

BRIEF REPORT

If All Your Friends Jumped Off a Bridge: The Effect of Others' Actions on Engagement in and Recommendation of Risky Behaviors

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There is a large gap between the types of risky behavior we recommend to others and those we engage in ourselves. In this study, we hypothesized that a source of this gap is greater reliance on information about others' behavior when deciding whether to take a risk oneself than when deciding whether to recommend it to others. To test this hypothesis, we asked participants either to report their willingness to engage in a series of risky behaviors themselves; their willingness to recommend those behaviors to a loved one; or, how good of an idea it would be for either them or a loved one to engage in the behaviors. We then asked them to evaluate those behaviors on criteria related to the expected utility of the risk (benefits, costs, and likelihood of costs), and on engagement in the activity by people they knew. We found that, after accounting for effects of perceived benefit, cost, and likelihood of cost, perceptions of others' behavior had a dramatically larger impact on participants' willingness to engage in a risk than on their willingness to recommend the risk or their prescriptive evaluation of the risk. These findings indicate that the influence of others' choices on risk-taking behavior is large, direct, cannot be explained by an economic utility model of risky decision-making, and goes against one's own better judgment.

Keywords: risk, decision-making, social cognition

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Risky behavior is a vital, ubiquitous, and sometimes paradoxical part of life. One of the most perplexing aspects of risk-taking behavior is the inconsistency between the risks we take ourselves and the risks we consider acceptable for others. For example, nine out of 10 drivers support laws that ban texting while driving (NHTSA, 2012), but 18% of drivers in the same survey admitted to sometimes texting and driving themselves, and other studies estimate that up to 81% of the population occasionally texts while driving (Atchley, Atwood, & Boulton, 2011). How and why do such dramatic gaps emerge between the patterns of risk-taking behavior we recommend for others and the actions we engage in ourselves?

We theorize that “risk gaps”—patterns of systematically recommending risks to others far more or less than one is willing to engage in them oneself—emerge because individuals use

different criteria when evaluating a risky decision for another than when deciding whether to engage in the same risk themselves. Research in the broader field of decision-making indicates that individuals make systematically different choices when asked to advise or decide for another than to decide for themselves (Beisswanger et al., 2003; Zikmund-Fisher et al., 2006), including displaying fewer cognitive biases when deciding for others (Ubel, Angott, & Zikmund-Fisher, 2011) and placing greater weight on the most important factors in the decision (Kray & Gonzalez, 1999).

These findings suggest that individuals may evaluate risky decisions more rationally when considering how to advise others than when choosing actions for themselves. The evaluation of risk has traditionally been considered a mathematical process of maximizing “economic utility” (Friedman & Savage, 1948; Markowitz, 1952), with an emphasis on measurements of the costs, benefits, and tolerance for variance in outcomes. However, a great deal of research in recent decades has shown that people display systematic biases in their decision-making that cannot be explained through economic utility models (Kahneman & Tversky, 1984). We believe one factor that may strongly affect risky decision-making for oneself that cannot be accounted for by economic utility models is knowledge about others' engagement in that type of risk.

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The behavior of one's peers has been shown to relate strongly to one's own actions—for instance, peer behavior correlates with risky behaviors such as smoking (Kobus, 2003; Christakis & Fowler, 2008), alcohol use, (Borsari & Carey, 2001; Rosenquist, Murabito, Fowler, & Christakis, 2010), juvenile crime (Bayer, Pintoff, & Pozen, 2004), and sexual intercourse and marijuana use in teenagers (Card & Giuliano, 2013). Several longitudinal studies (Christakis & Fowler, 2007; Christakis & Fowler, 2008; Fowler & Christakis, 2009) have shown that a change in behavior by a member of one's peer network increases the likelihood of a future, similar change in one's own behavior, and a recent field study (Bursztyjn et al., 2014) has shown that receiving information about a friend or family member's engagement in a particular risk dramatically influences participants' own decisions about the risk.

