	3.58(.37)	3.48(.43)	
Conscientiousness virtue	3.41(.40)	3.29(.37)	3.38(.39)	3.30(.37)	3.55(.38)	3.32(.41)	3.52(.42)	
Smartphone addiction	2.62(.69)	2.64(.63)	2.53(.61)	2.70(.66)	2.70(.64)	3.40(.34)	1.84(.27)	

Participants responded to scales ranging from 1 (lowest) to 5 (highest).

Dominance Analysis

Dominance analysis was conducted to assess the relative contribution of the three virtues to Smartphone addiction. Johnson (2000) suggested that traditional multiple regression analysis may overestimate or underestimate predictive power. This is consistent with Budesco (1993) proposal that dominance analysis be used to refine current approaches to data analysis.

Based on Johnson (2000) and Budesco (1993) research and similar to Zhang et al.’s (2014) recent study, in the current study, the three virtues were categorized into 7 combinations. Dominance analysis showed that the relative contribution (R^2) of the three virtues was divided by .045 when the relative importance of each predictor was assessed. In this study, the conscientiousness virtue contributed 71.74% of the predicted variance, followed by vitality (17.39%) and relationship virtues (10.87%) (Table 4). Thus, of all virtues, conscientiousness was the most strongly associated with Smartphone addiction.

Discussion

As hypothesized, relationship, vitality, and conscientiousness virtues significantly predicted Smartphone addiction among university students. These findings are consistent with studies that report stable and strong influences of character strengths

and other positive traits on Smartphone addiction as well as other psychological symptoms (Duan et al. 2015; Heaven et al. 2013; Hong et al. 2012). For example, a previous study demonstrated that these three virtues were important in pathological internet use (PIU) (Zhang et al. 2014). This finding may be partially accounted for by problem-behavior theory (Jessor 1987), which implies that different personality traits could be associated with the likelihood of Smartphone-related addictive behaviors. Therefore, virtues can reflect positive traits related to interactions with others, zest for life, and self-regulation, thereby accounting for the significant relationship between Smartphone addiction and virtues.

In this study, an important finding was that the conscientiousness virtue acted as a protective factor, as it contributed 71.74% of the predicted variance. Thus, consistent with previous findings (Zhang et al. 2014), individuals with high conscientiousness are more likely to easily control cravings and withdrawal symptoms associated with Smartphone addiction. Likewise, a recent study indicated that in the Big Five model of personality traits, conscientiousness was negatively associated with impulsivity (Roberts et al. 2015). This is pertinent because impulsivity has been reported to play a potential role in both substance addiction and negative health-related behaviors (Roberts and Pirog 2012). A possible explanation for this finding is that the conscientiousness virtue reflects the traditional Chinese

Table 3 Pearson correlation coefficient analysis of virtue factors and Smartphone addiction dimensions

	1	2	3	4	5	6	7	8
1.Relationship virtue	-	.60**	.59**	-.14**	-.17**	-.01	-.19**	-.17**
2.Vitality virtue	.47**	-	.73**	-.19**	-.05	-.10**	-.09	.15**
3.Conscientiousness virtue	.43**	.63**	-	-.20**	-.09	-.14**	-.20**	-.20**
4.Inability	-.06	-.11*	-.19**	-	.58**	.47**	.53**	-
5.Anxious	-.07	-.07	-.09	.43**	-	.52**	.46**	-
6.Escape	.06	-.08	-.18**	.41**	.53**	-	.49**	-
7.Productivity loss	-.07	-.01	-.12**	.57**	.44**	.34**	-	-
8.Smartphone addiction	-.12**	-.10	-.19**	-	-	-	-	-

Statistics for males are above the diagonal and statistics for females are below the diagonal.

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

Table 4 Dominance analysis of relationship, vitality, and conscientiousness virtues as predictors of Smartphone addiction

	R^2	ΔR^2		
		Relationship	Vitality	Conscientiousness
	-	.011	.017	.041
Relationship	.011	-	.008	.032
Vitality	.017	.002	-	.025
Conscientiousness	.041	.002	.001	-
Relationship and Vitality	.019	-	-	.026
Relationship and Conscientiousness	.043	-	.002	-
Vitality and Conscientiousness	.042	.003	-	-
Relationship, Vitality, and Conscientiousness	.045	-	-	-
Decomposition of R^2		.005	.008	.033
% of the predicted variance		10.87%	17.391%	71.739%

cultural concept of “shendu” (慎獨) (Zhang et al. 2014), which is the idea that a person can control his or her own behavior regardless of the situation. Similarly, Baumeister (2002) indicates that key characteristics of conscientiousness are self-control and self-regulation. Furthermore, a central tenant of social cognitive theory is that self-regulation forms the foundation of personal agency (Bandura 1991). In regard to Smartphone use, it appears that failure to self-regulate can lead to uncontrolled use, resulting in a higher risk of addiction (van Deursen et al. 2015). Thus, students high in conscientiousness show strict self-control and seem to be predisposed toward reasonable Smartphone use. In contrast, students who are low in conscientiousness and have difficulty focusing on a given task are more vulnerable to Smartphone overuse.

Additionally, this study found that high vitality could increase the risk of Smartphone addiction. This is consistent with a recent study reporting that a high degree of vitality was a positive predictor of PIU (Zhang et al. 2014). However, past studies have shown that vitality produces the opposite effect, acting instead as a protective factor against Smartphone addiction or other problematic behaviors. For example, Akin. (2012) defined vitality as the subjective experience of being full of energy and life, and demonstrated that subjective vitality negatively predicted PIU. That said, the current study defined vitality differently. Specifically, the vitality virtue was used to denote a cluster of positive traits or psychological resources (Duan et al. 2015), including elements such as curiosity, bravery, and creativity (Duan et al. 2012). Based on this definition, students with high vitality will likely demonstrate a strong desire to explore Smartphones’ new and complex functions and spend the majority of their time using them to attain pleasurable or new experiences. As a result, they are more likely to have strong attachments to their Smartphones. Thus, it is not surprising that students who depend on Smartphones to satisfy curiosity could be prone to an increased risk of addiction.

The current study also offered preliminary results in regard to the relationship virtue by demonstrating that it could negatively predict Smartphone addiction severity, which is consistent with a recent study reporting that this virtue was negatively associated with PIU (Zhang et al. 2014). Here, the psychological mechanism appears to be that individuals higher in the relationship virtue are less likely to overuse Smartphones. Conversely, individuals extremely low in the relationship virtue have difficulty establishing meaningful social connections, resulting in feelings of unhappiness. Therefore, these individuals might have increased vulnerability to Smartphone overuse as they use them to decrease negative emotions and/or as a way to escape from daily life, and/or increase feelings of belonging (van Deursen et al. 2015). Moreover, the basic functions of Smartphones are to facilitate communication between individuals in different locations, compensate for real life helplessness or loneliness, and eliminate anxiety caused by negative emotions (Jin and Park 2010; Lim and Shim 2016). Consequently, individuals low in the relationship virtue may more frequently overuse Smartphones to alleviate many types of negative emotional experiences.

Consistent with some empirical research, the finding that there were gender differences in degrees of different virtues was equally important. In particular, the current study results suggest that female students were more likely to demonstrate increased concern for others (e.g., kindness, authenticity, and teamwork) and an affinity toward particular elements of relationships (e.g., love, gratitude, forgiveness). In contrast, male students appeared to have an increased level of positive qualities related to acting within the broader world or society as well as adherence to individual regulations (zest, creativity, bravery, belief, judgment, perseverance, self-regulation). Moreover, males tended to manifest comparatively higher vigorousness and willpower within social relationships and as relationship traits. The gender differences in the three virtues may be a reflection of cultural differences (Chemaitelly et al. 2013).

Specifically, in traditional Chinese social role expectations and practices, males pay more attention to and spend more time on career development and attend more to conscientiousness, whereas females spend more time with their families and attend more to relationships (Kong et al. 2015).

Limitations and Future Directions

There were a few limitations to the current study. First, this study only offers a preliminary exploration of the relationships among the three virtues and Smartphone addiction. Thus, future longitudinal studies should be conducted to explore the predictive ability of virtues in Smartphone addiction and potentially reveal causal relationship between the two. Second, the use of self-report and examination of university students limited the extent to which findings can be generalized and increased the potential for response-related biases. Consequently, future research should use multiple methods of evaluation (e.g., peer reports or behavioral criteria) and expand the sampling range (e.g., clinical samples, the public, adolescents). Finally, all study participants owned their Smartphone for a year or longer; consequently, the LA group did not include students who have never owned a Smartphone or who have only owned one for a brief time period. Thus, it would be beneficial to obtain more data to help identify at-risk students who have owned their Smartphone for shorter time periods. It may also be worthwhile to compare those who have never owned Smartphones to those who have.

Conclusions and Practical Implications

Despite these limitations, this study leads to several important conclusions and has a number of key implications. At a theoretical level, it underscores the roles and different functions of the three virtues as they related to Smartphone addiction among Chinese university students. Furthermore, the results suggest that conscientiousness and relationship virtues are potentially protective factors for Smartphone addiction, while vitality increases students' vulnerability.

In practice, these results may help university administrators and educators to identify the students who are at greatest risk for Smartphone addiction (i.e., students with low levels of conscientiousness and relationship virtues or high in the vitality virtue). Following identification of high-risk students, educators could then consider providing further preventative assistance (e.g., a positive psychology intervention program emphasizing daily use of conscientiousness and relationship virtues) (Duan et al. 2014) to improve or cultivate individual virtues. For instance, educators could teach students the meaning of and strategies available to build and utilize virtues as well as methods to savor and attend to ordinary classroom life. Subsequently, they could ask students to attend to when, where, and how they used the three virtues, and write down

their thoughts in a short essay. In other words, educators can incorporate positive virtue-based interventions into the daily teaching, thereby preventing or reducing students' Smartphone dependence.

Moreover, the results imply that gender differences should be taken into account. Consistently, in practice, educators could focus on cultivating male students' conscientiousness virtue (e.g., mindfulness intervention can be used to increase male students' self-control) (Canby et al. 2015) and female students' relationship virtue (e.g., role-playing games can be used to improve female students' interpersonal skills). However, additional research should be conducted to validate study findings and translate cumulative evidence into the development of the most successful prevention and intervention programs.

Compliance with Ethical Standards

Conflict of Interest Author Ling Lian is a teacher at Xi'an Polytechnic University. She has received research grants from the Philosophy and Social Sciences Research Project of Xi'an Polytechnic University (grant number 2015ZXSK02) and the Education Department of Shaanxi Provincial Government (grant number 2013JK0031). Author Xuqun You has received research grants from the 2011 Key Projects of Philosophy and Social Sciences Research, Ministry of Education (grant number 11JZD044), the Specialized Research for the Doctoral Program of Higher Education (grant number 20130202110014), and the Shaanxi Science and Technology Department (grant number 2015KTZDSF02–02). Author Ling Lian declares that she has no conflict of interest. Author Xuqun You declares that he has no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This study does not include any studies with animals performed by any of the authors.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Funding This study was funded by the Philosophy and Social Sciences Research Project of Xi'an Polytechnic University (grant number 2015ZXSK02), the Education Department of Shaanxi Provincial Government (grant number 2013JK0031), the 2011 Key Projects of Philosophy and Social Sciences Research, Ministry of Education (grant number 11JZD044), the Specialized Research for the Doctoral Program of Higher Education (grant number 20130202110014), and the Shaanxi Science and Technology Department (grant number 2015KTZDSF02–02).

References

- Akin, A. (2012). The relationships between internet addiction, subjective vitality, and subjective happiness. *Cyberpsychology, Behavior and Social Networking*, 15(8), 404–410. doi:10.1089/cyber.2011.0609.
- Aljomaa, S. S., Al Qudah, M. F., Albursan, I. S., Bakhiet, S. F., & Abduljabbar, A. S. (2016). Smartphone addiction among university

- students in the light of some variables. *Computers in Human Behavior*, 61, 155–164. doi:10.1016/j.chb.2016.03.041.
- Alt, D. (2016). Students' wellbeing, fear of missing out, and social media engagement for leisure in higher education learning environments. *Current Psychology*. doi:10.1007/s12144-016-9496-1.
- Bandura, A. (1991). Theories of cognitive self-regulation. Social cognitive theory of self-regulation. *Organizational Behavior and Human Decision Processes*, 50(2), 248–287. doi:10.1016/0749-5978(91)90022-L.
- Baumeister, R. F. (2002). Yielding to temptation: Self-control failure, impulsive purchasing, and consumer behavior. *Journal of Consumer Research*, 28(4), 670–676.
- Billieux, J., Maurage, P., Lopez-Fernandez, O., Kuss, D. J., & Griffiths, M. D. (2015). Can disordered mobile phone use be considered a behavioral addiction? An update on current evidence and a comprehensive model for future research. *Current Addiction Reports*, 2(2), 156–162. doi:10.1007/s40429-015-0054-y.
- Budescu, D. V. (1993). Dominance analysis: A new approach to the problem of relative importance of predictors in multiple regression. *Psychological Bulletin*, 114(3), 542–551.
- Canby, N. K., Cameron, I. M., Calhoun, A. T., & Buchanan, G. M. (2015). A brief mindfulness intervention for healthy college students and its effects on psychological distress, self-control, meta-mood, and subjective vitality. *Mindfulness*, 6, 1071–1081. doi:10.1007/s12671-014-0356-5.
- Chemaitelly, H., Kanaan, C., Beydoun, H., Chaaya, M., Kanaan, M., & Sibai, A. (2013). The role of gender in the association of social capital, social support, and economic security with self-rated health among older adults in deprived communities in Beirut. *Quality of Life Research*, 22(6), 1371–1379. doi:10.1007/s11136-012-0273-9.
- Chiu, S.-I. (2014). The relationship between life stress and smartphone addiction on taiwanese university student: A mediation model of learning self-efficacy and social self-efficacy. *Computers in Human Behavior*, 34, 49–57. doi:10.1016/j.chb.2014.01.024.
- Chung, N. (2011). Korean adolescent girls' addictive use of mobile phones to maintain relationship solidarity. *Social Behavior and Personality: An International Journal*, 39(10), 1349–1358. doi:10.2224/sbp.2011.39.10.1349.
- Dahlsgaard, K., Peterson, C., & Seligman, M. E. P. (2005). Shared virtue: The convergence of valued human strengths across culture and history. *Review of General Psychology*, 9(3), 203–213.
- Deng, Z. J., Huang, H., Gui, Y. F., Niu, L. Y., & Zhou, C. Y. (2015). Mobile phone dependence, parenting style and subjective wellbeing in college students. *Chinese Mental Health Journal*, 29(1), 68–73.
- Duan, W., Ho, S. M. Y., Yu, B., & Yuen, T. (2012). Factor structure of the Chinese virtues questionnaire. *Research on Social Work Practice*, 22(6), 680–688. doi:10.1177/1049731512450074.
- Duan, W., Ho, S. M. Y., Bai, Y., & Tang, X. (2013). Psychometric evaluation of the Chinese virtues questionnaire. *Research on Social Work Practice*, 23(3), 336–345. doi:10.1177/1049731513477214.
- Duan, W., Ho, S. M. Y., Tang, X., Li, T., & Zhang, Y. (2014). Character strength-based intervention to promote satisfaction with life in the Chinese university context. *Journal of Happiness Studies*, 15, 1347–1361. doi:10.1007/s10902-013-9479-y.
- Duan, W., Ho, S. M. Y., Siu, B. P. Y., Li, T., & Zhang, Y. (2015). Role of virtues and perceived life stress in affecting psychological symptoms among Chinese college students. *Journal of American College Health*, 63(1), 32–39.
- Emanuel, R., Bell, R., Cotton, C., Craig, J., Drummond, D., Gibson, S., et al. (2015). The truth about smartphone addiction. *College Student Journal*, 49(2), 291–299.
- Geser, H. (2006). Is the cell phone undermining the social order?: Understanding mobile technology from a sociological perspective. *Knowledge, Technology, and Policy*, 19(1), 8–18. doi:10.1007/s12130-006-1010-x.
- Gillham, J., Adams-Deutsch, Z., Werner, J., Reivich, K., Coulter-Heindl, V., Linkins, M., et al. (2011). Character strengths predict subjective well-being during adolescence. *The Journal of Positive Psychology*, 6(1), 31–44. doi:10.1080/17439760.2010.536773.
- Heaven, P. C. L., Ciarrochi, J., Leeson, P., & Barkus, E. (2013). Agreeableness, conscientiousness, and psychoticism: Distinctive influences of three personality dimensions in adolescence. *British Journal of Psychology*, 104(4), 481–494. doi:10.1111/bjop.12002.
- Hong, F.-Y., Chiu, S.-I., & Huang, D.-H. (2012). A model of the relationship between psychological characteristics, mobile phone addiction and use of mobile phones by Taiwanese university female students. *Computers in Human Behavior*, 28(6), 2152–2159. doi:10.1016/j.chb.2012.06.020.
- Huang, H., Niu, L.-y., Zhou, C.-y., & He-ming, W. (2014). Reliability and validity of mobile phone addiction index for Chinese college students. *Chinese Journal of Clinical Psychology*, 22(5), 835–838.
- Jessor, R. (1987). Problem-behavior theory, psychosocial development, and adolescent problem drinking. *British Journal of Addiction*, 82(4), 331–342.
- Jin, B., & Park, N. (2010). In-person contact begets calling and texting: Relationship motives for cell phone use, face-to-face interaction, and loneliness. *CyberPsychology, Behavior & Social Networking*, 13(6), 611–618. doi:10.1089/cyber.2009.0314.
- Johnson, J. W. (2000). A heuristic method for estimating the relative weight of predictor variables in multiple regression. *Multivariate Behavioral Research*, 35(1), 1–19.
- Kong, F., Ding, K., & Zhao, J. (2015). The relationships among gratitude, self-esteem, social support and life satisfaction among undergraduate students. *Journal of Happiness Studies*, 16(2), 477–489. doi:10.1007/s10902-014-9519-2.
- Lepp, A., Li, J., Barkley, J. E., & Salehi-Esfahani, S. (2015). Exploring the relationships between college students' cell phone use, personality and leisure. *Computers in Human Behavior*, 43, 210–219. doi:10.1016/j.chb.2014.11.006.
- Leung, L. (2008). Linking psychological attributes to addiction and improper use of the mobile phone among adolescents in Hong Kong. *Journal of Children and Media*, 2(2), 93–113.
- Lim, S., & Shim, H. (2016). Who multitasks on Smartphones? Smartphone multitaskers' motivations and personality traits. *CyberPsychology, Behavior & Social Networking*, 19(3), 223–227. doi:10.1089/cyber.2015.0225.
- Linkins, M., Niemiec, R. M., Gillham, J., & Mayerson, D. (2015). Through the lens of strength: A framework for educating the heart. *Journal of Positive Psychology*, 10(1), 64–68. doi:10.1080/17439760.2014.888581.
- Peterson, C., & Seligman, M. E. P. (2004). *Character strengths and virtues: A handbook and classification*. USA: Oxford University Press.
- Roberts, J. A., & Pirog, S. F. (2012). A preliminary investigation of materialism and impulsiveness as predictors of technological addictions among young adults. *Journal of Behavioral Addictions*, 9, 308–314.
- Roberts, J. A., Pullig, C., & Manolis, C. (2015). I need my smartphone: A hierarchical model of personality and cell-phone addiction. *Personality and Individual Differences*, 79, 13–19. doi:10.1016/j.paid.2015.01.049.
- Samaha, M., & Hawi, N. S. (2016). Relationships among smartphone addiction, stress, academic performance, and satisfaction with life. *Computers in Human Behavior*, 57, 321–325. doi:10.1016/j.chb.2015.12.045.
- Thomée, S., Härenstam, A., & Hagberg, M. (2011). Mobile phone use and stress, sleep disturbances, and symptoms of depression among young adults - a prospective cohort study. *BMC Public Health*, 11(1), 1–11. doi:10.1186/1471-2458-11-66.
- Toner, E., Haslam, N., Robinson, J., & Williams, P. (2012). Character strengths and wellbeing in adolescence: Structure and correlates of

- the values in action inventory of strengths for children. *Personality and Individual Differences*, 52(5), 637–642. doi:10.1016/j.paid.2011.12.014.
- van Deursen, A. J. A. M., Bolle, C. L., Hegner, S. M., & Kommers, P. A. M. (2015). Modeling habitual and addictive smartphone behavior: The role of smartphone usage types, emotional intelligence, social stress, self-regulation, age, and gender. *Computers in Human Behavior*, 45, 411–420. doi:10.1016/j.chb.2014.12.039.
- Walsh, S. P., White, K. M., & McD Young, R. (2010). Needing to connect: The effect of self and others on young people's involvement with their mobile phones. *Australian Journal of Psychology*, 62(4), 194–203. doi:10.1080/00049530903567229.
- White, M. P., Eiser, J. R., & Harris, P. R. (2004). Risk perceptions of mobile phone use while driving. *Risk Analysis: An Official Publication Of The Society For Risk Analysis*, 24(2), 323–334.
- Yu, J. J., Kim, H., & Hay, I. (2013). Understanding adolescents' problematic internet use from a social/cognitive and addiction research framework. *Computers in Human Behavior*, 29(6), 2682–2689. doi:10.1016/j.chb.2013.06.045.
- Zhang, Y., Yang, Z., Duan, W., Tang, X., Gan, F., Wang, F., et al. (2014). A preliminary investigation on the relationship between virtues and pathological internet use among Chinese adolescents. *Child And Adolescent Psychiatry And Mental Health*, 8(1), 8–8. doi:10.1186/1753-2000-8-8.



Investigating the factors that trigger airline industry purchase intention

MaryMagdaline EnowMbi Tarkang¹ · Uju Violet Alola^{1,2} · Ruth Yunji Nange³ · Ali Ozturen³

Published online: 29 May 2020

© Springer Science+Business Media, LLC, part of Springer Nature 2020

Abstract

As the main communication platforms for today's competitive air transportation market expands, airline websites need to be user friendly to trigger positive electronic word of mouth. Website quality constitutes an influencing factor in consumer behavior and decision-making. Therefore the purpose of this study is to test information-task-fit on electronic word of mouth, purchase intention and website quality. The study tested the effect of information-task-fit on website quality, electronic word of mouth and purchase intention of users of Turkish Airlines. A total of 604 questionnaires was obtained online within six months, using a quantitative and cross-sectional approach. The proposed above relationships were evaluated via structural equation modeling. Results were as hypothesized, with the perception that the availability of information required by users on the website influence website quality, electronic word of mouth and purchase intention. The website quality also influenced users' intention to purchase and electronic word of mouth. These results offer insights into improving and maintaining website quality by making the website user friendly so as to attract greater audience. This study's comprehensive model is lacking in service airline literature, thus this is an added research on the influence of information-task-fit web information and design on supposed quality of service and intention to purchase. Managers should also maintain high standards by hiring professional website builders so as to increase their usage. This study provides implications for airline website quality. A conclusion and further studies are presented below.

Keywords Information-task-fit · Website quality · Electronic word of mouth · Purchase intention

Introduction

Information technology has substantially renovated and developed the hospitality and tourism business (Wang et al. 2015). Another type of commerce; e-business has been generated by the internet, and this influences the way consumers behave. Consumers use the internet as an e-communication means to obtain access to mediators and providers where they will be provided with immediate information and reservation services

accessible to a huge number of clients at comparatively lower costs (Chaiprasit et al. 2011). Nonetheless, the advent of e-commerce internet websites ushered in the development of novel and influential platforms for communications and distributions between service providers and customers (Ponte et al. 2015). Past studies found the out that electronic knowledge has an effect on behavioral characteristics, including intentions to purchase and trust. Several scholarly writers have also discovered the consumers' recognition of online marketing technologies within the areas of tourism (Usoro et al. 2010). In regard to the internet world, which has reduced the world to a global village, a great number of people are linked through social media and this has become a part of everyday life. The social platform has, to a great extent, impacted customers' online purchasing lifestyles. For the aforementioned reasons, the availability of social media and e-commerce has given multiple buying choices to current and potential buyers (Aakash and Aggarwal 2019). As a result, customers will be able to make their best purchase decisions based on the quality and user friendly nature of websites and online reviews of current customers.

Due to high rate of online travel and development of the electronic business, hospitality companies are dedicating a

✉ MaryMagdaline EnowMbi Tarkang
memtarkang@gelisim.edu.tr

Uju Violet Alola
uvalola@gelisim.edu.tr

- ¹ Faculty of Economics, Administrative and Social Science, Istanbul Gelisim University, Istanbul, Turkey
- ² School of Economics and Management, South Ural State University, Lenin prospect 76, Chelyabinsk, Russian Federation 454080
- ³ Faculty of Tourism, Eastern Mediterranean University, Famagusta North Cyprus, via Mersin 10, Turkey

great deal of time, cash, and energy to develop and maintain the quality and navigability of the websites.

Previous research has found that, when consumers visit travel websites, prospective clients will scan through many pages on the web in one session (Önder et al. 2016). Of more interest, potential purchasers will give attention only on the information that they need. Therefore, the present study will examine a recognized, but infrequently examined, concept information-task-fit (INTF) on perceived website quality (WSQ), electronic word of mouth (eWOM) and intention to purchase. The underpinning issue behind information-task-fit used in this research is to identify how website have several unrelated information (informativeness) different from what users seek to find for their definite mission (that is, lack of information-task-fit). INTF is well-defined by (Loiacono et al. 2007), to be the level at which consumers recognize that information that the website provided is in line with the needs of their tasks. Past papers define information-task-fit as the degree to which a website's information adequately meets a user's conclusions. This definition describes the informativeness of the website, which explains how buyers perceive a website as being able to provide them with inventiveness and supportive information (Pavlou et al. 2007). Information needed must fit the tasks of the consumers so to have a positive impact on consumer experiences and performance. In this situation, exploring information-task-fit is critical, but has been largely disregarded in the literature, especially in terms of hospitality (Zha et al. 2018).

Past study by Dedeke (2016) have examined the effect of website design quality on information-task-fit, the effect of information-task-fit on outcomes like website quality and intention to purchase in the service industry. However, research on this comprehensive model and the reverse effect of information-task-fit on the quality of the website is scarce in the service industry, and particularly the airline industry, thus there require further examinations on the influence of information-task-fit website design and information on service quality and intention to purchase (Wells et al. 2011). This study will contribute the above findings to the body of extant literature. The main aim for these e-businesses is to enhance sales and relationship with buyers, with the notion to capture a possibly huge share in the internet market (Law et al. 2010). Improving website service quality is rapidly intensifying over all service sectors; the service industry like the travel industry is becoming one of the most prominent segments in this area.

E-purchasing has observed an outstanding rise in a positive direction (Chiu et al. 2014). The internet is now being used by tourism enterprises as a marketing effort for effective communication with consumers (Díaz and Koutra 2013; Yang and Lin 2014). There is no question on the fact that the service industry and the internet are becoming very compatible. For this reason, these industries should try to understand the important

role that quality, authenticity, and reliability of the information on their website play in affecting the way customers behave. Consumers who perceive a good quality of a particular website will spread their experience to their friends, relatives, and others by engaging in word of mouth, which can be more internet-based or more electronic word of mouth. This will influence the intentions and behaviors of consumers (Oh et al. 2015). Irrespective of the growing rate of e-shopping, many consumers have indicated their dissatisfaction with their e-purchase involvements. Thus, it is necessary to study the factors affecting consumers' evaluations of e-purchasing dealings and understanding the way they behave (Luo et al. 2012).

WOM impact has been studied for many years in extant marketing research or writings. Notwithstanding the reputation of WOM in tourism city selection, current research on the transportation industry is limited. WOM can be defined as a head-on information interchange, but, lately, it has advanced as electronic word of mouth, based on technological statistical advances as a result of the developing access to online statistics (Kim et al. 2015; Qi et al. 2017). The modern affinity of tourists for eWOM has amplified the dedication of scholars to internet accessible travel WOM, as well as internet available travel reviews, or online travel diaries (Leung et al. 2015). Electronic word of mouth makes use of the large-scale, unspecified, transient nature of the internet to realize an innovative way to capture, analyze, interpret, and manage the impact of communication in hospitality and tourism marketing (Yoo and Donthu 2001). Consumers go through the reviews posted on the websites by experienced consumers of their actual or potential service providers, which end up in shaping intentions.

An evaluation of past tourism and travel literature reveals the internet as a very important information source about tourists travel (Park et al. 2011), because potential and actual customers can easily collect information about air travel products. These services allow them to compare online prices without necessarily having to meet sales agents, and to prepare for trips by viewing just a screen in front of them. Numerous tourists travel for leisure, education, pleasure, and so on and, currently, online review websites and cyber communities are becoming very vital information sources that travelers and tourists use in order to plan their trips. Mostly, travelers describe and share their experience as regards to products and services to the public online in the form of WOM, in this case electronic word of mouth. The term WOM began to appear in academic literature in the 1950s and emphasized how opinion leaders influence their cohorts (Groeger and Buttle 2016). In this century, the impact of WOM is a popular subject in academic and industrial marketplaces (Kimmel and Kitchen 2014). However, the interest has shifted to online environments as individuals become more connected electronically and share experiences through the internet in the form of what is known as eWOM (electronic word of mouth) (Groeger and

Buttle 2016). Various literatures have looked at how eWOM impacts products that are not tangible (Sotiriadis and Van Zyl 2013; Jalilvand and Samiei 2012) and tangible products (Aakash and Aggarwal 2019). Although past studies have examined the effect of website quality on intention to purchase and the effect of website quality on customer satisfaction (Chang et al. 2017), a comprehensive model of information-task-fit, website quality, electronic word of mouth, and intention to purchase based on airlines websites has been given very little attention in the airlines industry.

Literature and Hypotheses

The present study adopted the Theory of Planned Behavior (TPB), that various factors may play a vital role in the prediction of certain behaviors (Ajzen 1991). According to this theory, what immediately precedes any behavior is the ‘intention’ of the person to take an action. The possibility of demonstrating a certain behaviour is ‘behavioural intention’. The stronger the intent of a person, the more feasible it is for the person to act according to their behavior (Ajzen and Fishbein 1980). Planned Behavior Theory states that the demonstration of a behavior is not related to the intention of the person only; it may be completely under the person’s control. Certain behavior of a person would be determined by their intent to perform such behavior. Hyun and Kim (2014) proposed that intention to purchase is a combination of consumers’ awareness on buying a product and the possibility to buy.

Information-Task-Fit and Website Quality, Electronic Word of Mouth and Purchase Intentions

Past studies have examined the effect of information-task-fit on product quality, but little attention has been given on this construct and the impact in the service industry. Gregg and Walczak (2008) and Dedeke (2016) presented product and background information influenced client’s disposition to accomplish business on a website. Another study showed that long textual explanations leads to the growing of the buyer’s impression on the usefulness for a products (Kauffman and Wood 2006). Hypermedia software setups are concluded to impact consumer website experience (Hultén et al. 2009), while similarly extant work has shown that a low information-task-fit impacts buyer behaviors. There should be an availability and provision of past users’ information to potential and current customers in order to improve services like bookings, reservations, and intention to purchase or purchase decision improves the website (Jeong et al. 2003). As a consequence, the quality of information has continually remained a vital factor that will shape the minds and beliefs of potential travelers and users (Smith 2004). Travelers always have the urge to search the internet for relevant information about specific tourism destinations, and, of course, airlines, in order to make decisions on

purchase, and as, mentioned earlier, the quality of information has powerful impact on decisions (Elci et al. 2017).

To summarize, the richness of information delivered on a website impacts users’ experiences, Vargo and Lusch (2004) contended that eliciting the sensory experience of possible buyers enables them to cultivate symbolic, emotional, perceptive, interpersonal and values toward the products or services offered. Information given on web is aimed at influencing the value of consumers (Lohse and Spiller 1998). Consumers who perceive value about the quality of a website will engage in electronic word of mouth. Word of mouth (WOM) is defined as “the process of handing over information by mouth from one person to another” (Filieri 2015), but, in regard to the digital phase, online consumer reviews are referred to as the electronic form of WOM, electronic word of mouth. The quality of a website is a foremost concern in electronic-commerce because consumers’ insights of website quality affect their intentions to purchase significantly: a reason why the paradigm of purchase intentions (PIN) is regarded as a significant resulting variable in the present study and is incorporated as a criterion variable in the study model. Therefore, electronic word of mouth also will trigger consumers’ intentions to purchase from the websites. Hence, the following hypotheses can be posited.

- H1. Information-task-fit positively affects website quality.
- H2. Information-task-fit positively affects electronic word of mouth.
- H3. Information-task-fit positively affects purchase intentions.

Website Quality and Electronic Word of Mouth

Tourism and hospitality is the biggest emerging sector that uses the internet, and its use nowadays has several paybacks in making available information to clients and other enterprises (Díaz and Koutra 2013; Winnie 2014). The quality of a website is a vital perception in electro-commerce because consumers awareness of the web in terms of quality impacts in a direct manner their intent to make use of it. (Chen et al. 2017).

Studies linked to website quality and its impacts started in the late 1990s; nevertheless, the scope of website quality construct in literature has shown a serious discrepancy and it has been specified that website quality is a construct with many dimensions consisting of information, system, and service quality. These dimensions could form the major factors that influence the users’ expectation and perception of website quality (Wen 2012). Word of mouth is a vital aspect of the process of many consumers’ decision-making of (Bilgihan and Bujisic 2015), playing a major part in travelers’ satisfaction and loyalty formation (Yang and Lin 2014).

Being recognised or considered as a present day route for marketing, the website is the key channel used for communication between consumers and business organizations; therefore, a website's quality plays a central part in the realisation of internet commerce (Ponte et al. 2015). Website quality explains how users evaluate whether a website's features meet their needs and reflect the general excellence of the website. (Hsu et al. 2015). The underlying constituent of tourism and travel services, like airline services, that singles it out from other sector is the intangible nature of those services. That is to say, tourism and travel offers service products to its customers, unlike physical goods offered by manufacturing industries (Elci et al. 2017). The intangible nature of tourism and travel products, which are termed services, makes it impossible for consumers to access the quality of the service until after consumption, thus feelings of uncertainty and the risk increases (Abubakar 2016).

