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Thought Speed Induces Risk Taking

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Abstract

Two experiments test the hypothesis of a causal link between thought speed and risk taking. In Experiment 1, thought speed was manipulated via fast- versus slow-paced presentation of neutral-content text that participants read. In Experiment 2, thought speed was manipulated via presentation to participants of movie clips that varied in pace but not in content. In Experiment 1, participants who were induced to think more quickly took more risks with actual money. In Experiment 2, participants who were induced to think more quickly reported greater intentions to engage in real-world risky behaviors, such as unprotected sex and illegal drug use. These experiments provide evidence that faster thinking induces greater risk taking.

Thought Speed Induces Risk Taking

Some people are risk takers and others are more conservative. That distinction can differentiate those who take drugs, gamble, and hang glide from those who closely follow the label on their prescription medications and invest their money in certificates of deposit (e.g., Roberti, 2004). Not just personality, but circumstances too, can influence people's inclination to take risks. For example, people tend to be more risk taking when faced with the prospect of heavy losses rather than sizeable gains (Kahneman & Tversky, 1979). The present experiments explore a different possible source of risk-taking behavior: the momentary pace of one's own thoughts. Thought speed has recently emerged as a potentially important aspect of human thought process, with fast thinking inducing positive mood (Pronin & Jacobs, 2008; Pronin, Jacobs, & Wegner, 2008; Pronin & Wegner, 2006).

A Link Between Thought Speed and Risk Taking

Some observations suggest that fast thinking is linked to risk taking. People experiencing mania exhibit accelerated thought speed in almost all cases (Goodwin & Jamison, 1990; Young, Abrams, Taylor, & Meltzer, 1983). They also engage in risky behaviors including reckless goal pursuit and risk-seeking in gambling tasks (Clark, Iverson, & Goodwin, 2001; Johnson, 2004; Murphy et al., 2001). Stimulant drugs like cocaine and amphetamines ("speed") also induce fast thinking (Asghar et al., 2003; Vollm et al., 2004). Moreover, stimulant abusers show elevated risk-seeking (Paul et al, 1994; Leland & Paulus, 2005). In experimental studies, amphetamine intake produces feelings of confidence (Asghar et al., 2003) and an inclination to take risks (Hurst, 1962; Killgore et al., 2008).

Studies of the effects of time pressure also suggest the possibility of a causal link between thought speed and risk taking. People faced with time limitations make riskier

decisions. Specifically, people under time pressure show an elevated preference for unlikely high stakes gambles (Cella, Dymond, Cooper, & Turnbull, 2007; DeDonno & Demaree, 2008) – an effect that could reflect time pressure revving up thought speed (Ariely & Zakay, 2001).

The Present Research

The primary hypothesis of this research is that faster thought speed induces greater risk taking. In Experiment 1, participants were induced to read text at a faster or slower pace, and they then engaged in a risk-taking task in which they could win real money. In Experiment 2, participants watched a video that proceeded at a faster, slower, or in-between pace, and they then reported their intentions to engage in a variety of risky behaviors, as well as rating the likelihood of upside and downside consequences of those behaviors.

Experiment 1

Method

Thirty-six university students were randomly assigned to read aloud trivia statements (e.g., *A pilot light continually remains lit in a gas stove. In ring toss, players throw a “hoop” over a “peg.”*) that were presented on a computer monitor at either a fast or slow pace – i.e., at about half or twice normal reading speed for this population (either 40 ms/letter with 320 ms between sentences, or 170 ms/letter with 4000 ms between sentences; see Pronin & Wegner, 2006). As a check on their adherence to the speed manipulation, the experimenter surreptitiously listened outside the door to the lab room (all participants adhered).

Reading text aloud at an externally controlled pace is a standard manipulation of thought speed (see Pronin & Jacobs, 2008). It requires participants to process information at either a fast or slow pace, depending on the speed with which that information is provided, and thereby ensures participants’ active engagement in the experimental manipulation.

After reading the text, participants reported their thought speed while reading it (1 = *very slow*, 9 = *very fast*). They then rated their mood via the PANAS (Watson, Clark, & Tellegen, 1988), which measures feelings such as *excited*, *interested*, and *distressed* on 5-point scales and has been found to be impacted by thought speed (e.g., Pronin et al., 2008; Pronin & Wegner, 2006).

Participants then completed the Balloon Analogue Risk Task (BART; adapted from Lejuez et al., 2002). In this task, participants inflate a number of simulated balloons one at a time. For each balloon, participants control how much they inflate it by virtue of how many times they pump it up. With each pump, the balloon becomes further inflated, and 5 cents are placed in a bank. If a balloon is pumped too many times it bursts, and the participant loses the contents of the bank. Participants can stop pumping at any time and lock in the gains earned for that balloon. All participants followed this procedure for 18 different balloons and were able to keep all money they earned during the experiment.

