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# Publishing impactful meta-analysis & handling the revise-and-resubmit process at a top journal: The case of prosocial motivation and its work outcomes

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# Where can I submit my meta-analysis?

→ Number of meta-analyses published in top-tier management/psychology journals in the last two decades (2002 – 2022):

- Psychological Bulletin: 447
- Journal of Applied Psychology: 222
- Journal of Personality and Social Psychology: 90
- Journal of Management: 84
- Personnel Psychology: 74
- Academy of Management Journal: 20
- Strategic Management Journal: 10
- Organization Science: 4

# Why meta-analysis?

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- A good meta-analysis “moves the needle” in a subject area through theoretical and empirical integration;
- Conducting a meta-analysis is an excellent way to establish substantive expertise on a topic;
- Meta-analyses are among the most highly cited and most impactful research in our field.

# Why meta-analysis?

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- Barrick, M. R., & Mount, M. K. (1991). The big five personality dimensions and job performance: a meta-analysis. *Personnel Psychology*, 44(1), 1-26. **[Cited 14428 times]**
- Schmidt, F. L., & Hunter, J. E. (1998). The validity and utility of selection methods in personnel psychology: Practical and theoretical implications of 85 years of research findings. *Psychological Bulletin*, 124(2), 262-274. **[Cited 6393 times]**
- Kristof-Brown, A. L., Zimmerman, R. D., & Johnson, E. C. (2005). Consequences of individual's fit at work: A meta-analysis of person-job, person-organization, person-group, and person-supervisor fit. *Personnel Psychology*, 58(2), 281-342. **[Cited 6514 times]**
- Blume, B. D., Ford, J. K., Baldwin, T. T., & Huang, J. L. (2010). Transfer of training: A meta-analytic review. *Journal of Management*, 36(4), 1065-1105. **[Cited 1890 times]**
- Jiang, K., Lepak, D. P., Hu, J., & Baer, J. C. (2012). How does human resource management influence organizational outcomes? A meta-analytic investigation of mediating mechanisms. *Academy of Management Journal*, 55(6), 1264-1294. **[Cited 2499 times]**

# What is a good meta-analysis?



→ For real estates, it's "location, location, location."

→ For meta-analysis, it's "contribution, contribution, contribution."

- Empirical contribution
- Theoretical contribution
- Practical contribution



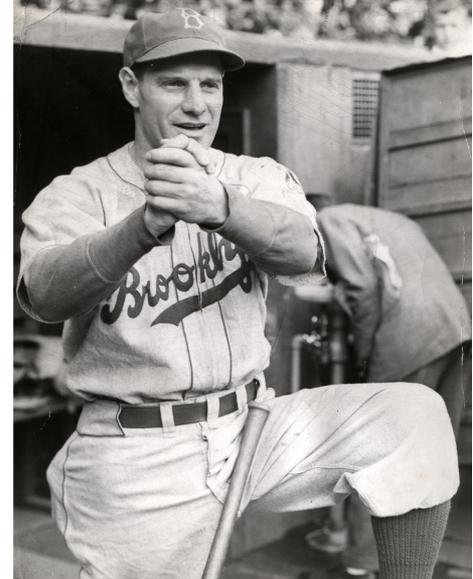
# The case of prosocial motivation

→ Liao, H., Su, R., Ptashnik, T., & Nielsen, J. (2022). Feeling good, doing good, and getting ahead: A meta-analytic investigation of the outcomes of prosocial motivation at work. *Psychological Bulletin*, 148(3-4), 158–198. <https://doi.org/10.1037/bul0000362>



# What is prosocial motivation?

- Bolino and Grant (2016): the desire to benefit others or expend effort out of concern for others
- What are the costs and benefits of prosocial motivation in the workplace? Do “nice guys finish last” in the work setting?



# The empirical contribution

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- For prosocial motivation, there are conflicting empirical findings regarding its relationship with employee well-being (e.g., Farmer & Van Dyne, 2017; Bolino, Hsiung, Harvey, & LePine, 2015) and with performance and career success (e.g., Halbesleben, Bowler, Bolino, & Turnley, 2010; Lester, Meglino, & Korsgaard, 2008). Bolino and Grant's (2016) narrative review summarized some of the conflicting findings in the prosocial literature.
- To resolve these inconsistencies, we conducted a systematic, quantitative review on the effects of prosocial motivation on employee well-being, prosocial behavior, job performance, and career success.

# The empirical contribution

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→ The empirical contribution of a meta-analysis lies in identifying and resolving the inconsistencies in the empirical literature.

→ Examples:

- Barrick, M. R., & Mount, M. K. (1991). The big five personality dimensions and job performance: a meta-analysis. *Personnel Psychology*, 44(1), 1-26.
- Kim, J. H., Gerhart, B., & Fang, M. (2021). Do financial incentives help or harm performance in interesting tasks? *Journal of Applied Psychology*, 107(1), 153-167.

# The empirical contribution

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→ Avoid two common mistakes:

- “We conducted a meta-analysis on the relationship between X and Y because it has never been examined before.”
- Overstating the debate and inaccurately presenting the state of the literature

# The theoretical contribution

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- For a meta-analysis, a key theoretical contribution is to integrate previously fragmented conceptualizations and measures of a construct (i.e., “clean up the construct space”)
- Prosocial motivation has been studied under a plethora of labels, including “other-orientation”, “concern for others”, “social value orientation”, and “prosocial role identity”; and it has been conceptualized and operationalized differently across various fields of research.

# The theoretical contribution

**Table 1**

*Summary of Major Constructs Related to Prosocial Motivation and Corresponding Measures Used in the Literature*

<b>Label</b>	<b>Definition/Conceptualization</b>	<b>Example Measures/Operationalizations</b>
Other orientation/other-focused/concern for others	A dispositional tendency to be concerned with and helpful to other persons (Meglino & Korsgaard, 2004).	Comparative emphasis scale (CES; Ravlin & Meglino, 1987):
Prosociality dimension of the “Social value orientation” (SVO)	SVO assesses individuals’ stable preferences for distributing outcomes between the self and others, wherein the prosociality dimension assesses individuals’ preferences for maximizing outcomes for the self and others at the same time. (Van Lange et al., 1997)	Decomposed games (Messick & McClintock, 1968)
Social interests of the vocational interests model	A person’s interests in work that involves helping, teaching, and caring for others (Holland, 1973, 1997).	Strong interest inventory (Donnay, Morris, Schaubhut, & Thompson, 2005)
Universalism and benevolence values of Schwartz’s value system	Universalism value refers to the understanding, appreciation, and protection for the welfare of <i>all people and nature</i> , whereas benevolence refers to the preservation and enhancement of the welfare of people with whom one is <i>in frequent personal contact</i> (Schwartz & Sagiv, 1995).	Schwartz’ Value System Survey (Schwartz & Sagiv, 1995).
The prosocial value dimension of organizational citizenship behavior (OCB) motives	Employees’ desire to engage in OCBs stemming from a need to be helpful and to build positive relationship with others (Rioux & Penner, 2001)	The “prosocial values” sub-scale of the OCB motive scale (Rioux & Penner, 2001)