Clients undertake more online purchase due to the efficiency of e-commerce channels. Existing literature has found website quality to be associated with product quality as perceived by consumers. For example, Wells et al. (2011) concluded that the quality of a website affects perceived product quality. Several researchers have anticipated the positive impact that website quality has on consumer satisfaction, leading to intent to purchase (Wang et al. 2015). Electronic word of mouth speaks to any statement, whether negative positive or made by former or existing patrons, with respect to a product or service available to the masses via the internet (Litvin et al. 2018). Electronic word of mouth is a very vital information source, influencing the travel intention and choices of tourists (Jalilvand and Samiei 2012). Güngör and Çadirci (2013) presented a shortened definition, which describes electronic word of mouth as any inscribed statement visible to a greater number of individuals and or organisations and establishments with the help of SNS (social networking sites), with respect to a brand, company or product, conveyed by members of that SNS. The authors also went further to say an SNS is a community that relies on the internet world, articulating a user's list with common connections and where followers interrelate with one other in a continuous platform. These types of online settings are pervasive currently and incorporate such platforms or elements as bulletin boards, chat rooms, email, messenger, online forums and review sites, all of which are beneficial to electronic word of mouth contributions (Hornik et al. 2015). Individuals discussing their comments and experiences through eWOM have been described as a "convergence culture" (Jenkins 2006) formed by the convergence of the media, participatory culture, and collective intelligence. Considering the fact that the customers express their experiences of already used services to their friends and loved ones through the internet, we can posit that:

H4: Website quality positively affects electronic word of mouth.

Website Quality and Purchase Intentions

Websites with excellent quality would increase user's intentions to purchase (Wang et al. 2015). In addition, an enterprises build websites to attract patrons and focus on competitive strategies in improving its quality. This is because an upgraded website quality will always lead to satisfaction of its users, the attraction of new ones and retention of existing ones (Bai et al. 2008). To meet customers' expectations, it is very necessary for companies to be aware of the effect of website quality on its users' purchase intention. Customers' intention to purchase can be defined as the prospect of customers to purchase a defined product (Park et al. 2011).

A website with a good quality as perceived by users will trigger their intentions to buy products and or services from the providers of this website. Thus, we posit the third hypothesis:

H5: Website quality positively and significantly affects purchase intentions.

Electronic Word of Mouth and Purchase Intentions

Electronic word of mouth can be considered as a form of free advertising that reinforces the brand, and increases product sales through increasing purchase rates (Kietzmann and Canhoto 2013). Before choosing a destination, tourists will probably spend some valuable time searching for facts and data online to support their decisions. As a result of the expanded use of the internet, tourists now have options for collecting information about destinations and products or service by searching comments of other tourists posted on the web. This has provided tourists with opportunities to supply their own experience the destination by engaging themselves in electronic word of mouth. The consumption of tourism services and other services provided by service industries like airlines, as is the case of this study, in most cases encompasses two group of consumers; the first time users of these services and the frequent users of these services (Huang and Hsu 2009). Decision-making for first time consumers is mostly based on information gathered from various sources, which results in an expectation of a desired encounter from a tourism service provider. This type of anticipation has been investigated earlier in extant hospitality writings as intention to visit as in destinations or intention to purchase as in service providers (Abubakar et al. 2017).

Electronic word of mouth offers more information to a large number of people within a shorter time period (Zhao et al. 2015) than the old-fashioned WOM. Electronic word of mouth makes negative comments spread faster and damage companies as the information is public and can reach a broad range of viewers with the click of a mouse. Online reviews and SNS allow customers to

work together virtually and share information, feelings, and information about all kinds of services, goods and brands (Filiari 2015). Selection of a travel product requires more plentiful and high quality statistics. The tourism product and services are multifaceted and cannot be evaluated until consumed. Electronic word of mouth remain a potent marketing means And, in recent years, there has been an emerging literature focusing on the effectiveness of electronic word of mouth communication. However, there is a need for extra research to expose the insinuations of electronic word of mouth in the tourism market. Attesting to the repute of electronic word of mouth, 90% of customers in the United States of America reported that their buying choices are influenced by online reviews (Gesenhues 2013) and the same influence was also found for 80% of British consumers (Casaló et al. 2015). This indicates that consumer decision-making processes in purchasing a product or service are strongly influenced by electronic word of mouth from other experienced consumers, whether positive or negative. The information about a tourism product or service is highly important for online packages, travel agents' hotel room reservations, and destinations (Bilgihan and Bujisic 2015). This is because of the characteristics of service products, thus hotels and other tourism sector enterprises make use of websites to affect the process of their customers decision-making when making reservations for accommodation. An investigatory research exposes the success of online shopping in determining intentions to purchase by consumers (Park et al. 2011). Purchase intentions are often driven by electronic word of mouth from other social shoppers. As such, electronic word of mouth has proved to be a mutual indicator of repute and an ultimately substantial tool that drives demand (Amblee and Bui 2011). It has been debated that a superior consumer web experience can influence consumers' awareness, attitudes, and purchase intentions. The web has redesigned many aspects of travel, including the search for information and travel plan as well as the intentions (Park et al. 2011). Perceived risks of traveler's e-purchase, their perceived usefulness, and their trust are determinants of their attitude to e-purchasing (Nunkoo and Ramkissoon 2013), which significantly, in turn, affect their purchase intentions. In contrast to conventional offline WOM where opinions fade in the air, electronic word of mouth provides public records that last for ages (Yang and Lin 2014). An important conclusion from this line of research is that these electronic word of mouth review sources exert a very significant influence upon purchase intentions (Ye et al. 2011).

H6: Positive (negative) electronic word of mouth has a positive (negative) impact on purchase intentions.

Website Quality as a Mediator

Previous writings have examined and validated the effect of information-task-fit on product quality, but little has been said

about this construct and its impact in the service industry (Dedeke 2016). The quality of a website as a product of a particular business, and the airlines industry as a case of this, has been confirmed to be triggered by the ITF. Information that's provided on websites is employed to influence the consumer's value (Lohse and Spiller 1998). Consumers who perceive value about the quality of a website will engage in eWOM. Gregg and Walczak (2008) found product and background information to influence client's disposition to accomplish business on a web. Past researches have investigated and confirmed that websites with excellent quality would influence and increase users' intentions to purchase (Wang et al. 2015). Furthermore, businesses and enterprises construct their websites in a way so as to appeal to their users. By doing this, they focus on competitive strategies for improving its quality. Based on the above discussion, website quality can be influenced by information-task-fit. Since the website is considered as a contemporary itinerary for marketing, the website is the key network for communication between consumers and business organizations. For this reason, a website's quality as perceived by the kind and richness of the type of information needed by the user plays a central part in the realisation of internet commerce (Ponte et al. 2015). Website quality can, in turn, impact electronic word of mouth and purchase intentions. For this reason, website quality can be considered a mediator effect on both the relationship between information-task-fit and electronic word of mouth and purchase intentions. Thus we suggest that:

H7: Website quality mediates the relationship between information-task-fit and electronic word of mouth.

H8: Website quality mediates the relationship between information-task-fit and purchase intentions.

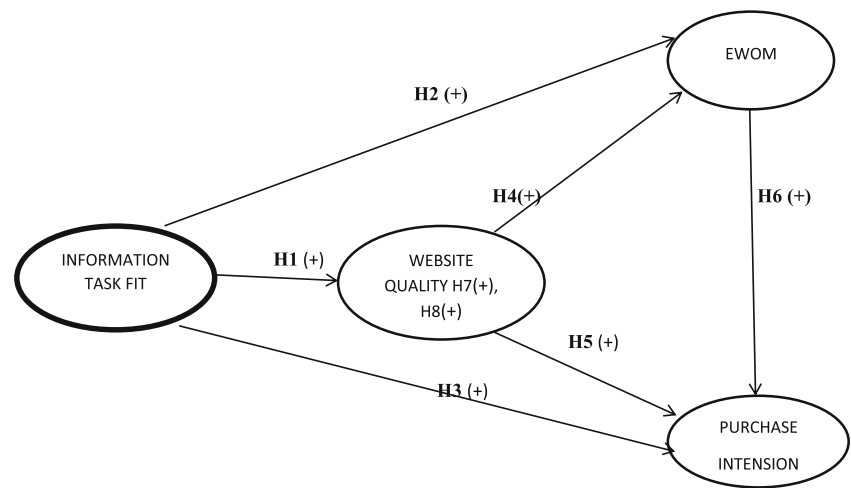
Research Model (Fig. 1)

Research Methodology

The aim of the present research is to examine the effect of website quality on electronic word of mouth and purchase intentions, and, in particular, the effect of electronic word of mouth on purchase intentions on TurkishAirlines.com. The research design is quantitative and descriptive and this type of research is commonly used when an understanding of the research problem exists, which is the case of the present study. The study tries to understand how website quality can affect electronic word of mouth and how, in turn, electronic word of mouth can affect purchase intentions.

The study adopted a cross-sectional method of data collection in which data were obtained from a given set of the population. The present study embraced a quantitative research

Fig. 1 Research Model



method through an online survey. The population of the study was users of [TurkishAirlines.com](https://www.turkishairlines.com). The respondents must have used the online website of the company. In a quantitative research, sampling error reduces with increasing sample size. This leads to a more accurate survey (Lewis 1984). An online survey is more superior and advantageous than other data collection procedures such as interview and postal surveys (Sheehan 2001). It is more cost-effective easy to manage and effortless with a stress-free and faster means of response (Flaherty et al. 1998). This study employed the use of Google Forms online survey system to administer its questionnaire for data collection. The population was hard to reach because there is no sample frame from which the population can be drawn since they are scattered all over the world. An online social network site (Facebook) was used in order to reach the respondents. Online convenience and snowball sampling methods were used to reach respondents: one respondent gives the name of another or forwards the survey to another qualified respondent. This procedure was carried out until we obtained a sample size of 604. The present policy can be seen as a method to counter the problems that are related to population samples that are hard to reach or can be termed concealed sample, such as the unlawful and the secluded (Atkinson and Flint 2001). A pilot survey was conducted with 20 users of [Turkishairlines.com](https://www.turkishairlines.com) and assessed whether the survey was easy to read, reasonable, and free of errors with no indistinctness and dual meaning of intentions to use social media continuously and share information.

Selection criteria were implemented to users of the Turkish Airlines website: [Turkishairlines.com](https://www.turkishairlines.com). Respondents' ages were considered from 18 years and above. The survey was undertaken for eight months from June 2017 to January 2018. The participants were constantly reminded by resends of the survey and reminder messages. In total, 700 surveys were distributed to respondents via Facebook and email, of which 630 of them were filled and submitted, giving a response rate of 90.0%. The people who liked the official Facebook page of

Turkish Airlines were selected as the primary target group. The final data analysis contained 604 usable surveys as some of them were rejected due to partial filling, giving a final response rate of 86.29%.

The Questionnaire Development

The study paradigms used adopted and adapted items made to suit the present study. Items were taken from empirical studies from existing literature. The questionnaire was divided into four parts. The first four parts includes website quality, electronic word of mouth, information-task-fit and purchase intentions in that order and part four consisted of demographic variables. Information-task-fit was operationalized with the use of three (3) items adopted from Loiacono et al. (2007) and responses were rated on a 5-point Likert type scale with 5 as strongly agree and 1 as strongly disagree. Website quality was measured using three items with one reversed item making four and adopted from Yoo and Donthu (2001). Six (6) items for electronic word of mouth were adopted from Jalilvand and Samiei (2012), three items for purchase intentions were modified from Wells et al. (2011), and items were assessed on a 5-point Likert scale from 5 strongly agree to 1 strongly disagree.

Data Analysis

First, we conducted Confirmatory Factor Analysis (CFA) to assess the estimated model. Furthermore, reliability and validity of the constructs were assessed. The study also assessed reliability using Cronbach's Alpha and CR. We then assessed convergent validity and discriminant validity utilizing the Average Variance Extracted (AVE) technique (Hair et al. 2010; Leung et al. 2015). In SEM statistical models, paths denotes causal relationships, a path is a postulated correlation between variables demonstrating the independent and outcome paradigms of a hypothetical recommendation. Each path

represents a proposition or an assumption for testing a hypothetical proposition. Paths are most of the time seen as arrows in statistical models of a SEM diagram, projecting toward the recommended direction of causation.

Results

Demographic Profile

In Table 1 below, the demographic results showed that more than half (442) of the respondents were within the 20s and 30s age range, giving a percentage of 73.2; 343 were male and 261 were female with a percentage of 56.8 and 43.2, respectively. Three hundred and sixty-eight of the respondents were students, a percentage of 55.6, and 441 of the respondents were on an income below 1000 Euros, accounting for 73%.

According to the results of psychometry, as seen in Table 2 below, the study used SPSS 20 and AMOS 23 version to determine reliability, validity, and to investigate the hypothesized model (Hair et al. 2006). By conducting CFA, all the loading loaded high and were significant to their respective constructs and were retained, as suggested by (Anderson and Gerbing 1988; Bagozzi and Yi 1988; Fornell and Larcker 1981). However, two items from electronic word of mouth (eWOM 12) and one item from WSQ (WSQ7) with low loadings were deleted.

Furthermore, CFA was conducted to examine the measurement model. The validity and reliability of the constructs were assessed following guidelines by Nunnally (1978) cited in Hair et al. (2010) and Fornell and Larcker (1981). Cronbach's alpha reliability and composite reliability (CR) were also used to examine the construct reliability. Both results suggested values of (0.7) for all variables, thus good reliability was attained (Kimmel and Kitchen 2014; Nunnally and Bernstein 1994).

In addition, the result of the confirmatory factor analysis (CFA) shows that the above displayed model is a perfect fit based on the cutoff values according to Hooper et al. (2008) and a perfect fit.

$\chi^2 = 227.560$, $df = 71$, $\chi^2 / df = 3.21$; $GFI = 0.948$, $IFI = 0.972$, $CFI = 0.972$; $RMSEA = 0.60$. $RMR = 0.10$ (Henseler et al. 2015).

Table 2 also shows that the values of CR all fell within the acceptable range (0.882 and 0.890). The absolute standardized loadings were > 0.69 in all variables. Responses were reliable across the items based on Cronbach's alpha (0.862 and 0.888). The AVE values were greater than 0.50, ensuring convergent validity. The research also achieved discriminant validity (0.85 or 0.95 thresholds); achieving the threshold.

Finally, collinearity was not an issue, as the values of VIF ranged between 1.7 and 2.7 (Hair et al. 2012). Also, the results were positive for discriminant validity as the AVE values for any

Table 1 Demographic profile

Characteristics	Frequency	Percentage	Cumulative Percentage
Age			
Under 20	61	10.1	10.1
20–29	283	46.9	57.0
30–39	159	26.3	83.3
40–49	66	10.9	94.2
50–59	29	4.8	99.0
60 and Above	6	1.0	100.0
Gender			
Male	343	56.8	56.8
Female	261	43.2	100.0
Occupation			
Students	336	55.6	55.6
Others	19	3.1	58.8
Public service	79	13.1	77.8
Business	72	11.9	89.7
Medicals	20	3.3	97.8
Engineers	9	1.5	99.3
Managers	5	0.8	100.0
Technicians	11	1.8	97.2
Drivers	17	2.8	100.0
Marital Status			
Single	368	60.9	60.9
Married	217	35.9	96.9
Divorced	19	3.1	100.0
Education			
High School	113	18.7	18.7
Undergraduate	291	48.2	66.9
Masters	132	21.9	88.7
PhD	68	11.3	100.0
Income (Euros)			
Below 500	259	42.9	42.9
501–1000	182	30.1	73.0
1001–1500	57	9.4	82.5
1501–2000	46	7.6	90.1
2001–2500	21	3.5	93.5
2501–3000	8	1.3	94.9
3000+	28	4.6	99.5
Total	604	100.0	100.0

construct were greater than the squared values of the standardized correlation of each of the constructs with any other construct in the analysis (Fornell and Larcker 1981, Hair et al. 2010). This is also in concordance with the works of Nunkoo and Ramkissoon (2013) and Karatepe and Choubtarash (2014).

Table 3 shows the correlation of observed variables: information-task-fit is positively correlated with website quality (.842** $p < 0.05$), eWOM (.332** $p < 0.05$) and also

Table 2 Psychometric properties of the study variables

Construct and items	Standardized loadings	t-values	AVE	CR	α
Information-task-fit			0.729	0.890	0.888
QUESTION 1	0.863	Fixed			
QUESTION 2	0.894	24.99			
QUESTION 3	0.802	24.02			
Website Quality			0.727	0.889	0.865
QUESTION 4	0.882	Fixed			
QUESTION 5	0.852	12.25			
QUESTION 6	0.751	12.85			
QUESTION 7	****	****			
EWOM			0.558	0.882	0.882
QUESTION 8	0.743	Fixed			
QUESTION 9	0.857	13.09			
QUESTION 10	0.821	17.78			
QUESTION 11	0.756	18.94			
QUESTION 12	****	****			
QUESTION 13	0.700	17.19			
Purchase Intentions			0.689	0.869	0.888
QUESTION 14	0.855	Fixed			
QUESTION 15	0.867	24.81			
QUESTION 16	0.835	24.41			

Model fit statistics: $\chi^2 = 227.560$, $df = 71$, $\chi^2/df = 3.21$; GFI = 0.948, IFI = 0.972, CFI = 0.972; RMSEA = 0.60. RMR = 0.10. Notes: All loadings were significant. AVE Average variance extracted, CR Composite reliability, GFI Goodness of fit index, IFI Incremental Fit Index, RMSEA Root mean square error of approximation

purchase intentions (.345** $p < 0.05$). The study also accessed the correlation between website quality and eWOM and found a positive correlation (.617** $p < 0.05$). In the same line, website quality has a positive correlation with purchase intentions (.632** $p < 0.05$). For the relationship between eWOM and purchase intention, a positive correlation was also observed (.426** $p < 0.05$).

This study adds its quota of contribution to Website quality, eWOM and purchase intentions in the airline industry websites in general and Turkish Airlines in particular. The perception of good quality leads to users’ sustainability as expressed in positive eWOM advertising, leading to the attraction of new users for purchase through the website. The present research study aimed to investigate the effect of website

quality on eWOM, eWOM on purchase intention, and website quality on intention purchase. As earlier mentioned, the data were analyzed using SPSS 20 and AMOSS 23. According to the emerged results, a website with good quality as perceived by customers will influence them post positive feedbacks online and this will trigger intentions to purchase services from the website. Customers of Turkish Airlines perceived its quality as good and so they continue to express their satisfaction in the form of eWOM and this continues to influence their intention to purchase airline services from the website, whether directly or indirectly through agencies.

Information-task-fit is positively related to website quality, supporting hypothesis (H1). This is a major robust contribution to the study as, to the authors’ best knowledge, no literature has found a relationship between the two variables. Therefore, the information found on the website is as good as the quality of the website. Also, the information-task-fit has a positive relationship with eWOM and purchase intentions, supporting H2 and H3. On the other hand, there are positive and significant effects of website quality on eWOM and purchase intention, giving support for the proposed hypotheses. The result of H4 is in line with the study of Chen et al. (-2017), that website quality is vital for achieving organizational goals in e-commerce because the way customers perceive a website in terms of quality directly affects their intentions to

Table 3 Summary statistics and correlation of observed variables

Variables	Mean	SD	1	2	3	4
INTF	4.60	1.39	–			
WSQ	4.34	.863	.842***	–		
eWOM	4.11	1.29	.332***	.617***	–	
PIN	4.61	1.39	.345***	.632***	.426***	–

*** $P < .05$ (Two-tailed test)

use it. Furthermore, the result of H5 is in line with the study by Hornik et al. (2015). The results also indicate that there is a positive and significant effect of website quality on purchase intentions. Significantly, eWOM has a positive relationship with purchase intention, thereby supporting H6.

To test the statistical significance of the path coefficients, and the indirect effect, a bootstrap using 10,000 resamples with 95% bias improved confidence interval (BCa CI). The non-parametrically obtained bootstrapping procedure was made functional with 604 cases, 10,000 subsamples and discrete sign alterations (Hair et al. 2011). The analysis revealed that all five postulated relationships in the inner path model exhibit statistically considerable figures of 4.095 and 3.652 as above 1.96 for a 95% confidence interval, as shown in the table. Therefore for H7, website quality fully mediates the relationship between information-task-fit and eWOM and information-task-fit partially mediates the relationship between information-task-fit and purchase intention, thereby supporting H8 (Tables 4 and 5).

Discussion

The result reveals that the proposed model is accepted. According to the result, the relationships between the studies' variables were all supported (direct and indirect relationship). To be more direct, a significant positive relationship exists between information-task-fit and website quality, eWOM and purchase intentions. Relatively, the relationship between information-task-fit and eWOM was fully mediated by website quality while, on the other hand, between information-task-fit and purchase intentions, website quality partially mediated the relationship. This relationship reveals that the quality of the website is significantly responsible for repeat purchase, such that, when a user of a website finds the website quality very high, user-friendly and attractive, there is a high possibility of a recommendation of the site to friends.

Also, an easy to use website was found to be a stronger predictor of website quality. This suggests that an easily accessible effective website will significantly increase consumers' motivation to visit the site and increases the possibility of using a positive word of mouth to attract traffic to the site. The current writings urge managers and website designers to attach greater preference in improving both information on the website and the quality of the site. Furthermore, airline management should give attention to visitors to the site. There is a possibility that the higher the number of visitors to a site, the higher the likelihood of purchase. Since online purchase is becoming more consumer-friendly and most consumers prefer purchasing online than from a physical store, it is, therefore, critical to ascertain that good website quality will influence consumer purchase intentions. In previous studies, Kim and Lennon (2013) opined that website quality is not only internal to the organization, focusing on organizational offer, but also reflects on external sources reference, including consumers' emotional cognitive and behavioral responses.

The study offers a direction on how website quality elicits positive emotion which eventually leads to purchase intentions. The significance of consumer experience is becoming increasingly vital in the online context; it is critical to maintaining a good image that will lead to positive eWOM (Hasanov and Khalid 2015; Kim and Lennon 2013) since the website is the only physical signals for users of a website.

Managerial Implications

Firstly, the study highlights the understanding and the relationship between information-task-fit and consumer behavior. Past researches have focused on how the quality of website correlation to purchase intentions (Bilgihan and Bujisic 2015; Chen et al. 2017; Yang and Lin 2014). Also, Wen (2012) studied the dimensions of website quality and concluded that the dimensions are important for consumers' intent, which narrows to purchase intentions (service quality, information).

Table 4 Direct and indirect effect of INTF, WSQ, eWOM, and PIN

	β	SE	t	p	Result
Direct Effects					
INTF→WSQ	.787	.046	17.009	.000	H1 = Supported
INTF→eWOM	.333	.046	7.151	.000	H2 = Supported
INTF→PIN	.688	.050	13.643	.000	H3 = Supported
WSQ → PIN	.365	.050	7.233	.000	H4 = Supported
WSQ → eWOM	.748	.056	13.371	.000	H5 = Supported
eWOM→PIN	.471	.051	9.181	.000	H6 = Supported
Indirect Effect					
INTF→ WSQ → eWOM	.140	.098	1.438	.150	H7 = Full Mediation
INTF→WSQ → PIN	.321	.094	3.406	.000	H8 = Partial Mediation

Table 5 Bootstrap results

Variables	Original Sample	Sample Mean (M)	Standard Deviation	T statistics	P-Values
INTF→ WSQ→eWOM	0.111	0.111	0.027	4.095	0.000
INTF→WSQ→PIN	0.135	0.145	0.062	3.652	0.000

Ponte et al. (2015) highlighted the role of website quality and internet commerce, evaluating how users see the features of a website. In the same manner, Hsu et al. (2015) opined that the reason customers purchase online is because of website efficiency. On the other hand, Wells et al. (2011) suggested that the quality of a website should be good, as it highly influences the perceived product quality. On the contrary, our study found that the information-task-fit is significantly and positively related to website quality.

This study is important for managers, marketers and website developers for online shopping customers in that greater preference should be given to both information on the website and the quality of the site. More specifically, airline industry should give attention to visitors to the site; this they can do by giving out questionnaires to visitors from time to time to see how friendly the website is and see how it can be improved. In addition, this study encourages the organization to maintain a feedback relationship with website visitors and customers. It is also significant to note that website visitors will spread either positive or negative word of mouth (Litvin et al. 2018); therefore, an innovative website that is appealing to the current target customers should be designed. Secondly, the e-business firms should put into consideration a good website design that will be appealing to visitors who often turn to customers. This could be checked by having people visit the website to check how appealing the site is in regard to the design before fully launching the site and to modify the site if needed before the actual launch (Dedeke 2016). Also, it is expedient that the website handlers (website monitors) should be ready 24/7 to provide quick assistance when needed. Thirdly, information-task-fit is the predicting variable that has influence on electronic word of mouth. Pragmatically, this implies that managers should check the information on the site to be able to meet customer demand. Also, the information on the website should not over emphasize, but a high information-task-fit will have a stronger perception in the mind of the customers that the product is of high quality and value. Lastly, incentives and bonuses should be introduced. This is to draw traffic to the site which will lead to purchase intentions. The bonus can be in the form of coupons or points that a user gets in a visit; these points will count to a certain level and can be used to redeem excess luggage when using the airplane for travel.

Theoretical Implications

Firstly, looking from the theoretical perspective, our study contributes to the existing literature to eWOM and purchase intentions in several ways. Previous study concentrated on website quality and information-task-fit as a single constraint, whereas the present study separates this constraint into two variables (information-task-fit and website quality). Secondly, our study has shown that negative news travels faster than positive news. Thirdly, most research focused on laboratory based to check website quality, whereas the study focused on the natural setting (field study). Also, most studies based their researches on intended intention, whereas this study focused on purchase intentions. Fourthly, the present study is consistent with Nunnally (1978), Hornik et al. (2015) and Wang et al. (2015) that proposed and found a relationship between quality of a website and users' purchase intention; conversely, poor website quality will decrease purchase intentions. In particular, the quality of the Turkish Airlines website significantly and positively influences eWOM of its consumers, and the website quality also significantly and positively influences purchase intention. Therefore, airline companies in general, and Turkish Airlines, in particular, must attach great importance and continue to maintain the high quality of their website so that customers can express their experiences positively in the form of online feedback.

Limitations and Further Study

One of the limitations of this study is the limiting of the responses to only Turkish Airlines customers; therefore, generalization of the study should be done with caution. Future research should consider a comparative analysis using more than one airline by comparing the website qualities to determine how customers are influenced by quality. The study uses an online data collection method; this process of data collection is difficult and often involves several messages to the respondents to fill the questionnaire. Respondents are usually very reluctant to fill surveys online as it feels boring. Future research should consider using face-to-face self-administration questionnaire. The study focused on purchase intentions and it will be interesting for other studies to examine how the dissemination influences actual behavior. Although the study has these limitations, it provides insights for the industry in managing their websites, tailoring their

strategies for achieving positive eWOM and enhancing consumers' purchase intentions.

Compliance of Ethical Standard Statement The authors states that this research was not fully or partly funded by any institution or organization either private or public.

Informed Consent The authors clearly stated in the consent form that the participation is only for academic purpose and therefore participation is on voluntary bases.

Conflict of Interest The authors declared that there is no conflict of interest.

References

- Aakash, A., & Aggarwal, A. G. (2019). Role of EWOM, product satisfaction, and website quality on customer repurchase intention. In J. C. de Amorim Carvalho & E.M.C.B. Sabino (Eds.), *Strategy and Superior Performance of Micro and Small Businesses in Volatile Economies* (pp. 144–168). IGI Global.
- Abubakar, A. M. (2016). Does eWOM influence destination trust and travel intention: A medical tourism perspective. *Economic Research-Ekonomika Istraživanja*, 29(1), 598–611. <https://doi.org/10.1080/1331677X.2016.1189841>.
- Abubakar, A. M., Ilkan, M., Al-Tal, R. M., & Eluwole, K. K. (2017). eWOM, revisit intention, destination trust and gender. *Journal of Hospitality and Tourism Management*, 31, 220–227.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211.
- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour*. Pearson.
- Ambler, N., & Bui, T. (2011). Harnessing the influence of social proof in online shopping: The effect of electronic word of mouth on sales of digital microproducts. *International Journal of Electronic Commerce*, 16, 91–114.
- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103(3), 411–423.
- Atkinson, R., & Flint, J. (2001). Accessing hidden and hard-to-reach populations: Snowball research strategies. *Social Research Update*, 33, 1–4.
- Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, 16(1), 74–94.
- Bai, B., Law, R., & Wen, I. (2008). The impact of website quality on customer satisfaction and purchase intentions: Evidence from Chinese online visitors. *International Journal of Hospitality Management*, 27(3), 391–402.
- Bilgihan, A., & Bujisic, M. (2015). The effect of website features in online relationship marketing: A case of online hotel booking. *Electronic Commerce Research and Applications*, 14(4), 222–232.
- Casaló, L. V., Flavián, C., Guinalfú, M., & Ekinci, Y. (2015). Avoiding the dark side of positive online consumer reviews: Enhancing reviews' usefulness for high risk-averse travelers. *Journal of Business Research*, 68(9), 1829–1835.
- Chaiprasit, K., Jariangprasert, N., Chomphunut, A., Napat, D., & Jaturapatrapom, J. (2011). Tourist expectations toward travel and tourism websites in Thailand. *International Business & Economics Research Journal*, 10(3), 41–49.
- Chang, K.-C., Hsu, C.-L., Chen, M.-C., & Kuo, N.-T. (2017). How a branded website creates customer purchase intentions. *Total Quality Management & Business Excellence*, 1–25.
- Chen, X., Huang, Q., & Davison, R. M. (2017). The role of website quality and social capital in building buyers' loyalty. *International Journal of Information Management*, 37(1B), 1563–1574.
- Chiu, C. M., Wang, E. T., Fang, Y. H., & Huang, H. Y. (2014). Understanding customers' repeat purchase intentions in B2C e-commerce: The roles of utilitarian value, hedonic value and perceived risk. *Information Systems Journal*, 24(1), 85–114.
- Dedeke, A. N. (2016). Travel web-site design: Information task-fit, service quality and purchase intention. *Tourism Management*, 54, 541–554.
- Díaz, E., & Koutra, C. (2013). Evaluation of the persuasive features of hotel chains websites: A latent class segmentation analysis. *International Journal of Hospitality Management*, 34, 338–347.
- Elci, A., Abubakar, A. M., Ilkan, M., Kolawole, E. K., & Lasisi, T. T. (2017). The impact of travel 2.0 on travelers booking and reservation behaviors. *Business Perspectives and Research*, 5(2), 124–136.
- Filieri, R. (2015). What makes online reviews helpful? A diagnosticity-adoption framework to explain informational and normative influences in e-WOM. *Journal of Business Research*, 68, 1261–1270.
- Flaherty, L. M., Pearce, K. J., & Rubin, R. B. (1998). Internet and face-to-face communication: Not functional alternatives. *Communication Quarterly*, 46(3), 250–268.
- Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics.
- Gesenhues, A. (2013). Study: Number of people who share or post videos online has doubled since 2009. *Pew Research Center*.
- Gregg, D. G., & Walczak, S. (2008). Dressing your online auction business for success: An experiment comparing two eBay businesses. *MIS Quarterly*, 32(3), 653–670.
- Groeger, L., & Buttle, F. (2016). Deciphering word-of-mouth marketing campaign reach: Everyday conversation versus institutionalized word of mouth. *Journal of Advertising Research*, 56(4), 368–384.
- Güngör, A. S., & Çadirci, T. O. (2013). Segmenting eWOM engagers on online social networks based on personal characteristics and behaviour. *EKEV Akademi Dergisi*, 57, 33–50.
- Hair, F., Anderson, R., Tatham, R., & Black, W. (2006). *Multivariate data analysis with readings*. London: Prentice-Hall.
- Hair, J., Black, W., Babin, B., & Anderson, R. (2010). *Multivariate data analysis: A global perspective*. New Jersey: Pearson Prentice Hall.
- Hair, J. F., Ringle, C. M., & Sarstedt, M. (2012). Partial least squares: the better approach to structural equation modeling? *Long Range Planning*, 45(5–6), 312–319.
- Hasanov, J., & Khalid, H. (2015). The impact of website quality on online purchase intention of organic food in Malaysia: A WebQual model approach. *Procedia Computer Science*, 72(6), 382–389.
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135.
- Hornik, J., Satchi, R. S., Cesareo, L., & Pastore, A. (2015). Information dissemination via electronic word-of-mouth: Good news travels fast, bad news travels faster! *Computers in Human Behavior*, 45, 273–280.
- Hooper, D., Coughlan, J., & Mullen, M. R. (2008). Structural equation modeling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods*, 6(1), 53–60.
- Hsu, M.-H., Chang, C.-M., & Chuang, L.-W. (2015). Understanding the determinants of online repeat purchase intention and moderating role of habit: The case of online group-buying in Taiwan. *International Journal of Information Management*, 35(1), 45–56.
- Huang, S., & Hsu, C. H. (2009). Effects of travel motivation, past experience, perceived constraint, and attitude on revisit intention. *Journal of Travel Research*, 48(1), 29–44.
- Hultén, B., Broweus, N., & Van Dijk, M. (2009). What is sensory marketing? In B. Hultén, N. Broweus, M. van Dijk, & M. van Dijk (Eds.), *Sensory marketing* (pp. 1–23). London: Palgrave Macmillan.