While it is possible that the effect of peer influence on risk behavior may operate within an economic utility model—for instance, individuals with heavy-drinking peers may see greater benefits to drinking alcohol in the form of increased social opportunities and acceptance—the evidence raises the possibility that social information contributes separately to risky decision-making, independently of assessment of the cost-benefit structure of the risk. We hypothesize that this social heuristic model of risk evaluation will predominate when deciding whether to engage in a risk oneself. However, given the evidence that individuals tend to display fewer cognitive biases when asked to evaluate risks for others, we hypothesize that under these circumstances a more quantitative, utility-based assessment will prevail.

To test this hypothesis, we asked people to assess either their own willingness to engage in a series of risky activities, or their willingness to recommend engaging in the same risky activities to a loved one. They evaluated each activity on three dimensions related to utility (size of the potential benefits of taking the risk, size of the potential costs, and the likelihood of the risk resulting in a negative outcome) and one dimension related to social information (how many of the people they know they believed to engage in the risky behavior). We then examined how strongly each of these dimensions influenced willingness to engage in and willingness to recommend the risky behaviors.

Any differences between participants' willingness to engage and willingness to recommend could be driven either because individuals deploy different assessment strategies when considering themselves or another as the actor in a risky decision, or rather because they deploy different strategies when considering what ought to be done—as when recommending a risk—than when deciding what to actually do. To distinguish between these two possibilities, we asked additional groups of participants to assess either how good of an idea it was for them to engage in the risky behavior, or how good of an idea it was for another to engage in it.

Method

Participants

Data were collected from 400 participants on Mechanical Turk (203 males, 197 females; mean age = 34.29, range = 18–75). The sample size was determined prior to data collection based on an earlier pilot study and stopping was fixed by the predetermined sample size. Participation was limited to those individuals who

reported that they were living in the United States. Of these, four were excluded for having IP addresses indicating that they were not in the United States, and seven were excluded for having previously participated in the pilot study, leaving 89 subjects in the *engagement* group (49 male; mean age = 31.63), 103 subjects in the *recommendation* group (50 male; mean age = 33.31), 100 subjects in the *good idea-self* group (46 male; mean age = 34.45), and 97 subjects in the *good idea-other* group (50 male; mean age = 37.63).

Measures

Participants were presented with the 30 risky scenarios from the DOSPERT (Blais & Weber, 2006) and were asked to evaluate each scenario on a series of items. Participants were randomly assigned to either the Willingness to Engage (WTEngage), Willingness to Recommend (WTRRecommend), Good Idea-Self, or Good Idea-Other group. First, subjects were asked to evaluate each scenario on a 7-point Likert scale for Risk Perception (“How risky do you perceive this activity to be?;” 1 = *not risky at all* to 7 = *extremely risky*), to ensure that differences in the variable of interest were not driven by group differences in risk perception. Then, those in the WTEngage group were asked to evaluate how likely they would be to engage in each activity, if given the opportunity, and those in the WTRRecommend group were asked to evaluate how likely they would be to encourage a loved one to engage in the activity (1 = *not at all likely* to 7 = *extremely likely*). Those in the Good Idea-Self group were asked to evaluate how good of an idea it would be for them to engage in the activity, and those in the Good Idea-Other group were asked to evaluate how good of an idea it would be for a loved one to engage in the activity (1 = *extremely bad idea* to 7 = *extremely good idea*). Participants in all four groups evaluated each scenario on Benefits of Risk (“If the risk turns out well, how substantial would the benefits be?;” 1 = *no benefit* to 7 = *extremely large benefit*); Costs of Risk (“If the risk turns out badly, how bad would the costs be?;” 1 = *no cost* to 7 = *extremely large cost*); Likelihood of Cost (“If 1,000 people were each to engage in this activity one time, about how many do you expect would have a bad outcome?;”), and Familiarity (“How many people do you know who have engaged in this activity before?;” 1 = *no one I know* to 7 = *almost everyone I know*).