# The theoretical contribution

The “prosocial orientation” dimension of “occupational calling”	Employees’ motivation to benefit others in their career (Dik & Duffy, 2009)	The “prosocial orientation” sub-scale of the Brief Calling Scale (Dik, Eldridge, Steger, & Duffy, 2012)
Prosocial work motivation	Employees’ desire to expend effort to benefit other people through their work	Prosocial motivation scale (Grant, 2008a); Prosocial motivation scale (Grant & Sumanth, 2009)
Prosocial role identity	The extent to which employees regard prosocial behavior as part of their job role responsibility (Podsakoff, MacKenzie, Moorman, & Fetter, 1990)	Prosocial role identity scale (Podsakoff, MacKenzie, Moorman, & Fetter, 1990)
Prosocial identity	The extent to which being a prosocial person is internalized and incorporated into employees’ self-concept (Grant, Dutton, & Ross, 2008)	Prosocial identity scale (Grant, Dutton, & Ross, 2008)
Organization-specific prosocial identity	The extent to which helping one’s organization is internalized and incorporated into employees’ self-concept (Finkelstein & Penner, 2004)	Organization-specific prosocial identity (Finkelstein & Penner, 2004)
Prosocial obligation/pressure	Employees’ felt obligation/pressure to help others (Brummel & Parker, 2015)	Prosocial obligation scale (Brummel & Parker, 2015); Prosocial obligation scale (Ravlin & Meglino, 1987) Pressure-based prosocial motivation (Gebauer et al., 2008)
Target-specific/activity-specific prosocial identity/motivation	Employees’ motivation to help a specific group of individuals (e.g., customers), or to help others in a specific activity (e.g., volunteering)	Children-helping prosocial identity (Farmer & Van Dyne, 2010) Customer Orientation scale (Brown, Mowen, Donavan, & Licata, 2002) Volunteer Function Inventory (VFI; Clary, Snyder, Ridge, Copeland, Stukas, Haugen, & Miene, 1998)
Industry-specific prosocial motivation	Employees from a specific industry (e.g., public service) expending efforts to benefit others through their work	Public service motivation scale (Perry, 1996)

# A theoretical integration

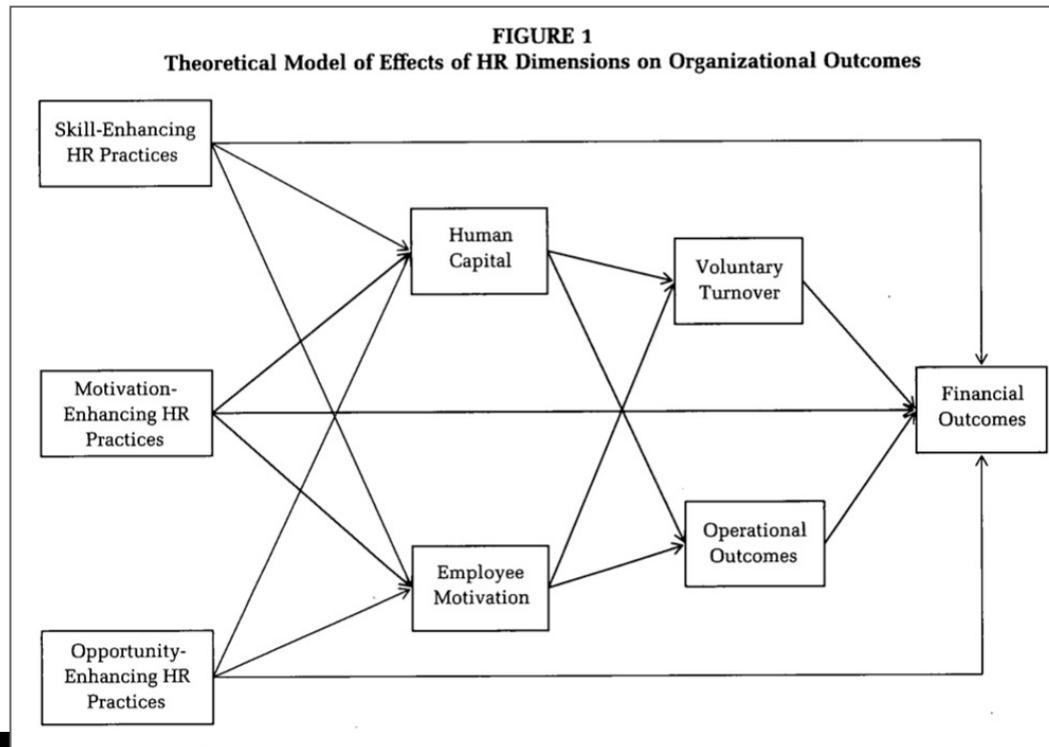
Self Determination Theory (Ryan & Deci, 2000):  
**Level of autonomy**

Vallerand's (1997)  
 hierarchical model of motivation  
**Level of generality/specificity**

	Discretionary	Obligatory
Global	Prosocial identity (Grant, Dutton, & Ross, 2008): "I see myself as caring/generous"	Prosocial obligation (Brummel & Parker, 2015): "I ought to spend more time helping others"
Contextual	Social interests (Donnay, Morris, Schaubhut, & Thompson, 2005): occupational interest in "Helping others overcome their difficulties."	Commitment to public interest (Perry, 1997): "I consider public service my civic duty."
Positional	Customer orientation (Brown et al., 2002): "I get satisfaction from making my customer happy."	Other-orientation work value (Ravlin & Meglino, 1987): <i>should or ought to</i> "help others on difficult jobs"

# Other great examples of theoretical integration

→ Jiang, K., Lepak, D. P., Hu, J., & Baer, J. C. (2012). How does human resource management influence organizational outcomes? A meta-analytic investigation of mediating mechanisms. *Academy of Management Journal*, 55(6), 1264-1294.



# Other great examples of theoretical integration

→ Liu, S., Huang, J. L., & Wang, M. (2014). Effectiveness of job search interventions: A meta-analytic review. *Psychological Bulletin*, 140(4), 1009-1041.

Table 1  
A Framework of the Critical Components in Job Search Interventions

Focus	Components	Descriptions	Major theories used in job search interventions			
			Behavioral learning theory	Theory of planned behavior	Social cognitive theory	Coping theory
Skill development	Teaching job search skills	Teaching job search skills such as identifying types of jobs where one's skills may be relevant; using classifieds, newspapers, Internet, and social networking to obtain job leads; and practicing phone calls to obtain job information.	X		X	
	Improving self-presentation	Providing training on presenting one's skills and abilities in a concrete and relevant manner on résumés and applicant blanks; providing dress and grooming instructions; teaching gestures, manners, and things to do during employment interviews; and using exercises to improve preparedness for interviews and other employment tests.	X		X	
	Boosting self-efficacy	Improving job seekers' self-efficacy by using the following experiences: enactive mastery of job search behaviors (e.g., making a convincing self-presentation, solving employment-related problems, and role-playing a job interview), vicarious learning (i.e., modeling of job search activities), and verbal self-guidance (i.e., converting negative self-statements to positive ones).		X	X	
Motivation enhancement	Encouraging proactivity	Encouraging job seekers to widen the variety of positions considered; encouraging job seekers to make "cold calls" or follow-up calls regarding employment opportunities; offering additional job-related information not requested by the organization; asking an employer who did not have an opening if he or she knows of other employers who might have job openings.	X	X		
	Promoting goal setting	Teaching and encouraging job seekers to set concrete goals regarding desired occupation, job type, or salary level; Teaching and encouraging job seekers to set specific job search behavior goals, such as making a certain amount of phone calls or sending out certain numbers of résumés in the next week.			X	
	Enlisting social support	Facilitating peer support among job seekers; encouraging job seekers to share information on job leads; explaining the needs of job seekers to their family and friends; encouraging family and friends of job seekers to provide emotional support (e.g., encouragement) and tangible support (e.g., arrangements for transportation and allowances).	X	X		X
	Stress management	Encouraging job seekers to anticipate setbacks and rejections; inoculating job seekers against stress during job search; teaching skills (e.g., relaxation and expressive writing) to cope with adverse situations; promoting job seekers to adopt controllable and unstable perceptions of lack of progress in job search.				X

Note. An X denotes a theory that suggests a component as critical for successful job search interventions.