- Hyun, S. S., & Kim, I. (2014). Identifying optimal rapport-building behaviors in inducing patrons' emotional attachment in luxury restaurants. *Journal of Hospitality and Tourism Research*, 38(2), 162–198.
- Jalilvand, M. R., & Samiei, N. (2012). The impact of electronic word of mouth on a tourism destination choice: Testing the theory of planned behavior (TPB). *Internet Research: Electronic Networking Applications and Policy*, 22(5), 591–612.
- Jenkins, H. (2006). *Convergence culture: Where old and new media collide*. NYU press.
- Jeong, M., Oh, H., & Gregoire, M. (2003). Conceptualizing web site quality and its consequences in the lodging industry. *International Journal of Hospitality Management*, 22(2), 161–175.
- Karatepe, O. M., & Choubtarash, H. (2014). The effects of perceived crowding, emotional dissonance, and emotional exhaustion on critical job outcomes: A study of ground staff in the airline industry. *Journal of Air Transport Management*, 40, 182–191.
- Kauffman, R. J., & Wood, C. A. (2006). Doing their bidding: An empirical examination of factors that affect a buyer's utility in internet auctions. *Information Technology and Management*, 7(3), 171–190.
- Kietzmann, J., & Canhoto, A. (2013). Bittersweet! Understanding and managing electronic word of mouth. *Journal of Public Affairs*, 13(2), 146–159.
- Kim, J., & Lennon, S. J. (2013). Effects of reputation and website quality on online consumers' emotion, perceived risk and purchase intention. *Journal of Research in Interactive Marketing*, 7(1), 33–56.
- Kim, D., Jang, S., & Adler, H. (2015). What drives café customers to spread eWOM? Examining self-relevant value, quality value, and opinion leadership. *International Journal of Contemporary Hospitality Management*, 27(2), 261–282.
- Kimmel, A. J., & Kitchen, P. J. (2014). WOM and social media: Presaging future directions for research and practice. *Journal of Marketing Communications*, 20, 5–20.
- Law, R., Qi, S., & Buhalis, D. (2010). Progress in tourism management: A review of website evaluation in tourism research. *Tourism Management*, 31(3), 297–313.
- Leung, X. Y., Xue, L., & Bai, B. (2015). Internet marketing research in hospitality and tourism: A review and journal preferences. *International Journal of Contemporary Hospitality Management*, 27, 1556–1572.
- Lewis, R. C. (1984). Theoretical and practical considerations in: Research design. *Cornell Hotel and Restaurant Administration Quarterly*, 24(4), 25–35.
- Litvin, S. W., Goldsmith, R. E., & Pan, B. (2018). A retrospective view of electronic word-of-mouth in hospitality and tourism management. *International Journal of Contemporary Hospitality Management*, 30(1), 313–325.
- Lohse, G. L., & Spiller, P. (1998). Electronic shopping. *Communications of the ACM*, 41(7), 81–87.
- Loiacono, E. T., Watson, R. T., & Goodhue, D. L. (2007). WebQual: An instrument for consumer evaluation of web sites. *International Journal of Electronic Commerce*, 11(3), 51–87.
- Luo, J., Ba, S., & Zhang, H. (2012). The effectiveness of online shopping characteristics and well-designed websites on satisfaction. *Quarterly*, 36(4), 1131–1144.
- Nunkoo, R., & Ramkissoon, H. (2013). Travelers' E-purchase intent of tourism products and services. *Journal of Hospitality Marketing & Management*, 22(5), 505–529.
- Nunnally, J. C. (1978). *Psychometric theory* (2nd edit.) (p. 416). Hillsdale, NJ: McGraw-Hill.
- Nunnally, J. C. & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.
- Oh, S., Baek, H., & Ahn, J. (2015). The effect of electronic word-of-mouth (eWOM) on mobile application downloads: An empirical investigation. *International Journal of Mobile Communications*, 13(2), 136–156.
- Önder, I., Koerbitz, W., & Hubmann-Haidvogel, A. (2016). Tracing tourists by their digital footprints: The case of Austria. *Journal of Travel Research*, 55(5), 566–573.
- Park, S., Wang, D., & Fesenmaier, D. (2011). Assessing structure in American online purchase of travel products. *Anatolia*, 22(3), 401–417.
- Pavlou, P. A., Liang, H., & Xue, Y. (2007). Understanding and mitigating uncertainty in online exchange relationships: A principal-agent perspective. *MIS Quarterly*, 31(1), 105–136.
- Ponte, E. B., Carvajal-Trujillo, E., & Escobar-Rodríguez, T. (2015). Influence of trust and perceived value on the intention to purchase travel online: Integrating the effects of assurance on trust antecedents. *Tourism Management*, 47, 286–302.
- Qi, S., Law, R., & Buhalis, D. (2017). Comparative evaluation study of the websites of China-based and international luxury hotels. *Journal of China Tourism Research*, 13(1), 1–25.
- Sheehan, K. B. (2001). E-mail survey response rates: A review. *Journal of Computer-Mediated Communication*, 6(2).
- Smith, A. D. (2004). Information exchanges associated with internet travel marketplaces. *Online Information Review*, 28(4), 292–300.
- Sotiriadis, M. D., & Van Zyl, C. (2013). Electronic word-of-mouth and online reviews in tourism services: The use of twitter by tourists. *Electronic Commerce Research*, 13, 103–124.
- Usoro, A., Shoyelu, S., & Kuofie, M. (2010). Task technology fit and technology acceptance models applicability to eTourism. *Journal of Economic Development, Management, IT, Finance and Marketing*, 2(1), 1e32.
- Vargo, S. L., & Lusch, R. F. (2004). The four service marketing myths: Remnants of a goods-based, manufacturing model. *Journal of Service Research*, 6(4), 324–335.
- Wang, L., Law, R., Guillet, B. D., Hung, K., & Fong, D. K. C. (2015). Impact of hotel website quality on online booking intentions: eTrust as a mediator. *International Journal of Hospitality Management*, 47, 108–115.
- Wells, J. D., Valacich, J. S., & Hess, T. J. (2011). What signal are you sending? How website quality influences perceptions of product quality and purchase intentions. *MIS Quarterly*, 35(2), 373–396.
- Wen, I. (2012). An empirical study of an online travel purchase intention model. *Journal of Travel & Tourism Marketing*, 29(1), 18–39.
- Winnie, P. (2014). The effects of website quality on customer e-loyalty: The mediating effect of trustworthiness. *International Journal of Academic Research in Business and Social Sciences*, 4(3), 19–41.
- Yang, H.-L., & Lin, C.-L. (2014). Why do people stick to Facebook web site? A value theory-based view. *Information Technology & People*, 27(1), 21–37.
- Ye, Q., Law, R., Gu, B., & Chen, W. (2011). The influence of user-generated content on traveler behavior: An empirical investigation on the effects of e-word-of-mouth to hotel online bookings. *Computers in Human Behavior*, 27(2), 634–639.
- Yoo, B., & Donthu, N. (2001). Developing and validating a multidimensional consumer-based brand equity scale. *Journal of Business Research*, 52(1), 1–14.
- Zha, X., Yang, H., Yan, Y., Liu, K., & Huang, C. (2018). Exploring the effect of social media information quality, source credibility and reputation on informational fit-to-task: Moderating role of focused immersion. *Computers in Human Behavior*, 79, 227–237.
- Zhao, X., Wang, L., Guo, X., & Law, R. (2015). The influence of online reviews to online hotel booking intentions. *International Journal of Contemporary Hospitality Management*, 27(6), 1343–1364.



The Ways of Altruism

Gualtiero Piccinini¹ · Armin W. Schulz²

Published online: 4 August 2018
© Springer Nature Switzerland AG 2018

Abstract

We argue that some organisms are altruistically motivated and such altruistic motivation is adaptive. We lay out the *helper's decision problem*—determining whether to help another organism. We point out that there are more ways of solving this problem than most people recognize. Specifically, we distinguish two kinds of altruistic motivations, depending on whether a desire to help is produced for one's own sake or for others' sake. We identify circumstances in which either kind of psychological altruism provides the most adaptive solution to the helper's decision problem. As a result, we show that both kinds of psychological altruism are likely to be instantiated and selected for.

Keywords Egoism · Evolution · Evolutionary altruism · Mechanisms · Psychological altruism

Introduction

Some organisms behave in ways that increase the direct (reproductive) fitness of another organism (West et al. 2007). In what follows, we call organisms that behave in this way—regardless of their motive—“helpers.” In some species, dispositions to help have been selected for (e.g., Sober and Wilson 1998; Gardner and West 2010; West et al. 2007, 2011; Okasha 2006). This could be because increasing the (direct) fitness of other organisms also increases the (direct) fitness of the helper, as in cases of mutual benefit (West et al. 2007; Sober and Wilson 1998). There can also be selection for helping where the helping decreases the direct fitness of the helper, as in cases of strict evolutionary biological altruism (West et al. 2007; Okasha 2006).

Evolutionary biological altruism can be explained in terms of inclusive fitness, which is the sum of an organism's direct fitness (i.e., the expected number of offspring minus the portion of offspring due to the help it receives from others in its

population) and its weighted contribution to the direct fitness of every other organism in the population, where the weights are given by the coefficient of relationship between the organisms (Hamilton 1964; Gardner et al. 2011; Rubin 2018). There is good reason to think that what natural selection depends on is inclusive fitness, not direct fitness or personal fitness (an organism's expected number of offspring) (Grafen 2006). This matters, as the inclusive fitness of biologically altruistic behaviors can be positive: the behavior's positive contribution to the personal reproductive success of related organisms can outweigh its negative contribution to the organism's own personal reproductive success.

It remains controversial how (selected for) helping behavior, whether strictly evolutionarily altruistic or not, is motivated. In particular, it is not yet clear whether and when helping behavior is motivated in a way that deserves to be called *psychologically altruistic*—rather than selfish or merely reflexive. Equally controversial is whether and when *psychological altruism* is adaptive—i.e., whether it contributes to the inclusive fitness of the helper and, therefore, is subject to evolution and preservation by natural selection. Also, whether psychological altruism is adaptive leaves open whether it is strictly evolutionary biologically altruistic: depending on how it increases the bearer's inclusive fitness, it could also be mutually beneficial or evolutionarily selfish. This will become important below.¹

✉ Gualtiero Piccinini
piccininig@umsl.edu; <http://www.umsl.edu/~piccininig/>

Armin W. Schulz
awschulz@ku.edu; <http://people.ku.edu/~a382s825/>

¹ Department of Philosophy, University of Missouri–St. Louis, 1 University Blvd, St. Louis, MO 63121, USA

² Department of Philosophy, University of Kansas, 3101 Wescoe Hall, Lawrence, KS 66045, USA

¹ Analogous points can also be made within other theoretical frameworks, such as involving neighborhood-modulated fitness or multi-level selection theory.

Psychological altruism has been heavily debated by ethicists, cognitive neuroscientists, social psychologists, economists, and evolutionary biologists. Some classical and contemporary theories deny that organisms ever have ultimate altruistic desires (Hobbes 1969/1651; La Rochefoucauld 1691; Bentham 1824: 392–3; Nietzsche 1881: 148; Cialdini et al. 1997). Others maintain that some organisms are psychological altruists (e.g., Batson 1991; Fehr and Camerer 2007; Stich et al. 2010) and that psychological altruism can be selected for (Sober and Wilson 1998; Schulz 2011, 2016, 2018; Clavien 2011). Some contemporaries argue that identifying psychological mechanisms behind altruism is empirically too difficult, so we should leave these proximate mechanisms aside and focus on altruistic behavior alone (Wilson 2015, Chap. 5). In summary, there is no consensus on whether psychological altruism occurs and, if it does, whether it is selected for (Stich et al. 2010; Garson 2016).

In this paper, we propose an enhanced evolutionary framework for investigating psychological altruism. Our framework encompasses both humans and non-human species (cf. Bshary and Raihani 2017). We argue that some organisms are altruistically motivated and such altruistic motivation is adaptive. In section “The Helper’s Decision Problem,” we lay out the helper’s decision problem—determining whether to help another organism—and point out that it can be extremely difficult to solve. Clarifying the tradeoffs involved in the helper’s decision problem allows us to articulate a space of possible strategies for solving it. In the section “A Matrix of Helping Strategies: Egoistic, Altruistic, and Impersonal,” we note that there are more options than most people recognize. Specifically, we identify four kinds of strategy for solving the helper’s decision problem and place them in a matrix based on whether the motivations for a behavior have egoistic or altruistic content and whether they are produced egoistically or altruistically. In the section “The Evolutionary Biology of Psychological Altruism,” we argue that psychologically altruistic solutions are likely to be selected for. One reason is that, in some cases, egoistic strategies are impractical for lack of sufficient information and computational resources. Therefore, organisms must resort to altruistic strategies at least some of the time. In the section “Predictions and Consequences,” we bring out some consequences of this discussion for ethics, cognitive neuroscience, and economics.

The Helper’s Decision Problem

It is widely recognized that organisms must decide when to help and when not. In some circumstances, it might be adaptive for some organisms to help all the time—or to never do so. More commonly, organisms need to determine when helping is biologically called for. We shall call it the helper’s decision problem. Four points are important to note.

First, solving this problem does not require that the organism have a concept of adaptiveness or inclusive fitness, nor that it chooses behaviors by calculating their expected (inclusive, direct, or personal) fitness. For one thing, (selected for) helping behavior may be determined by processes that are not even cognitive, let alone explicitly representational (cf. Strassmann and Queller 2011).²

Second, what *is* required is that organisms have some proximate mechanism for choosing helping behaviors in a way that correlates at least reasonably well with (at least) their direct fitness.³ Organisms cannot use a mechanism that *systematically* picks out maladaptive behaviors. If they did, they would eventually go extinct. In fact, there is empirical evidence that many organisms choose helping behaviors in ways that are by and large adaptive for them (Houston and McNamara 1999; Jensen 2012; Chudek et al. 2013, 436–437).⁴ Beyond this, no further assumptions about these proximate mechanisms need to be made.

Third, the helper’s decision problem is very difficult to solve in the general case. There are a large number of variables that influence whether helping another organism is selected for (e.g., Frank 1998; West et al. 2007, 2011; Queller 1985, 1992; Okasha 2006; Birch and Okasha 2014; Skyrms 1996, 2004; Sober and Wilson 1998; Stevens and Hauser 2004). The adaptiveness of helping depends on how closely the recipient is biologically related to the agent, the likelihood that the recipient will reciprocate (which in turn may depend on whether there are mechanisms for ensuring reciprocation), the existence of mechanisms for punishing non-helpers and rewarding helpers, and other factors. The value of each of these variables can be onerous to calculate, and combining these values optimally can be computationally highly complex. Because of this, the most that an organism can hope for is a good-enough solution most of the time.

² We will remain neutral on the vexed issues of what counts as a representation and how it gets its content. Any reasonable account will do. For an opinionated defense of representational explanation within cognitive neuroscience that doubles as a defense of the notion of neurocognitive mechanism we adopt here, see Boone and Piccinini (2016) and Thomson and Piccinini (2018).

³ As noted earlier, an organism’s direct fitness is the expected number of offspring it has just by itself. The organism’s personal fitness is simply its expected number of offspring (this will be greater than its direct fitness if some of its offspring result at least partly from the actions of other organisms). Finally, an organism’s inclusive fitness is the relatedness-weighted sum of the organism’s own direct fitness and those of the other organisms it is related to (see also Birch 2017). Note also that the points in the text could be made in terms of other notions of fitness as well (such as neighborhood-modulated fitness or various multi-level notions of fitness—Wilson 2015, 28; Okasha 2006; Sober and Wilson 1998, Gardner et al. 2011).

⁴ In cases where the relevant organisms are cultural learners, what determines whether a behavior will spread through the population—i.e., whether it is adaptive in the broadest sense—can depend on more than its biological adaptiveness. Gächter et al. (2010) find that culture influences cooperation. For more on this, see e.g., Boyd and Richerson (2005), Richerson et al. (2016), Stich (2016). See also below.

Fourth, given the difficulty of the helper's decision problem, evolution must select shortcuts—heuristics that provide good-enough solutions most of the time (Gigerenzer et al. 1999; Hutchinson and Gigerenzer 2005). In turn, this implies that different situations are likely to call for different heuristics. Some organisms, such as social insects, have relatively automatic and rigid ways of choosing behaviors, including altruistic ones. Other organisms may sort behaviors in terms of which ones are worth performing and which ones are not—e.g., they might assign different behavior utility or reward values and then act accordingly (for more on this, see, e.g., Morillo 1990; Schroeder 2004; Glimcher et al. 2005). Even cognitively sophisticated organisms may sometimes rely on relatively simple, innately⁵ hardwired strategies because they are sufficient (e.g., “help offspring in need”—see Schulz 2016, 2018).

The helper's decision problem and its varied heuristic solutions raise two additional questions. Consider all the possible ways of determining whether an organism should help another. Which ones deserve to be called psychologically *altruistic*, which *egoistic*, and which deserve neither label? We will answer this question in the next section. The subsequent section will examine which ways of altruism are likely to be selected for.

A Matrix of Helping Strategies: Egoistic, Altruistic, and Impersonal

Just because it is adaptive for an organism to help another, it does not follow that it is adaptive for its *motives* to be altruistic. Someone can (adaptively) act altruistically for entirely selfish reasons. Our goal in this section is to distinguish more precisely between different motivations for helping.

Drawing these distinctions in a satisfactory way is not easy. The traditional way is roughly in terms of the content of the organism's *ultimate* desires—desires that are *not* instrumentally derived from other desires. To the extent that an organism is motivated by ultimate other-involving desires—i.e., desires directed at increasing others' well-being (or happiness, or the like), and thus, by assumption, their fitness—it is deemed a psychological altruist. By contrast, to the extent that an organism is motivated by ultimate self-involving desires—i.e., desires directed at increasing one's own well-being—it is deemed a psychological egoist. This implies that, to the extent that an organism is motivated by ultimate *neutral* desires—i.e., desires directed neither at the self nor at another organism—it should be considered neither an altruist nor an egoist (see also Sober and Wilson 1998; Stich et al. 2010; Garson 2016; Schulz 2016).

⁵ The notion of innateness is controversial. For an account that suits our purposes, see Northcott and Piccinini (in press).

This characterization is too simplistic. The main problem is that it neglects how desires are produced. Desires are produced by cognitive mechanisms such as innate dispositions, learning, and instrumental reasoning. Such mechanisms may deserve to be called altruistic or egoistic. To make progress on psychological altruism, this question of production must be addressed.

To begin, we need greater precision on what counts as a desire in the relevant sense. We cannot limit ourselves to paradigmatic desires, namely, propositional representations of a state of affairs that cognizers explicitly deliberate with. On one hand, if we required that psychological altruists be motivated by explicit deliberation that employs propositional desires, we would rule out too much. Someone who acts on an immediate urge *to help another organism*—i.e., a representation of the kind “must help so and so”—without representing the precise state of affairs aimed at and without deliberating, still deserves to be called a psychological altruist. On the other hand, we should not be overly inclusive. For example, an organism that helps another because of a mere reflex—e.g., a cow that gives us milk because its milk ejection reflex is triggered—should *not* count as a psychological altruist. There is no good reason to classify automatic responses such as reflexes as *psychologically* egoistic or altruistic. Of course, this is not to say that automatic responses to help others are biologically or even morally unimportant—the point is just that they are different in nature from either psychologically altruistic or egoistic helping behaviors.

Therefore, for present purposes, we will count as a *desire* any conative state that represents which goals or states of affairs to pursue, without requiring that desires be propositional attitudes that can be deliberately reasoned with (cf. Clavien 2011). We follow mainstream cognitive neuroscience and assume that not only human beings but also many other organisms are motivated by desires in this broad sense. Desires contrast with reflexes, fixed action patterns, motor commands, and other automatic control mechanisms—what we shall call *automatisms* in what follows. While the latter can also trigger behaviors, they do so without representing goals or states of affairs.

When it comes to helping behaviors driven by desires, we can distinguish between behaviors caused by egoistic desires and those caused by (ultimate) altruistic desires. This traditional distinction should be refined. A more fine-grained view of the nature of representational decision-making situates the traditional distinction within a matrix spanned by two dimensions. On one hand, helping behaviors stem from desires with different kinds of *contents*: some are driven by a concern for other organisms (altruistic ones), some by concern for oneself only (egoistic ones), and some by concerns that are neither other-involving nor self-involving (e.g., wanting to play). We will continue to refer to desires with altruistic content as altruistic desires, and desires with egoistic content as egoistic

desires (this dimension is familiar from most of the recent discussion of this topic: e.g., Sober and Wilson 1998; Stich et al. 2010; Batson 1991). On the other hand, helping behaviors stem from desires that are generated in different ways. Here, we are not talking solely about ultimate desires. The distinction is between sources of desires regardless of whether the desires are ultimate or instrumental. In particular, desires (whether altruistic, egoistic, or neutral in content) can be *produced* by egoistic, altruistic, or neutral cognitive mechanisms. This makes for the second dimension of the matrix of helping strategies: it concerns the cognitive mechanisms that *produce* the desire in question.

This brings us to what we mean by egoistic, altruistic, or neutral mechanisms of desire production. By *egoistically produced* desires, we mean desires produced by evolutionarily selfish mechanisms: mechanisms that were selected for increasing their bearer's own reproductive success (i.e., its direct or personal fitness) only, as opposed to that of other organisms (see also West et al. 2007).⁶ There are at least three kinds of evolutionarily selfish desire-production mechanisms. First, an organism can have an *innate* disposition to form desires to pursue one's self-interest under certain circumstances. That is to say, the organism's brain is built so that detecting certain circumstances (e.g., low blood glucose levels) triggers the formation of a desire to pursue one's self-interest (e.g., the urge to eat). Second, an organism can *learn* to produce desires. There are a number of different such learning mechanisms available (for an overview, see, e.g., Henrich and McElreath 2007; Boyd and Richerson 2005; Sterelny 2012), at least some of which very plausibly evolved for evolutionarily selfish reasons. For example, consider the class of reward-based learning dispositions: the mechanism behind these dispositions—the tendency to seek rewards and avoid aversive stimuli—is evolutionarily ancient and can be found in solitary organisms as cognitively simple as the sea slug *Aplysia californica* (Kandel 2001). There is no reason to think that these reward-based learning mechanisms could not extend to the acquisition of desires. The third example of egoistically produced desires is cases where organisms *internalize* external norms: in cases where certain behaviors are socially rewarded, organisms that can and do internalize the relevant norms might save processing and error costs, and thus benefit themselves (see Gintis 2003, for a model of altruism based on this).⁷

By contrast, by *altruistically produced* desires, we mean desires produced by mechanisms that are evolutionarily altruistic: mechanisms that were selected, at least partially, for

⁶ Put differently, egoistically produced desires are desires produced by mechanisms whose evolution is driven just by the fact that they increase the direct reproductive fitness (i.e., the number of offspring) of the organism in question, while not increasing its indirect fitness (so that the second component of the inclusive fitness calculation here is zero).

increasing other organisms' reproductive success (i.e., their direct fitness). In other words, evolutionarily altruistic mechanisms increase the expected reproductive success of other organisms (and may or may not increase the organism's own reproductive success).⁸ The main instance of this is any selected-for innate disposition to form desires to help others under certain circumstances. That is to say, the organism's brain may have evolved so that detecting certain circumstances (e.g., that a baby is crying) triggers a desire to help others (e.g., the urge to soothe the baby), possibly mediated by an intermediate internal state (e.g., empathy⁹) under appropriate background conditions (e.g., bonding between agent and target and sufficient resources). This kind of innate disposition mechanism may be subject to developmental constraints, so that the precise range of others and circumstances that trigger a desire to help depend on environmental factors—e.g., on whom an organism is raised with. For instance, empathy is highly plastic: its intensity is modulated by factors such as whether its target is a member of the group and whether they behaved fairly in the past; as a result, empathy predicts altruistic behavior under certain circumstances (compassion) but not others (empathic distress) (Klimecki 2015).

Finally, a desire is *neutrally produced* just in case it is neither egoistically nor altruistically produced. It may result from mechanisms that have not been selected for at all, or it may be a by-product of other mechanisms. For example, a desire may be generated in a manner similar to how skills are acquired: for example, after repeatedly helping B, organism A may come to form a desire to help B, much like the skill of riding a bike comes after an organism has practiced this for a while. We are not committed to this being a frequent occurrence, or even for it to be possible at all—we just want to note that our account has room for it if this turns out to be a plausible empirical possibility.

⁷ This internalization mechanism could also be seen as a form of reward-based learning. However, this would not alter the main point in the text: namely, that desires can be egoistically produced.

⁸ We may distinguish further between two kinds of altruistically produced desires. *Strictly* altruistically produced desires are produced by mechanisms solely selected for increasing others' direct fitness—they increase the expected reproductive success of that other organism and do not affect or even decrease the bearer's expected reproductive success. *Broadly* altruistically produced desires are produced by mechanisms selected for increasing others' direct fitness along with their bearer's (what West et al. 2007, call "mutual benefit"). This distinction will not play a role in this paper.

⁹ De Waal (2008) argues that empathy can play such a role; Klimecki et al. (2016) provide additional supporting evidence. Someone might object that empathy-driven altruistic behavior is *selfishly* motivated, because it improves the agent's emotional state. This objection is confused. It is well established that empathy can lead to either altruistic or selfish desires and, consequently, to either altruistic or selfish behaviors (Schulz 2017). Here we are considering cases in which empathy leads to ultimate altruistic desires. In such cases, empathy deserves to be considered a component in an *altruistic* source of desires. Any improvement in the agent's emotional state, which may or may not follow the desire's satisfaction, is not the agent's motive—it's just a by-product.

There will also be mixed cases. Most obviously, an altruistic desire may be first produced by an innate mechanism and then reinforced by conditioning. In what follows, we will focus primarily on pure etiologies, but we should not forget that mixed etiologies are possible.

We can now combine the two dimensions—desire content and desire production—to obtain a space of psychological strategies for solving the helper’s decision problem. This space includes at least four types of motivation to help others.¹⁰ We label them as follows.

Psychological egoism chooses actions based on desires with egoistic contents.

Psychological egoists need not engage in helping behavior, but they can. If they do, they determine the appropriateness of helping from instrumental reasoning starting from egoistic first principles.

Classical psychological altruism chooses actions based on non-egoistically produced ultimate desires with altruistic contents.¹¹

Although we are calling this motivational structure classical psychological altruism, this is not exactly the same as psychological altruism as classically conceived—indeed, it is not entirely clear how psychological altruism *is* classically conceived. For traditional theorists of psychological altruism say nothing at all about whether the ultimate desires are produced altruistically, egoistically, or neutrally. Still, the spirit of psychological altruism as classically conceived is that it is a motivational structure untainted by egoism. Therefore, given our framework, what we call classical psychological altruism is the motivational structure that is closest to the spirit of psychological altruism as classically conceived. Classical psychological altruists need not succeed in helping others, but they aim to help. They have one main source of ultimate altruistic desires: (more or less plastic) innate dispositions.¹²

Apart from these classical motivational structures, there is also a nonclassical variant of altruism:

Nonclassical psychological altruism chooses actions based on egoistically produced ultimate desires with altruistic contents.

Nonclassical psychological altruists need not succeed in helping others, but they aim to help. The main egoistic source of desires with altruistic contents we focus on here is reward-based learning. This kind of learning leads to the reoccurrence

of a previously occurring desire by either rewarding its presence or punishing its absence (see also Rachlin 2002; Erev and Roth 2014). In cases where this learning operates by rewarding a previously occurring desire with altruistic content, the chain of rewards must end in a desire that is produced by some other means. Thus, nonclassical psychological altruists must possess some other source of desires as well.

Finally, there is a motivational structure that is based on desires with contents that are neither altruistic nor egoistic:

Impersonal agency chooses actions based on desires with neutral (i.e., non-egoistic and non-altruistic) contents.

Impersonal agents neither aim to help themselves nor others, but they may help others nonetheless. For example, someone might volunteer to fight a community’s enemy to pursue adventure; nevertheless, their action may protect their community. This impersonal helping is most relevant to highly social and cognitively sophisticated organisms subject to cultural pressures, such as human beings. Presumably, it piggybacks on other forms of altruism and molds them in light of social pressures. It is not directly relevant to our discussion so we set it aside.

These four motivational structures are summarized in Table 1.

This taxonomy has some important implications: in particular, we can now see clearly a major deficiency of the traditional definitions of psychological altruism and egoism: these definitions oversimplify the situation and make it appear that there are only two options, when in fact there are (at least) four.¹³ This is important, for it overlooks some theoretically and empirically important options that need to be taken into account to develop a proper understanding of the psychological structures that might underlie helping behaviors.

The Evolutionary Biology of Psychological Altruism

Now that the theoretical landscape is clearer, we can explore when these ways of making helping decisions are selected for. Specifically, we want to assess the evolutionary pressures that plausibly underlie the different ways of being motivated to help. To prepare the terrain, let us briefly consider the nature of this evolutionary biological methodology.

The empirical plausibility of the different ways of making helping decisions is a (comparative) psychological question. Thus, asking about the evolutionary pressures on these different ways of making helping

¹⁰ Böckler et al. (2016), Clavier and Chapuisat (2013), and Ramsey (2016) also distinguish different types of altruisms, but they are addressing different questions so their taxonomies are different from ours.

¹¹ Classical psychological altruism admits of two variants: a *pure* variant, where the ultimate desires with altruistic content are all produced altruistically (whether strictly or broadly), and an *impure* variant, where the ultimate desires with altruistic content are produced either altruistically or neutrally. We will not consider this subdivision further.

¹² As noted earlier, they may have a second source in the form of desires formed by habit. As also noted earlier, we will not consider this further here.

¹³ Schulz (2016, 2018) and Garson (2016) also point out that there are more than two options—though they do not expand the space of helping motivations in the way that we do here.

Table 1 Four key motivational structures for helping others

Content of the desire (↓)	Origin of the desire (⇒)	Altruistic	Egoistic
Altruistic		Classical altruism	Non-classical altruism
Neutral		Impersonal agency	
Egoistic		Egoism	

decisions is not obviously the most straightforward way of proceeding—though hardly unorthodox either (e.g., Sober and Wilson 1998; Stich et al. 2010; Schulz 2011, 2016; Garson 2014; see also Barrett 2015; Barrett et al. 2002; Buss 2014; Barkow et al. 1992; Wilson 2015).

One reason it is particularly valuable here, though, is that other sources of data are not yet available: as the previous section made clear, the questions of psychological altruism has so far been investigated within an impoverished theoretical framework, so that existing work is unable to discriminate between classical and nonclassical psychological altruism. In turn, this makes it useful to look towards theoretical evolutionary biology to see what it can add to this discussion (in the next section, we return to the concrete empirical implications of the evolutionary framework laid out here).

We will argue on largely evolutionary grounds that different motivations for helping are instantiated in the ways set out below. Our argument is not conclusive; however, we do hope it is a fruitful starting point for more detailed investigations into how different organisms make helping decisions and how their motivational profiles evolved (see also Schulz 2011, 2013, 2016).

With this in mind, we can now consider the evolutionary pressures on the different ways of being motivated to help. To begin with, recall that some mechanisms for producing helping behaviors are neither altruistic nor egoistic simply because they involve no desires at all. Specifically, some behaviors are chosen by automatisms, and some of those are *helping* behaviors (whether strictly biologically altruistic or mutually beneficial). In addition, helping behaviors can be caused by entirely noncognitive means. Consider the way cells in multicellular organisms cooperate. Most theorists do not attribute cognitive mechanisms to individual cells in the sense in which they attribute cognitive mechanisms to multicellular organisms. Yet, individual cells within multicellular organisms often benefit other cells at their own expense.

This sort of example shows that the default explanation for helping behavior is neither psychological egoism, as many have supposed (cf. the discussion in Sober 1999, pp. 147–

148), nor psychological altruism. At least from an evolutionary biological point of view, *the default explanation for helping behavior is noncognitive mechanisms and automatisms*. This is because there is good reason to think noncognitive mechanisms and automatisms evolved before representational mechanisms, are easier than representational mechanisms for evolution to produce, and are the ancestral states from which representational decision-making evolved—probably more than once. Bacteria, microbes, insects, and many other animals make decisions by relying on automatisms and noncognitive means; the reliance on representational mental states (like desires) to make decisions has evolved after that (Schulz 2018). Given this, to the extent that one sees any of the above options as the default explanation for helping behaviors, it should be automatisms and noncognitive ways of making decisions. This conclusion is important because it frees us to think about the remaining types of mechanism for helping behavior in their own right, without presupposing that one is a priori more plausible than the others.

When it comes to cognitively sophisticated organisms, there are many variables that contribute to the evolutionary pressures for helping behavior. The most crucial variables for our purposes are the following: the extent to which a helping behavior is selected over a more egoistic alternative, how easy it is for the organism to recognize a situation in which helping behavior is selected for, and the existence of social structures enforcing reciprocation between members of a group and providing rewards to those who provide help (in the form of resources, status, power, mating opportunities, etc.). These variables give rise to a space of possible scenarios that favor different strategies for solving the helper's decision problem.

Psychological egoism is the most flexible but most cognitively demanding way to generate altruistic desires. It may be the best strategy in some cases, such as helping someone who will be thereby obligated to reciprocate in light of existing circumstances (*quid pro quo*). But in many cases, it is too cognitively demanding, and hence unfeasible. Would-be altruists often have no reliable way of knowing whether a stranger will reciprocate help in the absence of social structures that enforce reciprocation, let alone whether helping strangers will lead to future rewards through means other than direct reciprocation (see, e.g., Baumard et al. 2013). In many practical circumstances, organisms simply lack sufficient information to conduct the relevant instrumental reasoning with any hope of reaching reliable conclusions. Still, no one doubts that psychological egoism plays a role in animal psychology, including—at least in some specialized cases—in generating helping behaviors. What matters here is that, given how difficult the helper's decision problem is in the general case, psychological

egoism is unlikely to be the most important way of making helping decisions. This is noteworthy in and of itself.¹⁴

This takes us to classical psychological altruism (ultimate altruistic desires from non-egoistic sources). Classical psychological altruism is likely to play an important role in animal psychology. For starters, we have seen that helping behaviors can be caused by automatisms, which are neither altruistic nor egoistic. If evolution can select for automatisms that produce helping behavior, there is no reason to rule out that, when more sophisticated heuristics than fixed action patterns are involved in choosing a behavior, ultimate other-involving desires that are generated either altruistically or neutrally may play a role. In other words, there is no reason to rule out that evolution can select for classical altruistic motivations. Specifically, classical psychological altruism is most efficient in cases of reliably adaptive conditions that require little modulation based on social context but still require enough modulation that relying on automatisms would be maladaptive (Schulz 2018). Examples include helping needy offspring, needy partners, needy family members, and perhaps injured in-group members (see also Alger and Weibull 2013).