To control for any group differences in demographic variables, age and gender were included as nuisance regressors in all analyses. For all analyses but the individual scenario regressions, mixed effects models were used to adjust for repeated measures within subject. The `lmer()` function of the `lme4` library in R was used to estimate the mixed models, and the `confint` function was used to estimate all confidence intervals. Degrees of freedom and *p* values for mixed effects models were calculated with the `lmerTest` library in R, using Satterthwaite's approximation, based on SAS proc mixed theory (SAS Technical Report R-1010, 1978).

Results

We found differences in mean engagement and encouragement scores for four of the five risk domains in the DOSPERT (see Figure 1). WTEngage was greater than WTRRecommend for health and safety (mean difference: 0.63, 95% CI [0.38, 0.89], $t(1,188.20) = 4.83, p < .001$) and social (mean difference: 0.37,

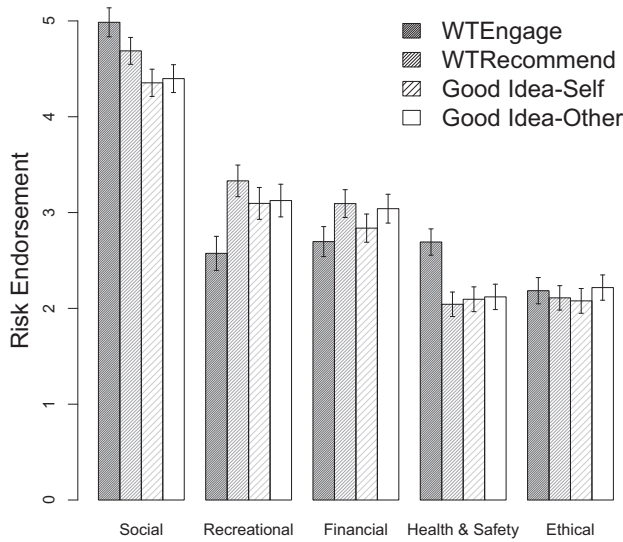


Figure 1. Mean levels of risk endorsement for engagement, recommendation to others, good idea for self, and good idea for others in five domains of risk. Error bars represent 95% confidence intervals.

95% CI [0.11, 0.63], $t(1,187.90) = 2.795$, $p < .01$ risks, yet the opposite effect was seen for recreational (mean difference: -0.61 , 95% CI $[-0.90, -0.32]$, $t(1,188.10) = 4.057$, $p < .001$) and financial (mean difference: -0.33 , 95% CI $[-0.57, -0.08]$, $t(1,187.96) = 2.608$, $p < .01$) risk-taking. Ethical risks elicited similar rates of engagement and recommendation (mean difference: 0.14 , 95% CI $[-0.11, 0.39]$, $t(1,187.97) = 1.058$, $p > .1$). These findings largely replicated those from an earlier pilot study (see supplemental materials). We compared WTEngage and WTRRecommend participants on their scores within each domain for risk perception, benefits, costs, likelihood, and familiarity (see supplemental materials) and found no significant differences between groups in any domain on any criterion (all $ps > .05$), suggesting that these effects were not due to chance differences between the groups in their perception of the scenarios in any of these domains.

In all domains, scores for Good Idea-Self and Good Idea-Other did not differ from each other (all $ps > .1$). In the social, recreational, and health/safety domain, scores for Good Idea-Self and Good Idea-Other were both closer to scores for WTRRecommend

than WTEngage. In the financial domain, Good Idea-Other was closer to WTRRecommend and Good Idea-Self was closer to WTEngage. In the ethical domain scores all four conditions did not significantly differ.

Together, these findings indicate that individuals evaluate risks differently for engagement than for recommendation to others, resulting in them finding certain domains of risks more palatable for themselves and other domains more palatable for other people, despite the fact that their perceptions of what constitutes a good idea for themselves and others does not differ.