# Results (original submission)

**Table 3.**

*Meta-analytic Estimates of The Effects of Prosocial Motivation on Work-related Outcomes*

	<i>k</i>	<i>N</i>	$\bar{r}$	$\hat{\rho}$	$SD_{\rho}$	CI <sub>LL</sub>	CI <sub>UL</sub>	CV <sub>LL</sub>	CV <sub>UL</sub>	<i>Q</i>	<i>I</i> <sup>2</sup>	Z-Test
<b>Well-being</b>	<b>89</b>	<b>39836</b>	<b>.19</b>	<b>.23</b>	<b>.21</b>	<b>.18</b>	<b>.27</b>	<b>-.04</b>	<b>.49</b>	<b>1401.10**</b>	<b>93.72</b>	
<i>Discretionary PM</i>	76	31285	.22	.26	.20	.21	.30	.01	.51	1018.34**	92.64	<i>Z</i> = 3.81, <i>p</i> < .001
<i>Obligatory PM</i>	9	6464	.01	.02	.17	-.10	.13	-.20	.24	128.65**	93.78	
<i>Global PM</i>	14	4987	.24	.29	.10	.23	.35	.16	.41	48.69**	73.30	
<i>Contextual PM</i>	49	25428	.21	.24	.21	.18	.31	-.03	.52	939.92**	94.89	<i>Z</i> <sub><i>c-s</i></sub> = 1.82, <i>p</i> < .05;
<i>Situational PM</i>	28	10609	.13	.15	.19	.06	.21	-.11	.38	364.00**	92.58	<i>Z</i> <sub><i>g-s</i></sub> = 2.67, <i>p</i> < .01
<b>Prosocial Behavior</b>	<b>108</b>	<b>38521</b>	<b>.31</b>	<b>.36</b>	<b>.18</b>	<b>.32</b>	<b>.39</b>	<b>.13</b>	<b>.58</b>	<b>1141.60**</b>	<b>90.63</b>	
<i>Affiliative</i>	91	34271	.31	.37	.17	.33	.40	.15	.59	962.39**	90.65	<i>Z</i> = 2.17, <i>p</i> < .05
<i>Challenging</i>	19	4695	.23	.26	.19	.17	.35	.02	.50	149.99**	88.00	
<i>Discretionary PM</i>	91	21879	.30	.34	.18	.30	.38	.11	.57	714.75**	87.47	<i>Z</i> = -0.19, <i>p</i> = .427
<i>Obligatory PM</i>	15	15704	.30	.35	.17	.26	.44	.14	.57	368.86**	96.21	
<i>Global PM</i>	17	16557	.33	.40	.12	.34	.46	.24	.56	221.30**	92.77	<i>Z</i> <sub><i>g-c</i></sub> = 0.91, <i>p</i> = .182;
<i>Contextual PM</i>	33	7718	.32	.36	.17	.30	.42	.14	.58	236.25**	86.46	<i>Z</i> <sub><i>c-s</i></sub> = 1.25, <i>p</i> = .106;
<i>Situational PM</i>	58	14247	.27	.31	.22	.25	.36	.03	.58	608.44**	90.63	<i>Z</i> <sub><i>g-s</i></sub> = 2.20, <i>p</i> < .05

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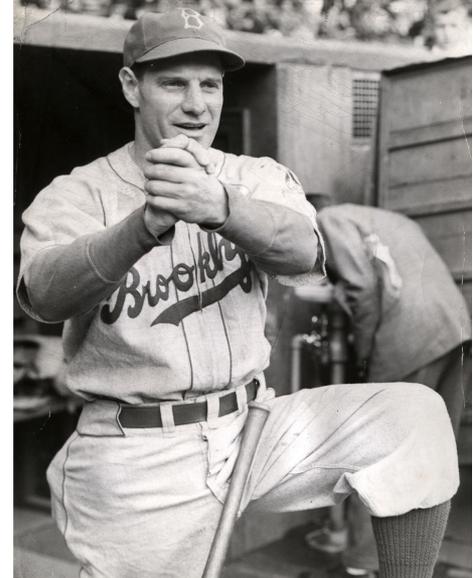
	$k$	$N$	$\bar{r}$	$\hat{\rho}$	$SD_{\rho}$	CI <sub>LL</sub>	CI <sub>UL</sub>	CV <sub>LL</sub>	CV <sub>UL</sub>	$Q$	$I^2$	Z-Test
<b>Performance</b>	<b>79</b>	<b>16219</b>	<b>.18</b>	<b>.21</b>	<b>.24</b>	<b>.15</b>	<b>.26</b>	<b>-.10</b>	<b>.51</b>	<b>822.02**</b>	<b>90.51</b>	
<i>Subjective</i>	64	12820	.24	.27	.23	.21	.33	-.03	.57	639.84**	90.15	$Z = 6.99, p < .001$
<i>Objective</i>	19	3713	-.004	-.001	.07	-.05	.05	-.09	.09	31.38*	42.64	
<i>Discretionary PM</i>	74	15283	.18	.21	.24	.15	.26	-.10	.51	778.66**	90.63	$Z = 1.50, p = .067$
<i>Obligatory PM</i>	3	552	.08	.10	.08	-.04	.23	-.01	.20	3.71	46.01	
<i>Global PM</i>	7	1282	.09	.10	.00	.06	.14	.10	.10	2.19	0.00	$Z_{g-c} = -1.86, p < .05;$
<i>Contextual PM</i>	56	11359	.16	.18	.26	.11	.25	-.15	.51	642.53**	91.44	$Z_{c-s} = -2.53, p < .01;$
<i>Situational PM</i>	16	3578	.29	.33	.19	.24	.42	.11	.55	114.35**	86.88	$Z_{g-s} = -4.42, p < .001$
<b>Career Success</b>	<b>12</b>	<b>2240</b>	<b>.11</b>	<b>.13</b>	<b>.11</b>	<b>.05</b>	<b>.20</b>	<b>-.01</b>	<b>.26</b>	<b>29.63**</b>	<b>62.87</b>	
<i>Other-perceived</i>	8	1645	.14	.16	.10	.07	.25	.03	.29	18.43*	62.03	$Z = 1.66, p < .05$
<i>Objective</i>	4	595	.03	.04	.08	-.08	.16	-.07	.14	5.58	46.23	

Note. PM stands for prosocial motivation.  $k$  = number of statistically independent samples;  $N$  = total sample size;  $\bar{r}$  = uncorrected sample-size-weighted mean correlation;  $\hat{\rho}$  = sample-size-weighted mean true score correlation corrected for measurement unreliability;  $SD_{\rho}$  = standard deviation of corrected correlation; CI<sub>LL</sub> and CI<sub>UL</sub>: lower and upper bounds, respectively, of the 95% confidence intervals around the corrected mean correlations; CV<sub>LL</sub> and CV<sub>UL</sub>: lower and upper bounds, respectively, of the 80% credibility intervals;  $Q$  = true effect size heterogeneity;  $I^2$  is the percentage of the true effect size heterogeneity within the total variance of effect sizes. In the Z-test, subscripts  $g, c, s$  are abbreviations for global PM, contextual PM, and situational PM, respectively.