To understand this better, note that behaviors are often selected for to help others that are sufficiently closely related to the agent (Gardner et al. 2011; Taylor and Frank 1996; Frank 1998; Queller 1992; van Veelen 2009; Birch and Okasha 2014). Indeed, helping direct descendants often increases an organism's direct fitness; helping other kin often increases an organism's inclusive fitness. This is typically true regardless of social circumstances: it does not matter whether there are mechanisms enforcing reciprocity or punishing freeloading.

In cognitively sophisticated animals whose behaviors are motivated by desires, this circumstance creates an evolutionary pressure towards an endogenous source of desires to help members of these special groups when they are needy. A mechanism that responds to this pressure must be able to do two things: recognize when a needy organism is a member of these special groups, and then generate a desire to help that organism. As a matter of fact, many cognitively sophisticated organisms help others roughly in proportion to how closely they are genetically related to them (Gardner et al. 2011; Strassman et al., 2011; Kuzdzal-Fick et al. 2011; West et al. 2007; Henrich and Henrich 2007). The likely explanation is an innate, fitness-enhancing disposition to desire to help their

kin: for some organisms, helping their kin cannot be done automatically—for instance, because kin recognition is too complex, or because there are many different ways to help kin, so that an organism benefits from representational reasoning about *how* to help their kin—but it is always adaptive to *somehow* help their kin.¹⁵ This thus leads to the selection of classical altruism.¹⁶

Helping kin is not the only kind of circumstance where classical psychological altruism is likely to be the evolutionarily favored solution. Classical psychological altruism is likely to be favored under any circumstance with the following characteristics: relatively easy to recognize, relatively low cost, relatively high payoff, but sufficiently complex and variegated to make automatisms too rigid for the job (Schulz 2016, 2018). One such example is a needy reproductive partner: insofar as an organism is going to reproduce and raise offspring with that partner, helping the partner is also helpful to the self. Another example is the presence of injured in-group members in highly social animals: they are easily recognizable, their recovery benefits us because it strengthens the group and our fitness depends on the group's strength, and helping them can be relatively low cost. Therein may lie a selection pressure for empathy in response to others' pain.

In sum, classical psychological altruism is likely to play a large role in animal psychology. Under any circumstances that are easy to recognize, relatively low cost, and in which representationally driven helping behavior is relatively adaptive, there is the potential for a selection pressure towards classical psychological altruism.

We now turn to nonclassical altruism. Like its predecessors, nonclassical altruism (ultimate altruistic desires from egoistic sources—primarily, reward-based learning) is likely to play a large role in animal psychology. To understand this, recall that the difference between classical and nonclassical altruism is precisely that the latter is based on (reward-based) learning. Reward-based learning is a powerful way to determine when circumstances are appropriate for helping others. Thus, nonclassical altruism is sandwiched between egoism and classical altruism: it is less cognitively demanding than egoism—which needs to derive all helping behaviors from egoistic first principles—but more flexible than classical altruism. This sandwiching makes clear when nonclassical altruism is adaptive: namely, when helping behavior is reliably adaptive in a certain situation, but this adaptiveness depends on social conditions such as the likelihood of reciprocity, which in turn may depend on presence or absence of mechanisms rewarding help or enforcing reciprocity.

¹⁴ Psychological egoists decide whether to help by assessing whether helping increases their own wellbeing. If the psychological variables egoists use as a proxy for wellbeing correlate with personal or direct fitness (as opposed to inclusive fitness), egoists will not choose to help when helping increases their inclusive fitness without increasing their direct or personal fitness. Therefore, psychological egoism will fail to lead to helping behaviors in cases of selected-for evolutionary biological altruism. This further strengthens the conclusion established in the main text. This could be avoided if an egoist's proxy for personal wellbeing correlates with its inclusive fitness, but the biological plausibility of this is low—for reasons related to the ones laid out in the text.

¹⁵ Of course, for some organisms, helping their kin can be done automatically: see e.g. Strassmann et al. (2011); Kuzdzal-Fick et al. (2011).

¹⁶ Note, though, that this may require complex decisions as to which kin to help (in case there are several options)—including potential future kin. See also Hausfater and Hrdy (1984) and Trivers (1974).

Simply put, there are circumstances where it is adaptive for organisms motivated by desires to *learn* when to help even though calculating whether to help in every occasion through instrumental reasoning is unfeasible. More specifically, non-classical altruism is adaptive if it is inter-generationally variable whether helping is adaptive, but intra-generationally stable: it is not adaptive for organisms to be born with an innate disposition to form desires to help certain other organisms because whether this help is adaptive depends on the precise conditions the organism faces; but, if the conditions are such that helping *is* adaptive, it is also adaptive for the organism not to derive the helping behavior, every time, from egoistic ultimate desires. Rather, the organism learns when forming a desire to help certain other organisms is appropriate.

The existence of circumstances like this is well known: in fact, the evolution of learning is based on it (see, e.g., Henrich 2015; Boyd and Richerson 2005; Fehr and Fischbacher 2003). Therefore, it follows straightforwardly that there are circumstances where we should expect the evolution of nonclassical altruism.

Consider cognitively sophisticated social animals, whose behaviors are motivated by desires (as opposed to automatisms). Examples include wolves, vervet monkeys, and vampire bats. These organisms depend on their mutual cooperation with other members of their group for foraging, escaping predators, securing mates, raising offspring, grooming, etc. If all group members cooperate equally, a simple innate disposition to cooperate with in-group members would solve their helper's decision problem. This is what most social insects do. But these animals are capable of both reciprocal cooperation and freeloading. Free-loaders use shared resources without sharing, thus increasing their fitness at the expense of other group members (e.g., Packer and Rutan 1988). In addition, such animals can leave or join a group, so that the boundaries of groups are at least somewhat flexible, and members within groups can form alliances that compete with other alliances to some degree. Finally, the same member of such groups may be more or less prone to freeloading depending on circumstances. Therefore, such animals must adjust their degree of helping to circumstances such as encountering new group members and the likelihood that another group member is freeloading. In this context, an innate disposition to cooperate with in-group members may be part of the story but cannot be the whole story because it risks defeat by freeloader invasion.

Thus, social animals who live in groups with flexible boundaries and who are capable of freeloading face several different motivations: (i) to help other group members because a thriving group is also good for them, (ii) to freeload, (iii) to not help (or, even better for the group, to punish) free-loaders (other than themselves). Therefore, social animals of this kind cannot rely solely on simple innate dispositions to help in-group members, except for special circumstances to be discussed below.

A better solution involves mechanisms that generate a sense of reward when individuals act on their desire to help non-free-loading members of their group, so that these desires are reinforced. These mechanisms have two jobs: identifying correct targets for helping behavior (i.e., members of the group, except for free-loaders) and motivating helping behavior towards the correct targets by rewarding helping behavior and punishing freeloading.

There are a number of mechanisms that appear to play this role. One is ritual-based bonding. This is a process of mutual signaling between individuals, which requires positive feedback loops with its target(s). Bonding involves the limbic system and the release of a set of hormones (oxytocin and vasopressin) and neurotransmitters (dopamine and endorphins) in social situations that are likely to involve members of the group (mates, family members, or members of a larger group). We need not be concerned with the details of the bonding mechanism, except to note that bonding creates trust between partners and a sense of reward in the presence of its target, which means that helping the bonding target is likely to generate a sense of reward—if nothing else, by promoting proximity with the bonding target.¹⁷

Another type of relevant mechanism is overt rewards and punishments delivered by other members of the group as a function of helping behavior. Many cognitively sophisticated species of social animals live in groups that establish complex social hierarchies. One function of such hierarchies is to maintain balance between the group members' motivation to pursue their direct or personal fitness at the expense of other group members and their motivation to cooperate with the group. This sort of mechanism for generating altruistic desires is primarily exogenous, although in order to work it requires that external rewards and punishments be met by appropriate internal changes, such as reward-based learning.¹⁸ Group members who share food and other resources may be rewarded in the form of acceptance, status, reciprocation, mates, etc.; free-loaders should not be helped and may even be punished in the form of physical aggression, low status, expulsion from the group, etc. The extent to which a cognitively sophisticated social animal exhibits

¹⁷ Donaldson and Young (2008) review evidence that oxytocin and vasopressin modulate complex social behavior. De Dreu (2012) reviews evidence that oxytocin release enables categorization of others into in-group versus out-group members, promotes trust towards in-group members, and motivates cooperation with in-group members and aggression towards out-group members. Frost (2016) provides a formal argument that ritual bonding can promote helping behavior in a way that is consistent with nonclassical psychological altruism. For two types of cooperation that would benefit from this type of mechanism, see Brosnan and de Waal (2002) on symmetry-based reciprocity and attitudinal reciprocity. See also Soares et al. 2010.

¹⁸ An example of inappropriate internal change is instrumental reasoning aimed at avoiding punishment and reaping rewards. Organisms that respond thus are (maladaptive) psychological egoists. We are not considering that sort of response here, although it is certainly a possible one.

helping behavior is modulated by the extent to which such behavior is appropriately reinforced within a relevant group, which in turn depends on the exact boundaries of the group and the degree to which reinforcing stimuli are elicited during relevant circumstances (Cf. Raihani et al. 2012; Brosnan and de Waal 2014).

In sum, nonclassical psychological altruism is likely to play a large role in animal psychology. But nonclassical altruism works primarily by *reinforcing* existing altruistic desires; it does not generate them in the first place. Thus, nonclassical altruism needs a way to generate altruistic desires in the first place. As we have already mentioned, though, psychological egoism is an unlikely source of altruistic desires in many circumstances, because there is not enough information to establish the benefits of altruism for the agent. Therefore, altruistic desires that originate in those circumstances are likely to be produced via classical psychological altruism.

For simplicity, we have focused on pure versions of the strategies we defined. We should not forget that there might be hybrid strategies. For example, it is possible that an organism wants to help their offspring both because they have learned to do so (e.g., through bonding rituals) *and* because they have an innate disposition to do so. Under certain circumstances, such mixed helping motivations may make cooperative behavior between organisms over time especially stable.

Predictions and Consequences

The framework we introduced, to the effect that egoism, classical altruism, and non-classical altruism is likely to be selected for, has important empirical implications.

First, our framework predicts that each of the above three helping motivations is likely to be instantiated, although it may not always be recognized as such. This allows us to reinterpret existing findings in novel and productive ways. For example, as noted above, the disposition to help human offspring in need is widely instantiated. While abortion and even infanticide are common in several cultures, they are universally seen as difficult decisions (Hausfater and Hrdy 1984). In turn, this suggests that a *desire* to help offspring in need is a virtually universal feature of human life. This can now be recognized as offspring-focused classical altruism. Similarly, financial and other economic interactions among strangers are widely seen to be underwritten by desires to further one's own well-being—i.e., psychological egoism. These interactions are widely seen to be egoistic and our framework confirms this. Finally and most interestingly, here is a plausible example of nonclassical altruism. One widely noted effect of military training, discipline, and combat experience is to instill in soldiers a genuine care for their comrades. This can now be recognized as a case of non-classical altruism: the soldiers

learn—through individual as well as collective rewards and punishments and the resultant bonding process—to want to their colleagues to do well. This matters, as it shows that the kind of attitude soldiers have towards each other are comparable in content—though not in origin—with those family members have for each other. In turn, this can help us understand the benefits and challenges that come from life in the armed forces.

In this way, the framework laid out in this paper (a) predicts *that* these three motivational structures are instantiated, (b) clarifies the relationships among these different helping motivations, and (c) explains why they are instantiated. So, the reason why non-classical altruism is likely to be instantiated among well-trained soldiers is that these are interactions among non-kin, in which everybody profits from a cooperative relationship, but where the benefits of freeriding can be high. In such a case—as noted earlier—non-classical altruism is likely to be adaptive. This kind of suggestion is worth investigating in more detail.

Second, the above conceptual framework makes novel predictions and suggests new avenues of investigation. In what follows, we lay out several of these predictions and suggestions for the different disciplines studying psychological altruism.

In ethics, two points need to be noted. On the one hand, the arguments of this paper suggest that the value of psychological altruism vis-à-vis egoism must be reassessed. Given the conceptual framework laid out here, the difference between psychological altruism and egoism is much narrower than is traditionally supposed. This is so not only because altruistic behavior can be reliably caused by egoistic motivational structures—as Stich et al. (2010) have argued—but also because even when altruistic behavior is caused by desires with altruistic content, such desires may be produced by egoistic mechanisms. In turn, this makes it plausible that the difference between psychological altruism and egoism is also less ethically significant than commonly supposed (see, e.g., Rachels 2000, p. 81; Schroder 2000, p. 396). Of course, fully establishing this last conclusion would require significantly further argumentation; here, we just want to note that our descriptive conclusions put some pressure on ethical positions that are based on a very sharp distinction between psychological altruism and egoism.

On the other hand, the evolutionary framework laid out here may yield valuable insights about how to coax our evolved psychological mechanisms into producing ethically good outcomes. For instance, our account makes clear that there are different ways to increase the degree of psychological altruism in a population. Most obviously, the plausible existence of non-classical altruism makes clear that people can be *taught* to want to help others. A similar point applies to classical altruism. Given that (as noted above) innate dispositions to form desires to help others may need to be

developmentally mediated by a functioning empathy system, ensuring that the latter does indeed develop appropriately can thus increase the prevalence of classically altruistic motivations. Both of these points can help prevent the kind of racist and discriminatory behaviors that are still so common (cf. Greene 2013). Neither of these points has been fully appreciated before: for example, typical efforts to combat bullying and harassment pay little attention to the possibility that people may be trained to no longer *want* to bully or harass.

In cognitive neuroscience, our argument complements recent advances in the subject, which also emphasize that understanding helping behavior requires investigating its underlying neurocognitive structures (cf. Gluth and Fontanesi 2016; Greene et al. 2016; Hein et al. 2016; Kurzban et al. 2015). More specifically, we have argued that, in order to arrive at a proper understanding of these structures, we must go beyond the content of the relevant motivations and also consider their production—for only then can we develop an adequate view of the ways that organisms are driven to help (whether they are classically altruistic, nonclassically altruistic, egoistic, or impersonal). In turn, this implies that the study of psychological altruism is a diachronic problem: we need to take into account not only how the organism is psychologically constituted at time t_1 (by assessing the contents of its desires), but also how it was psychologically constituted at time t_0 (by assessing how it produced the relevant desires).¹⁹

This complicates the empirical investigation of altruism, egoism, and impersonal agency (which was complex to begin with—see, e.g., Batson 1991; Stich et al. 2010). But this is not to say that this topic is intractable. There are ways to investigate the distinction between classical and nonclassical altruism empirically. For example, we have hypothesized that unconditioned empathy and bonding between kin are primary mechanisms behind classical altruism, whereas conditioned empathy and bonding to non-kin group members are primary mechanisms behind nonclassical altruism. This is a hypothesis worth investigating. Indeed, this hypothesis yields novel, testable predictions: for example, increasing bonding mechanisms among non-kin—e.g., through administering oxytocin—and rewarding a desire to help others can increase stable altruistic helping dispositions beyond just increasing trust in an economic interaction (Kosfeld et al. 2005)—these helping dispositions are likely to be maintained for long periods even if no longer encouraged.

In economics, the adaptiveness of different forms of altruism is also important. To see this, note that it is a typical assumption in much economic modeling that people are

egoistically motivated. This assumption is not required by economic theory—which generally leaves the form of an agent's utility function open—but it is still often made (Kalenscher and van Wingerden 2011; Fehr and Camerer 2007; Falk et al. 2003; Fehr and Gächter 2000). Recently, though, some authors have argued that this assumption is misguided: it appears that at least sometimes, some people are motivated to help others (Rand 2016; Fehr and Camerer 2007; Falk et al. 2003; Fehr and Gächter 2000; Fehr and Schmidt 1999; Clavien and Chapuisat 2016). What our discussion does is use evolutionary biological considerations to expand this latter position further: there are good reasons to think that human beings (among other organisms) are in fact *frequently* altruistically motivated, and for deep evolutionary reasons. Specifically, the above framework predicts that, for many humans, *very many* economic interactions—even beyond those with kin—have an altruistic component: after all, many humans live in circumstances that favor one or the other form of altruism. In turn, this prediction needs to be further considered, as it can call for a major reevaluation of much consumer behavior.

Finally, in evolutionary biology, some theorists say that all that matters for evolution is whether a behavior is altruistic, not whether it is motivated altruistically (e.g., Wilson 2015). On the contrary, we have argued that different sorts of motivational profiles are likely to be involved in solving different portions of the helper's decision problem. As we have argued, different motivational profiles may be favored by different selection pressures, which make them adaptive under different circumstances. Therefore, to reach a deeper understanding of the ways of altruism, it is incumbent on evolutionary theorists to consider which evolutionary pressures favored one or another of the possible causes of altruistic behavior (cf. Brosnan and Bshary 2010; Bshary and Raihani 2017).

Conclusion

The upshot is this. First, the problem of deciding when to help others—the *helper's decision problem*—is generally difficult to solve and requires heuristic solutions, which often must be selected for. Second, the solutions that are easiest to be selected for are those that involve noncognitive mechanisms and automatism (reflexes, fixed action patterns, and the like). Therefore, the default explanation of altruistic behavior involves noncognitive mechanisms and automatism, not psychological egoism as is often assumed. Nevertheless, many organisms are motivated by desires (including urges); this cognitive motivational structure gives rise to the distinction between psychological egoism (egoistic desires) and psychological altruism (desires to help). Third, there are two importantly different kinds of altruistic motivations: *classical psychological altruism*, which generates desires to help for

¹⁹ There is an asymmetry here, in that we do not need to take this diachronic perspective when it comes to psychological egoism and impersonal agency: as noted above, these are defined just by the contents of the relevant conative states. Still, the cognitive neuroscience of helping behavior cannot ignore the diachronic perspective, on pain of missing the distinction between classical and nonclassical altruism.

others' sake, and *nonclassical psychological altruism*, which generates desires to help for one's sake. Fourth, calculating whether to behave altruistically is egoistically desirable is unfeasible or inefficient in many cases; therefore, either classical or nonclassical psychological altruism are more efficient and hence adaptive solutions to the helper's decision problem than psychological egoism. Classical altruism is most efficient when altruistic behavior is reliably adaptive without requiring much modulation based on social context. Nonclassical psychological altruism is most efficient when altruistic behavior is reliably adaptive but this adaptiveness depends on social conditions that can be learned. Thus, both kinds of psychological altruism are likely to be instantiated and selected for. Fifth, we hypothesize that unconditioned empathy and bonding between kin are primary mechanisms behind classical altruism, whereas conditioned empathy and bonding to non-kin group members are primary mechanisms behind nonclassical altruism. We submit that grounding this theory of psychological altruism in neurocognitive mechanisms, testing it empirically, and exploring its normative implications would be a fruitful interdisciplinary research program.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

References

- Alger, I., & Weibull, J. W. (2013). Homo Moralis; preference evolution under incomplete information and assortative matching. *Econometrica*, *81*(6), 2269–2302.
- Barkow, J., Cosmides, L., & Tooby, J. (Eds.). (1992). *The adapted mind*. Oxford: Oxford University Press.
- Barrett, H. C. (2015). *The shape of thought: How mental adaptations evolve*. Oxford: Oxford University Press.
- Barrett, L., Dunbar, R., & Lycett, J. (2002). *Human evolutionary psychology*. Princeton, NJ: Princeton University Press.
- Batson, D. (1991). *The altruism question: Toward a social-psychological answer*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Baumard, N., André, J. B., & Sperber, D. (2013). A mutualistic approach to morality. *Behavioral and Brain Sciences*, *36*(1), 59–122.
- Bentham, J. (1824). *The book of fallacies*. London: Hunt.
- Birch, J. (2017). *The philosophy of social evolution*. Oxford: Oxford University Press.
- Birch, J., & Okasha, S. (2014). Kin selection and its critics. *Bioscience*, *65*(1), 22–32.
- Böckler, A., Tusche, A., & Singer, T. (2016). The structure of human Prosociality: Differentiating altruistically motivated, norm motivated, strategically motivated, and self-reported prosocial behavior. *Social Psychological and Personality Science*, *7*(6), 530–541.
- Boone, W., & Piccinini, G. (2016). The cognitive neuroscience revolution. *Synthese*, *193*(5), 1509–1534.
- Boyd, R., & Richerson, P. (2005). *The origin and evolution of cultures*. Oxford: Oxford University Press.
- Brosnan, S. F., & Bshary, R. (2010). Cooperation and deception: From evolution to mechanisms. *Phil. Trans. R. Soc. B*, *365*, 2593–2598.
- Brosnan, S. F., & de Waal, F. B. M. (2002). A Proximate Perspective on Reciprocal Altruism. *Human Nature*, *13*(1), 129–152.
- Brosnan, S. F., & de Waal, F. B. (2014). Evolution of responses to (un-)fairness. *Science*, *346*, 1251776.
- Bshary, R., & Raihani, N. J. (2017). Helping in humans and other animals: A fruitful interdisciplinary dialogue. *Proceedings of the Royal Society B*, *284*, 20170929. <https://doi.org/10.1098/rspb.2017.0929>.
- Buss, D. M. (2014). *Evolutionary psychology: The new science of the mind* (5th ed.). Boston: Allyn & Bacon.
- Chudek, M., Zhao, W., & Henrich, J. (2013). Culture-gene coevolution, large scale cooperation, and the shaping of human social psychology. In K. Sterelny, R. Joyce, B. Calcott, & B. Fraser (Eds.), *Cooperation and its evolution* (pp. 425–457). Cambridge, MA: MIT Press.
- Cialdini, R. B., Brown, S. L., Lewis, B. P., Luce, C., & Neuberg, S. L. (1997). Reinterpreting the empathy-altruism relationship: When one into one equals oneness. *Journal of Personality and Social Psychology*, *73*(3), 481–494.
- Clavien, C. (2011). “Altruistic Emotional Motivation: An Argument in Favour of Psychological Altruism.” in K. Plaisance & T. Reydon (eds.), *Philosophy of Behavioral Biology. Boston Studies in Philosophy of Science, Volume 282*. Springer, 275–296.
- Clavien, C., & Chapuisat, M. (2013). Altruism across disciplines: One word, multiple meanings. *Biology and Philosophy*, *28*(1), 125–140.
- Clavien, C., & Chapuisat, M. (2016). The evolution of utility functions and psychological altruism. *Studies in the History and Philosophy of the Biological and Biomedical Sciences*, *56*, 24–31.
- De Dreu, C. K. (2012). Oxytocin modulates cooperation within and competition between groups: An integrative review and research agenda. *Hormones and Behavior*, *61*, 419–428.
- de Waal, F. B. M. (2008). Putting the altruism back into altruism: The evolution of empathy. *Annual Review of Psychology*, *59*, 279–300.
- Donaldson, Z. R., & Young, L. J. (2008). Oxytocin, vasopressin, and the neurogenetics of sociality. *Science*, *322*, 900–904.
- Erev, I., & Roth, A. E. (2014). Maximization, learning, and economic behavior. *Proceedings of the National Academy of Sciences of the United States of America*, *111*(10), 818–10 825.
- Falk, A., Fehr, E., & Fischbacher, U. (2003). On the nature of fair behavior. *Economic Inquiry*, *41*(1), 20–26.
- Fehr, E., & Camerer, C. F. (2007). Social neuroeconomics: The neural circuitry of social preferences. *Trends in Cognitive Sciences*, *11*(10), 419–427.
- Fehr, E., & Fischbacher, U. (2003). The nature of human altruism. *Nature*, *425*, 785–791.
- Fehr, E., & Gaechter, S. (2000). Fairness and retaliation: The economics of reciprocity. *The Journal of Economic Perspectives*, *14*, 159–181.
- Fehr, E., & Schmidt, K. M. (1999). A theory of fairness, competition, and cooperation. *The Quarterly Journal of Economics*, *114*(3), 818–868.
- Frank, S. A. (1998). *Foundations of social evolution*. Princeton: Princeton University Press.
- Frost, K. (2016). “Coevolutionary Dynamics of Costly Bonding Ritual and Altruism.” doi: <https://doi.org/10.1101/060624>.
- Gächter, S., Herrmann, B., & Thöni, C. (2010). Culture and cooperation. *Philosophical Transactions of the Royal Society B*, *365*, 2651–2661.
- Gardner, A., & West, S. A. (2010). Greenbeards. *Evolution*, *64*(1), 25–38.
- Gardner, A., West, S. A., & Wild, G. (2011). The genetical theory of kin selection. *Journal of Evolutionary Biology*, *24*(5), 1020–1043.
- Garson, J. (2014). *The biological mind: A philosophical introduction*. Abingdon: Routledge.
- Garson, J. (2016). Two types of psychological hedonism. *Studies in History and Philosophy of Biological and Biomedical Sciences*, *56*, 7–14.
- Gigerenzer, G., Todd, P. M., & ABC Research Group. (1999). *Simple heuristics that make us smart*. Oxford: Oxford University Press.

- Gintis, H. (2003). The Hitchhiker's guide to altruism: Genes, culture, and the internalization of norms. *Journal of Theoretical Biology*, 220, 407–418.
- Glimcher, P. W., Dorris, M. C., & Bayer, H. M. (2005). Physiological utility theory and the neuroeconomics of choice. *Games Econ Behav*, 52(2), 213–256.
- Gluth, S., & Fontanesi, L. (2016). Wiring the altruistic brain. *Science*, 351(6277), 1028–1029.
- Grafen, A. (2006). Optimization of inclusive fitness. *Journal of Theoretical Biology*, 238, 541–563.
- Greene, J. D. (2013). *Moral tribes*. London: Penguin.
- Greene, J. D., Morrison, I., & Seligman, M. E. P. (2016). *Positive Neuroscience*. Oxford: Oxford University Press.
- Hamilton, W. D. (1964). The genetical evolution of social behaviour. I. *Journal of Theoretical Biology*, 7(1), 1–16.
- Hausfater, G., & Hrdy, S. B. (Eds.). (1984). *Infanticide: Comparative and evolutionary perspectives*. Chicago: Aldine Transactions.
- Hein, G., Morishima, Y., Leiberg, S., Sul, S., & Fehr, E. (2016). The Brain's functional network architecture reveals human motives. *Science*, 351(6277), 1074–1078.
- Henrich, J. (2015). *The secret of our success: How culture is driving human evolution, domesticating our species, and making us smarter*. Princeton, NJ: Princeton University Press.
- Henrich, N., & Henrich, J. (2007). *Why humans cooperate: A cultural and evolutionary explanation*. Oxford: Oxford University Press.
- Henrich, J., & McElreath, R. (2007). Dual-inheritance theory: The evolution of human cultural capacities and cultural evolution. In R. Dunbar & L. Barrett (Eds.), *The Oxford handbook of evolutionary psychology* (pp. 555–570). Oxford: Oxford University Press.
- Hobbes, T. (1969). *Leviathan, 1651*. Menston: Scolar P.
- Houston, A. I., & McNamara, J. M. (1999). *Models of adaptive behaviour: An approach based on state*. Cambridge: Cambridge University Press.
- Hutchinson, J. M., & Gigerenzer, G. (2005). Simple heuristics and rules of thumb: Where psychologists and behavioural biologists might meet. *Behavioral Processes*, 69, 97–124.
- Jensen, K. (2012). Who cares? Other-regarding concerns—Decisions with feeling. In P. Hammerstein & J. R. Stevens (Eds.), *Evolution and the mechanisms of decision making* (pp. 299–317). Cambridge, MA: MIT Press.
- Kalenscher, T., & van Wingerden, M. (2011). Why we should use animals to study economic decision making – A perspective. *Frontiers in Neuroscience*, 5, 1–11.
- Kandel, E. (2001). The molecular biology of memory storage: A dialogue between genes and synapses. *Science*, 294(5544), 1030–1038.
- Klimecki, O. M. (2015). The plasticity of social emotions. *Social Neuroscience*, 10(5), 466–473.
- Klimecki, O. M., Mayer, S. V., Jusyte, A., Scheeff, J., & Schönberg, M. (2016). Empathy promotes altruistic behavior in economic interactions. *Scientific Reports*, 6, 31961. <https://doi.org/10.1038/srep31961>.
- Kosfeld, M., Heinrichs, M., Zak, P. J., Fischbacher, U., & Fehr, E. (2005). Oxytocin increases trust in humans. *Nature*, 435(7042), 673–676.
- Kurzban, R., Burton-Chellew, M. N., & West, S. A. (2015). The evolution of altruism in humans. *Annual Review of Psychology*, 66, 575–599.
- Kuzdzal-Fick, J. A., Fox, S. A., Strassmann, J. E., & Queller, D. C. (2011). High relatedness is necessary and sufficient to maintain multicellularity in *Dictyostelium*. *Science*, 334, 1548–1551.
- La Rochefoucauld, F. d. (1691). *Moral maxims and reflections, in four parts*. London: Gillyflower, Sare, & Everingham.
- Morillo, C. (1990). The reward event and motivation. *Journal of Philosophy*, 87, 169–186.
- Nietzsche, F. (1881). *The dawn of day*. New York: Macmillan.
- Northcott, R. & Piccinini, G. (in press). Conceived this way: Innateness defended. *Philosophers' Imprint*.
- Okasha, S. (2006). *Evolution and the levels of selection*. Oxford: Oxford University Press.
- Packer, C., & Ruttan, L. (1988). The evolution of cooperative hunting. *American Naturalist*, 132, 159–198.
- Queller, D. C. (1985). Kinship, reciprocity and synergism in the evolution of social behavior. *Nature*, 318(28), 366–367.
- Queller, D. C. (1992). Quantitative genetics, inclusive fitness and group selection. *American Naturalist*, 139, 540–558.
- Rachels, J. (2000). Naturalism. In H. LaFollette (Ed.), *The Blackwell guide to ethical theory* (pp. 74–91). Oxford: Blackwell Publishing.
- Rachlin, H. (2002). Altruism and selfishness. *Behavioral and Brain Sciences*, 25, 239–296.
- Raihani, N. J., Pinto, A. I., Grutter, A. S., Wismer, S., & Bshary, R. (2012). Male cleaner wrasses adjust punishment of female partners according to the stakes. *Proceedings of the Royal Society B*, 279, 365–370.
- Ramsey, G. (2016). Can altruism be unified? *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences*, 56, 32–38.
- Rand, D. (2016). Cooperation, fast and slow: Meta-analytic evidence for a theory of social heuristics and self-interested deliberation. *Psychological Science*, 27(9), 1192–1206.
- Richerson, P., Baldini, R., Bell, A. V., Demps, K., Frost, K., Hillis, V., Mathew, S., Newton, E. K., Naar, N., Newson, L., Ross, C., Smaldino, P. E., Waring, T. M., & Zefferman, M. (2016). Cultural group selection plays an essential role in explaining human cooperation: A sketch of the evidence. *Behavioral and Brain Sciences*, 39, e30. <https://doi.org/10.1017/S0140525X1400106X>.
- Rubin, H. (2018). The debate over inclusive fitness as a debate over methodologies. *Philosophy of Science*, 85(1), 1–30.
- Schroder, W. (2000). Continental ethics. In H. LaFollette (Ed.), *The Blackwell guide to ethical theory* (pp. 375–399). Oxford: Blackwell Publishing.
- Schroeder, T. (2004). *Three faces of desire*. Oxford: Oxford University Press.
- Schulz, A. (2011). Sober & Wilson's evolutionary arguments for psychological altruism: A reassessment. *Biology and Philosophy*, 26, 251–260.
- Schulz, A. (2013). The benefits of rule following: A new account of the evolution of desires. *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences*, 44(4, part a), 595–603.
- Schulz, A. (2016). Altruism, egoism, or neither: A cognitive-efficiency-based evolutionary biological perspective on helping behavior. *Studies in History and Philosophy of Biological and Biomedical Sciences*, 56, 15–23.
- Schulz, A. (2017). The evolution of empathy. In H. Maibom (Ed.), *Routledge handbook of the philosophy of empathy* (pp. 64–73). London: Routledge.
- Schulz, A. (2018). *Efficient cognition: The evolution of representational decision making*. Cambridge, MA: MIT Press.
- Skyrms, B. (1996). *Evolution and the social contract*. Cambridge: Cambridge University Press.
- Skyrms, B. (2004). *The stag hunt and the evolution of social structure*. Cambridge: Cambridge University Press.
- Soares, M. C., Bshary, R., Fusani, L., Goymann, W., Hau, M., Hirschenhauser, K., & Oliveira, R. F. (2010). Hormonal mechanisms of cooperative behavior. *Phil. Trans. R. Soc. B*, 365, 2737–2750.
- Sober, E. (1999). Psychological egoism. In H. LaFollette (Ed.), *The Blackwell guide to ethical theory* (pp. 129–148). Oxford: Blackwell.
- Sober, E., & Wilson, D. S. (1998). *Unto others: The evolution and psychology of unselfish behavior*. Cambridge, MA: Harvard University Press.
- Sterelny, K. (2012). *The evolved apprentice: How evolution made humans unique*. Cambridge, MA: MIT Press.

- Stevens, J. R., & Hauser, M. D. (2004). Why be nice? Psychological constraints on the evolution of cooperation. *Trends in Cognitive Sciences*, 8(2), 60–65.
- Stich, S. (2016). Why there might not be an evolutionary explanation for psychological altruism. *Studies in the History and Philosophy of the Biological and Biomedical Sciences*, 56, 3–6.
- Stich, S., Doris, J., & Roedder, E. (2010). Altruism. In J. Doris and the moral psychology research group (Ed.), *The Moral Psychology Handbook* (pp. 147–205). Oxford: Oxford University press.
- Strassmann, J. E., & Queller, D. C. (2011). Evolution of cooperation and control of cheating in a social microbe. *PNAS*, 108, 10855–10862.
- Strassmann, J. E., Gilbert, O. M., & Queller, D. C. (2011). Kin discrimination and cooperation in microbes. *Annual Review of Microbiology*, 65, 349–367.
- Taylor, P. D., & Frank, S. A. (1996). How to make a kin selection model. *Journal of Theoretical Biology*, 180, 27–37.
- Thomson, E., & Piccinini, G. (2018). Neural representations observed. *Minds and Machines*, 28(1), 191–235.
- Trivers, R. (1974). Parent-offspring conflict. *American Zoologist*, 14, 247–262.
- van Veelen, M. (2009). Group selection, kin selection, altruism, and cooperation: When inclusive fitness is right and when it can be wrong. *Journal of Theoretical Biology*, 259, 589–600.
- West, S. A., Griffin, A. S., & Gardner, A. (2007). Social semantics: Altruism, cooperation, mutualism, strong reciprocity and group selection. *Journal of Evolutionary Biology*, 20(2), 415–432.
- West, S. A., El Mouden, C., & Gardner, A. (2011). Sixteen common misconceptions about the evolution of cooperation in humans. *Evolution and Human Behavior*, 32(4), 231–262.
- Wilson, D. S. (2015). *Does altruism exist? Culture, genes, and the welfare of others*. New Haven: Yale University Press.