Participants had no information about what determined when each of the 18 balloons would burst. The number of allowable pumps for each balloon was determined randomly but was constant across participants (following Lejuez et al., 2002) with the constraints that the average balloon burst after 32 pumps and all balloons burst by 64 pumps.

The BART is a behavioral measure of risk-taking designed to capture several important features of everyday risk taking: the probability of positive and negative outcomes is unknown, the relative magnitude of gains decreases with increased risk taking, and the cumulative probability of experiencing a loss increases with increased risk-taking. Performance on the BART correlates with harmful risky behaviors including drug use, gambling, petty theft, smoking, and unprotected sex (for a review, see Hunt, Hopiko, Bare, Lejuez, & Robinson, 2005).

Results and Discussion

Participants in the fast condition were induced to read at a faster pace than their peers in the slow condition. Consistent with this experimental manipulation, participants who were induced to read quickly reported thinking faster than did participants who were induced to read slowly ($M_s = 6.05$ vs. 4.71 ; $SD_s = 1.84, 1.72$), $F(1, 34) = 5.10, p = .03, \eta_p^2 = .13$.

Our primary hypothesis, involving thought speed and risk taking, was supported. Participants who were induced to think quickly rather than slowly were more risk taking, as indicated by the average number of pumps they inflated each balloon, whether or not the balloon ultimately burst ($M_s = 21.82$ vs. 17.61 ; $SD_s = 5.14, 5.96$), $F(1, 34) = 5.19, p = .03, \eta_p^2 = .13$.

This difference in how much participants inflated the balloons resulted in a greater number of trials with burst balloons among those in the fast condition as compared to the slow condition ($M_s = 8.42$ vs. 6.71 ; $SD_s = 2.04, 2.14$), $F(1, 34) = 6.06, p = .02, \eta_p^2 = .15$. In an analysis (as recommended by Lejuez et al., 2002) that included only each participant's responses for trials in which that participant did not burst the balloon, participants in the fast condition again showed greater risk taking by inflating those balloons more times than did participants in the slow condition ($M_s = 26.56$ vs. 20.60 ; $SD_s = 8.54, 8.63$), $F(1, 34) = 4.32, p = .04, \eta_p^2 = .11$. See Fig. 1. Participants in the fast and slow conditions earned similar amounts of money ($M_s = \$11.98$ vs. $\$11.40$; $SD_s = 1.86, 2.15$), $F < 1$, because losses from the burst balloons were offset by larger payouts on trials where balloons did not burst. Reflecting this pattern of larger payouts but more likely failure, those in the fast condition experienced more volatility in returns across trials than those in the slow condition ($M_{SDFast} = 0.72, M_{SDSlow} = 0.59$), $F(1, 34) = 4.09, p = .05, \eta_p^2 = .11$.

Consistent with previous research, participants induced to think fast reported more positive mood than those induced to think slowly ($M_s = 2.90$ vs. 2.35 ; $SD_s = .75, .59$), $F(1, 34) =$

5.71, $p = .02$, $\eta_p^2 = .14$, and no difference emerged for negative mood, $F < 1$. Mood was unrelated to risk taking, and including it as a covariate in the above analyses only increased estimates of effect size.

Participants led to think at a faster pace were more risk-taking than those led to think more slowly, confirming our basic prediction. In our next experiment, we sought to further explore these results. We used a different measure of risk-taking, in order to assess the generalizability of our effects to familiar risky behaviors, such as unprotected sex and illegal drug use. We also explored whether fast thinking induces more risk taking by making individuals more attracted to potential gains, or less sensitive to potential losses.

Experiment 2

Method

Fifty-two university students were randomly assigned to watch one of three versions of a video that varied in average shot length (ASL), or the length of time before the camera switches to a different angle. The fast video had an ASL of .75 sec (the speed of a typical pop-music video), the medium video had an ASL of 1.5 sec, and the slow video had an ASL of 3 sec (the speed of a typical, but not slow-moving, Hollywood film). Each video contained 3 min of scenes from the film *Baraka* (Fricke, 1992), depicting things like waterfalls, iguanas, and urban landscapes. The videos were matched for content such that, for example, a 3-sec shot of mountains in the slow condition was matched with four .75-sec shots of those mountains in the fast condition. Like the original film, the videos had no verbal narrative/dialogue.

Participants watched the film and then reported their thought speed (0 = *very slow*, 100 = *very fast*) and mood (via the PANAS).

Participants next completed a 23-item version of the Cognitive Appraisal of Risky Events scale (CARE; Katz, Fromme, & D'Amico, 2000). They rated their likelihood of engaging in various risky behaviors over the next 6 months ($\alpha = .76$), as well as the likelihood that each behavior would yield positive ($\alpha = .91$) and negative ($\alpha = .89$) consequences (1 = *Not at all likely*, 7 = *Extremely likely*). Behaviors included smoking marijuana, playing drinking games, having unprotected sex, damaging public property, and leaving assignments for the last minute. Intentions on the CARE have been shown to predict future risk-taking (Fromme, Katz, & Rivet, 1997; Katz et al., 2000).