# The practical contribution

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- What are the costs and benefits of prosocial motivation in the workplace? Do “nice guys finish last” in the work setting?
- Practical implications for:
  - Individual employees
  - Personnel selection
  - Assessment of prosocial motivation
  - Organizational culture



# The Revisions

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→ Two rounds of R&Rs:

- R1: major revision (with a 56-page response letter)
- R2: minor revision (with a 17-page response letter)

→ My rough estimates at *Psych Bulletin* (these estimates vary at other A journals and across different AEs):

- Desk rejection: >60% --> <40% go into the review process
- Rejected after initial round of review: 60-70% --> R1
- Rejected after second round of review: 20-30% --> R2
- Rejected after R2: very few

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- Rejected after R2: very few

# The Revisions

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- Some general advice for a constructive R&R process:
- Don't give up!
  - See reviewers as partners in an intellectual conversation
  - Understand what the reviewers were really asking for
  - Consider the best approach to achieving the desired goal—sometimes you need to education the reviewers
  - Use numbers to support your arguments
  - Go above and beyond

# Example comments and responses

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→ Reviewer 1 on the role of self-concern: *“I would love to see you develop and test a hypothesis about how prosocial motivation is more likely to contribute to job performance and career success when self-concern is high rather than low. Is this possible using the evidence gathered to date? **For example, you could code self-concern from measures of self-interest, narcissism, impression management, and achievement motivation.**”*

# Example comments and responses

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- Our response in short: How can we examine the moderating role of self-concern in the effects of prosocial motivation (i.e., the interaction effect between prosocial motivation and self-concern)?
- Alternative approach 1: directly meta-analyze the interaction between prosocial motivation and self-concern in primary studies; X
  - Alternative approach 2: code the mean level of self-concern in each primary study and test whether sample-level self-concern moderates the effects of prosocial motivation on work outcomes across studies; X
  - Alternative approach 3: contrast the effects of ipsative vs. normative measures of prosocial motivation. ✓

# Results (after revisions)

**Table 3.**

*Meta-analytic Estimates of The Effects of Prosocial Motivation on Work-related Outcomes*

	<i>k</i>	<i>N</i>	$\bar{r}$	$\hat{\rho}$	$SD_{\rho}$	CI <sub>LL</sub>	CI <sub>UL</sub>	CV <sub>LL</sub>	CV <sub>UL</sub>	<i>Q</i>	<i>I</i> <sup>2</sup>	Z-Test
<b>Well-being</b>	<b>114</b>	<b>45777</b>	<b>.19</b>	<b>.23</b>	<b>.21</b>	<b>.19</b>	<b>.27</b>	<b>-.04</b>	<b>.50</b>	<b>1623.54**</b>	<b>93.04</b>	
<i>Discretionary PM</i>	96	36487	.22	.27	.20	.23	.31	.02	.52	1134.98**	91.63	<i>Z</i> = 5.37, <i>p</i> < .001
<i>Obligatory PM</i>	14	7203	-.00	-.00	.16	-.09	.09	-.21	.21	143.23**	90.92	
<i>Global PM</i>	23	7308	.21	.25	.14	.19	.32	.08	.43	121.63**	81.91	
<i>Contextual PM</i>	55	26344	.22	.27	.21	.21	.33	-.00	.54	946.14**	94.29	<i>Z</i> <sub><i>c-p</i></sub> = 2.63, <i>p</i> < .01
<i>Positional PM</i>	37	12360	.12	.14	.22	.07	.22	-.14	.43	472.90**	92.39	<i>Z</i> <sub><i>g-p</i></sub> = 2.25, <i>p</i> < .05
<i>Normative measure</i>	106	40111	.21	.26	.21	.22	.30	-.01	.53	1414.61**	92.58	<i>Z</i> = 8.90, <i>p</i> < .001
<i>Ipsative measure</i>	8	5666	.01	.02	.02	-.02	.05	-.01	.05	8.94	21.65	
<i>Col. culture</i>	36	10388	.35	.42	.22	.34	.49	.13	.70	489.60**	92.85	<i>Z</i> = 5.74, <i>p</i> < .001
<i>Ind. culture</i>	73	34214	.14	.17	.17	.13	.21	-.05	.38	744.11**	90.32	

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<b>Prosocial Behavior</b>	<b>122</b>	<b>42942</b>	<b>.30</b>	<b>.35</b>	<b>.18</b>	<b>.32</b>	<b>.38</b>	<b>.12</b>	<b>.58</b>	<b>1297.18**</b>	<b>90.67</b>	
<i>Affiliative</i>	104	38501	.30	.36	.18	.32	.40	.13	.59	1121.76**	90.82	<i>Z</i> = 1.93, <i>p</i> < .05
<i>Challenging</i>	20	4886	.24	.27	.19	.18	.36	.03	.51	155.80**	87.81	
<i>Discretionary PM</i>	102	25850	.29	.34	.18	.30	.38	.10	.58	847.03**	88.08	<i>Z</i> = -0.22, <i>p</i> = .412
<i>Obligatory PM</i>	17	15931	.30	.35	.17	.27	.43	.14	.56	366.24**	95.63	
<i>Global PM</i>	20	15025	.34	.42	.14	.36	.48	.24	.60	259.61**	92.68	<i>Z</i> <sub><i>g-c</i></sub> = 1.35, <i>p</i> = .089
<i>Contextual PM</i>	37	8271	.32	.36	.17	.30	.42	.14	.58	260.04**	86.16	<i>Z</i> <sub><i>c-p</i></sub> = 1.49, <i>p</i> = .068
<i>Positional PM</i>	64	19424	.26	.30	.19	.25	.35	.05	.55	663.71**	90.51	<i>Z</i> <sub><i>g-p</i></sub> = 2.87, <i>p</i> < .01
<i>Normative measure</i>	118	38055	.31	.36	.19	.33	.40	.13	.60	1255.56**	90.68	<i>Z</i> = 2.93, <i>p</i> < .01
<i>Ipsative measure</i>	4	4887	.21	.25	.06	.18	.32	.18	.33	12.85**	76.66	
<i>Col. culture</i>	44	13594	.27	.32	.20	.26	.38	.07	.57	475.86**	90.96	<i>Z</i> = 0.03, <i>p</i> = .490
<i>Ind. culture</i>	74	19891	.28	.32	.19	.28	.37	.08	.56	656.41**	88.88	

# Results (after revisions)

**Table 3.**

*Meta-analytic Estimates of The Effects of Prosocial Motivation on Work-related Outcomes*

	<i>k</i>	<i>N</i>	$\bar{r}$	$\hat{\rho}$	$SD_{\rho}$	CI <sub>LL</sub>	CI <sub>UL</sub>	CV <sub>LL</sub>	CV <sub>UL</sub>	<i>Q</i>	<i>I</i> <sup>2</sup>	Z-Test
<b>Performance</b>	<b>85</b>	<b>17569</b>	<b>.18</b>	<b>.20</b>	<b>.23</b>	<b>.15</b>	<b>.25</b>	<b>-.10</b>	<b>.50</b>	<b>858.00**</b>	<b>90.21</b>	
<i>Subjective</i>	69	14121	.23	.26	.23	.20	.31	-.03	.55	674.05**	89.91	<i>Z</i> = 6.84, <i>p</i> < .001
<i>Objective</i>	20	3762	-.01	-.01	.08	-.06	.04	-.11	.09	36.79**	48.36	
<i>Discretionary PM</i>	79	16341	.18	.20	.23	.15	.26	-.09	.50	795.71**	90.20	<i>Z</i> = 2.42, <i>p</i> < .01
<i>Obligatory PM</i>	4	844	.03	.03	.11	-.11	.16	-.12	.17	8.92*	66.35	
<i>Global PM</i>	9	1746	.09	.10	.07	.03	.17	.02	.19	12.98	38.38	<i>Z</i> <sub><i>g-c</i></sub> = -0.56, <i>p</i> = .289
<i>Contextual PM</i>	56	10980	.12	.13	.19	.08	.18	-.11	.37	359.00**	84.68	<i>Z</i> <sub><i>c-p</i></sub> = -3.99, <i>p</i> < .001
<i>Positional PM</i>	20	4843	.35	.39	.25	.27	.50	.06	.71	327.80**	94.20	<i>Z</i> <sub><i>g-p</i></sub> = -4.14, <i>p</i> < .001
<i>Normative measure</i>	83	17171	.18	.21	.23	.16	.26	-.09	.51	832.47**	90.15	<i>Z</i> = 10.02, <i>p</i> < .001
<i>Ipsative measure</i>	2	398	-.08	-.09	.00	-.11	-.06	-.09	-.09	0.05	0.00	
<i>Col. culture</i>	21	5037	.18	.20	.15	.13	.27	.00	.39	106.31**	81.19	<i>Z</i> = -0.04, <i>p</i> = .484
<i>Ind. culture</i>	61	11749	.17	.20	.26	.13	.27	-.14	.54	728.24**	91.76	