A Tale of Two Sample Sources: Do Results from Online Panel Data and Conventional Data Converge?

Sheryl L. Walter¹ · Scott E. Seibert² · Daniel Goering³ · Ernest H. O'Boyle Jr¹

Published online: 21 July 2018

© Springer Science+Business Media, LLC, part of Springer Nature 2018

Abstract

Samples drawn from commercial online panel data (OPD) are becoming more prevalent in applied psychology research, but they remain controversial due to concerns with data quality. In order to examine the validity of OPD, we conduct meta-analyses of online panel samples and compare internal reliability estimates for scales and effect size estimates for IV–DV relations commonly found in the field with those based on conventionally sourced data. Results based on 90 independent samples and 32,121 participants show OPD has similar psychometric properties and produces criterion validities that generally fall within the credibility intervals of existing meta-analytic results from conventionally sourced data. We suggest that, with appropriate caution, OPD are suitable for many exploratory research questions in the field of applied psychology.

Keywords Online panel data · MTurk · StudyResponse · Meta-analysis

An Examination of the Convergence of Online Panel Data and Conventionally Sourced Data

“I have recommended reject on every paper I’ve reviewed using this technique. I hope that it is a passing fad, because it is already hurting the integrity of our

journals and quality of our science.” –Review Board Member

“This is a great survey tool! I look forward to seeing more papers using such a survey technique.” –Review Board Member¹

We live in turbulent times for survey research methods. Social scientists in general, and survey researchers in the areas of applied psychology in particular, are finding it more difficult to access high-quality survey data. In response, applied psychology researchers have increasingly turned to commercial firms that recruit pools of potential respondents to participate in survey and opinion research, usually for compensation. Because recruitment and access to subjects is largely conducted through the internet, data provided by companies such as MTurk, StudyResponse, and Qualtrics have come to be known as online panel data (OPD). OPD services typically recruit a large pool of respondents who agree in advance to participate in survey studies on a variety of different topics. Essentially, anyone with internet access can volunteer to become a panel member or “opt in” and can choose to participate

An earlier version of this manuscript was presented at the 2016 Academy of Management conference in Anaheim, CA.

✉ Sheryl L. Walter
sherwalt@indiana.edu

¹ Department of Management and Entrepreneurship, Indiana University, 1309 E. 10th St., Bloomington, IN 47405, USA

² Department of Management, University of Oregon, Eugene, OR, USA

³ Department of Management and Organizations, University of Iowa, Iowa City, IA, USA

¹ These quotes are from an open-ended question (“Is there anything else you wish to say about online panel samples that haven’t been covered in this survey?”) from an anonymous survey sent to a randomized selection of 500 review board members from *Academy of Management Journal*, *Journal of Applied Psychology*, *Journal of Management*, *Organizational Behavior and Human Decision Processes*, and *Personnel Psychology* in March 2014.

in a given task or not. Many online panels provide payment for participation in the form of cash incentives, gift cards, or charitable contributions, sometimes as little as \$ 0.25 for a short survey. However, questions exist about the suitability of OPD for applied psychology research.

Researchers have used OPD in a range of fields since the 1990s (Postoaca, 2006). Goodman and Paolacci (2017) note that 43% of the behavioral studies published in the *Journal of Consumer Research* from June 2015–April 2016 were conducted on MTurk. As such, much of the research regarding the reliability of OPD comes from the consumer research field (e.g., Goodman & Paolacci, 2017; Sharpe Wessling, Huber, & Netzer, 2017). The adoption of OPD in applied psychology, although less pervasive, has grown considerably in the last 5 years. To demonstrate this point, we manually reviewed the last 10 years of six highly cited applied psychology journals (i.e., *Academy of Management Journal*, *Journal of Applied Psychology*, *Journal of Management*, *Journal of Organizational Behavior*, *Organizational Behavior and Human Decision Processes*, and *Personnel Psychology*). We found only 31 samples that used OPD in the 5 years from 2006 through 2010, but 307 samples in the 5 years from 2011 through 2015, an almost tenfold increase. Although we can glean some insight from the consumer research studies, it is important to consider the suitability of OPD for empirical studies explicitly in applied psychology.

Two main concerns with OPD revolve around the measurement properties of OPD and the characteristics of OPD samples (Landers & Behrend, 2015; Paolacci, Chandler, & Ipeirotis, 2010). Regarding measurement properties, the key question is the extent to which OPD respondents provide data that is reliable and meaningful. Regarding characteristics of OPD samples, the key question is how different OPD respondents are from “typical” respondents. A number of studies have examined demographic and employment characteristics of OPD samples relative to other, more traditional sampling techniques, such as student or organizational samples (Behrend, Sharek, Meade, & Wiebe, 2011; Paolacci et al., 2010; Gosling, Vazire, Srivastava, & John, 2004; Sprouse, 2011). However, this approach has both empirical and conceptual limitations. Demographic comparisons do not address the extent that constructs’ relationships for OPD samples differ from conventional applied psychology samples (Shadish, Cook, & Campbell, 2002). We attempt to address this question of generalizability by comparing relations among constructs based on OPD with established population estimates of these same construct relationships.

The Current Study

The purpose of our study is to examine evidence regarding the extent to which online panel samples produce

psychometrically sound and criterion-valid research results in the field of applied psychology. The strategy we adopt is to identify a set of frequently examined relations in studies using OPD, including such independent variables as leadership, personality, and affect and their relationship with outcome variables including job satisfaction, organizational commitment, organizational citizenship, and counterproductive work behavior. We then conduct a set of meta-analyses on published and unpublished studies in the field of applied psychology that have used OPD and compare the scale reliabilities and the effect size estimates from these studies with meta-analytic estimates already established in the existing literature. If the reliability and effect size estimates based on OPD studies fall within the credibility intervals provided by established meta-analyses (based on conventionally sourced data), we infer that OPD is not substantively biased relative to conventional samples currently in use. As described previously, others have used primary data to examine the demographic characteristics of OPD as a means of assessing external validity. This paper is the first to focus directly on the extent to which observed results using OPD are consistent with population estimates in the field. Our strategy, based meta-analytic estimates, complements previous approaches that are based on primary data alone.

Theoretical Concerns with Online Panel Data

Landers and Behrend (2015) suggest reviewers often dismiss OPD as a sample source due to a variety of assumptions that remain largely untested and perhaps even unstated. Fortunately, several scholars have expressed their concerns with OPD explicitly and systematically in published form (Harms & DeSimone, 2015; McGonagle, 2015; Feitosa, Joseph, & Newman, 2015). Below, we review issues of external validity and internal consistency as they relate to OPD and develop the research questions of the study.

External Validity and Online Panel Data

Some scholars question the external validity of OPD because the variety of recruitment methods used result in a nonprobability respondent population (e.g., Harms & DeSimone, 2015). This means that the total pool of potential online respondents is not a representative sample of the US or world working population, the population to which most applied psychology researchers at least implicitly wish to generalize (Landers & Behrend, 2015). Indeed, evidence suggests that OPD samples are more diverse, younger, more educated, but more poorly paid than the general US population (Paolacci et al., 2010; Gosling et al., 2004; Sprouse, 2011) and, at the same time, more diverse, older, and more work experienced than a typical undergraduate research sample (Behrend et al.,

2011). However, representative sampling or stratified random sampling is rarely used in applied behavioral science research, including applied psychology research (Fisher & Sandell, 2015; Shadish et al., 2002). Rather, samples of convenience are used, most often employees drawn from a single work organization. Such samples are unlikely to be representative of the entire US working population or even less, the worldwide working population (Highhouse & Gillespie, 2009; Landers & Behrend, 2015). For example, Bergman and Jean (2016) showed that, in the aggregate, samples in top I–O journals over-represent salaried, managerial, professional, and executive employees and under-represent wage earners, low- and medium-skilled employees, first-line personnel, and contract workers, relative to the US and international labor pool. Does the lack of representative sampling techniques and the resulting non-representative samples mean that the vast majority of the survey research in the field of applied psychology lacks external validity? Not necessarily.

Methodologists have long argued that the importance of representative sampling depends on the purpose for which the research sample is drawn (Fisher, 1955; Highhouse & Gillespie, 2009; Gillespie, Gillespie, Brodke, & Balzer, 2016). For example, public opinion pollsters as well as consumer behavior researchers typically seek to generalize a sample statistic (e.g., the sample mean) to the larger population in order to predict the voting or buying behavior of that population. They typically rely on representative sampling because a non-representative sample will lead to an inaccurate point estimate of a given attitude or behavior in the general population. Applied psychologists, on the other hand, are typically interested in *theoretical generalizability*. Theoretical generalizability concerns the extent to which presumed causal relationships among constructs can be expected to hold across other times, settings, or people (Cook & Campbell, 1976; Sackett & Larson Jr, 1990; Shadish et al., 2002). Sackett and Larson (Sackett & Larson Jr, 1990) argue that reasonable sacrifices of representative sampling are justifiable if the primary question is whether the presumed causal relationship under investigation *can* occur and if the purpose of the study is to falsify a theory through null hypothesis significance testing, circumstances that are typical of the applied psychology field. According to Sackett and Larson Jr (1990), under these circumstances, the sole criteria for selecting a setting and sample is that the sample be a relevant sub-group of the general population to which one wishes to generalize.

The logic of theoretical generalizability thus justifies the use of convenience samples for specific scientific purposes even when they do not strictly represent the population to which one wishes to generalize, so long as they may reasonably be seen as a sub-population of the larger population (Sackett & Larson Jr, 1990; Shadish et al., 2002). Several scholars have in fact argued that OPD are more generalizable than typical organizational samples precisely because they are

more diverse and because demographic and other characteristics can be screened for in advance to compose samples with the desired characteristics (Bergman & Jean, 2016; Landers & Behrend, 2015). However, some scholars suggest that OPD samples are so different they essentially do not form a sub-group of the population to which the researcher wishes to generalize. Demographic and other characteristics are self-reported and respondents may have financial or other reasons to provide inaccurate information regarding, for example, their nationality or employment status (Feitosa et al., 2015; McGonagle, 2015). Although the typical organizational sample may not be representative of the working population or even of the entire organization from which it is drawn (Bergman & Jean, 2016; Landers & Behrend, 2015), at least the researcher has some confidence respondents are indeed employed workers at the organization (McGonagle, 2015).

These authors suggest that OPD samples differ from traditional samples of convenience on key demographic and employment characteristics and, further, we can never know for certain how much they differ due to the potential for false reporting. However, as our review of the external generalizability suggests, the critical question is not if samples of convenience differ from the general population. Rather, the question is whether these differences are substantial enough to have a systematic influence on the theoretical relationships of interest to the researcher (Highhouse & Gillespie, 2009; Gillespie et al., 2016; Sackett & Larson Jr, 1990). Fortunately, we can compare the effect size estimates produced by OPD samples with those produced by conventional data without knowing anything about the underlying characteristics of the samples. Therefore, failure to find substantive effect size differences suggests, indirectly, that either sample characteristics do not differ substantially across these two types of data sources or that they differ on characteristics that do not have a significant influence on the effect size estimates.

The strategy we use in this paper is based upon comparisons of cumulative results using meta-analysis rather than a single primary sample. We conduct an omnibus test for differences between OPD and conventionally sourced data, assessing overall differences in effect size resulting from all factors that might differ between the two types of data. If OPD samples do differ from traditional samples used in applied psychology to such an extent that they do not derive from the same general population, we should expect to find the effect size estimates based on studies using OPD to differ significantly from those using traditional organizational samples. If we find substantial differences in effect size estimates, generalization from OPD samples to the general working population will be unjustified without serious consideration of the way these characteristics moderate or limit OPD results. If, on the other hand, we fail to find substantive differences, the field can be more confident that, although OPD samples may be different in a variety of ways, they make up a sub-population

of the full population to which we wish to generalize. We might then treat them as we would any other sample of convenience, as the source of tentative theoretical generalizations to the broad working population but with observed effects open to further exploration for moderation in different or less range restricted samples. This logic leads us to our first research question.

Research question 1: Do relationships among independent and dependent variables derived from online panel data differ from the same relationships found in conventionally sourced data?

Measurement Error and Online Panel Data

The second concern with OPD relates to measurement error. Measurement error occurs when individuals' answers are not accurate or "true" (Dillman, Smyth, & Christian, 2014). One of the primary reasons measurement error may occur is that respondents pay little attention to survey items in anonymous or low-stakes responding situations. Huang, Curran, Keeney, Popski, and DeShon (2012) have defined insufficient effort responding (IER) as a response set in which participants answer survey questions with little motivation to comply with survey instructions, correctly interpret item content, or provide accurate responses. The effects of such careless responding has generally been assumed to be the introduction of more random measurement error and thus weaker observed relationships with criterion variables (Schmidt & Hunter, 2014; Nunnally, 1978). However, patterned responding (e.g., pick 4 for all questions) may inflate internal reliability if scales items are grouped together and no reverse items are used (Huang et al., 2012) or may inflate observed correlations when the IER response set biases means in the same direction across multiple variables (Huang, Liu, & Bowling, 2015). Researchers have suggested a number of techniques for detecting IER, such as response time, extreme infrequency or bogus items, and psychometric antonyms (Huang et al., 2012; Meade & Craig, 2012).

A number of scholars have suggested OPD may be more prone to IER because respondents have a primarily monetary motivation for responding (McGonagle, 2015). Further, "professional" panel members, that is, members who participate in many surveys or belong to more than one panel, might maximize their income by speeding through surveys with little attention to the accuracy of their responses (Baker et al., 2010; Smith & Hofma Brown, 2006; Sparrow, 2007). Some research has examined the motivation of OPD responders and found that compensation is indeed a primary motivation of survey participation, but interest in the topic, self-insight, and altruism are also important motivators (Behrend et al., 2011; Brügger, Wetzels, de Ruyter, & Schillewaert, 2011; Paolacci et al., 2010). Evidence linking frequent participation in surveys to IER is also weak. For example, Hillygus,

Jackson, and Young (2014) showed that experienced survey takers complete surveys more quickly, but there was no relationship between participation frequency and poor responding. In fact, Hillygus et al. (2014) found *less* bias in the frequent responders than in the infrequent survey responders in the YouGov panel sample they examined relative to population benchmarks.

Other scholars have used detection techniques to directly examined IER in OPD sources. While evidence for IER is present, it is not clear that IER is more prevalent in OPD than in other types of samples. For example, Harms and DeSimone (2015) report 9.5% of their sample responded incorrectly to bogus items inserted in their survey and as much as 35% of their MTurk sample provided extreme outlier response patterns. However, Ran, Liu, Marchiondo, and Huang (2015) reported infrequent item responses ranging from 2.5 to 11.2% in four datasets based on MTurk data were similar to rates found in four of their student samples. Ran et al. (2015) concluded that OPD and student samples were equally prone to IER. Likewise, Fleischer, Mead, and Huang (2015) found 15–20% of OPD respondents identified as inattentive, rates only somewhat higher than student samples (Meade & Craig, 2012). Fleischer et al. (2015) suggested that features of some online panel sources, such as MTurk's respondent quality ratings function, may render OPD *less* prone to IER than traditional samples if used properly.

Finally, researchers have directly examined the quality of OPD based on psychometric properties. These scholars typically conclude OPD is at least as high-quality as student and field samples. For example, Buhrmester, Kwang, and Gosling (2011) found Cronbach's alpha and 3-week test–retest reliability of OPD to be good to excellent. Likewise, Behrend et al. (2011) found slightly higher internal consistency estimates in the OPD than in the student sample they examined. Behrend et al. (2011) also used item response theory analyses (Meade, 2010) and found minimal difference in the response characteristics of the OPD and student samples. Feitosa et al. (2015) assessed measurement equivalence (Vandenberg & Lance, 2000) of a measure of Big Five personality on an OPD (MTurk) sample, a student sample, and an organizational sample. They used the default settings for MTurk survey data collection, which includes workers with a 95% approval rate but no specified geographic origin. They found a lack of measurement equivalence with the student and organizational samples when using the whole MTurk sample. However, they found both configural invariance (i.e., the same pattern of factor loadings across samples) and metric invariance (i.e., factor loadings constrained to be equal across samples) when IP addresses were used to eliminate probable non-native English-speaking subjects from the MTurk sample. They conclude that OPD demonstrates measurement equivalence when data is collected from countries where English is the native language.

Thus, while a number of questions have been raised about OPD, previous empirical research suggests that the psychometric properties of OPD are not significantly worse than that of other sample sources. Each of the studies reviewed above is based on the analysis of primary data. Although meta-analytic data cannot be used to conduct item-level data quality analyses, it can be used to assess scale-level indicators of the psychometric quality of OPD, such as reliability. Use of meta-analytic techniques complements the work done with primary data because it allows us to draw more general conclusions about OPD. We therefore compare meta-analytically derived reliabilities based on OPD and traditional data sources in the literature. If the psychometric properties differ, we can conclude that OPD has more measurement error than traditional samples and researcher should give serious consideration to the use of IER techniques with such data. If, however, differences do not emerge, we may conclude that OPD and traditional samples have similar internal reliabilities.

Research question 2: Do the internal reliability estimates of samples using online panel sources differ from those of conventionally sourced data?

Methods

Identification of Studies Our meta-analysis included 90 independent samples based on online panel data for 32,121 online panel participants. Of the 90 samples, 54 were published in academic journals and 36 were from dissertations or samples that were unpublished. To increase the likelihood of gathering available studies based on online samples, we first searched electronic databases (i.e., PsycINFO, Google Scholar, ABI Inform, and ProQuest Dissertations) for the following keywords and various combinations thereof: *online panel*, *Study Response*, *StudyResponse*, *MTurk*, *Mechanical Turk*, *Qualtrics Panel*, *Survey Monkey*, *Zoomerang*, *online respondent*, *online study*, *internet sample*, *internet panel*, and *online sample*. Combined there were over 25,000 studies that cited one or more of the search terms as of December 31, 2015. We also conducted a manual search of six top applied psychology journals that have published OPD (i.e., *Academy of Management Journal*, *Journal of Applied Psychology*, *Journal of Management*, *Journal of Organizational Behavior*, *Organizational Behavior and Human Decision Processes*, and *Personnel Psychology*) for the years 2006–2015. Finally, we posted calls for additional in-press or unpublished articles on two OB/HR listservs, HRDIV_NET and RMNET; we gathered six additional studies in this way.

Inclusion Criteria Our initial search included over 25,000 total citations with one or more of the search terms. We were interested in finding empirical data from an online respondent pool (e.g., StudyResponse, MTurk, Qualtrics) which had included

a common OB/HR relationship with existing meta-analytic data that could be used for comparison. Of the total citations that included one or more of the online panel search terms, 5463 also included mention of at least one key variable of interest (i.e., either an independent (IV) or dependent variable (DV) of interest). As our search included information from several databases, we then searched for any duplicate citations, which reduced the remaining number to 3158 citations. We then determined which of these studies included quantitative, statistical data resulting in 838 potential studies remaining. Of these 838 quantitative studies, only 107 contained a *relationship* (i.e., IV–DV relationship) of interest (e.g., conscientiousness to OCB). Many studies using online panels were experimental in nature and testing a new manipulation or intervention on a DV of interest, and not necessarily an IV–DV relationship of interest.

Of the 107 studies considered for inclusion, 23 studies provided data that was not useable for our purposes (see Appendix 3 for a full list of these studies). The following study types were excluded: studies which used an online webhosting service (e.g., Qualtrics) but collected data from a conventional sample (e.g., employees at a specific company, $k = 10$), studies which mixed conventional and OPD samples together ($k = 9$), data which used an online panel data that was designed to be unique to a specific, non-generalizable population (e.g., sample drawn from Craigslist in a given area, $k = 3$), and studies which used online panel participants and examined relationships of interest but did not report an effect size ($k = 1$). Furthermore, if a paper contained multiple studies, only data from studies using exclusively an OPD sample were included. The available OPD needed to consist of relationships that were comparable to existing conventionally sourced meta-analyses; only those relationships for which enough OPD studies were available (i.e., $k \geq 3$) were analyzed and compared. We followed Wood's (2008) detection heuristic to ensure that we did not include any duplicate study effects.

Following guidelines outlined by Schmidt and Hunter (2014), we averaged correlations obtained from samples using multiple measures of the same construct (e.g., OCB) so that each effect size reflected a unique sample. We corrected the variance of the averaged effect size using equations provided by Borenstein, Hedges, Higgins, and Rothstein (2009). Finally, there were no criteria regarding the publication date or sample nationality. The nationality of sample participants was not clearly reported for most of the samples ($k = 50$). Of the 40 samples whose participants' nationality was reported, most were exclusively from the USA ($k = 30$). There was one exclusively Dutch sample. The remaining samples ($k = 9$) were of mixed nationalities with participants from the USA and other countries. Of those nine samples, seven samples included a majority of US participants and two samples included a majority of participants from India. Two members of

the authorship team coded the studies. These individuals independently coded a random subset of the studies and the interrater reliability was high at 99.3% (868 cells/874 cells; Cohen's kappa = .986). The discrepancies were resolved through discussion.

We coded the OPD studies for the type of data pre-screening and quality checks used by the original authors. Unfortunately, 34% of the samples provided no information about pre-screening of participants and 53% provided no information about data quality checks. Since non-reporting does not necessarily mean no checks were employed, we deemed this coding too “noisy” to analyze. Nevertheless, it may be instructive to know that 30% of the samples reported requiring participants to have a specific work status (e.g., full time or a minimum number of hours per week), 27% required other specific work characteristics (e.g., have a direct supervisor), and 24% required a specific geographic setting (however, only 16% reported using screening questions to ascertain these participant attributes). Further, some type of insufficient effort responding checks (e.g., bogus items or pattern responding) was used in almost 35% of the samples. Elimination of subjects for missing data was reported in 27% of the samples.

Selection of Comparison Conventional Meta-analyses To determine whether the OPD population estimate falls within the 80% credibility interval of existing, conventionally sourced meta-analyses, we created a protocol to identify existing meta-analytic data to use. The decision rules agreed upon by the research team prior to one of the researchers searching for and identifying meta-analyses examining the common OB/HR relationships of interest are as follows. First, the researcher found all existing meta-analyses which had data for a given relationship. Then, if multiple meta-analyses were identified for a single relationship, the study with the highest k around which CVs could be constructed was chosen. It was important to use the point estimate and corresponding CVs with the highest k to provide the most accurate and reliable population estimate of conventionally sourced data. Furthermore, since we are comparing overall effects between OPD and conventional meta-data, the overall effect sizes were used when possible (i.e., data from “main effects” tables) instead of choosing effect sizes as part of moderator analyses. Thus, whenever possible, we compare main effects and corresponding CVs of conventional meta-data with main effects of OPD. When applicable, we used weighted averages to calculate an overall effect size for constructs. We noted instances of this at the bottom of Table 4 in Appendix 1. Finally, we ensured that the corrected scores for all meta-analytic results were as comparable as possible. All but one of the meta-analyses corrected for reliability in the independent and dependent variables and made no other corrections. One conventional meta-analysis (Chiaburu, Oh, Berry, Li, & Gardner, 2011) also corrected for range restriction in the predictor (personality) values using

the estimated range restriction ratio (ux) from Schmidt, Shaffer, & Oh, 2008

Meta-analytic Techniques We used Schmidt and Hunter (2014) psychometric meta-analysis for analyzing the effect sizes of the OPD correlational relations. We performed the calculations using `metatfor` in R (Viechtbauer, 2010). To ensure that the OPD true score calculations were as comparable as possible, we corrected for reliability in the independent and dependent variables for all of our analyses. For those data missing reliability information, we used artifact distributions (Schmidt & Hunter, 2014). Additionally, we used the ux values from Schmidt et al. (2008) to correct for direct range restriction in the personality values when calculating the true score values between the Big Five personality traits and OCB (to be comparable with Chiaburu et al., 2011). The ux values used were as follows: conscientiousness .92, agreeableness .91, neuroticism .91, extraversion .92, and openness to experience .91.

To compare scale reliabilities, we used reliability generalization, a framework developed by Vacha-Haase (1998) based on the concept of validity generalization, as a means to amalgamate the variability in reliability estimates that occurs across measurements. The goal of reliability generalization is similar to that of a traditional meta-analysis: to obtain a weighted mean alpha and estimate the degree of variability in alpha across different measurements and samples. Consistent with best practices (Botella, Suero, & Gambaro, 2010), we performed all calculations on non-transformed estimates of alpha. We weighted the alphas by their inverse variance. We calculated the variance using derivations of the SE of alpha as explained by Duhachek, Coughlan, and Iacobucci (2005).

Moderator Analysis Although the primary purpose of this research study was to compare the effects of OPD to those from conventional data sources, we performed some supplementary analyses to examine potential moderators that may influence the OPD effect sizes. We examined three potential moderators: publication status, OPD source, and publication date. Regarding publication status, it is likely that reviewers have more closely scrutinized data from published studies and therefore these data have undergone more data cleaning and integrity checks than data in unpublished studies. These additional integrity checks may moderate the examined relationships. Regarding OPD source, subjects from MTurk often have lower compensation rates than other paid OPD sources, such as StudyResponse or Qualtrics. Therefore, MTurk respondents may have systematic differences from the other OPD sources due to the lower compensation (e.g., they may speed through the survey randomly selecting choices which may attenuate relationships). Finally, it may be possible that the nature of OPD respondents has changed over time, as OPD has become more popular. Therefore, the data when

OPD was collected may moderate relationships. We used the metafor program in R (Viechtbauer, 2010) with restricted maximum-likelihood estimation to examine whether or not these three moderators influenced the OPD relationships. For publication status and OPD source, we examined relationships where we had at least three studies in each group. For publication date, we performed the moderator analysis when there was at least one study published in three different years.

Results

Research Question 1: External Validity

Our first research question was whether relationships among variables derived from online panels differ from conventionally sourced data. We present the meta-analytic estimates from OPD samples in Table 1 and graphically in Fig. 1. We compare the results from the OPD meta-analysis to the meta-analytic estimates that we gathered from the existing literature, which we present in Table 4. Recall that our research question asks if ρ_{OPD} , the population estimate of the size of a given relationship based upon studies using online panel data, falls within the 80% credibility interval of the population estimate based on the conventionally sourced data. We found that 86% (37/43) of the IV-DV relationships fell within the 80% credibility intervals of conventionally sourced data.²

Each of the relationships that fall outside the credibility interval tend to be stronger for the OPD sources than for the conventional sources, whether more positive or more negative. Three of the five relationships that were outside the credibility interval involved turnover intentions. The relationship between positive leadership and turnover intentions was more negative for OPD ($\rho = -.50$) than in conventional samples (80% CV $-.40, -.06$). The relationship between conscientiousness and turnover intentions was also more strongly negative for OPD ($\rho = -.29$) than in conventional samples (80% CV $-.24, -.08$). Finally, the relationship between openness to experience and turnover intentions was consistently negative for OPD ($\rho = -.17$; 80% CV $-.28, -.07$), whereas there was a less consistent relationship in the conventional samples (80% CV $-.15, .17$).

We also examined the confidence intervals to note any pattern of significant differences in the OPD versus conventional superpopulation effect sizes. Confidence intervals were

² Although the primary purpose of this research was to examine online panel data as a whole, there may be interest in examining differences between MTurk and other online panel sources (such as StudyResponse and Qualtrics). Therefore, we performed supplemental analysis for relationships where there were a minimum of three MTurk samples and three samples from other online panel sources. These results are not substantially different as 80% of the MTurk relationships and 88% of the Qualtrics/StudyResponse/Zoomerang relationships were within the 80% credibility interval of the conventional meta-analyses. Results are presented in Table 5.

reported in the conventional meta-analyses for 29 of the effect sizes (not all conventional meta-analyses reported confidence intervals). We found that ρ_{OPD} was within the 95% confidence interval of the conventional meta-analytic effect size in 10 of the cases, was outside the upper bound of the confidence interval in nine of the cases, and was outside the lower bound of the confidence interval in 10 of the cases. Of the 19 effect sizes that fell outside the confidence interval (either upper or lower bounds), 11 of the OPD effect sizes were stronger than the conventional effect sizes and eight of the OPD effect sizes were weaker than the conventional effect sizes. These results suggest that there is no systematic difference between the OPD effect sizes and the conventional effect sizes. This is not to say that there are not differences, rather the differences do not seem to follow any interpretable pattern. As a final check of the confidence intervals, we examined whether or not the 95% confidence interval from the OPD meta-analysis overlapped with the 95% confidence interval from the conventional meta-analyses. There were three cases where the confidence interval did not overlap: conscientiousness-turnover intentions, openness to experience-turnover intentions, and negative affect-CWB.

Moderator Results

We examined three potential moderators that may influence the OPD relationships of interest: publication status, OPD source, and publication date. Although a few differences emerged, these differences were generally small and no systematic pattern of differences emerged. Publication status (published versus non-published) moderated only three of the 18 relationships that we examined (neuroticism-job satisfaction, neuroticism-CWB, and negative affect-CWB). Two of the three relationships were attenuated by publication status (negative affect-CWB was strengthened). Source (MTurk versus other) moderated two of the 19 relationships that we were examined (conscientiousness-job satisfaction and negative affect-CWB). One of the two relationships was attenuated by source (negative affect-CWB was strengthened). Finally, publication date moderated four of the 39 relationships examined (extraversion-turnover intentions, extraversion-CWB, openness-job satisfaction, and negative affect-turnover intentions). One of the four relationships was attenuated by date (the relationship between openness and job satisfaction was weaker as the publication date increased). Because of the null findings, the results of these analyses are not included in the manuscript but are available from the first author upon request.

Research Question 2: Reliability Generalization

Our second research question asked whether the internal reliability estimates from online panel sources differ from those

Table 1 Results for meta-analysis of online panel samples

Relationship	<i>k</i>	<i>N</i>	\bar{r}	SD_r	ρ	SD_ρ	80% CV	95% CI	% Var
Positive leadership									
Job satisfaction ^a	15	6943	.52	.10	.59	.11	.45, .72	.51, .66	12
Org Commitment ^a	10	3495	.46	.07	.52	.08	.41, .63	.45, .59	25
Turnover intentions ^b	7	3990	-.46	.06	-.50	.05	-.57, -.43	-.56, -.44	34
CWB	7	3265	-.14	.09	-.16	.10	-.29, -.03	-.28, -.04	25
Abusive supervision									
Job satisfaction ^b	5	2626	-.45	.16	-.49	.18	-.71, -.26	-.72, -.26	6
Org Commitment	3	598	-.21	.00	-.22	.00	-.22, -.22	-.31, -.14	100
CWB ^a	13	6426	.40	.13	.45	.13	.28, .62	.35, .56	9.5
Agreeableness									
Job satisfaction ^{a, b}	7	2274	.32	.11	.38	.15	.19, .57	.25, .51	15
Org Commitment	3	755	.25	.00	.32	.00	.32, .32	.23, .41	100
Turnover intentions	5	1331	-.22	.00	-.26	.02	-.28, -.24	-.32, -.20	96
OCB	6	3773	.22	.12	.27	.15	.08, .46	.14, .39	10
CWB	8	3931	-.29	.11	-.35	.12	-.51, -.20	-.45, -.25	15
Conscientiousness									
Job satisfaction ^a	10	2932	.34	.11	.40	.14	.21, .58	.29, .50	16
Org Commitment	5	1186	.19	.00	.23	.00	.23, .23	.17, .30	100
Turnover intentions ^{a, b}	6	1568	-.24	.06	-.29	.01	-.31, -.28	-.35, -.23	97
OCB	9	4517	.21	.12	.26	.14	.08, .43	.16, .36	13
CWB	11	4637	-.27	.25	-.32	.30	-.71, .06	-.53, -.12	3
Extraversion									
Job satisfaction ^a	8	2468	.28	.11	.33	.15	.14, .51	.21, .44	16
Org Commitment	4	959	.25	.02	.31	.01	.30, .32	.23, .38	99
Turnover intentions	5	1331	-.10	.06	-.11	.08	-.21, -.01	-.21, -.01	46
OCB	6	3389	.20	.05	.24	.07	.14, .33	.16, .31	33
CWB	4	2129	.13	.12	.14	.15	-.05, .33	-.03, .32	11
Neuroticism									
Job satisfaction ^a	9	2695	-.30	.11	-.35	.15	-.54, -.17	-.47, -.24	16
Turnover intentions	5	1331	.19	.09	.21	.11	.07, .36	.09, .34	29
OCB ^a	7	3479	-.13	.09	-.16	.1	-.30, -.03	-.26, -.07	22
CWB	8	2930	.12	.11	.15	.13	-.02, .31	.03, .26	19
Openness to Experience									
Job satisfaction	6	2035	.22	.09	.27	.11	.13, .41	.16, .38	26
Org Commitment	3	755	.08	.04	.09	.07	.00, .19	-.03, .22	58
Turnover intentions ^b	4	1092	-.14	.08	-.17	.08	-.28, -.07	-.29, -.06	47
OCB	4	2559	.23	.12	.28	.14	.10, .46	.13, .43	10
CWB ^b	4	2250	-.16	.11	-.20	.11	-.34, -.06	-.33, -.07	18
Positive affect									
Job satisfaction ^a	8	3350	.36	.12	.40	.12	.24, .56	.30, .50	13
Org Commitment	3	1429	.19	.10	.20	.11	.06, .34	.05, .36	19
Turnover Intentions	4	1053	-.28	.08	-.31	.09	-.43, -.2	-.43, -.19	35
CWB	4	1225	.01	.10	.02	.11	-.12, .16	-.14, .18	32
Negative affect									
Job satisfaction ^a	18	6036	-.26	.09	-.29	.11	-.42, -.15	-.35, -.22	23
Org Commitment ^a	9	2787	-.21	.08	-.23	.09	-.34, -.11	-.31, -.14	32
Turnover intentions ^a	10	2969	.34	.06	.39	.07	.31, .47	.33, .45	44
OCB	5	2042	-.09	.1	-.11	.11	-.25, .02	-.23, .01	24
CWB ^a	21	8192	.40	.11	.46	.10	.32, .59	.39, .52	18

Table 1 (continued)

Relationship	<i>k</i>	<i>N</i>	\bar{r}	SD_r	ρ	SD_ρ	80% CV	95% CI	% Var
Justice									
Job satisfaction	6	2927	.58	.17	.66	.18	.42, .89	.49, .82	3
Org Commitment	5	2128	.57	.10	.63	.12	.47, .78	.50, .75	9
CWB ^a	14	4976	-.19	.11	-.21	.13	-.37, -.05	-.29, -.14	18

k number of statistically independent samples; *N* total sample size; \bar{r} sample size-weighted mean observed (uncorrected) correlation; SD_r sample size-weighted observed standard deviation of correlations; ρ mean true score correlation corrected for unreliability (using local coefficients alpha for both variables); SD_ρ standard deviation of corrected correlations; 80% CV 80% credibility interval; 95% CI 95% confidence interval; % Var percentage of variance attributable to statistical artifacts; CWB counterproductive work behaviors, OCB organization citizenship behavior; Org Commitment organizational commitment

^a Relationship examined in supplemental analysis

^b OPD point estimate (ρ) falls outside 80% CVs of existing meta-analyses

found in conventionally sourced data. The results for the reliability generalization are presented in Table 2 and, graphically, in Fig. 2. Here, we compare the results of the reliability generalization analysis using OPD sources to a comprehensive reliability generalization study conducted by Greco, O’Boyle, Cockburn, and Yuan (2015). We were able to compare the reliability point estimate of 12 constructs from the Greco et al. (2015) analysis to reliability generalization using the OPD sources. All 12 point estimates from the OPD analysis fell within the 80% credibility estimate from the larger reliability generalization study. These results suggest that the internal consistency of scales with OPD samples is similar to that of conventional sample sources.