To assess the size of the differential effect of benefit, cost, likelihood of cost and others' engagement on WTEngage, WTRRecommend, Good Idea-Self, and Good Idea-Other, we conducted a full linear mixed effect regression on all data. Values for WTEngage/WTRRecommend/Good Idea-Self/Good Idea-Other were treated as the dependent variable, and values for benefit, cost, likelihood, familiarity, and assessment task were all entered as predictor variables. To compare the effects of the different assessment tasks on risk endorsement, each assessment task was coded as the indicator variable in turn to obtain difference scores between that task and all other tasks. Random effects for subject and scenario were also modeled. We found (see Table 1 and Figure 2) that in all conditions, all variables had effects in the expected directions, with higher ratings for benefit and others' engagement increasing endorsement of the risk and higher ratings for cost or likelihood of cost decreasing endorsement of the risk. However, the strength of the relationship between these variables and risk endorsement differed across conditions. Perceptions of benefits had a slightly stronger impact on WTRRecommend than Good Idea-Other, perceptions of costs had a slightly stronger effect on WTEngage and Good Idea-Other than WTRRecommend and Good Idea-Self, and likelihood of cost had a slightly weaker effect on WTEngage than WTRRecommend and Good Idea-Self. As hypothesized, Others' Engagement had a substantially larger effect on WTEngage than on WTRRecommend, Good Idea-Self, or Good Idea-Other. The strength of the effect of others' engagement on one's willingness to engage in a risky behavior is dramatic, larger even than the effect of the risks' benefits or costs, although its influence on one's willingness to recommend the risk to another is quite modest. In short, the perceived actions of others play a far stronger role in influencing one's own behavior than in determining what one considers to be optimal behavior, either for others or oneself.

Finally, we wanted to rule out the possibility that our findings were being driven by effects across scenarios—that is, that certain

Table 1
Differences in Standardized Beta Weights for Benefit, Cost, Likelihood of Cost, and Others' Engagement on Risk Endorsement Between Assessment Tasks

	Benefit	Cost	Likelihood of cost	Others' engagement
WTEngage vs. WTRRecommend	0.019 (0.019)	0.070*** (0.020)	-0.053** (0.019)	-0.259*** (0.018)
WTEngage vs. Good Idea-Self	-0.005 (0.019)	0.069*** (0.021)	-0.059** (0.019)	-0.270*** (0.018)
WTEngage vs. Good Idea-Other	-0.022 (0.019)	0.028 (0.021)	-0.032† (0.018)	-0.285*** (0.019)
WTRRecommend vs. Good Idea-Self	-0.024 (0.018)	-0.016 (0.019)	-0.006 (0.019)	-0.011 (0.018)
WTRRecommend vs. Good Idea-Other	-0.041* (0.018)	-0.042* (0.019)	0.021 (0.018)	-0.026 (0.018)
Good Idea-Self vs. Good Idea-Other	-0.017 (0.018)	-0.041* (0.020)	0.027 (0.018)	-0.015 (0.018)

Note. Standard error listed in parentheses.

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

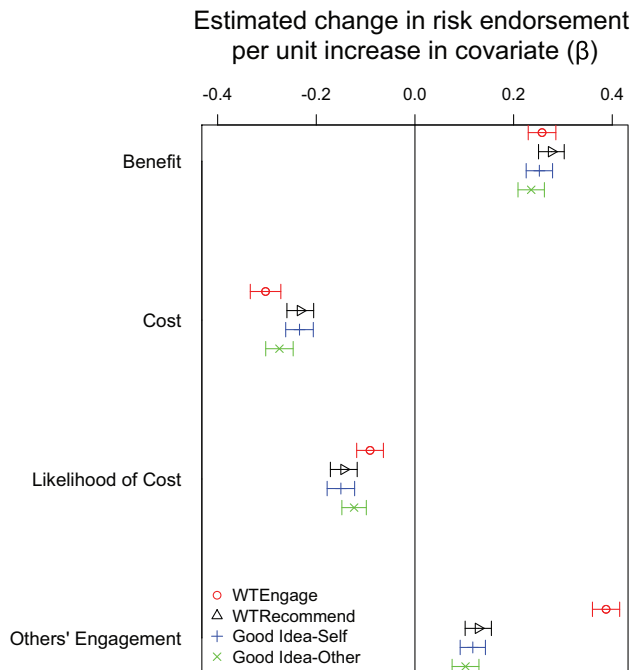


Figure 2. Effect of benefit, cost, likelihood of cost, and others' engagement on WTEngage/WTRRecommend/Good Idea-Self/Good Idea-Other. Error bars indicate 95% confidence intervals. See the online article for the color version of this figure.