# Results (after revisions)

**Table 3.**

*Meta-analytic Estimates of The Effects of Prosocial Motivation on Work-related Outcomes*

	<i>k</i>	<i>N</i>	$\bar{r}$	$\hat{\rho}$	$SD_{\rho}$	CI <sub>LL</sub>	CI <sub>UL</sub>	CV <sub>LL</sub>	CV <sub>UL</sub>	<i>Q</i>	<i>I</i> <sup>2</sup>	Z-Test
<b>Career Success</b>	<b>15</b>	<b>3716</b>	<b>.06</b>	<b>.06</b>	<b>.11</b>	<b>-.00</b>	<b>.13</b>	<b>-.08</b>	<b>.21</b>	<b>47.59**</b>	<b>70.58</b>	
<i>Other-perceived</i>	8	1645	.14	.16	.10	.07	.25	.03	.29	18.41*	61.98	Z = 3.24, <i>p</i> < .001
<i>Objective</i>	7	2071	-.01	-.01	.04	-.07	.05	-.06	.04	8.36	28.21	
<i>Normative measure</i>	13	3268	.08	.09	.11	.02	.16	-.05	.22	38.56**	68.88	
<i>Ipsative measure</i>	2	448	-.07	-.07	.00	-.07	-.07	-.07	-.07	0.00	0.00	Z = 4.48, <i>p</i> < .001
<i>Col. culture</i>	4	970	.11	.13	.14	-.03	.29	-.05	.31	14.40**	79.17	Z = 1.00, <i>p</i> = .160
<i>Ind. culture</i>	11	2746	.04	.04	.10	-.03	.11	-.08	.17	29.10**	65.64	

Note. PM stands for prosocial motivation. *k* = number of statistically independent samples; *N* = total sample size;  $\bar{r}$  = uncorrected sample-size-weighted mean correlation;  $\hat{\rho}$  = sample-size-weighted mean true score correlation corrected for measurement unreliability;  $SD_{\rho}$  = standard deviation of corrected correlation; CI<sub>LL</sub> and CI<sub>UL</sub>: lower and upper bounds, respectively, of the 95% confidence intervals around the corrected mean correlations; CV<sub>LL</sub> and CV<sub>UL</sub>: lower and upper bounds, respectively, of the 80% credibility intervals; *Q* = true effect size heterogeneity, \*\* *p* < .01, \* *p* < .05; *I*<sup>2</sup> is the percentage of the true effect size heterogeneity within the total variance of effect sizes. In the Z-test, subscripts *g*, *c*, *p* are abbreviations for global PM, contextual PM, and positional PM, respectively.

# Example comments and responses

---

→ Reviewer 1 on additional moderators:

- (a) organizational or national cultures
- (b) agreeableness
- (c) interaction between the two dimensions of prosocial motivation
- (d) for objective career success: financial outcomes vs. advancement
- (e) gender

# Example comments and responses

---

→ Our response:

- (a) organizational or national cultures ✓
- (b) agreeableness ✗
- (c) interaction between the two dimensions of prosocial motivation
- (d) for objective career success: financial outcomes vs. advancement ✗
- (e) gender ✓

# Results (after revisions)

**Table 3.**

*Meta-analytic Estimates of The Effects of Prosocial Motivation on Work-related Outcomes*

	<i>k</i>	<i>N</i>	$\bar{r}$	$\hat{\rho}$	$SD_{\rho}$	CI <sub>LL</sub>	CI <sub>UL</sub>	CV <sub>LL</sub>	CV <sub>UL</sub>	<i>Q</i>	<i>I</i> <sup>2</sup>	Z-Test
<b>Well-being</b>	<b>114</b>	<b>45777</b>	<b>.19</b>	<b>.23</b>	<b>.21</b>	<b>.19</b>	<b>.27</b>	<b>-.04</b>	<b>.50</b>	<b>1623.54**</b>	<b>93.04</b>	
<i>Discretionary PM</i>	96	36487	.22	.27	.20	.23	.31	.02	.52	1134.98**	91.63	<i>Z</i> = 5.37, <i>p</i> < .001
<i>Obligatory PM</i>	14	7203	-.00	-.00	.16	-.09	.09	-.21	.21	143.23**	90.92	
<i>Global PM</i>	23	7308	.21	.25	.14	.19	.32	.08	.43	121.63**	81.91	
<i>Contextual PM</i>	55	26344	.22	.27	.21	.21	.33	-.00	.54	946.14**	94.29	<i>Z</i> <sub><i>c-p</i></sub> = 2.63, <i>p</i> < .01
<i>Positional PM</i>	37	12360	.12	.14	.22	.07	.22	-.14	.43	472.90**	92.39	<i>Z</i> <sub><i>g-p</i></sub> = 2.25, <i>p</i> < .05
<i>Normative measure</i>	106	40111	.21	.26	.21	.22	.30	-.01	.53	1414.61**	92.58	<i>Z</i> = 8.90, <i>p</i> < .001
<i>Ipsative measure</i>	8	5666	.01	.02	.02	-.02	.05	-.01	.05	8.94	21.65	
<i>Col. culture</i>	36	10388	.35	.42	.22	.34	.49	.13	.70	489.60**	92.85	<i>Z</i> = 5.74, <i>p</i> < .001
<i>Ind. culture</i>	73	34214	.14	.17	.17	.13	.21	-.05	.38	744.11**	90.32	

# Results (after revisions)

**Table 3.**

*Meta-analytic Estimates of The Effects of Prosocial Motivation on Work-related Outcomes*