Discussion

Online panel sources are increasingly being used to compose research samples in the field of applied psychology. The purpose of our research was to examine the external validity and measurement properties of OPD. We used meta-analytic techniques to aggregate the published and unpublished online survey data and compare the psychometric properties and criterion validity of this data to that found in conventional data sources. Our reliability generalization analyses showed that 100% (12 of 12) of the reliability generalization estimates from OPD samples were within the 80% credibility values of the reliability estimates based on conventional samples (Greco et al., 2015). Based on both the primary data analyses reported in previous work and our analyses using aggregate data reported here, it appears that OPD does not systematically affect internal consistency in applied psychology research.

Little previous research has examined the criterion validity of OPD in the field of applied psychology. To test external validity, we calculated meta-analytic effect size estimates for 43 IV–DV relations frequently found in OPD and compared them to these same relations based on conventional data. The

OPD population estimate fell within the 80% credibility interval established in previous meta-analyses based on conventional data 86% of the time, suggesting differences between OPD and conventional data do not exceed chance. Thus, OPD appears to provide effect size estimates that do not differ from conventional data in the field. Together, our examination of the internal and external validity of data provided by online panel sources suggests such data as appropriate as other samples of convenience used in the field of applied psychology. As with all convenience samples, it important to be able to justify that the sample source is appropriate for addressing the hypotheses/research questions. For example, it would be difficult to justify MTurk as a sample source for a study on CEOs.

Theoretical Implications

It is important to understand the purposes for which OPD is or is not appropriate. OPD, like the vast majority of samples used in applied psychology, provides a convenience sample in the sense that it is not necessarily a representative sample of the US or world working population. It is not appropriate to generalize sample statistics, such as a mean, to a population when using a non-representative samples. However, point estimates are rarely the focus of research in the applied psychology field, which tends to focus much more on causal relations among constructs and rely on the concept of theoretical generalizability. According to generalizability theory (Sackett & Larson Jr, 1990), samples of convenience are appropriate when one wishes to generalize presumed causal relationships among constructs to a broader population and if the convenience sample is reasonably similar to the population to which one wishes to generalize. For such purposes, a completely random or stratified random sampling of the population is not necessary. Rather, one can make a strong case for generalizability if the convenience sample is reasonably similar to the larger population, for example, if the convenience sample is a subsample of the population. Some

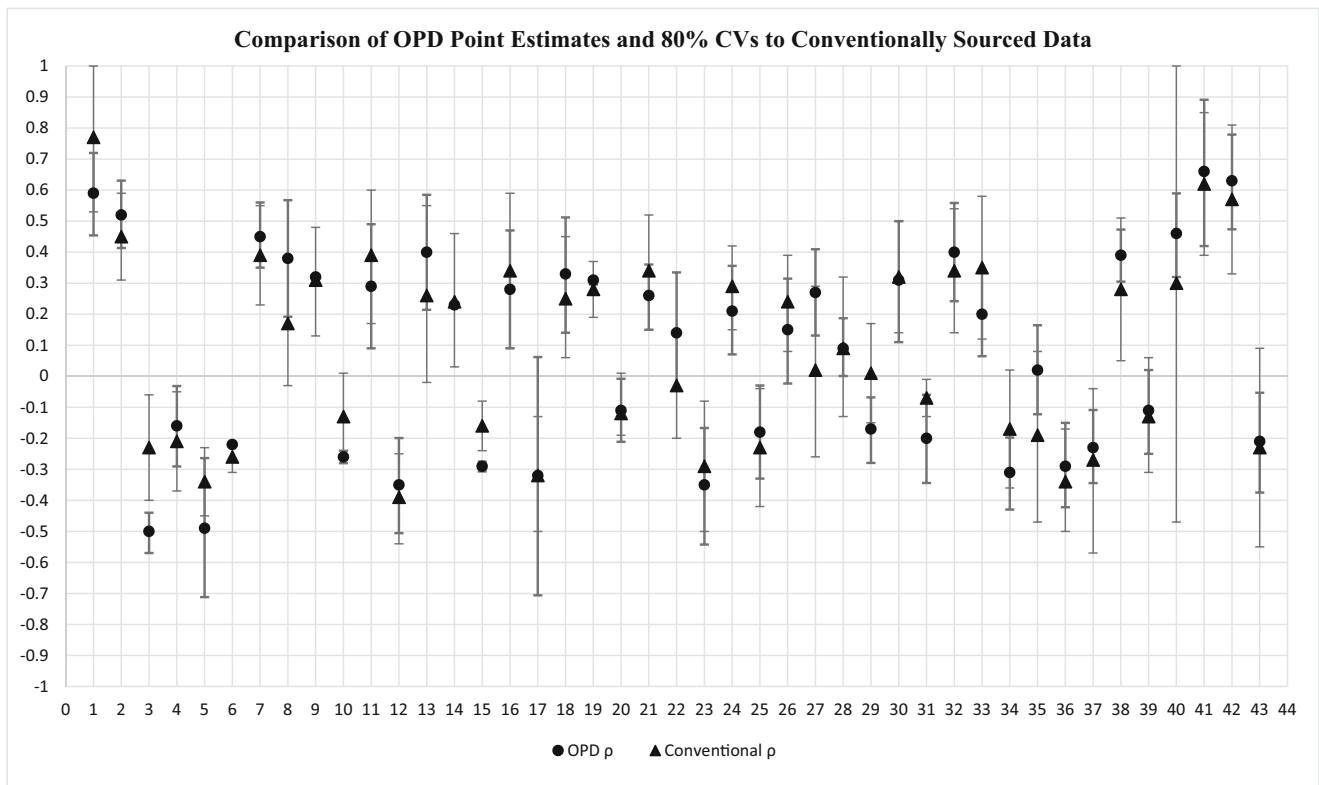


Fig. 1 Relationship number is on the *x*-axis; magnitude of correlation (from -1 to 1) is on the *y*-axis. The OPD point estimate (ρ) is designated with a circle and the 80% CVs are indicated with bold error bars; the point estimate (ρ) from existing meta-analyses is designated with a triangle and 80% CVs are indicated with thin error bars. The order of relationships follows the same order found in Table 4 in Appendix 1 and corresponds to the following number as shown on the *x*-axis: (1) positive leadership and job satisfaction (DeGroot, Kiker, & Cross, 2000), (2) positive leadership and organizational commitment (Jackson, Meyer, & Wang, 2013), (3) positive leadership and turnover intentions (Griffeth, Hom, & Gaertner, 2000), (4) positive leadership and CWB (Hershcovis et al., 2007), (5) abusive supervision and job satisfaction (Mackey et al., 2015), (6) abusive supervision and organizational commitment (Mackey et al., 2015), (7) abusive supervision and CWB (Mackey et al., 2015), (8) agreeableness and job satisfaction (Judge, Heller, & Mount, 2002), (9) agreeableness and organizational commitment (Choi et al., 2015), (10) agreeableness and turnover intentions (Zimmerman, 2008), (11) agreeableness and OCB (Chiaburu et al., 2011), (12) agreeableness and CWB (Berry, Ones, & Sackett, 2007), (13) conscientiousness and job satisfaction (Judge et al., 2002), (14) conscientiousness and organizational commitment (Choi et al., 2015), (15) conscientiousness and turnover intentions (Zimmerman, 2008), (16) conscientiousness and OCB (Chiaburu et al., 2011), (17) conscientiousness and CWB (Berry et al., 2007), (18) extraversion and job satisfaction (Judge et al., 2002), (19)

extraversion and organizational commitment (Choi et al., 2015), (20) extraversion and turnover intentions (Zimmerman, 2008), (21) extraversion and OCB (Chiaburu et al., 2011), (22) extraversion and CWB (Berry et al., 2007), (23) neuroticism and job satisfaction (Judge et al., 2002), (24) neuroticism and turnover intentions (Zimmerman, 2008), (25) neuroticism and OCB (Chiaburu et al., 2011), (26) neuroticism and CWB (Berry et al., 2007), (27) openness to experience and job satisfaction (Judge et al., 2002), (28) openness to experience and organizational commitment (Choi et al., 2015), (29) openness to experience and turnover intentions (Zimmerman, 2008), (30) openness to experience and OCB (Chiaburu et al., 2011), (31) openness to experience and CWB (Berry et al., 2007), (32) positive affect and job satisfaction (Thoresen, Kaplan, Barsky, Warren, & de Chernmont, 2003), (33) positive affect and organizational commitment (Thoresen et al., 2003), (34) positive affect and turnover intentions (Thoresen et al., 2003), (35) positive affect and CWB (Cochran, 2014), (36) negative affect and job satisfaction (Thoresen et al., 2003), (37) negative affect and organizational commitment (Thoresen et al., 2003), (38) negative affect and turnover intentions (Thoresen et al., 2003), (39) negative affect and OCB (Dalal, 2005), (40) negative affect and CWB (Cochran, 2014), (41) justice and job satisfaction (Colquitt, Conlon, Wesson, Porter, & Ng, 2001), (42) justice and organizational commitment (Colquitt et al., 2001), (43) justice and CWB (Cochran, 2014)

authors (Harms & DeSimone, 2015) have suggested that OPD respondents may not be truthful about their demographic or employment characteristics but may be so different as to preclude generalization to the broad working population. If this is so, our approach cannot tell us exactly what demographic and work experience characteristics OPD respondents possess, but our results do show that OPD data

demonstrate psychometric properties and criterion validities that are not meaningfully different from conventional field data. Thus, even if OPD samples differ from organizational samples on a number of attributes, these differences do not seem to have a systematic influence on the theoretical relationships we examined. This strongly suggests that the OPD samples are reasonably similar to other samples typically

Table 2 Comparison of scale reliabilities for OPD and conventionally sourced samples

Construct	OPD				Conventionally sourced samples			
	<i>k</i>	<i>N</i>	α	80% CV	<i>k</i>	<i>N</i>	α	80% CV
Abusive supervision	14	6811	.95	0.94, 0.96	–	–	–	–
Agreeableness	13	5340	.71	0.68, 0.86	206	108,783	.77	.65, .89
Conscientiousness	20	6908	.75	0.71, 0.89	235	102,227	.81	.73, .89
Counterproductive work behaviors	45	17,240	.84	0.83, 0.93	207	50,852	.87	.81, .93
Extraversion	12	4204	.76	0.71, 0.87	164	103,920	.81	.71, .91
Job satisfaction	41	15,378	.89	0.84, 0.94	139	64,207	.84	.76, .92
Justice	18	6791	.91	0.87, 0.95	84	47,912	.88	.82, .94
Leadership	21	8514	.90	0.86, 0.94	35	9888	.89	.84, .94
Negative affect	34	12,350	.89	0.88, 0.94	–	–	–	–
Neuroticism	14	4611	.75	0.70, 0.88	199	109,536	.83	.74, .92
Openness to experience	9	3540	.65	0.63, 0.81	165	100,958	.76	.65, .87
Organizational citizenship behaviors	10	4738	.79	0.78, 0.88	48	17,327	.85	.79, .91
Organizational commitment	22	7010	.86	0.85, 0.93	79	36,577	.85	.79, .91
Positive affect	11	4231	.92	0.92, 0.94	–	–	–	–
Turnover intentions	16	6242	.89	0.85, 0.93	44	30,067	.82	.75, .89

Comparison study was Greco et al. (2015)

k number of statistically independent samples; *N* total sample size; α internal reliability weighted by inverse of squared standard error; 80% CV 80% credibility value

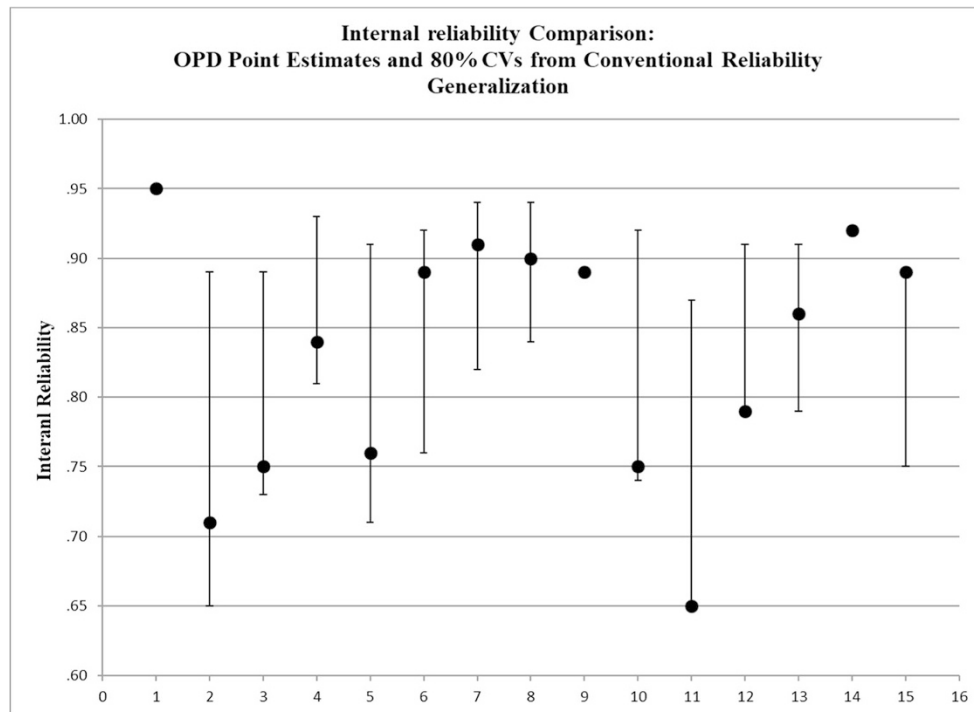


Fig. 2 Comparison of reliability generalization using OPD studies versus the reliability generalization information from published management studies. The reliability generalization estimate from the OPD studies is designated with a circle; the 80% CVs from the Greco et al. (2015) reliability generalization are indicated with error bars. The scales represented in the figure are as follows: (1) abusive supervision, (2)

agreeableness, (3) conscientiousness, (4) counterproductive work behaviors, (5) extraversion, (6) job satisfaction, (7) justice, (8) leadership, (9) negative affect, (10) neuroticism, (11) openness to experience, (12) organizational citizenship behaviors, (13) organizational commitment, (14) positive affect, and (15) turnover intentions

used in the field and thus make up an appropriate convenience sample.

Practical Implications

Our results and review of the literature on OPD yield a number of practical implications for scholars seeking to use OPD in their research beyond the theoretical considerations discussed above. Although we coded OPD studies for the types of respondent screening and data cleaning procedures used, reporting was inconsistent and incomplete, so we could not determine exactly which procedures were used or what effect each data handling technique might have on the quality of the data. It is important to note that some data screening procedures were used in the majority of the studies that make up our OPD meta-analyses. Therefore, until we can gather more accurate information regarding exactly which screening techniques are used, the conservative approach is to recommend a relatively comprehensive list of the screening procedures we found in the OPD-based studies. Table 3 provides a summary of best practices for data handling derived from the literature and the techniques already used with OPD in the field (see also DeSimone, Harms, & DeSimone, 2015). Overall, we recommend researchers carefully consider the purposes of their study, the population sampling frame, the incentives they use to select and motivate respondents, and the data screening procedures they use to eliminate poor responders. Further, we strongly suggest expressly detailing these procedures in the methods section of the article. Future research should determine which of these procedures are effective.

OPD may not be appropriate if a researcher is theorizing is about specific contextual processes (e.g., information

processing) or is concerned with a specific group of people (e.g., CEOs) since the convenience sample may not experience the type of contextual influences and may not make up a subsample of the desired population. Bergman and Jean (2016) go further to suggest that unrepresentative samples may lead scholars to overlook important workplace phenomenon that exist only in specific subgroups, such as food insufficiency or economic tenuousness. However, others have suggested that OPD sources can be of great utility precisely because they are more diverse and provide access to under-represented populations (Smith, Sabat, Martinez, Weaver, & Xu, 2015). Researchers should always be able to justify the appropriateness of the sample (source) for addressing their specific hypotheses.

Limitations and Future Research

This study, based as it is on meta-analytic techniques, has limitations common to meta-analysis. First, because the use of online panels is relatively recent in the field, the number of relationships examined and the number of studies in each meta-analysis is limited. Although we include personality, work attitudes, and leader behavior as independent variables and attitudes, behavioral intentions, and employee behavior as dependent variables, future research might extend our results to a broader range of IV–DV relations. However, the consistent nature of our results leads us to expect similar outcomes with other constructs. Second, the small number of studies for each effect size estimate restricts our ability to conduct moderation analyses by OPD source. Examining our data by OPD service source revealed no substantive differences, but future

Table 3 Recommendations when using online panel data

Assess suitability of OPD for project	Consider scientific purpose of data collection and appropriateness of OPD for purpose (Highhouse & Gillespie, 2009). Specify a sampling frame and desired sample attributes in advance (Dillman et al., 2014).
Select for desired sample attributes	Select respondents based on self-identified attributes and/or IP addresses (Feitosa et al., 2015). Use a screening survey to select respondents by attributes without specifying desired attributes in advance (McGonagle, 2015).
Deal with non-independence issue	Use procedures that track IDs to assure only one survey is completed per responder (Mason & Suri, 2012). Discard the first 150 respondents to eliminate professional responders (Harms & DeSimone, 2015).
Ensure high-quality responding	Select respondents with high-quality ratings if service does not do so already (Mason & Suri, 2012). Calibrate compensation to motivate but not over-motivate responders based on norms for the OPD source (Buhrmester et al., 2011). Warn respondents that there will be quality checks and/or payment is contingent on quality responding (Paolacci & Chandler, 2014). Use established missing data and IER checks to ensure high-quality data (Huang et al., 2012).

research based on a greater number of studies could explore this potential moderation with more statistical confidence.

Incomplete reporting in the primary studies regarding the way data were collected limited our ability to explore the extent to which data screening and cleaning might improve data quality. Our results suggest that the data handling procedures currently used in the field are adequate, since the OPD and conventional data do converge, but a more systematic understanding of these factors might make data collection smoother and more cost effective. Further research might also focus on the techniques and practices that the online panel firms themselves use to develop and maintain high-quality survey respondents, including the forms of compensation, identification protocols, and quality feedback from end users (Callegaro, Villar, Yeager, & Krosnick, 2014). Online panel participants and online panel service practices may change at any time, so continued attention to OPD quality issues is warranted.

A third limitation is that some of the more recent meta-analyses that we used to establish the 80% CV for conventional data themselves include a small number of OPD samples. We examined each of the conventional meta-analyses for studies that used OPD samples and found

slight overlap. The Choi, Oh, and Colbert (2015) and Chiaburu et al. (2011) meta-analysis contained one study that used OPD. The Mackey, Frieder, Brees, and Martinko (2015) meta-analyses contained five studies that used OPD. We chose to use the existing meta-analyses to represent the established true score estimates in the field because the small number of OPD samples is unlikely to have much influence and because the number of judgment calls necessary to update all of these meta-analyses would inevitably raise questions of their own.

A final limitation is that the majority of the OPD sources used in this study were from USA-based companies (MTurk, StudyResponse, Qualtrics). Due to differences in labor markets, social welfare, the culture of employee-employer relations, and other cultural differences, these results may not generalize to OPD from other countries.

As these future research ideas suggest, there is much more we might want to know about the nature of online panel samples and services. However, our results support a growing body of evidence that online panels can provide data that are appropriate to test some hypotheses about the general population within field of applied psychology.

Appendix 1

Table 4 Results from existing meta-analyses using conventionally sourced data

Relationship	<i>k</i>	<i>N</i>	\bar{r}	SD_r	ρ	SD_ρ	80% CV	95% CI	Meta-analysis
Positive leadership									
Job satisfaction	14	3832	.70	.19	.77	.19	.53, 1.00	.36, 1.00	DeGroot et al., 2000
Org Commitment	116	39,211	–	–	.45	.11	.31, .59	.43, .47	Jackson et al., 2013
Turnover intentions	3	161	–.21	–	–.23	.13	–.40, –.06	–.48, .02	Griffeth et al., 2000
CWB ^a	3	1215	–	–	–.21	.12	–.37, –.05	–	Hershcovis et al., 2007 ⁱ
Abusive supervision									
Job satisfaction	17	6560	–.31	.08	–.34	.09	–.45, –.23	–	Mackey et al., 2015
Org Commitment	9	2758	–.23	.04	–.26	.04	–.31, –.21	–	Mackey et al., 2015
CWB ^b	13	3726	.34	.11	.39	.10	.23, .55	–	Mackey et al., 2015
Agreeableness									
Job satisfaction	38	11,856	.13	–	.17	.16	–.03, .37	–	Judge et al., 2002
Org Commitment	29	9283	.24	.13	.31	.14	.13, .48	.25, .36	Choi et al., 2015
Turnover intentions	10	3527	–.10	–	–.13	.11	–.27, .01	–.21, –.05	Zimmerman, 2008
OCB	40	15,563	.28	.13	.39	.17	.17, .60	.33, .44	Chiaburu et al., 2011
CWB ^c	8	2934	–.31	.10	–.39	.11	–.54, –.25	–	Berry et al., 2007
Conscientiousness									
Job satisfaction	79	21,719	.20	–	.26	.22	–.02, .55	–	Judge et al., 2002
Org Commitment	38	11,041	.20	.15	.24	.17	.03, .46	.19, .30	Choi et al., 2015
Turnover intentions	13	4315	–.12	–	–.16	.07	–.24, –.08	–.21, –.11	Zimmerman, 2008
OCB	59	19,845	.24	.15	.34	.196	.09, .59	.29, .39	Chiaburu et al., 2011
CWB ^d	8	2934	–.26	.13	–.32	.15	–.50, –.13	–	Berry et al., 2007
Extraversion									
Job satisfaction	75	20,184	.19	–	.25	.15	.06, .45	–	Judge et al., 2002
Org Commitment	26	7996	.23	.08	.28	.07	.19, .37	.25, .32	Choi et al., 2015
Turnover intentions	25	7231	–.10	–	–.12	.09	–.19, .01	–.15, –.03	Zimmerman, 2008
OCB	35	14,945	.25	.12	.34	.14	.15, .52	.29, .39	Chiaburu et al., 2011
CWB ^e	5	1836	–.02	.12	–.03	.14	–.20, .15	–	Berry et al., 2007
Neuroticism									
Job Satisfaction	92	24,527	–.27	–	–.29	.16	–.50, –.08	–	Judge et al., 2002
Turnover intentions	41	15,075	.23	–	.29	.11	.15, .42	.25, .33	Zimmerman, 2008 ^j
OCB	35	15,232	–.17	.12	–.23	.15	–.42, –.04	–.28, –.18	Chiaburu et al., 2011 ^j

Table 4 (continued)

Relationship	<i>k</i>	<i>N</i>	\bar{r}	SD_r	ρ	SD_ρ	80% CV	95% CI	Meta-analysis
CWB ^f	7	2318	.20	.11	.24	.12	.08, .39	–	Berry et al., 2007 ^j
Openness to Experience									
Job satisfaction	50	15,196	.01	–	.02	.21	– .26, .29	–	Judge et al., 2002
Org Commitment	25	7797	.07	.15	.09	.18	– .13, .32	.05, .17	Choi et al., 2015
Turnover intentions	12	3730	.01	–	.01	.13	– .15, .17	.00, .03	Zimmerman, 2008
OCB	31	13,580	.23	.11	.32	.14	.14, .50	.27, .37	Chiaburu et al., 2011
CWB ^g	5	1772	– .05	.06	– .07	.05	– .13, – .01	–	Berry et al., 2007
Positive affect									
Job satisfaction	79	23,419	.28	–	.34	.16	.14, .54	.30, .38	Thoresen et al., 2003
Org Commitment	15	4873	.28	–	.35	.18	.12, .58	.25, .45	Thoresen et al., 2003
Turnover intentions	18	5327	– .14	–	– .17	.15	– .36, .02	– .25, – .09	Thoresen et al., 2003
CWB	15	3590	– .16	–	– .19	.22	– .47, .08	– .25, – .06	Cochran, 2014
Negative affect									
Job satisfaction	176	59,735	– .28	–	– .34	.13	– .50, – .17	– .36, – .32	Thoresen et al., 2003
Org Commitment	27	8040	– .21	–	– .27	.18	– .57, – .04	– .32, – .22	Thoresen et al., 2003
Turnover intentions	35	8671	.24	–	.28	.18	.05, .51	.22, .35	Thoresen et al., 2003
OCB	10	2792	– .11	.12	– .13	.14	– .31, .06	– .22, – .03	Dalal, 2005 ^k
CWB	52	11,818	.24	–	.30	.60	– .47, 1.00	.11, .37	Cochran, 2014
Justice ^h									
Job satisfaction	40	31,774	.51	–	.62	.18	.39, .85	.46, .56	Colquitt et al., 2001
Org Commitment	53	33,455	.48	–	.57	.18	.33, .81	.44, .52	Colquitt et al., 2001
CWB	29	9823	– .20	–	– .23	.25	– .55, .09	– .28, – .12	Cochran, 2014

k number of statistically independent samples; *N* total sample size; \bar{r} sample size-weighted mean observed (uncorrected) correlation; SD_r sample size-weighted observed standard deviation of correlations; ρ mean true score correlation corrected for unreliability (using local coefficients alpha for both variables); SD_ρ standard deviation of corrected correlations; 80% CV 80% credibility interval; 95% CI 95% confidence interval; CWB counterproductive work behaviors, OCB organization citizenship behavior; Org Commitment organizational commitment

^a It was assumed that the confidence interval reported in the tables of this article were the 80% credibility intervals, the sample size weighted average of interpersonal deviance (*k* = 5, *N* = 1339), organizational deviance (*k* = 4, *N* = 1215), and combined measure (*k* = 3, *N* = 1252), was used to calculate ρ , composite sd formula was used to calculate SD_ρ , and 80% CV, lower of three values is reported as *k* and *N*

^b Sample size weighted average of interpersonal deviance (*k* = 13, *N* = 3726) and organizational deviance (*k* = 22, *N* = 7761) was used to calculate \bar{r} and ρ , composite sd formula was used to calculate SD_r , SD_ρ , and 80% CV, lower of two values is reported as *k* and *N*

^c Sample size weighted average of CWB-I (*k* = 10, *N* = 3336) and OCB-O (*k* = 8, *N* = 2934) was used to calculate \bar{r} and ρ , composite sd formula was used to calculate SD_r , SD_ρ , and 80% CV, lower of two values is reported as *k* and *N*

^d Sample size weighted average of CWB-I (*k* = 11, *N* = 3458) and OCB-O (*k* = 8, *N* = 2934) was used to calculate \bar{r} and ρ , composite sd formula was used to calculate SD_r , SD_ρ , and 80% CV, lower of two values is reported as *k* and *N*

^e Sample size weighted average of CWB-I (*k* = 10, *N* = 2842) and OCB-O (*k* = 7, *N* = 2300) was used to calculate \bar{r} and ρ , composite sd formula was used to calculate SD_r , SD_ρ , and 80% CV, lower of two values is reported as *k* and *N*

^f Sample size weighted average of CWB-I (*k* = 8, *N* = 2360) and OCB-O (*k* = 5, *N* = 1836) was used to calculate \bar{r} and ρ , composite sd formula was used to calculate SD_r , SD_ρ , and 80% CV, lower of two values is reported as *k* and *N*

^g Sample size weighted average of CWB-I (*k* = 8, *N* = 2360) and OCB-O (*k* = 5, *N* = 1772) was used to calculate \bar{r} and ρ , composite sd formula was used to calculate SD_r , SD_ρ , and 80% CV, lower of two values is reported as *k* and *N*

^h Procedural justice was used as comparison

ⁱ Reverse coded “poor leadership”

^j Reverse coded emotional stability

^k These relationships were recoded using the available data from the original Dalal (2005) meta-analysis

Table 5 Results for meta-analysis of online panel samples

Relationship	<i>k</i>	<i>N</i>	\bar{r}	SD_r	ρ	SD_ρ	80% CV	95% CI	% Var
Positive leadership									
Job satisfaction									
MTurk	7	4520	.56	.10	.63	.10	.5, .76	.53, .73	8
SR/Q/Z ^a	7	1905	.45	.04	.50	.04	.46, .55	.45, .55	70
Org Commitment									
MTurk	7	2688	.46	.08	.52	.10	.39, .65	.42, .62	18
SR/Q/Z	3	807	.47	.00	.53	.00	.53, .53	.47, .59	100
Turnover intentions									
MTurk ^a	4	2737	-.47	.06	-.52	.06	-.60, -.44	-.61, -.44	28
CWB									
MTurk	3	2620	-.13	.09	-.14	.10	-.27, -.01	-.29, .00	16
SR/Q/Z	4	645	-.22	.03	-.24	.06	-.32, -.17	-.35, -.14	72
Abusive supervision									
Job satisfaction									
SR/Q/Z	4	978	-.24	.00	-.26	.00	-.26, -.26	-.32, -.19	100
Org Commitment									
SR/Q/Z	3	598	-.21	.00	-.22	.00	-.22, -.22	-.31, -.14	100
CWB									
MTurk	6	2844	.32	.08	.36	.09	.24, .47	.24, .48	27
SR/Q/Z	7	3582	.47	.12	.52	.12	.36, .67	.40, .64	10
Agreeableness									
Job satisfaction									
MTurk ^a	4	1330	.36	.13	.46	.17	.24, .67	.27, .65	13
SR/Q/Z	3	944	.26	.00	.29	.00	.29, .29	.22, .36	100
Turnover intentions									
SR/Q/Z	3	822	-.23	.02	-.26	.04	-.31, -.21	-.35, -.17	80
OCB									
SR/Q/Z	4	2495	.19	.10	.23	.12	.07, .39	.10, .36	13
CWB									
SR/Q/Z	7	3230	-.31	.12	-.36	.13	-.52, -.19	-.47, -.24	13
Conscientiousness									
Job satisfaction									
MTurk	6	1761	.40	.10	.50	.12	.35, .65	.38, .61	21
SR/Q/Z	4	1171	.24	.00	.27	.04	.22, .33	.19, .35	68
Org Commitment									
MTurk	3	813	.18	.00	.23	.00	.23, .23	.14, .31	100
Turnover intentions									
MTurk ^a	3	746	-.26	.06	-.32	.00	-.32, -.32	-.40, -.24	100
SR/Q/Z ^a	3	822	-.22	.04	-.27	.00	-.27, -.27	-.34, -.19	100
OCB									
MTurk	4	1795	.26	.14	.35	.14	.17, .53	.19, .51	14
SR/Q/Z	5	2722	.17	.08	.20	.10	.08, .33	.10, .31	21
CWB									
SR/Q/Z	9	3623	-.24	.28	-.29	.32	-.69, .12	-.53, -.04	3
Extraversion									
Job satisfaction									
MTurk	5	1524	.30	.06	.37	.08	.27, .47	.28, .46	42
SR/Q/Z	3	944	.25	.15	.27	.19	.03, .51	.03, .50	10
Org Commitment									

Table 5 (continued)