scenarios were more desirable to engage in (but not to recommend to others) than other scenarios for reasons not captured by our current model, and that these scenarios had higher levels of others' engagement simply because others engaged in them more due to their other, desirable characteristics. To eliminate this possibility, we performed a linear regression separately on each of the 30 DOSPERT scenarios and looked at the Others' Engagement \times Assessment Task interaction effect. These effects are presented in Figure 3. We found that Others' Engagement had a statistically significant ($p < .05$) larger effect on WTEngage than WTRRecommend for 13 of the 30 individual scenarios, while no scenarios has a significant effect in the opposite direction (all $ps > .7$). Overall, the average interaction effect across all 30 scenarios was -0.201 . From this, we conclude that even when considering any particular risky activity—which has a certain fixed level of popularity among Americans as a whole—one's perceptions of the engagement levels of the people one personally knows carry greater influence on one's willingness to engage in that risk than to recommend the risk to another.

Discussion

The present findings demonstrate that systematic "risk gaps" emerge between individuals' willingness to engage in certain risks themselves and to recommend those risks to others, with individuals "overengaging" in certain domains of risk and "underengaging" in others relative to their recommendations. These differences are directly related to a stronger relationship between others' risk engagement and WTEngage than WTRRecommend. The strong effect of others' engagement on WTEngage is above and beyond

the effects of benefit, cost, and relative likelihood of benefit versus cost.

These findings corroborate the well-established fact that the behavior of one's peers correlates well with one's own engagement in similar risky behavior, but extends this work in three key ways. First, it demonstrates that there is a substantial relationship between others' behavior and personal willingness to engage in the behavior that cannot be attributed to the effects of changes in the cost-benefit structure of the risk, suggesting that individuals rely heavily on a social heuristic when making risky decisions. Second, the relationship between others' behavior and risk evaluation is much weaker when evaluating actions for others rather than for oneself, suggesting that an economic-utility based assessment prevails when evaluating risks for others. This indicates a mechanism through which large gaps can emerge between prescribed and practiced behavior, leading to ongoing high rates of engagement in behaviors that are broadly discouraged. Third, it suggests that the gap between what we do ourselves and what we recommend to others is due to an increased weighting of others' choices when deciding what to do versus what is a good idea, rather than when evaluating what is good for us versus good for others.

The finding that the relationship between peer behavior and WTEngage is both very large and wholly inadequately explained by an economic utility model has critical implications for researchers trying to operationalize risk-taking in the laboratory. Laboratory tasks assessing risk-taking tend to be based on an economic utility model of risk-taking (Schonberg, Fox, & Poldrack, 2011). Clearly, these tasks fail to capture a critical aspect of risky decision-making. These findings suggest that it is necessary to develop models that incorporate information about others' decisions.

Although additional experimental studies will be needed to clearly establish causality, several features of the current data suggest that the perceptions of others' behavior are likely to have a causal influence on willingness to engage in the behavior. First, the finding is not simply a byproduct of subjects reporting more willingness to engage in activities that are generally popular, because the relationship between others' behavior and WTEngage held even within individual risky activities. For any given risky activity, whether widely or rarely practiced by the population at large, it was the individuals with the highest reports of engagement among those they knew who also reported the highest levels of WTEngage. The findings are also unlikely to be driven by homophily, because the relationship is much stronger between others' behavior and WTEngage than WTRRecommend, Good Idea-Self, or Good Idea-Other. If individuals were simply attracted to other individuals who had similar values or priorities, presumably this effect would be captured in their willingness to encourage others to engage and their prescriptive evaluation of those activities as well.