	<i>k</i>	<i>N</i>	$\bar{r}$	$\hat{\rho}$	$SD_{\rho}$	CI <sub>LL</sub>	CI <sub>UL</sub>	CV <sub>LL</sub>	CV <sub>UL</sub>	<i>Q</i>	<i>I</i> <sup>2</sup>	Z-Test
<b>Prosocial Behavior</b>	<b>122</b>	<b>42942</b>	<b>.30</b>	<b>.35</b>	<b>.18</b>	<b>.32</b>	<b>.38</b>	<b>.12</b>	<b>.58</b>	<b>1297.18**</b>	<b>90.67</b>	
<i>Affiliative</i>	104	38501	.30	.36	.18	.32	.40	.13	.59	1121.76**	90.82	<i>Z</i> = 1.93, <i>p</i> < .05
<i>Challenging</i>	20	4886	.24	.27	.19	.18	.36	.03	.51	155.80**	87.81	
<i>Discretionary PM</i>	102	25850	.29	.34	.18	.30	.38	.10	.58	847.03**	88.08	<i>Z</i> = -0.22, <i>p</i> = .412
<i>Obligatory PM</i>	17	15931	.30	.35	.17	.27	.43	.14	.56	366.24**	95.63	
<i>Global PM</i>	20	15025	.34	.42	.14	.36	.48	.24	.60	259.61**	92.68	<i>Z</i> <sub><i>g-c</i></sub> = 1.35, <i>p</i> = .089
<i>Contextual PM</i>	37	8271	.32	.36	.17	.30	.42	.14	.58	260.04**	86.16	<i>Z</i> <sub><i>c-p</i></sub> = 1.49, <i>p</i> = .068
<i>Positional PM</i>	64	19424	.26	.30	.19	.25	.35	.05	.55	663.71**	90.51	<i>Z</i> <sub><i>g-p</i></sub> = 2.87, <i>p</i> < .01
<i>Normative measure</i>	118	38055	.31	.36	.19	.33	.40	.13	.60	1255.56**	90.68	<i>Z</i> = 2.93, <i>p</i> < .01
<i>Ipsative measure</i>	4	4887	.21	.25	.06	.18	.32	.18	.33	12.85**	76.66	
<i>Col. culture</i>	44	13594	.27	.32	.20	.26	.38	.07	.57	475.86**	90.96	<i>Z</i> = 0.03, <i>p</i> = .490
<i>Ind. culture</i>	74	19891	.28	.32	.19	.28	.37	.08	.56	656.41**	88.88	

# Results (after revisions)

**Table 3.**

*Meta-analytic Estimates of The Effects of Prosocial Motivation on Work-related Outcomes*

	<i>k</i>	<i>N</i>	$\bar{r}$	$\hat{\rho}$	$SD_{\rho}$	CI <sub>LL</sub>	CI <sub>UL</sub>	CV <sub>LL</sub>	CV <sub>UL</sub>	<i>Q</i>	<i>I</i> <sup>2</sup>	Z-Test
<b>Performance</b>	<b>85</b>	<b>17569</b>	<b>.18</b>	<b>.20</b>	<b>.23</b>	<b>.15</b>	<b>.25</b>	<b>-.10</b>	<b>.50</b>	<b>858.00**</b>	<b>90.21</b>	
<i>Subjective</i>	69	14121	.23	.26	.23	.20	.31	-.03	.55	674.05**	89.91	<i>Z</i> = 6.84, <i>p</i> < .001
<i>Objective</i>	20	3762	-.01	-.01	.08	-.06	.04	-.11	.09	36.79**	48.36	
<i>Discretionary PM</i>	79	16341	.18	.20	.23	.15	.26	-.09	.50	795.71**	90.20	<i>Z</i> = 2.42, <i>p</i> < .01
<i>Obligatory PM</i>	4	844	.03	.03	.11	-.11	.16	-.12	.17	8.92*	66.35	
<i>Global PM</i>	9	1746	.09	.10	.07	.03	.17	.02	.19	12.98	38.38	<i>Z</i> <sub><i>g-c</i></sub> = -0.56, <i>p</i> = .289
<i>Contextual PM</i>	56	10980	.12	.13	.19	.08	.18	-.11	.37	359.00**	84.68	<i>Z</i> <sub><i>c-p</i></sub> = -3.99, <i>p</i> < .001
<i>Positional PM</i>	20	4843	.35	.39	.25	.27	.50	.06	.71	327.80**	94.20	<i>Z</i> <sub><i>g-p</i></sub> = -4.14, <i>p</i> < .001
<i>Normative measure</i>	83	17171	.18	.21	.23	.16	.26	-.09	.51	832.47**	90.15	<i>Z</i> = 10.02, <i>p</i> < .001
<i>Ipsative measure</i>	2	398	-.08	-.09	.00	-.11	-.06	-.09	-.09	0.05	0.00	
<i>Col. culture</i>	21	5037	.18	.20	.15	.13	.27	.00	.39	106.31**	81.19	<i>Z</i> = -0.04, <i>p</i> = .484
<i>Ind. culture</i>	61	11749	.17	.20	.26	.13	.27	-.14	.54	728.24**	91.76	

# Results (after revisions)

**Table 3.**

*Meta-analytic Estimates of The Effects of Prosocial Motivation on Work-related Outcomes*

	$k$	$N$	$\bar{r}$	$\hat{\rho}$	$SD_{\rho}$	CI <sub>LL</sub>	CI <sub>UL</sub>	CV <sub>LL</sub>	CV <sub>UL</sub>	$Q$	$I^2$	Z-Test
<b>Career Success</b>	<b>15</b>	<b>3716</b>	<b>.06</b>	<b>.06</b>	<b>.11</b>	<b>-.00</b>	<b>.13</b>	<b>-.08</b>	<b>.21</b>	<b>47.59**</b>	<b>70.58</b>	
<i>Other-perceived</i>	8	1645	.14	.16	.10	.07	.25	.03	.29	18.41*	61.98	$Z = 3.24, p < .001$
<i>Objective</i>	7	2071	-.01	-.01	.04	-.07	.05	-.06	.04	8.36	28.21	
<i>Normative measure</i>	13	3268	.08	.09	.11	.02	.16	-.05	.22	38.56**	68.88	$Z = 4.48, p < .001$
<i>Ipsative measure</i>	2	448	-.07	-.07	.00	-.07	-.07	-.07	-.07	0.00	0.00	
<i>Col. culture</i>	4	970	.11	.13	.14	-.03	.29	-.05	.31	14.40**	79.17	$Z = 1.00, p = .160$
<i>Ind. culture</i>	11	2746	.04	.04	.10	-.03	.11	-.08	.17	29.10**	65.64	

Note. PM stands for prosocial motivation.  $k$  = number of statistically independent samples;  $N$  = total sample size;  $\bar{r}$  = uncorrected sample-size-weighted mean correlation;  $\hat{\rho}$  = sample-size-weighted mean true score correlation corrected for measurement unreliability;  $SD_{\rho}$  = standard deviation of corrected correlation; CI<sub>LL</sub> and CI<sub>UL</sub>: lower and upper bounds, respectively, of the 95% confidence intervals around the corrected mean correlations; CV<sub>LL</sub> and CV<sub>UL</sub>: lower and upper bounds, respectively, of the 80% credibility intervals;  $Q$  = true effect size heterogeneity, \*\*  $p < .01$ , \*  $p < .05$ ;  $I^2$  is the percentage of the true effect size heterogeneity within the total variance of effect sizes. In the Z-test, subscripts  $g, c, p$  are abbreviations for global PM, contextual PM, and positional PM, respectively.