Relationship	<i>k</i>	<i>N</i>	\bar{r}	SD_r	ρ	SD_ρ	80% CV	95% CI	% Var
MTurk	3	813	.26	.03	.31	.04	.26, .36	.22, .40	76
Turnover intentions									
SR/Q/Z	3	822	-.05	.02	-.05	.03	-.09, 0	-.14, .05	83
OCB									
MTurk	3	1482	.24	.06	.30	.08	.20, .40	.19, .41	35
SR/Q/Z	3	1907	.16	.00	.19	.00	.19, .19	.14, .24	100
CWB									
SR/Q/Z	3	1428	.06	.10	.07	.11	-.07, .22	-.09, .23	21
Neuroticism									
Job satisfaction									
MTurk	5	1524	-.36	.06	-.45	.09	-.57, -.34	-.55, -.35	34
SR/Q/Z	4	1171	-.23	.10	-.25	.12	-.41, -.09	-.4, -.11	21
Turnover intentions									
SR/Q/Z ^a	3	822	.13	.08	.14	.10	.02, .27	-.01, .30	37
OCB									
MTurk	3	1423	-.14	.08	-.18	.09	-.29, -.06	-.31, -.05	30
SR/Q/Z	4	2056	-.12	.09	-.15	.11	-.30, -.01	-.29, -.02	20
CWB									
SR/Q/Z	6	2084	.08	.11	.10	.13	-.06, .27	-.03, .23	21
Openness to experience									
Job satisfaction									
MTurk	4	1330	.20	.09	.24	.12	.08, .40	.09, .39	24
CWB									
SR/Q/Z ^a	3	1549	-.20	.10	-.23	.11	-.37, -.10	-.38, -.09	19
Positive affect									
Job satisfaction									
MTurk	4	1689	.32	.09	.36	.09	.24, .47	.24, .47	25
SR/Q/Z	4	1661	.40	.13	.45	.14	.27, .62	.29, .61	11
Turnover intentions									
SR/Q/Z	3	852	-.30	.09	-.34	.09	-.46, -.23	-.48, -.20	36
Negative affect									
Job satisfaction									
MTurk	8	2952	-.25	.13	-.27	.14	-.45, -.10	-.39, -.16	14
SR/Q/Z	10	3084	-.27	.03	-.30	.05	-.36, -.23	-.35, -.25	58
Org Commitment									
MTurk	4	1789	-.17	.00	-.19	.00	-.19, -.19	-.23, -.14	100
SR/Q/Z	5	998	-.27	.10	-.31	.13	-.47, -.14	-.45, -.16	28
Turnover intentions									
MTurk	4	1097	.30	.00	.34	.00	.34, .34	.28, .40	100
SR/Q/Z	6	1872	.37	.07	.42	.07	.33, .51	.34, .50	39
OCB									
MTurk	4	1893	-.09	.10	-.10	.11	-.24, .04	-.24, .03	39
CWB									
MTurk	11	3909	.33	.09	.38	.08	.28, .48	.32, .45	20
SR/Q/Z	10	4283	.46	.09	.52	.08	.42, .61	.45, .59	25
Justice									
Job Satisfaction									
MTurk	3	1658	.53	.17	.59	.17	.37, .81	.38, .80	4
SR/Q/Z	3	1269	.65	.14	.75	.16	.54, .95	.54, .95	4

Table 5 (continued)

Relationship	<i>k</i>	<i>N</i>	\bar{r}	<i>SD_r</i>	ρ	<i>SD_ρ</i>	80% CV	95% CI	% Var
Org Commitment									
MTurk	3	1483	.54	.11	.59	.12	.43, .75	.43, .75	8
CWB									
MTurk	6	2712	– .15	.08	– .16	.09	– .28, – .05	– .25, – .08	25
SR/Q/Z	8	2264	– .24	.13	– .27	.14	– .45, – .10	– .39, – .16	18

k number of statistically independent samples; *N* total sample size; \bar{r} sample size-weighted mean observed (uncorrected) correlation; *SD_r* sample size-weighted standard deviation of correlations; ρ mean true score correlation corrected for unreliability (using local coefficients alpha for both variables); *SD_ρ* standard deviation of corrected correlations; *80% CV* 80% credibility interval; *95% CI* 95% confidence interval; *% Var* percentage of variance attributable to statistical artifacts; *SR/Q/Z* combined data for StudyResponse, Qualtrics, and Zoomerang samples; *CWB* counterproductive work behaviors, *OCB* organization citizenship behavior; *Org Commitment* organizational commitment

^a OPD point estimate (ρ) falls outside 80% CVs of existing meta-analysis

Appendix 2

Table 6 Main codes and input values for the primary OPD studies included the meta-analysis

Author(s)	Year	Pub	Source	<i>N</i>	X	r _{xx}	Y	r _{yy}	<i>r</i>
Alarcon	2009	N	StudyResponse	541	NA	0.9	JS	0.95	– 0.3
Alarcon	2009	N	StudyResponse	541	PA	0.93	JS	0.95	0.56
Badger	2014	N	MTurk	688	L	0.91	JS	0.89	0.56
Badger	2014	N	MTurk	688	L	0.91	OC	0.9	0.4
Badger	2014	N	MTurk	688	L	0.91	TOI	0.92	– 0.44
Ballinger, Lehman, & Schoorman	2010	Y	StudyResponse	496	L	0.95	TOI	0.89	– 0.43
Ballinger et al.	2010	Y	StudyResponse	496	NA	0.92	TOI	0.89	0.39
Ballinger et al.	2010	Y	StudyResponse	496	PA	0.94	TOI	0.89	– 0.38
Baratta	2014	N	MTurk	145	NA	0.9	CWB	0.56	0.13
Baratta	2014	N	MTurk	145	N	0.94	CWB	0.56	0.28
Baratta	2014	N	MTurk	145	PA	0.92	CWB	0.56	– 0.19
Baratta	2014	N	MTurk	145	NA	0.9	OCB	0.7	– 0.06
Baratta	2014	N	MTurk	145	N	0.94	OCB	0.7	– 0.12
Basford, Offermann, & Behrend	2014	Y	MTurk	511	L	0.92	JS	0.84	0.77
Basford et al.	2014	Y	MTurk	511	NA	0.93	JS	0.84	– 0.15
Basford et al.	2014	Y	MTurk	511	PA	0.93	JS	0.84	0.18
Basford et al.	2014	Y	MTurk	511	L	0.85	OC	0.92	0.47
Basford et al.	2014	Y	MTurk	511	NA	0.93	OC	0.85	– 0.1
Basford et al.	2014	Y	MTurk	511	PA	0.93	OC	0.85	0.26
Bauer	2013	N	MTurk	460	NA	0.9	CWB	0.78	0.26
Bauer	2013	N	MTurk	460	NA	0.9	OCB	0.79	0.1
Bowling & Burns	2010	Y	StudyResponse	239	AG	0.85	JS	0.9	0.18
Bowling & Burns	2010	Y	StudyResponse	239	CON	0.78	JS	0.9	0.26
Bowling & Burns	2010	Y	StudyResponse	239	EXT	0.89	JS	0.9	0.08
Bowling & Burns	2010	Y	StudyResponse	239	N	0.91	JS	0.9	– 0.4
Bowling & Burns	2010	Y	StudyResponse	239	AG	0.85	TOI	0.91	– 0.13
Bowling & Burns	2010	Y	StudyResponse	239	CON	0.78	TOI	0.91	– 0.16
Bowling & Burns	2010	Y	StudyResponse	239	EXT	0.89	TOI	0.91	0.02
Bowling & Burns	2010	Y	StudyResponse	239	N	0.91	TOI	0.91	0.27
Bowling & Eschleman	2010	Y	StudyResponse	726	AG	0.81	CWB	0.88	– 0.39

Table 6 (continued)

Author(s)	Year	Pub	Source	<i>N</i>	X	rx	Y	ry	<i>r</i>
Bowling & Eschleman	2010	Y	StudyResponse	726	CON	0.78	CWB	0.88	−0.38
Bowling & Eschleman	2010	Y	StudyResponse	726	NA	0.91	CWB	0.88	0.44
Bowling & Michel	2011	Y	StudyResponse	380	AS	0.96	JS	0.91	−0.21
Bowling, Burns, Stewart, & Gruys	2011	Y	StudyResponse	220	AG	0.86	CWB	0.9	−0.31
Bowling et al.	2011	Y	StudyResponse	220	CON	0.82	CWB	0.9	−0.31
Bowling et al.	2011	Y	StudyResponse	220	NA	0.93	CWB	0.9	0.41
Bowling, Burns, & Beehr	2010	Y	StudyResponse	227	CON	0.81	JS	0.89	0.24
Bowling et al.	2010	Y	StudyResponse	227	CON	0.81	OCB	0.7	0.17
Bowling et al.	2010	Y	StudyResponse	227	CON	0.81	OC	0.91	0.22
Bunk	2006	N	StudyResponse	522	NA	0.74	CWB	0.9	0.31
Bunk	2006	N	StudyResponse	522	NA	0.9	TOI	0.89	0.34
Burton	2014	Y	MTurk	165	NA	0.93	CWB	0.83	0.41
Burton	2014	Y	MTurk	165	NA	0.93	JS	0.98	−0.36
Burton	2014	Y	MTurk	165	NA	0.93	OC	0.86	−0.23
Carlesen	2015	N	MTurk	204	CON	0.77	OCB	0.82	0.23
Carlesen	2015	N	MTurk	204	EXT	0.86	OCB	0.82	0.17
Carlesen	2015	N	MTurk	204	CON	0.77	OC	0.82	0.15
Carlesen	2015	N	MTurk	204	EXT	0.86	OC	0.82	0.15
Carsten & Uhl-Bien	2012	Y	StudyResponse	206	L	0.78	JS	x	0.43
Castille	2015	N	MTurk	701	AG	0.53	CWB	0.9	−0.22
Castille	2015	N	MTurk	701	CON	0.49	CWB	0.9	−0.36
Castille	2015	N	MTurk	701	EXT	0.9	CWB	0.69	0.26
Castille	2015	N	MTurk	701	N	0.9	CWB	0.69	0.2
Castille	2015	N	MTurk	701	O	0.9	CWB	0.49	−0.05
Castille	2015	N	MTurk	701	AG	0.53	OCB	0.92	0.13
Castille	2015	N	MTurk	701	CON	0.49	OCB	0.92	0.1
Castille	2015	N	MTurk	701	EXT	0.69	OCB	0.92	0.19
Castille	2015	N	MTurk	701	N	0.92	OCB	0.69	−0.06
Castille	2015	N	MTurk	701	O	0.92	OCB	0.49	0.15
Chung-Yan	2010	Y	StudyResponse	259	NA	0.78	JS	0.85	−0.29
Chung-Yan	2010	Y	StudyResponse	259	NA	0.78	TOI	0.86	0.2
Cochrum-Nguyen	2013	N	MTurk	194	CON	0.81	JS	0.79	0.54
Cochrum-Nguyen	2013	N	MTurk	194	EXT	0.84	JS	0.79	0.51
Cochrum-Nguyen	2013	N	MTurk	194	N	0.69	JS	0.79	−0.46
Cohen, Panter, & Turan	2013	Y	MTurk	443	NA	0.92	CWB	0.97	0.47
Cohen, Panter, & Turan	2013	Y	MTurk	443	NA	0.92	JS	0.9	−0.45
Cohen, Panter, & Turan	2013	Y	MTurk	443	NA	0.92	TOI	0.85	0.34
Cohen, Panter, Turan, Morse, & Kim	2013	Y	StudyResponse	845	AG	0.76	CWB	x	−0.135
Cohen, Panter, Turan, Morse, & Kim	2013	Y	StudyResponse	845	CON	0.78	CWB	x	0.23
Cohen, Panter, Turan, Morse, & Kim	2013	Y	StudyResponse	845	EXT	0.82	CWB	x	0.155
Cohen, Panter, Turan, Morse, & Kim	2013	Y	StudyResponse	845	N	0.74	CWB	x	−0.05
Cohen, Panter, Turan, Morse, & Kim	2013	Y	StudyResponse	844	O	0.79	CWB	x	−0.11
Cohen, Panter, Turan, Morse, & Kim	2013	Y	StudyResponse	845	AG	0.76	OCB	x	0.065
Cohen, Panter, Turan, Morse, & Kim	2013	Y	StudyResponse	845	CON	0.78	OCB	x	0.06
Cohen, Panter, Turan, Morse, & Kim	2013	Y	StudyResponse	845	EXT	0.82	OCB	x	0.135
Cohen, Panter, Turan, Morse, & Kim	2013	Y	StudyResponse	845	N	0.74	OCB	x	−0.01
Cohen, Panter, Turan, Morse, & Kim	2013	Y	StudyResponse	844	O	0.79	OCB	x	0.11
Colbert, Bono, & Purvanova	2008	N	StudyResponse	210	NA	x	JS	x	−0.28
Colbert et al.	2008	N	StudyResponse	210	PA	x	JS	x	0.434

Table 6 (continued)

Author(s)	Year	Pub	Source	N	X	rx	Y	ry	r
Colbert et al.	2008	N	StudyResponse	210	NA	x	TOI	x	0.4
Colbert et al.	2008	N	StudyResponse	210	PA	x	TOI	x	-0.139
Costa	2015	N	MTurk	151	NA	0.93	CWB	0.89	0.35
Credé, Harms, Niehorster, & Gaye-Valentine	2012	Y	StudyResponse	437	AG	0.96	CWB	x	-0.37
Credé et al.	2012	Y	StudyResponse	437	CON	0.97	CWB	x	-0.43
Credé et al.	2012	Y	StudyResponse	437	EXT	0.98	CWB	x	-0.07
Credé et al.	2012	Y	StudyResponse	437	N	0.98	CWB	x	0.17
Credé et al.	2012	Y	StudyResponse	437	O	0.96	CWB	x	-0.35
Credé et al.	2012	Y	StudyResponse	437	AG	0.96	JS	x	0.28
Credé et al.	2012	Y	StudyResponse	437	CON	0.97	JS	x	0.18
Credé et al.	2012	Y	StudyResponse	437	EXT	0.98	JS	x	0.19
Credé et al.	2012	Y	StudyResponse	437	N	0.98	JS	x	-0.09
Credé et al.	2012	Y	StudyResponse	437	O	0.96	JS	x	0.34
Credé et al.	2012	Y	StudyResponse	437	AG	0.96	OCB	x	0.39
Credé et al.	2012	Y	StudyResponse	437	CON	0.97	OCB	x	0.34
Credé et al.	2012	Y	StudyResponse	437	EXT	0.98	OCB	x	0.18
Credé et al.	2012	Y	StudyResponse	437	N	0.98	OCB	x	-0.28
Credé et al.	2012	Y	StudyResponse	437	O	0.96	OCB	x	0.3
Credé et al.	2012	Y	StudyResponse	437	AG	0.96	TOI	x	-0.27
Credé et al.	2012	Y	StudyResponse	437	CON	0.97	TOI	x	-0.29
Credé et al.	2012	Y	StudyResponse	437	EXT	0.98	TOI	x	-0.04
Credé et al.	2012	Y	StudyResponse	437	N	0.98	TOI	x	0.04
Credé et al.	2012	Y	StudyResponse	437	O	0.96	TOI	x	-0.25
Dahling and Thompson	2013	Y	MTurk	139	NA	0.95	JS	0.92	-0.26
Dahling & Thompson	2013	Y	MTurk	139	NA	0.95	TOI	0.91	0.24
Deker & Van Quaquebeke	2015	Y	Respondi	518	L	0.96	JS	0.84	0.45
Deker & Van Quaquebeke	2015	Y	Respondi	518	L	0.96	TOI	0.80	-0.44
Duniewicz	2015	N	MTurk	200	AS	0.94	CWB	0.70	0.415
Duniewicz	2015	N	MTurk	200	L	0.91	CWB	0.70	-0.28
Eschleman, Bowling, & Judge	2015	Y	MTurk	144	AG	0.77	JS	0.86	0.09
Eschleman et al.	2015	Y	MTurk	144	CON	0.66	JS	0.86	0.33
Eschleman et al.	2015	Y	MTurk	144	EXT	0.72	JS	0.86	0.25
Eschleman et al.	2015	Y	MTurk	166	NA	0.93	JS	0.88	0.15
Eschleman et al.	2015	Y	MTurk	240	NA	0.93	JS	0.89	-0.24
Eschleman et al.	2015	Y	MTurk	144	N	0.63	JS	0.86	-0.21
Eschleman et al.	2015	Y	MTurk	184	O	0.68	JS	0.86	0.13
Eschleman et al.	2015	Y	MTurk	166	PA	0.93	JS	0.88	0.38
Eschleman et al.	2015	Y	MTurk	240	PA	0.92	JS	0.89	0.44
Ferris et al.	2013	Y	StudyResponse	227	N	0.9	JS	0.9	-0.27
Gabler, Nagy, & Hill	2014	Y	Qualtrics Panels	122	AS	0.8	JS	0.95	-0.3
Gabler et al.	2014	Y	Qualtrics Panels	120	AS	0.89	JS	0.77	-0.26
Gabler et al.	2014	Y	Qualtrics Panels	122	J	0.87	JS	0.95	0.55
Gabler et al.	2014	Y	Qualtrics Panels	122	NA	0.73	JS	0.95	-0.26
Gabler et al.	2014	Y	Qualtrics Panels	120	NA	0.66	JS	0.77	-0.45
Gabler et al.	2014	Y	Qualtrics Panels	122	AS	0.8	OC	0.83	-0.24
Gabler et al.	2014	Y	Qualtrics Panels	120	AS	0.89	OC	0.9	-0.22
Gabler et al.	2014	Y	Qualtrics Panels	122	J	0.87	OC	0.83	0.56
Gabler et al.	2014	Y	Qualtrics Panels	122	NA	0.73	OC	0.83	-0.18
Gabler et al.	2014	Y	Qualtrics Panels	120	NA	0.66	OC	0.9	-0.39

Table 6 (continued)

Author(s)	Year	Pub	Source	<i>N</i>	<i>X</i>	<i>r_{xx}</i>	<i>Y</i>	<i>r_{yy}</i>	<i>r</i>
Gangadharan	2014	N	MTurk	201	NA	0.92	TOI	0.92	0.27
Gangadharan	2014	N	MTurk	201	PA	0.93	TOI	0.92	-0.19
Giacopelli, Simpson, Dalal, Randolph, & Holland	2013	Y	MTurk	237	CON	0.92	JS	0.94	0.51
Giacopelli et al.	2013	Y	MTurk	237	CON	0.92	TOI	0.92	-0.36
Goo	2015	N	StudyResponse	381	L	0.92	JS	0.96	0.42
Hannah, Jennings, Bluhm, Peng, & Schaubroeck	2014	Y	Empanel Inc.	229	L	0.95	CWB	0.73	-0.16
Hausknecht, Sturman, & Roberson	2011	Y	StudyResponse	523	J	0.85	JS	0.89	0.82
Hausknecht et al.	2011	Y	StudyResponse	523	J	0.85	OC	0.9	0.64
Holtz & Harold	2013b	Y	StudyResponse	318	J	0.89	CWB	0.79	-0.36
Holtz & Harold	2013a	Y	StudyResponse	105	J	0.85	CWB	0.87	-0.29
Holtz & Harold	2013a	Y	StudyResponse	105	L	0.65	CWB	0.87	-0.37
Holtz & Harold	2013b	Y	StudyResponse	318	NA	0.94	CWB	0.79	0.3
Jenkins, Heneghan, Bailey, & Barber	2014	Y	MTurk	423	J	0.93	CWB	0.81	-0.15
Jeon	2011	N	MTurk	516	J	0.93	CWB	0.94	0.01
Jeon	2011	N	MTurk	516	NA	0.87	CWB	0.94	0.42
Jeon	2011	N	MTurk	516	J	0.93	JS	0.81	0.33
Jeon	2011	N	MTurk	516	NA	0.87	JS	0.81	-0.31
Jeon	2011	N	MTurk	516	NA	0.87	OCB	0.92	-0.14
Johnson, Beehr, & O'Brien	2015	Y	MTurk	211	AG	0.9	TOI	0.94	-0.19
Johnson et al.	2015	Y	MTurk	211	CON	0.92	TOI	0.94	-0.29
Johnson et al.	2015	Y	MTurk	211	EXT	0.88	TOI	0.94	-0.17
Johnson et al.	2015	Y	MTurk	211	N	0.92	TOI	0.94	0.32
Johnson et al.	2015	Y	MTurk	211	O	0.82	TOI	0.94	-0.01
Johnston-Fisher	2014	N	MTurk	314	NA	0.93	TOI	x	0.3
Joseph	2011	N	MTurk	577	AG	0.74	JS	0.77	0.49
Joseph	2011	N	MTurk	577	CON	0.78	JS	0.77	0.47
Joseph	2011	N	MTurk	577	EXT	0.68	JS	0.77	0.26
Joseph	2011	N	MTurk	577	L	0.91	JS	0.77	0.38
Joseph	2011	N	MTurk	577	N	0.77	JS	0.77	-0.42
Joseph	2011	N	MTurk	577	O	0.78	JS	0.77	0.3
Joseph	2011	N	MTurk	577	AG	0.74	OCB	0.91	0.42
Joseph	2011	N	MTurk	577	CON	0.78	OCB	0.91	0.44
Joseph	2011	N	MTurk	577	EXT	0.68	OCB	0.91	0.33
Joseph	2011	N	MTurk	577	N	0.77	OCB	0.91	-0.25
Joseph	2011	N	MTurk	577	O	0.78	OCB	0.91	0.43
Kiffin-Petersen, Jordan, & Soutar	2011	Y	Australian Panel	625	AG	0.81	OCB	0.64	0.21
Kiffin-Petersen et al.	2011	Y	Australian Panel	625	CON	0.8	OCB	0.64	0.19
Kiffin-Petersen et al.	2011	Y	Australian Panel	625	EXT	0.72	OCB	0.64	0.18
Kiffin-Petersen et al.	2011	Y	Australian Panel	625	N	0.8	OCB	0.64	-0.14
Krischer, Penney, & Hunter	2010	Y	StudyResponse	295	J	0.77	CWB	0.66	0.00001
Lambert, Tepper, Carr, Holt, & Barekka	2012	Y	StudyResponse	372	L	0.79	JS	0.96	0.38
Lambert et al.	2012	Y	StudyResponse	372	L	0.79	OC	0.95	0.47
Lee	2012	N	StudyResponse	239	L	0.95	JS	0.86	0.45
Lee	2012	N	StudyResponse	239	NA	0.92	JS	0.86	-0.38
Lee	2012	N	StudyResponse	239	L	0.95	OC	0.88	0.45
Lee	2012	N	StudyResponse	239	NA	0.92	OC	0.88	-0.4
Lee	2012	N	StudyResponse	239	L	0.95	TOI	0.83	-0.35
Lee	2012	N	StudyResponse	239	NA	0.92	TOI	0.83	0.51
Long & Christian	2015	Y	MTurk	270	J	0.94	CWB	0.93	-0.32

Table 6 (continued)

Author(s)	Year	Pub	Source	N	X	rx	Y	ry	r
Long & Christian	2015	Y	MTurk	270	NA	0.93	CWB	0.93	0.42
Long, Bendersky, & Morrill	2011	Y	Qualtrics Panels	624	J	0.89	JS	0.82	0.52
Lusin	2014	N	MTurk	200	L	x	OC	0.8	0.52
Meyer, Thau, Workman, Van Dijke, & De Cremer	2012	Y	Zoomerang	367	AS	0.95	CWB	0.85	0.35
Meyer et al.	2012	Y	Dutch panel	412	J	0.95	CWB	0.85	-0.42
Meyer, Dalal, José, Hermida, Chen, Vega, & Khare	2014	Y	StudyResponse	588	AG	0.87	CWB	0.96	-0.47
Meyer et al.	2014	Y	StudyResponse	588	CON	0.88	CWB	0.96	-0.47
Meyer et al.	2014	Y	StudyResponse	588	AG	0.87	OCB	0.9	0.21
Meyer et al.	2014	Y	StudyResponse	588	CON	0.88	OCB	0.9	0.18
Michel & Clark	2009	Y	StudyResponse	187	NA	0.91	JS	0.75	-0.22
Michel & Clark	2009	Y	StudyResponse	187	PA	0.93	JS	0.75	0.48
Michel, Newness, & Duniewicz	2016	Y	StudyResponse	355	AS	0.96	CWB	0.94	0.71
Michel et al.	2016	Y	MTurk	256	AS	0.96	CWB	0.67	0.35
Michel et al.	2016	Y	MTurk	256	NA	0.89	CWB	0.67	0.35
Michel et al.	2016	Y	StudyResponse	355	NA	0.9	CWB	0.94	0.61
Mullins	2015	N	MTurk	1648	AS	0.94	CWB	0.87	0.27
Mullins	2015	N	MTurk	1648	L	0.87	CWB	0.9	-0.17
Mullins	2015	N	MTurk	1648	AS	0.94	JS	0.92	-0.58
Mullins	2015	N	MTurk	1648	L	0.92	JS	0.9	0.57
Mullins	2015	N	MTurk	1648	L	0.9	TOI	0.93	-0.52
Murphy	2015	N	MTurk	313	CON	0.95	CWB	0.82	-0.4
Murphy	2015	N	MTurk	313	CON	0.95	OCB	0.82	0.32
Nichols & Cottrell	2014	Y	MTurk	116	L	0.83	JS	0.6	0.41
Nichols & Cottrell	2014	Y	MTurk	116	L	0.83	OC	0.61	0.5
Oboyle	2010	N	StudyResponse	154	CON	0.87	CWB	0.96	-0.44
Oboyle	2010	N	StudyResponse	154	J	0.93	CWB	0.96	-0.11
O'Brien	2008	N	StudyResponse	424	J	0.94	CWB	0.94	-0.3
Penney, Hunter, & Perry	2011	Y	StudyResponse	239	CON	0.85	CWB	0.87	-0.09
Penney et al.	2011	Y	StudyResponse	239	N	0.89	CWB	0.87	0.22
Peterson	2015	N	MTurk	341	J	0.9	CWB	0.77	-0.14
Peterson	2015	N	MTurk	341	NA	0.91	CWB	0.77	0.33
Peterson	2015	N	MTurk	341	J	0.9	OC	0.9	0.57
Peterson	2015	N	MTurk	341	NA	0.91	OC	0.9	-0.17
Porter, Woo, & Tak	2015	Y	MTurk	311	AG	0.83	JS	0.94	0.34
Porter et al.	2015	Y	MTurk	311	CON	0.85	JS	0.94	0.32
Porter et al.	2015	Y	MTurk	311	EXT	0.87	JS	0.94	0.29
Porter et al.	2015	Y	MTurk	311	N	0.87	JS	0.94	-0.35
Porter et al.	2015	Y	MTurk	311	O	0.84	JS	0.94	0.05
Porter et al.	2015	Y	MTurk	311	AG	0.83	OC	0.89	0.27
Porter et al.	2015	Y	MTurk	311	CON	0.85	OC	0.89	0.23
Porter et al.	2015	Y	MTurk	311	EXT	0.87	OC	0.89	0.31
Porter et al.	2015	Y	MTurk	311	O	0.84	OC	0.89	-0.01
Powell	2013	N	MTurk	266	AS	0.95	CWB	0.89	0.39
Powell	2013	N	MTurk	274	AS	0.92	CWB	0.73	0.24
Powell	2013	N	MTurk	200	AS	0.97	CWB	0.95	0.59
Ramirez	2015	N	MTurk	390	J	0.93	CWB	0.91	-0.22
Ramirez	2015	N	MTurk	390	NA	0.7	CWB	0.91	0.14
Richards & Schat	2011	Y	StudyResponse	146	AG	0.7	CWB	0.95	-0.28
Richards & Schat	2011	Y	StudyResponse	146	CON	0.69	CWB	0.95	-0.19

Table 6 (continued)

Author(s)	Year	Pub	Source	N	X	rx	Y	ry	r
Richards & Schat	2011	Y	StudyResponse	146	EXT	0.64	CWB	0.95	-0.06
Richards & Schat	2011	Y	StudyResponse	146	NA	0.94	CWB	0.95	0.57
Richards & Schat	2011	Y	StudyResponse	146	N	0.56	CWB	0.95	0.17
Richards & Schat	2011	Y	StudyResponse	146	PA	0.93	CWB	0.95	-0.08
Richards & Schat	2011	Y	StudyResponse	146	AG	0.7	OC	0.87	0.25
Richards & Schat	2011	Y	StudyResponse	146	CON	0.69	OC	0.87	0.19
Richards & Schat	2011	Y	StudyResponse	146	EXT	0.64	OC	0.87	0.2
Richards & Schat	2011	Y	StudyResponse	146	NA	0.94	OC	0.87	-0.39
Richards & Schat	2011	Y	StudyResponse	146	O	0.64	OC	0.87	0.16
Richards & Schat	2011	Y	StudyResponse	146	PA	0.93	OC	0.87	0.41
Richards & Schat	2011	Y	StudyResponse	146	AG	0.7	TOI	0.7	-0.25
Richards & Schat	2011	Y	StudyResponse	146	CON	0.69	TOI	0.7	-0.13
Richards & Schat	2011	Y	StudyResponse	146	EXT	0.64	TOI	0.7	-0.17
Richards & Schat	2011	Y	StudyResponse	146	NA	0.94	TOI	0.7	0.42
Richards & Schat	2011	Y	StudyResponse	146	N	0.56	TOI	0.7	0.16
Richards & Schat	2011	Y	StudyResponse	146	O	0.64	TOI	0.7	-0.11
Richards & Schat	2011	Y	StudyResponse	146	PA	0.93	TOI	0.7	-0.27
Rosen, Slater, & Johnson	2013	Y	StudyResponse	196	L	0.93	JS	0.89	0.48
Rosen et al.	2013	Y	StudyResponse	196	L	0.93	OC	0.9	0.51
Salvaggio	2014	N	MTurk	208	L	0.93	JS	0.91	0.41
Salvaggio	2014	N	MTurk	208	L	0.93	OC	0.86	0.21
Salvaggio	2014	N	MTurk	208	L	0.93	TOI	0.87	-0.3
Schultz	2009	N	StudyResponse	723	NA	0.9	JS	0.85	-0.2
Schultz	2009	N	StudyResponse	723	PA	0.92	JS	0.85	0.25
Scott & Zweig	2008	N	StudyResponse	312	NA	0.9	JS	0.9	-0.25
Shao	2010	N	StudyResponse	162	L	0.9	CWB	0.94	-0.15
Shao	2010	N	StudyResponse	162	NA	0.92	CWB	0.94	0.44
Shao	2010	N	StudyResponse	162	PA	0.88	CWB	0.94	-0.13
Shao, Resick, & Hargis	2011	Y	StudyResponse	490	AS	0.95	CWB	0.85	0.28
Sharif & Scandura	2014	Y	StudyResponse	199	L	0.93	JS	0.91	0.6
Sprung & Jex	2012	Y	StudyResponse	191	J	0.96	CWB	0.99	-0.15
Sprung & Jex	2012	Y	StudyResponse	208	NA	0.95	CWB	0.99	0.61
Tepper et al.	2009	Y	StudyResponse	356	AS	0.97	CWB	0.86	0.47
Tepper et al.	2009	Y	StudyResponse	356	AS	0.97	JS	0.96	-0.24
Tepper et al.	2009	Y	StudyResponse	356	AS	0.97	OC	0.95	-0.19
Tepper, Mitchell, Haggard, Kwan, & Park	2015	Y	ZoomPanel	371	NA	0.93	JS	0.96	-0.22
Tepper et al.	2015	Y	ZoomPanel	371	NA	0.93	OC	0.94	-0.14
Thau & Mitchell	2010	Y	StudyResponse	365	AS	0.95	CWB	0.86	0.48
Thau & Mitchell	2010	Y	StudyResponse	365	J	0.94	CWB	0.86	-0.14
Thau, Bennett, Mitchell, & Marrs	2009	Y	Zoomerang Panel	1477	AS	0.95	CWB	0.89	0.53
Thau et al.	2009	Y	Zoomerang Panel	1477	NA	0.92	CWB	0.89	0.5
Thompson	2008	N	StudyResponse	312	L	0.96	JS	0.9	0.49
Toaddy	2012	N	MTurk	370	J	0.89	JS	0.95	0.8
Toaddy	2012	N	MTurk	370	J	0.89	OC	0.94	0.72
van Prooijen & de Vries	2016	Y	MTurk	193	L	0.79	OC	0.86	0.54
van Prooijen & de Vries	2016	Y	MTurk	193	L	0.79	TOI	0.89	-0.37
Vogel & Mitchell	2015	Y	StudyResponse	172	AS	0.93	CWB	0.85	0.29
Wall	2014	N	MTurk	772	J	0.91	CWB	0.87	-0.16
Wall	2014	N	MTurk	772	L	0.91	CWB	0.87	0.01

Table 6 (continued)

Author(s)	Year	Pub	Source	<i>N</i>	X	rxx	Y	ryy	<i>r</i>
Wall	2014	N	MTurk	772	NA	0.94	CWB	0.87	0.3
Wall	2014	N	MTurk	772	PA	0.94	CWB	0.87	0.1
Wall	2014	N	MTurk	772	J	0.91	JS	0.94	0.54
Wall	2014	N	MTurk	772	L	0.91	JS	0.94	0.61
Wall	2014	N	MTurk	772	NA	0.94	JS	0.94	-0.22
Wall	2014	N	MTurk	772	PA	0.94	JS	0.94	0.37
Wall	2014	N	MTurk	772	NA	0.94	OCB	0.9	-0.17
Wall	2014	N	MTurk	772	J	0.91	OC	0.93	0.44
Wall	2014	N	MTurk	772	L	0.91	OC	0.93	0.54
Wall	2014	N	MTurk	772	NA	0.94	OC	0.93	-0.2
Wall	2014	N	MTurk	772	PA	0.94	OC	0.93	0.1
Wilson	2015	N	MTurk	298	AG	0.49	JS	0.92	0.25
Wilson	2015	N	MTurk	298	CON	0.57	JS	0.92	0.21
Wilson	2015	N	MTurk	298	EXT	0.72	JS	0.92	0.25
Wilson	2015	N	MTurk	298	N	0.72	JS	0.92	-0.28
Wilson	2015	N	MTurk	298	O	0.52	JS	0.92	0.176
Wilson	2015	N	MTurk	298	AG	0.49	OC	0.89	0.22
Wilson	2015	N	MTurk	298	CON	0.57	OC	0.89	0.14
Wilson	2015	N	MTurk	298	EXT	0.72	OC	0.89	0.29
Wilson	2015	N	MTurk	298	O	0.52	OC	0.89	0.137
Wilson	2015	N	MTurk	298	AG	0.49	TOI	0.88	-0.22
Wilson	2015	N	MTurk	298	CON	0.57	TOI	0.88	-0.16
Wilson	2015	N	MTurk	298	EXT	0.72	TOI	0.88	-0.20
Wilson	2015	N	MTurk	298	N	0.72	TOI	0.88	0.25
Wilson	2015	N	MTurk	298	O	0.52	TOI	0.88	-0.069
Wiltshire, Bourdage, & Lee	2014	Y	StudyResponse	268	AG	0.78	CWB	0.97	-0.19
Wiltshire et al.	2014	Y	StudyResponse	268	CON	0.79	CWB	0.97	-0.58
Wiltshire et al.	2014	Y	StudyResponse	268	N	0.73	CWB	0.97	0.05
Wiltshire et al.	2014	Y	StudyResponse	268	O	0.77	CWB	0.97	-0.26
Wiltshire et al.	2014	Y	StudyResponse	268	AG	0.78	JS	0.82	0.29
Wiltshire et al.	2014	Y	StudyResponse	268	CON	0.79	JS	0.82	0.32
Wiltshire et al.	2014	Y	StudyResponse	268	EXT	0.76	JS	0.82	0.49
Wiltshire et al.	2014	Y	StudyResponse	268	N	0.73	JS	0.82	-0.26
Wiltshire et al.	2014	Y	StudyResponse	268	O	0.77	JS	0.82	0.15
Wynne	2012	N	StudyResponse	149	L	x	CWB	0.98	-0.27
Wynne	2012	N	StudyResponse	149	NA	x	CWB	0.98	0.51
Wynne	2012	N	StudyResponse	149	N	x	CWB	0.98	0.31
Wynne	2012	N	StudyResponse	149	NA	x	OCB	x	-0.18
Wynne	2012	N	StudyResponse	149	N	x	OCB	x	-0.19

Appendix 3

Studies considered but excluded from the current meta-analyses ($k = 23$)

Excluded due to mixed samples (i.e., combined conventional and OPD samples) ($k = 9$):

Dennis, R., & Winston, B. E. (2003). A factor analysis of Page and Wong's servant leadership instrument. *Leadership & Organization Development Journal*, 24(8), 455–459.