One implication of the present findings is that interventions designed to discourage (or encourage) particular risky behaviors ought to have a secondary effect throughout social networks, as the shift in one individuals' risk-taking behaviors leads others to shift their own behavior. These effects can be seen in the patterns of participants overengagement and underengagement in the different domains of the DOSPERT. The social and health/safety domains, where participants' WTEN-

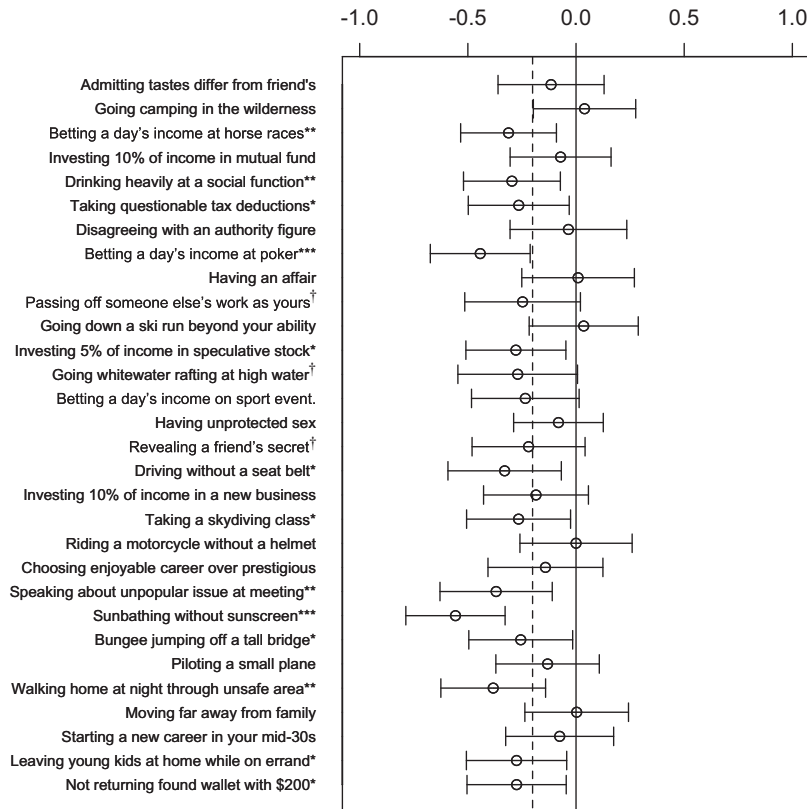


Figure 3. Mean and 95% CI for the beta weight of the Others' Engagement \times WTEngage/WTRecommend interaction for each of the 30 risky scenarios presented in the study. Negative beta weights indicate a larger effect of Others' Engagement on WTEngage than WTRecommend. Solid line at 0 indicates a null effect; dashed line at -0.201 indicates the mean interaction beta weight across all 30 scenarios. Asterisks indicate a significant Others Engagement \times WTRecommend interaction effect in the expected direction ($^\dagger = p < .1$, $^* = p < .05$, $^{**} = p < .01$, $^{***} = p < .001$). No scenarios showed a trend or significant interaction effect in the opposite direction (all $ps > .70$).

gage was higher than their WTRecommend, contain many types of risk-taking that are commonplace. Because most individuals in our sample doubtless knew many people who engaged in these risks, they were more willing to engage in them themselves than would be the case based on their cost-benefit structure alone. By contrast, the recreational and financial domains contained many unusual risks and the low rates of others' engagement in these risks made them more reluctant to engage in them themselves than would be called for based on a purely economic evaluation of the risks.

To conclude, the current study introduces evidence that perceptions of others' risky behavior has a strong influence on one's willingness to engage in a behavior, but a much weaker effect on both one's willingness to recommend the behavior to others and one's assessment of how good of an idea engaging in the risk is. In other words, knowledge about others' behavior influences our risky decision-making beyond its influence on the perceived costs and benefits of risks or on what we perceive as the "prudent" thing to do. These findings force us to move outside the economic utility model of risk-taking and think more deeply about the role of information about others' behavior in risky decision-making.

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