# Results (after revisions)

**Table 4.**

*Results of Robust Variance Estimation (RVE) Analyses*

	Psychological well-being		Prosocial behavior		Job performance	
	<i>b</i>	95% <i>CI</i>	<i>b</i>	95% <i>CI</i>	<i>b</i>	95% <i>CI</i>
<b>Study-Level Moderators</b>						
Publication year	.00	[-.00, .01]	-.00	[-.01, .01]	.00	[-.00, .01]
Publication status (unpublished)	.04	[-.10, .18]	.00	[-.13, .13]	.04	[-.14, .21]
Presence of same-source effect	.08	[-.26, .43]	.17**	[.06, .27]	.32*	[.05, .59]
<b>Sample-Level Moderators</b>						
Percentage of females	-.16	[-.39, .07]	.02	[-.24, .28]	.06	[-.18, .31]
Individualism	-.19*	[-.37, -.00]	-.01	[-.15, .14]	.04	[-.16, .24]
Student sample	-- <sup>a</sup>	--	-.09	[-.19, .02]	.28*	[.02, .55]
<b>Variable-Level Moderators</b>						
Autonomy (discretionary)	.32*	[.07, .56]	.18 <sup>†</sup>	[-.01, .36]	.09 <sup>†</sup>	[-.00, .19]
Generality (contextual)	.10	[-.04, .24]	.00	[-.13, .14]	.12 <sup>†</sup>	[-.01, .24]
Generality (positional)	-.01	[-.17, .16]	.07	[-.06, .20]	.19**	[.07, .31]
Ipsative measure	.11	[-.12, .34]	-.11	[-.31, .09]	-.43**	[-.62, -.25]
Type of prosocial behavior (challenging)			-.11 <sup>†</sup>	[-.23, .01]		
Objectivity (subjective)					.19**	[.06, .32]
Number of studies	83		96		68	
Number of effect sizes	158		189		107	
$I^2$	93.09		93.20		89.32	
$\tau^2$	.06		.06		.05	

Note. \*\*  $p < .01$ , \*  $p < .05$ , <sup>†</sup>  $p < .10$ . <sup>a</sup> No studies with student samples for well-being outcomes.

# Example comments and responses

---

→ Our response:

- (a) organizational or national cultures ✓
- (b) agreeableness X
- (c) **interaction between the two dimensions of prosocial motivation**
- (d) for objective career success: financial outcomes vs. advancement X
- (e) gender ✓

# Example comments and responses

---

→ Our response in short: to address the **interaction between the two dimensions of prosocial motivation** would require us to conduct a hierarchical subgroup analysis (cf. Hunter & Schmidt, 2004), for which we will break down the studies in our meta-analytic database first by one of the two dimensions (e.g., autonomy) and then by the other dimension (e.g., generality). Unfortunately, doing so will result in highly unbalanced numbers of studies in the six categories and too few or no studies in some of the categories.

# Example comments and responses

## Well-being

	Discretionary	Obligatory
Global	7	2
Contextual	59	0
Situational	27	7

## Prosocial Behavior

	Discretionary	Obligatory
Global	11	5
Contextual	38	0
Situational	53	10

## Performance

	Discretionary	Obligatory
Global	6	1
Contextual	60	0
Situational	13	2

## Career Success

	Discretionary	Obligatory
Global	0	0
Contextual	11	0
Situational	2	1

# Example comments and responses

---

- Reviewer 2 on whether prosocial motivation should be viewed as a predictor or as a moderator of prosocial behavior in predicting work outcomes

# Example comments and responses

- Our response in short:
- First, we perused the 201 studies in our meta-analytic database and summarized how prosocial motivation has been positioned in a conceptual model among these studies;

<b>Role of Prosocial Motivation</b>	<b>Number of Studies<sup>1</sup></b>
Predictor	148
Moderator	53 (in 13 of which prosocial motivation moderated the effect of prosocial behavior)
Concurrent (without specifying a causal direction)	1
Outcome of a third variable	4
Control	4

# Example comments and responses

---

- Our response in short:
- Second, we acknowledged that you raised an interesting and important question of when we should conceptualize prosocial motives as a moderator of prosocial behavior, and we reviewed all the studies in our meta-analytic database that have done so to directly answer this question.

# Example comments and responses

---

- Our response in short:
- Third, we noted that, statistically, modeling prosocial motivation as a moderator for the relationship between another variable and an outcome is *equivalent* to modeling prosocial motivation as the predictor of an outcome whose effect is moderated by another variable. For both models, a researcher would need to estimate the main effect of prosocial motivation, the main effect of the other variable, and the interaction effect of the two. There is no statistical difference between the two models. Only the substantive interpretation of the meaning of the moderating effect is different.

# Example comments and responses

---

- Reviewer 1 and Reviewer 2 on the incremental validity of prosocial motivation over:
- Reviewer 1: (a) Big Five personality traits (especially agreeableness and conscientiousness), (b) other types of motives (e.g., achievement, affiliation, and power motives), and (c) cognitive and emotional intelligence
  - Reviewer 2: agreeableness and honesty-humility

# Example comments and responses

---

- Our response in short: In our analyses, we have focused on the incremental validity of prosocial motivation above and beyond general cognitive ability (*g*) and Big Five personality traits, and we explained why we focused on those:
- First, existing meta-analyses have demonstrated the predictive validity of *g* and the Big Five for all four outcomes in our study (well-being, prosocial behavior, job performance, and career success), and organizations have widely used assessments of these constructs for the purposes of personnel selection and development. Therefore, demonstrating the incremental validity of prosocial motivation over and above *g* and the Big Five offers the strongest evidence for its unique contribution to work-related outcomes.

# Example comments and responses

- Our response in short:
- Second, we discussed the feasibility of assembling a meta-analytic correlation matrix among all the predictor and outcome variables for the incremental validity analysis, including the correlations between prosocial motivation and outcomes from the current meta-analysis, meta-analytic correlations between prosocial motivation and other predictor variables as well as among all other predictor variables, and meta-analytic correlations between all other predictor variables and the outcomes. That is, we would have to supply a total of  $(15 \times 14)/2 = 105$  meta-analytic correlations among all the predictors mentioned in Reviewer 1's comment and the outcomes, or  $(105 - 4) = 101$  new meta-analytic correlations besides those between prosocial motivation and four outcomes from the current meta-analysis.

# Example comments and responses

**Table 5.**

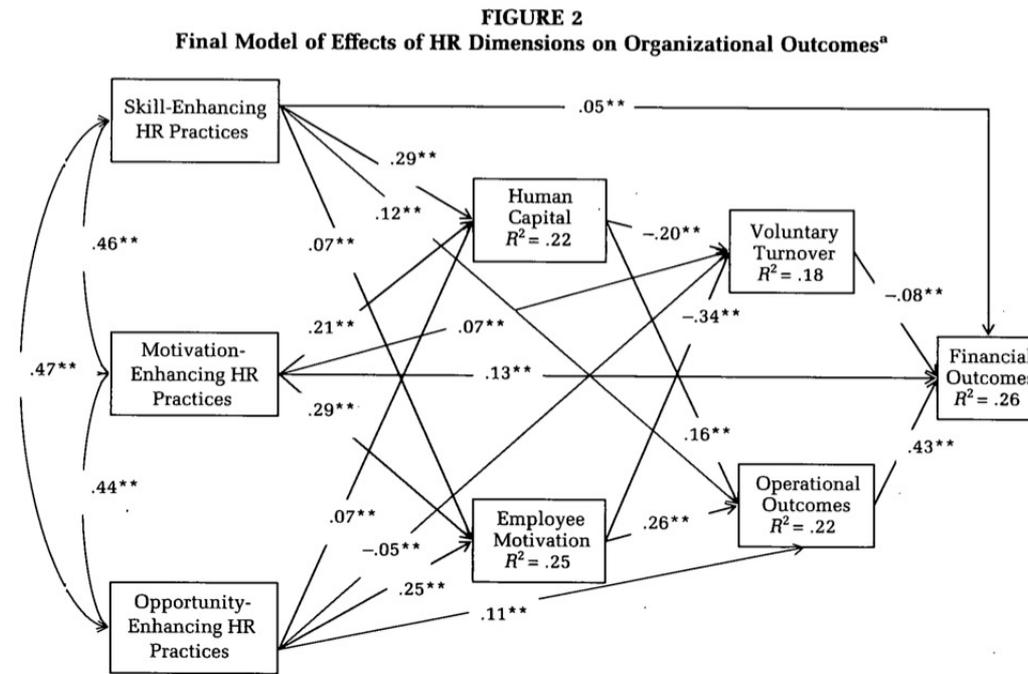
*Regression Coefficients and Amount of Variance Accounted for from Incremental Validity Analyses*