Irak, D. U. (2010). The role of affectivity in an expanded model of person-environment fit. (NR70552 Ph. D.), Carleton University (Canada). *Ann Arbor*. Retrieved from <http://search.proquest.com/docview/851889665>.

McAllister, C. P., Harris, J. N., Hochwarter, W. A., Perrewé, P. L., & Ferris, G. R. Got Resources? A multi-sample constructive replication of perceived resource availability's role in work passion–job outcomes relationships. *Journal of Business and Psychology*, 1–18.

Raver, J. L., & Nishii, L. H. (2010). Once, twice, or three times as harmful? Ethnic harassment, gender harassment, and generalized workplace harassment. *Journal of Applied Psychology*, 95(2), 236.

Sandell, K. (2007). *Transformational leadership, engagement, and performance: A new perspective* (Doctoral dissertation, Colorado State University. Libraries).

Smith, C. L. (2007). *The relational context of employee engagement: An intrinsic perspective* (Doctoral dissertation, Colorado State University. Libraries).

Staples, D. S., & Webster, J. (2007). Exploring traditional and virtual team members' "best practices" a social cognitive theory perspective. *Small Group Research*, 38(1), 60–97.

Thoroughgood, C. N., Tate, B. W., Sawyer, K. B., & Jacobs, R. (2012). Bad to the bone empirically defining and measuring destructive leader behavior. *Journal of Leadership & Organizational Studies*, 19(2), 230–255.

Tolentino, A. L. (2009). Are all good soldiers created equal? examining the "why" that underlies organizational citizenship behavior: The development of an OCB motives scale. (Doctoral dissertation, University of South Florida).

Excluded due to using online panel company's survey webhosting but not panel data = (e.g., Survey Monkey) ($k = 10$):

Anderson, L. E. (2015). *Relationship between leadership, organizational commitment, and intent to stay among junior executives* (Doctoral dissertation, Walden University).

Ayers, J. P. (2010). *Job satisfaction, job involvement, and perceived organizational support as predictors of*

organizational commitment (Doctoral dissertation, Walden University).

Barbuto Jr., J. E., & Millard, M. L. Developing wisdom and reducing emotional labor in the workplace: Testing the impact of servant leadership.

De Lacy, J. C. (2009). Employee engagement: the development of a three dimensional model of engagement; and an exploration of its relationship with affective leader behaviours.

Emu, K. E., & Umeh, O. J. (2014). How leadership practices impact job satisfaction of customer relationship officers': An empirical study. *Journal of Management*, 2(3), 19–56.

Mutsvunguma, P. S. (2012). *Ethical climate fit, leader-member exchange and employee job outcomes* (Doctoral dissertation).

Rader, M. M. (2015). *Effects of authentic leadership on job satisfaction and younger worker turnover intentions* (Doctoral dissertation, The Chicago School of Professional Psychology).

Spector, P. E., & Che, X. X. (2014). Re-examining citizenship: How the control of measurement artifacts affects observed relationships of organizational citizenship behavior and organizational variables. *Human Performance*, 27(2), 165–182.

Yates, L. (2011). Exploring the relationship of ethical leadership with job satisfaction, organizational commitment, and organizational citizenship behavior.

Yukl, G., O'Donnell, M., & Taber, T. (2009). Influence of leader behaviors on the leader-member exchange relationship. *Journal of Managerial Psychology*, 24(4), 289–299.

Excluded due to niche or otherwise unique online panel (total $k = 3$):

Online panel of Dutch public sector employees ($k = 1$):

Ashikali, T., & Groeneveld, S. (2015). Diversity management in public organizations and its effect on employees' affective commitment the role of transformational leadership and the inclusiveness of the organizational culture. *Review of Public Personnel Administration*, 35(2), 146–168.

Craigslist in Southeastern USA ($k = 1$):

Colquitt, J. A., Long, D. M., Rodell, J. B., & Halvorsen-Ganepola, M. D. (2015). Adding the "in" to justice: A qualitative and quantitative investigation of the differential effects of justice rule adherence and violation. *Journal of Applied Psychology*, 100(2), 278.

Social workers belonging to social work online community magazine ($k = 1$):

Sullivan, E. M. (2012). *A correlational study of perceived transformational leadership styles and job satisfaction among social workers* (Doctoral dissertation, University of Phoenix).

Excluded due to lack of reporting effect size for relationship of interest ($k = 1$):

Swee, H. Y. (2009). *A cognitive perspective of self-other agreement: A look at outcomes and predictors of shared implicit performance theories* (Doctoral dissertation, University of Akron).

References

The articles marked with an asterisk are included in the meta-analysis.

- *Alarcon, G. M. (2009). *The development of the wright work engagement scale* (Doctoral dissertation). Available from ProQuest Dissertations & Theses database. (UMI No. 3393395).
- *Badger, J. M. (2014). *The formative nature of perceived person-environment fit* (Doctoral dissertation). Available from ProQuest Dissertations & Theses database. (UMI No. 3615149).
- Baker, R., Blumberg, S. J., Brick, J. M., Couper, M. P., Courtright, M., Dennis, J. M., et al. (2010). Research synthesis AAPOR report on online panels. *Public Opinion Quarterly*, 74(4), 711–781.
- *Ballinger, G. A., Lehman, D. W., & Schoorman, F. D. (2010). Leader–member exchange and turnover before and after succession events. *Organizational Behavior and Human Decision Processes*, 113(1), 25–36.
- *Baratta, P. (2014). *The “Noonday Demon”, weariness, inattention, or all of the above? Refining the definition and measurement of state boredom* (Unpublished doctoral dissertation). The University of Guelph.
- *Basford, T. E., Offermann, L. R., & Behrend, T. S. (2014). Please accept my sincerest apologies: Examining follower reactions to leader apology. *Journal of Business Ethics*, 119(1), 99–117.
- *Bauer, J. A. (2013). *An investigation of OCB demands and workplace behaviors*. (Doctoral dissertation). Graduate theses and dissertations. <https://scholarcommons.usf.edu/etd/4634>
- Behrend, T. S., Sharek, D. J., Meade, A. W., & Wiebe, E. N. (2011). The viability of crowdsourcing for survey research. *Behavior Research Methods*, 43(3), 800–813.
- Bergman, M. E., & Jean, V. A. (2016). Where have all the “workers” gone? A critical analysis of the unrepresentativeness of our samples relative to the labor market in the industrial–organizational psychology literature. *Industrial and Organizational Psychology*, 9(01), 84–113.
- Berry, C. M., Ones, D. S., & Sackett, P. R. (2007). Interpersonal deviance, organizational deviance, and their common correlates: A review and meta-analysis. *Journal of Applied Psychology*, 92(2), 410–424.
- Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. Chichester: John Wiley & Sons, Ltd.
- Botella, J., Suero, M., & Gamarra, H. (2010). Psychometric inferences from a meta-analysis of reliability and internal consistency coefficients. *Psychological Methods*, 15, 386–397.
- *Bowling, N. A., & Burns, G. N. (2010). A comparison of work-specific and general personality measures as predictors of work and non-work criteria. *Personality and Individual Differences*, 49(2), 95–101.
- *Bowling, N. A., Burns, G. N., & Beehr, T. A. (2010). Productive and counterproductive attendance behavior: An examination of early and late arrival to and departure from work. *Human Performance*, 23(4), 305–322.
- *Bowling, N. A., Burns, G. N., Stewart, S. M., & Gruys, M. L. (2011). Conscientiousness and agreeableness as moderators of the relationship between neuroticism and counterproductive work behaviors: A constructive replication. *International Journal of Selection and Assessment*, 19(3), 320–330.
- *Bowling, N. A., & Eschleman, K. J. (2010). Employee personality as a moderator of the relationships between work stressors and counterproductive work behavior. *Journal of Occupational Health Psychology*, 15(1), 91–103.
- *Bowling, N. A., & Michel, J. S. (2011). Why do you treat me badly? The role of attributions regarding the cause of abuse in subordinates’ responses to abusive supervision. *Work & Stress*, 25(4), 309–320.
- Brüggen, E., Wetzels, M., de Ruyter, K., & Schillewaert, N. (2011). Individual differences in motivation to participate in online panels: The effect on response rate and response quality perceptions. *International Journal of Market Research*, 53(3), 369–390.
- Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon’s Mechanical Turk a new source of inexpensive, yet high-quality, data? *Perspectives on Psychological Science*, 6(1), 3–5.
- *Bunk, J. A. (2006). *The role of appraisals, emotions, and coping in understanding experiences of workplace incivility*.
- *Burton, J. P. (2014). The role of job embeddedness in the relationship between bullying and aggression. *European Journal of Work and Organizational Psychology*, 24(4), 518–529.
- Callegaro, M., Villar, A., Yeager, D., & Krosnick, J. A. (2014). *A critical review of studies investigating the quality of data obtained with online panels based on probability and nonprobability samples*. Online panel research: A data quality perspective, pp. 23–53.
- *Carlsen, J. J. (2015). *An investigation of work engagement as a moderator of the relationship between personality and work outcomes* (Doctoral dissertation, San Diego State University).
- *Carsten, M. K., & Uhl-Bien, M. (2012). Follower beliefs in the co-production of leadership. *Zeitschrift für Psychologie*, 220(4), 210–220.
- *Castille, C. M. (2015). *Bright or dark, or virtues and vices? A reexamination of the big five and job performance*. Louisiana Tech University.
- Chiaburu, D. S., Oh, I. S., Berry, C. M., Li, N., & Gardner, R. G. (2011). The five-factor model of personality traits and organizational citizenship behaviors: A meta-analysis. *Journal of Applied Psychology*, 96(6), 1140.
- Choi, D., Oh, I. S., & Colbert, A. (2015). Understanding organizational commitment: A meta-analytic examination of the roles of the five-factor model of personality and culture. *Journal of Applied Psychology*, 100(5), 1542–1567.
- *Chung-Yan, G. A. (2010). The nonlinear effects of job complexity and autonomy on job satisfaction, turnover, and psychological well-being. *Journal of Occupational Health Psychology*, 15(3), 237.
- Cochran, M. N. (2014). *Counterproductive work behaviors, justice, and affect: A meta-analysis* (Unpublished doctoral dissertation). University of Central Florida, Orlando, FL.
- *Cochrum-Nguyen, F. L. (2013). *Predicting job performance and job satisfaction: An examination of the five-factor model of personality, polychronicity and role overload* (Doctoral dissertation, San Diego State University).
- *Cohen, T. R., Panter, A. T., & Turan, N. (2013). Predicting counterproductive work behavior from guilt proneness. *Journal of Business Ethics*, 114(1), 45–53.

- *Cohen, T. R., Panter, A. T., Turan, N., Morse, L., & Kim, Y. (2013). Agreement and similarity in self-other perceptions of moral character. *Journal of Research in Personality, 47*(6), 816–830.
- *Colbert, A. E., Bono, J. E., & Purvanova, R. (2008). *Development of a relationship functions inventory: Assessing the functions of high-quality work relationships*. Paper presented at the annual meeting of the Academy of Management, Anaheim, CA.
- Colquitt, J. A., Conlon, D. E., Wesson, M. J., Porter, C. O., & Ng, K. Y. (2001). Justice at the millennium: A meta-analytic review of 25 years of organizational justice research. *Journal of Applied Psychology, 86*(3), 425.
- Cook, T. D., & Campbell, D. T. (1976). *Four kinds of validity. Handbook of industrial and organizational psychology* (pp. 224–246).
- *Costa, J. B. (2015). *Coping through counterproductive work behaviors: An examination of how employees deal with emotional labor* (Master's thesis, Roosevelt University).
- *Credé, M., Harms, P., Niehorster, S., & Gaye-Valentine, A. (2012). An evaluation of the consequences of using short measures of the Big Five personality traits. *Journal of Personality and Social Psychology, 102*(4), 874.
- *Dahling, J. J., & Thompson, M. N. (2013). Detrimental relations of maximization with academic and career attitudes. *Journal of Career Assessment, 21*(2), 278–294.
- Dalal, R. S. (2005). A meta-analysis of the relationship between organizational citizenship behavior and counterproductive work behavior. *Journal of Applied Psychology, 90*(6), 1241–1255.
- *Decker, C., & Van Quaquebeke, N. (2015). Getting respect from a boss you respect: How different types of respect interact to explain subordinates' job satisfaction as mediated by self-determination. *Journal of Business Ethics, 131*(3), 543–556.
- DeGroot, T., Kiker, D. S., & Cross, T. C. (2000). A meta-analysis to review organizational outcomes related to charismatic leadership. *Canadian Journal of Administrative Sciences/Revue Canadienne des Sciences de l'Administration, 17*(4), 356–372.
- DeSimone, J. A., Harms, P. D., & DeSimone, A. J. (2015). Best practice recommendations for data screening. *Journal of Organizational Behavior, 36*(2), 171–181.
- Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, phone, mail, and mixed-mode surveys: The tailored design method* (4th ed.). Hoboken, NJ: John Wiley & Sons, Inc.
- Duhachek, A., Coughlan, A. T., & Iacobucci, D. (2005). Results on the standard error of the coefficient alpha index of reliability. *Marketing Science, 24*, 294–301.
- *Duniewicz, K. (2015). *Don't get mad, get even: how employees abused by their supervisor retaliate against the organization and undermine their spouses*. FIU Electronic Theses and Dissertations. Paper 1848. <https://digitalcommons.fiu.edu/etd/1848>.
- *Eschleman, K. J., Bowling, N. A., & Judge, T. A. (2015). The dispositional basis of attitudes: A replication and extension of Hepler and Albarraçin (2013). *Journal of Personality and Social Psychology, 108*(5), e1–e15.
- Feitosa, J., Joseph, D. L., & Newman, D. A. (2015). Crowdsourcing and personality measurement equivalence: A warning about countries whose primary language is not English. *Personality and Individual Differences, 75*, 47–52.
- *Ferris, D. L., Johnson, R. E., Rosen, C. C., Djurdjevic, E., Chang, C. H. D., & Tan, J. A. (2013). When is success not satisfying? Integrating regulatory focus and approach/avoidance motivation theories to explain the relation between core self-evaluation and job satisfaction. *Journal of Applied Psychology, 98*(2), 342–353.
- Fisher, R. (1955). Statistical methods and scientific induction. *Journal of the Royal Statistical Society. Series B (Methodological), 69*–78.
- Fisher, G. G., & Sandell, K. (2015). Sampling in industrial–organizational psychology research: Now what? *Industrial and Organizational Psychology, 8*(02), 232–237.
- Fleischer, A., Mead, A. D., & Huang, J. (2015). Inattentive responding in MTurk and other online samples. *Industrial and Organizational Psychology, 8*(02), 196–202.
- *Gabler, C. B., Nagy, K. R., & Hill, R. P. (2014). Causes and consequences of abusive supervision in sales management: A tale of two perspectives. *Psychology & Marketing, 31*(4), 278–293.
- *Gangadharan, A. (2014). *Can I smile with spirit? Towards a process model associating workplace spirituality and emotional labor* (Doctoral dissertation). Available from ProQuest Dissertations & Theses database (UMI No. 3642187).
- *Giacopelli, N. M., Simpson, K. M., Dalal, R. S., Randolph, K. L., & Holland, S. J. (2013). Maximizing as a predictor of job satisfaction and performance: A tale of three scales. *Judgment and Decision Making, 8*(4), 448–469.
- Gillespie, M. A., Gillespie, J. Z., Brodke, M. H., & Balzer, W. K. (2016). The importance of sample composition depends on the research question. *Industrial and Organizational Psychology, 9*(01), 207–211.
- *Goo, W. (2015). *Employee needs and job-related opportunities: From the person-environment fit framework* (Doctoral dissertation). Available from ProQuest Dissertations & Theses database. (UMI No. 3681240).
- Goodman, J. K., & Paolacci, G. (2017). Crowdsourcing consumer research. *Journal of Consumer Research, 44*(1), 196–210.
- Gosling, S. D., Vazire, S., Srivastava, S., & John, O. P. (2004). Should we trust web-based studies? A comparative analysis of six preconceptions about internet questionnaires. *American Psychologist, 59*(2), 93.
- Greco, L., O'Boyle, E., Cockburn, B., & Yuan, Z. (2015). *Raising the .70 bar: A meta-analytic study of coefficient alpha*. Working Paper.
- Griffeth, R. W., Hom, P. W., & Gaertner, S. (2000). A meta-analysis of antecedents and correlates of employee turnover: Update, moderator tests, and research implications for the next millennium. *Journal of Management, 26*(3), 463–488.
- *Hannah, S. T., Jennings, P. L., Bluhm, D., Peng, A. C., & Schaubroeck, J. M. (2014). Duty orientation: Theoretical development and preliminary construct testing. *Organizational Behavior and Human Decision Processes, 123*(2), 220–238.
- Harms, P. D., & DeSimone, J. A. (2015). Caution! MTurk workers ahead—fines doubled. *Industrial and Organizational Psychology, 8*(02), 183–190.
- *Hausknecht, J. P., Sturman, M. C., & Roberson, Q. M. (2011). Justice as a dynamic construct: Effects of individual trajectories on distal work outcomes. *Journal of Applied Psychology, 96*(4), 872–880.
- Hershcovis, M. S., Turner, N., Barling, J., Arnold, K. A., Dupré, K. E., Inness, M., Mirielle LeBlanc, M., & Sivanathan, N. (2007). Predicting workplace aggression: A meta-analysis. *Journal of Applied Psychology, 92*(1), 228–238.
- Highhouse, S., & Gillespie, J. Z. (2009). Do samples really matter that much. *Statistical and methodological myths and urban legends: Doctrine, verity and fable in the organizational and social sciences* (pp. 247–265).
- Hillygus, D. S., Jackson, N., & Young, M. (2014). Professional respondents in non-probability online panels. *Online panel research: A data quality perspective, 1*, 219–237.
- *Holtz, B. C., & Harold, C. M. (2013a). Effects of leadership consideration and structure on employee perceptions of justice and counterproductive work behavior. *Journal of Organizational Behavior, 34*(4), 492–519.
- *Holtz, B. C., & Harold, C. M. (2013b). Interpersonal justice and deviance: The moderating effects of interpersonal justice values and justice orientation. *Journal of Management, 39*(2), 339–365.
- Huang, J. L., Curran, P. G., Keeney, J., Popski, E. M., & DeShon, R. P. (2012). Detecting and deterring insufficient effort responding to surveys. *Journal of Business and Psychology, 27*(1), 99–114.
- Huang, J. L., Liu, M., & Bowling, N. A. (2015). Insufficient effort responding: Examining an insidious confound in survey data. *Journal of Applied Psychology, 100*(3), 828–845.

- Jackson, T. A., Meyer, J. P., & Wang, X. H. F. (2013). Leadership, commitment, and culture: A meta-analysis. *Journal of Leadership & Organizational Studies*, 20(1), 84–106.
- *Jenkins, J. S., Heneghan, C. J., Bailey, S. F., & Barber, L. K. (2014). The work–family interface as a mediator between job demands and employee behaviour. *Stress and Health*.
- *Jeon, G. (2011). *Equity sensitivity versus equity preference: Validating a new viewpoint on equity sensitivity* (Unpublished doctoral dissertation). University of Illinois at Urbana-Champaign.
- *Johnson, V. A., Beehr, T. A., & O'Brien, K. E. (2015). Determining the relationship between employee psychopathy and strain: Does the type of psychopathy matter? *International Journal of Stress Management*, 22(2), 111–136.
- *Johnston-Fisher, J. (2014). *Testing a multi-level mediation model of workgroup incivility: The role of civility climate and group norms for civility* (Unpublished master's thesis). Western Kentucky University.
- *Joseph, D. L. (2011). *Emotional intelligence, leader-member exchange, and behavioral engagement: Considering mediation and reciprocity effects* (Doctoral dissertation, University of Illinois at Urbana-Champaign).
- Judge, T. A., Heller, D., & Mount, M. K. (2002). Five-factor model of personality and job satisfaction: A meta-analysis. *Journal of Applied Psychology*, 87(3), 530–541.
- *Kiffin-Petersen, S. A., Jordan, C. L., & Soutar, G. N. (2011). The Big Five, emotional exhaustion and citizenship behaviors in service settings: The mediating role of emotional labor. *Personality and Individual Differences*, 50(1), 43–48.
- *Krischer, M. M., Penney, L. M., & Hunter, E. M. (2010). Can counterproductive work behaviors be productive? CWB as emotion-focused coping. *Journal of Occupational Health Psychology*, 15(2), 154.
- *Lambert, L. S., Tepper, B. J., Carr, J. C., Holt, D. T., & Barelka, A. J. (2012). Forgotten but not gone: An examination of fit between leader consideration and initiating structure needed and received. *Journal of Applied Psychology*, 97(5), 913.
- Landers, R. N., & Behrend, T. S. (2015). An inconvenient truth: Arbitrary distinctions between organizational, mechanical Turk, and other convenience samples. *Industrial and Organizational Psychology*, 1–23.
- *Lee, J. (2012). *The effects of leadership behavior on workplace harassment, employee outcomes, and organizational effectiveness in small businesses* (Doctoral dissertation). Available from ABI/INFORM Global; ProQuest Dissertations & Theses database (UMI No. 3489453).
- *Long, C. P., Bendersky, C., & Morrill, C. (2011). Fairness monitoring: Linking managerial controls and fairness judgments in organizations. *Academy of Management Journal*, 54(5), 1045–1068.
- *Long, E. C., & Christian, M. S. (2015). Mindfulness buffers retaliatory responses to injustice: A regulatory approach. *Journal of Applied Psychology*, 100(5), 1409–1422.
- *Lusin, J. M. (2014). *Employee perceptions of authentic leadership and outcomes of planned organizational change* (Doctoral dissertation). Available from ProQuest Dissertations & Theses database (UMI No. 3615782).
- Mackey, J. D., Frieder, R. E., Brees, J. R., & Martinko, M. J. (2015). Abusive supervision: A meta-analysis and empirical review. *Journal of Management*, 0149206315573997.
- Mason, W., & Suri, S. (2012). Conducting behavioral research on Amazon's Mechanical Turk. *Behavior Research Methods*, 44(1), 1–23.
- *Mayer, D. M., Thau, S., Workman, K. M., Van Dijke, M., & De Cremer, D. (2012). Leader mistreatment, employee hostility, and deviant behaviors: Integrating self-uncertainty and thwarted needs perspectives on deviance. *Organizational Behavior and Human Decision Processes*, 117(1), 24–40.
- McGonagle, A. K. (2015). Participant motivation: A critical consideration. *Industrial and Organizational Psychology*, 8(02), 208–214.
- Meade, A. W. (2010). A taxonomy of effect size measures for the differential functioning of items and scales. *Journal of Applied Psychology*, 95(4), 728.
- Meade, A. W., & Craig, S. B. (2012). Identifying careless responses in survey data. *Psychological Methods*, 17(3), 437.
- *Meyer, R. D., Dalal, R. S., José, I. J., Hermida, R., Chen, T. R., Vega, R. P., et al. (2014). Measuring job-related situational strength and assessing its interactive effects with personality on voluntary work behavior. *Journal of Management*, 40(4), 1010–1041.
- *Michel, J. S., & Clark, M. A. (2009). Has it been affect all along? A test of work-to-family and family-to-work models of conflict, enrichment, and satisfaction. *Personality and Individual Differences*, 47(3), 163–168.
- *Michel, J. S., Newness, K., & Duniewicz, K. (2016). How abusive supervision affects workplace deviance: A moderated-mediation examination of aggressiveness and work-related negative affect. *Journal of Business and Psychology*, 31(1), 1–22.
- *Mullins, A. K. (2015). *The dimensionality of destructive leadership: Toward an integration of the bright and dark sides*. North Carolina State University.
- *Murphy, S. L. (2015). *Individual adaptability as a predictor of job performance*. Louisiana Tech University.
- *Nichols, A. L., & Cottrell, C. A. (2014). What do people desire in their leaders? The role of leadership level on trait desirability. *The Leadership Quarterly*, 25(4), 711–729.
- Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill.
- *O'Brien, K. E. (2008). *A stressor-strain model of organizational citizenship behavior and counterproductive work behavior* (Doctoral dissertation). Available from ProQuest Dissertations & Theses database (UMI No. 3347361).
- *O'Boyle, E. H. (2010). *A test of the general CWB-OCB emotion model* (Doctoral dissertation). Available from ABI/INFORM Global; ProQuest Dissertations & Theses database (UMI No. 3411997).
- Paolacci, G., & Chandler, J. (2014). Inside the Turk understanding mechanical Turk as a participant pool. *Current Directions in Psychological Science*, 23(3), 184–188.
- Paolacci, G., Chandler, J., & Ipeirotis, P. G. (2010). Running experiments on Amazon Mechanical Turk. *Judgment and Decision making*, 5(5), 411–419.
- *Penney, L. M., Hunter, E. M., & Perry, S. J. (2011). Personality and counterproductive work behaviour: Using conservation of resources theory to narrow the profile of deviant employees. *Journal of Occupational and Organizational Psychology*, 84(1), 58–77.
- *Petersen, N. L. (2015). *Retaliatory behavior as a response to executive compensation*. Bowling Green State University.
- *Porter, C., Woo, S. E., & Tak, J. (2015). Developing and validating short form protean and boundaryless career attitudes scales. *Journal of Career Assessment*, 1069072714565775.
- Postoaca, A. (2006). Launching the bottle: The rhetoric of the online researcher. *The anonymous elect: market research through online access panels* (pp. 67–107).
- *Powell, N. C. (2013). *Responding to abusive supervision: Opposing arguments for the role of social class in predicting workplace deviance*. (Masters thesis). Available from <https://uwaterloo.ca>.
- *Ramirez, S. A. (2015). *Impulsive and premeditated counterproductive work behaviors and the moderating effects of self-monitoring and core self-evaluation*. North Carolina State University.
- Ran, S., Liu, M., Marchiondo, L. A., & Huang, J. L. (2015). Difference in response effort across sample types: Perception or reality? *Industrial and Organizational Psychology*, 8(02), 202–208.
- *Richards, D. A., & Schat, A. C. (2011). Attachment at (not to) work: Applying attachment theory to explain individual behavior in organizations. *Journal of Applied Psychology*, 96(1), 169–182.

- *Rosen, C. C., Slater, D. J., & Johnson, R. E. (2013). Let's make a deal development and validation of the ex post I-deals scale. *Journal of Management*, 39(3), 709–742.
- Sackett, P. R., & Larson Jr, J. R. (1990). *Research strategies and tactics in industrial and organizational psychology*.
- *Salvaggio, T. (2014). *Towards a more complete understanding of the effects of the virtual environment on the relationship between leadership style and outcomes of LMX relationships* (Doctoral dissertation). Available from ProQuest Dissertations & Theses database (UMI No. 3690538).
- Schmidt, F. L., & Hunter, J. E. (2014). *Methods of meta-analysis: Correcting error and bias in research findings* (3rd ed.). Thousand Oaks, CA: Sage.
- Schmidt, F. L., Shaffer, J. A., & Oh, I.-S. (2008). Increased accuracy for range restriction corrections: Implications for the role of personality and general mental ability in job and training performance. *Personnel Psychology*, 61, 827–868.
- *Schultz, L. A. (2009). *Exploring the relationship between the positive and negative sides of the work-family interface: The role of enrichment in buffering the effects of time-, strain-, and behavior-based conflict* (Doctoral dissertation). Available from ProQuest Dissertations & Theses database (UMI No. 3378859).
- *Scott, K. A., & Zweig, D. (2008, May). Dispositional predictors of organizational cynicism. In *ASAC* (Vol. 29, No. 5).
- Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Houghton: Mifflin and Company.
- *Shao, P. (2010). *Ethics-based leadership and employee ethical behavior: Examining the mediating role of ethical regulatory focus* (Doctoral dissertation). Available from ProQuest Dissertations & Theses database (UMI No. 3430591).
- *Shao, P., Resick, C. J., & Hargis, M. B. (2011). Helping and harming others in the workplace: The roles of personal values and abusive supervision. *Human Relations*, 64(8), 1051–1078.
- *Sharif, M. M., & Scandura, T. A. (2014). Do perceptions of ethical conduct matter during organizational change? Ethical leadership and employee involvement. *Journal of Business Ethics*, 124(2), 185–196.
- Sharpe Wessling, K., Huber, J., & Netzer, O. (2017). MTurk character misrepresentation: Assessment and solutions. *Journal of Consumer Research*, 44(1), 211–230.
- Smith, R. & Hofma Brown, H. (2006). Panel and data quality: Comparing metrics and assessing claims. In *Proceedings of the ESOMAR Panel Research Conference*. Barcelona: ESOMAR.
- Smith, N. A., Sabat, I. E., Martinez, L. R., Weaver, K., & Xu, S. (2015). A convenient solution: Using MTurk to sample from hard-to-reach populations. *Industrial and Organizational Psychology*, 8(02), 220–228.
- Sparrow, N. (2007). Quality issues in online research. *Journal of Advertising Research-New York*, 47(2), 179.
- Sprouse, J. (2011). A validation of Amazon Mechanical Turk for the collection of acceptability judgments in linguistic theory. *Behavior Research Methods*, 43(1), 155–167.
- *Sprung, J. M., & Jex, S. M. (2012). Work locus of control as a moderator of the relationship between work stressors and counterproductive work behavior. *International Journal of Stress Management*, 19(4), 272–291.
- *Tepper, B. J., Carr, J. C., Breaux, D. M., Geider, S., Hu, C., & Hua, W. (2009). Abusive supervision, intentions to quit, and employees' workplace deviance: A power/dependence analysis. *Organizational Behavior and Human Decision Processes*, 109(2), 156–167.
- *Tepper, B. J., Mitchell, M. S., Haggard, D. L., Kwan, H. K., & Park, H. M. (2015). On the exchange of hostility with supervisors: An examination of self-enhancing and self-defeating perspectives. *Personnel Psychology*, 68(4), 723–758.
- *Thau, S., Bennett, R. J., Mitchell, M. S., & Marrs, M. B. (2009). How management style moderates the relationship between abusive supervision and workplace deviance: An uncertainty management theory perspective. *Organizational Behavior and Human Decision Processes*, 108(1), 79–92.
- *Thau, S., & Mitchell, M. S. (2010). Self-gain or self-regulation impairment? Tests of competing explanations of the supervisor abuse and employee deviance relationship through perceptions of distributive justice. *Journal of Applied Psychology*, 95(6), 1009.
- *Thompson, C. N. (2008). *Personal characteristics and the impact of transformational leadership behaviors on follower outcomes* (Doctoral dissertation). Available from ABI/INFORM Global; ProQuest Dissertations & Theses database (UMI No. 3375475).
- Thoresen, C. J., Kaplan, S. A., Barsky, A. P., Warren, C. R., & de Chermont, K. (2003). The affective underpinnings of job perceptions and attitudes: A meta-analytic review and integration. *Psychological Bulletin*, 129(6), 914–945.
- *Toaddy, S. (2012). *Validation of a measure of external organizational justice*. North Carolina State University.
- Vacha-Haase, T. (1998). Reliability generalization: Exploring variance in measurement error affecting score reliability across studies. *Educational and Psychological Measurement*, 58, 6–20.
- Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods*, 3(1), 4–70.
- *van Prooijen, J. W., & de Vries, R. E. (2016). Organizational conspiracy beliefs: Implications for leadership styles and employee outcomes. *Journal of Business and Psychology*, 31(4), 479–491.
- Viechtbauer, W. (2010). Conducting meta-analyses in R with the metafor package. *Journal of Statistical Software*, 36(3), 1–48.
- *Vogel, R. M., & Mitchell, M. S. (2015). The motivational effects of diminished self-esteem for employees who experience abusive supervision. *Journal of Management*.
- *Wall, A. (2014). *Common method variance: An experimental manipulation* (Doctoral dissertation). Available from ProQuest Dissertations & Theses database (UMI No. 3662469).
- *Wilson, L. M. (2015). *An examination of the moderating effects of work centrality on the relationships between person-group fit and work-related outcomes* (Doctoral dissertation, San Diego State University).
- *Wiltshire, J., Bourdage, J. S., & Lee, K. (2014). Honesty-humility and perceptions of organizational politics in predicting workplace outcomes. *Journal of Business and Psychology*, 29(2), 235–251.
- Wood, J. A. (2008). Methodology for dealing with duplicate study effects in a meta-analysis. *Organizational Research Methods*, 11(1), 79–95.
- *Wynne, K. T. (2012). *Profiling leaders: Using a profiling approach to examine the effects of multifactor leadership on follower deviance* (Master's thesis). Available from ProQuest Dissertations & Theses database (UMI No. 1518818).
- Zimmerman, R. D. (2008). Understanding the impact of personality traits on individuals' turnover decisions: A meta-analytic path model. *Personnel Psychology*, 61(2), 309–348.