	Psychological well-being		Prosocial behavior		Job performance		Career success	
Harmonic Mean	44641	11128	26337	9844	6166	5105	20446	8049
<b>Step 1 (<math>\beta</math>)</b>								
General cognitive ability	.06**	.09**	.21**	.27**	.53**	.58**	.27**	.30**
Agreeableness	.05**	-.02	.06**	-.05**	.05**	-.03*	-.18**	-.22**
Conscientiousness	.17**	.16**	.13**	.11**	.21**	.20**	.09**	.08**
Emotional stability	.17**	.19**	.04**	.06**	.02	.03**	.07**	.08**
Extraversion	.18**	.15**	.01	-.04**	.07**	.03*	.12**	.09**
Openness	-.13**	-.16**	.04**	-.02	-.15**	-.19**	-.04**	-.07**
<b>Step 2 (<math>\beta</math>)</b>								
Prosocial motivation		.23**		.40**		.28**		.17**
$R^2$	.15	.19	.09	.22	.33	.39	.12	.14
$\Delta R^2$		.04		.13		.06		.02

Note.  $\beta$  = standardized regression coefficients; \*\*  $p < .01$ , \*  $p < .05$ .

# Some notes on secondary uses of meta-analytic data

→ Do justify *a priori* the inclusion and exclusion and the positioning of constructs in the model (don't do it for the sake of doing it)



<sup>a</sup> Standardized coefficients are presented;  $n = 3,714$ .  
\*\*  $p < .01$

# Some notes on secondary uses of meta-analytic data

→ Another example from Shockley, K. M., Shen, W., DeNunzio, M. M., Arvan, M. L., & Knudsen, E. A. (2017). Disentangling the relationship between gender and work–family conflict: An integration of theoretical perspectives using meta-analytic methods. *Journal of Applied Psychology, 102*(12), 1601-1635.

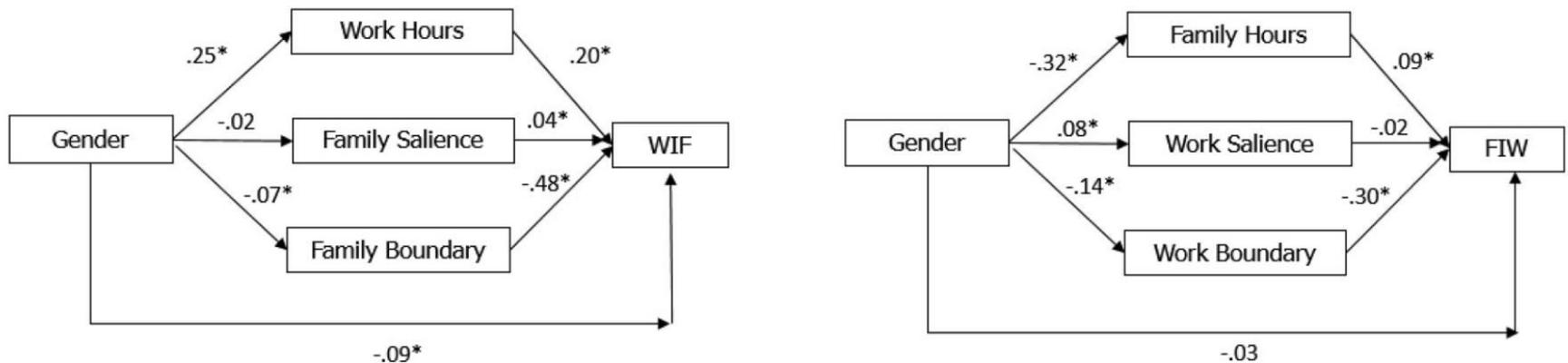


Figure 1. Path models testing theoretical perspectives for gender and work-interference-with-family (WIF) and family-interference-with-work (FIW). Gender is coded so that positive correlations indicate that males are higher on the associated variable. Path between gender and WIF/FIW is the residual path when modeling the various mediators. \*  $p < .05$ .

# Some notes on secondary uses of meta-analytic data

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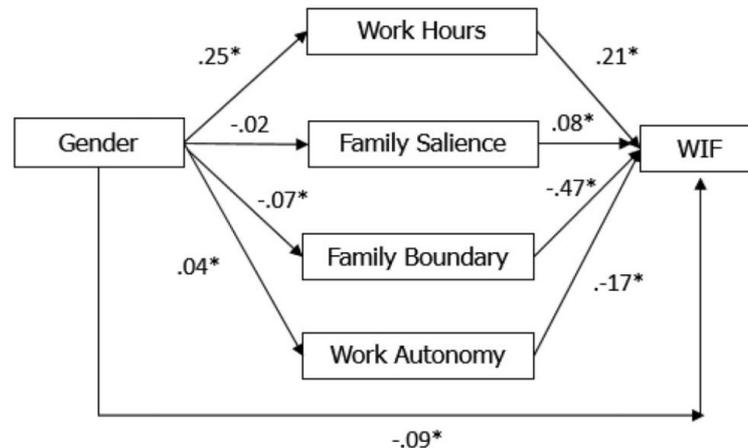


Figure 2. Path models testing theoretical perspectives for gender and WIF with autonomy added. Gender is coded so that positive correlations indicate that males are higher on the associated variable. Path between gender and WIF is the residual path when modeling the various mediators. \*  $p < .05$ .

# Some notes on secondary uses of meta-analytic data

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- Be mindful of the *heterogeneity* in meta-analytic correlations (don't treat results from secondary analyses of meta-analytic data as the definitive answer)
  
- Recommendations:
  - Cheung & Chan (2005): two-stage SEM (TSSEM)
  - Yu, Downes, Carter, & O'Boyle (2016): FIMASEM
  - For an example of FIMASEM, see Fang, R., Zhang, Z., & Shaw, J. D. (2021). Gender and social network brokerage: A meta-analysis and field investigation. *Journal of Applied Psychology*, 106(11), 1630-1654.

# FAQs

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- What are the differences in scopes and aims for different top-tier journals when publishing meta-analyses (e.g., Psych Bull, JAP, PPsych, JOM, AMJ)?
- How many studies do I need to include in order to publish my meta-analysis at a top-tier journal?
- Can empirical and theoretical contribution substitute each other?
- What software packages do you recommend for conducting meta-analyses?

# Recommended textbooks

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- The following two books are excellent primers on meta-analysis:
  - Lipsey, M. W., & Wilson, D. (2000). *Practical meta-analysis (applied social research methods)*. Sage.
  - Borenstein, M., Hedges, L. V., Higgins, J., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. Wiley.
  
- The following book provides an in-depth treatment of the method of psychometric meta-analysis, which is widely used in many fields of the social sciences and in management. It will serve as a useful reference for your future meta-analytic work and is highly recommended if you are interested in learning more.
  - Schmidt, F. L., & Hunter, J. E. (2014). *Methods of meta-analysis: Correcting error and bias in research findings*. Sage.

# Recommended R packages

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- For psychometric meta-analysis (a.k.a. the Hunter & Schmidt method), use the ***psychmeta*** R package: <https://psychmeta.com>
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- For regression-based meta-analytic approaches, including meta-regression with moderators, multilevel meta-analysis, and robust variance estimation (RVE), use the ***metafor*** R package: <http://www.metafor-project.org/>
- The authors of both packages include highly useful tutorials on their websites and I encourage you to check them out.

**IOWA**

**THANK YOU!**

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**Continue the Conversation:**  
[rong-su@uiowa.edu](mailto:rong-su@uiowa.edu)

**IOWA**