Results and Discussion

Effects of thought speed were analyzed using regression with average shot length as the predictor.

Participants in the fast condition reported thinking fastest, followed by the medium condition, and then the slow condition ($M_s = 59.88, 46.82, 40.94$; $SD_s = 19.45, 18.87, 16.73$), $\beta = -.37, t(50) = 2.84, p = .006$.

Our primary hypothesis was supported. Participants in the fast condition reported the greatest intentions to take risks in the next 6 months, followed by participants in the medium, and then the slow, conditions ($M_s = 2.34, 2.17, 1.86$; $SD_s = .72, .47, .50$), $\beta = -.34, t(50) = 2.55, p = .01$. See Fig. 2.

Participants in the fast condition reported the lowest perceptions that risky behavior would have negative consequences, followed by participants in the medium, and then the slow, conditions ($M_s = 5.48, 5.63, 6.02$; $SD_s = .64, .86, .80$), $\beta = -.29, t(50) = 2.15, p = .04$. The anticipated likelihood of positive outcomes from risky behavior did not differ from the fast, to medium, to slow conditions ($M_s = 1.98, 2.23, 2.18$; $SD_s = 1.99, 1.21, 1.09$), $t < 1$.

We next examined whether the effect of thought speed on risk taking was mediated by reduced perceptions of the negative consequences of risk taking. The effect of video speed on risk taking ($B = -.20$, $t(49) = 2.36$, $p = .02$) became non-significant when perceived negative consequences were included in the model ($B = -.12$, $t(49) = 1.49$, $p = .14$).¹ Further, using the bootstrapping method advocated by Preacher and Hayes (2008), the indirect effect of video speed on risk taking, through perceived negative consequences, was significant, with a point estimate of .08 and a 95% BCa (see Efron, 1987) bootstrap confidence interval of .014 to .18.

Participants' experimental condition tended to predict positive mood – though not significantly – across the fast, medium, and slow conditions ($M_s = 3.10, 2.79, 2.77$; $SD_s = .50, .63, .60$), $\beta = .20$, $t(49) = 1.46$, $p = .15$. Mood was unrelated to risk taking, and including it in the mediational analysis did not change the strength of the indirect effect.

In sum, experimental manipulation of thought speed, via exposure to films varying in average shot length, demonstrated that faster thought speed induced greater intentions to take risks. This effect was mediated by the effect of film speed on perceptions of the negative consequences of risky behavior.

General Discussion

Two experiments demonstrate a causal link between thought speed and risk taking. In Experiment 1, a paced reading manipulation influenced risk taking behavior on a task involving actual monetary rewards. In Experiment 2, a video manipulation of thought speed influenced intentions to engage in real-world risky behaviors like unprotected sex and illicit drug use. This effect was mediated by perceptions of the negative consequences of risky behavior. These findings are consistent with prior theorizing suggesting that fast thinking signals a need for

urgent action and thereby may encourage bold behavior and discourage pausing to contemplate the negative consequences of action (Pronin & Jacobs, 2008).

The present experiments, considered in combination with prior evidence that fast thinking elevates mood, suggest that thought speed is a fundamental determinant of human emotion and behavior. Extensive research in psychology has focused on the consequences of thought content – *what* we think – for human experience. The present research suggests that another aspect of thought – *how* we think, and, in particular, the speed of that thought – also has important consequences.

These results have practical implications. Treatments designed to slow thought in manic patients could reduce their tendency towards harmful risk-taking. The rest of us also are likely to be affected. The pace of modern life sometimes seems to be getting faster and faster. Regardless of whether this is true, this research suggests that even passing changes in the pace of the stimuli which we process can speed up our thinking in ways that heighten risk-taking intentions and behavior. In battle situations, military decision makers' proneness to risky decisions may be influenced by the speed with which they can access information. On a typical work day, the risks one takes in pursuing new projects may be affected by whether one has just slowly perused one's emails or raced through them like a speed-reader. Finally, the movies we watch today are moving at a faster pace than ever (Bordwell, 2002; Cutting, DeLong, & Brunick, 2011). Some parents and policymakers are concerned about the racy content (eroticism, violence) of the movies, videos, and Internet communications that children ingest. This research suggests they are right to worry – but that the problem may involve a different kind of “raciness” entirely.

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Footnote

1. According to convention (see Preacher & Hayes, 2008), we conduct and report mediation analysis using unstandardized coefficients, even though this use departs from the standardized coefficients reported elsewhere in the article.

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Fig. 1. Means by thought-speed condition for risky behavior in Experiment 1. Y-axis values indicate average number of times participants pumped the balloon on each trial (excluding cases where participants burst the balloon), on Balloon Analogue Risk Task. The average balloon burst after 32 pumps (range: 1-64). Error bars indicate 1 *SE* above the mean.

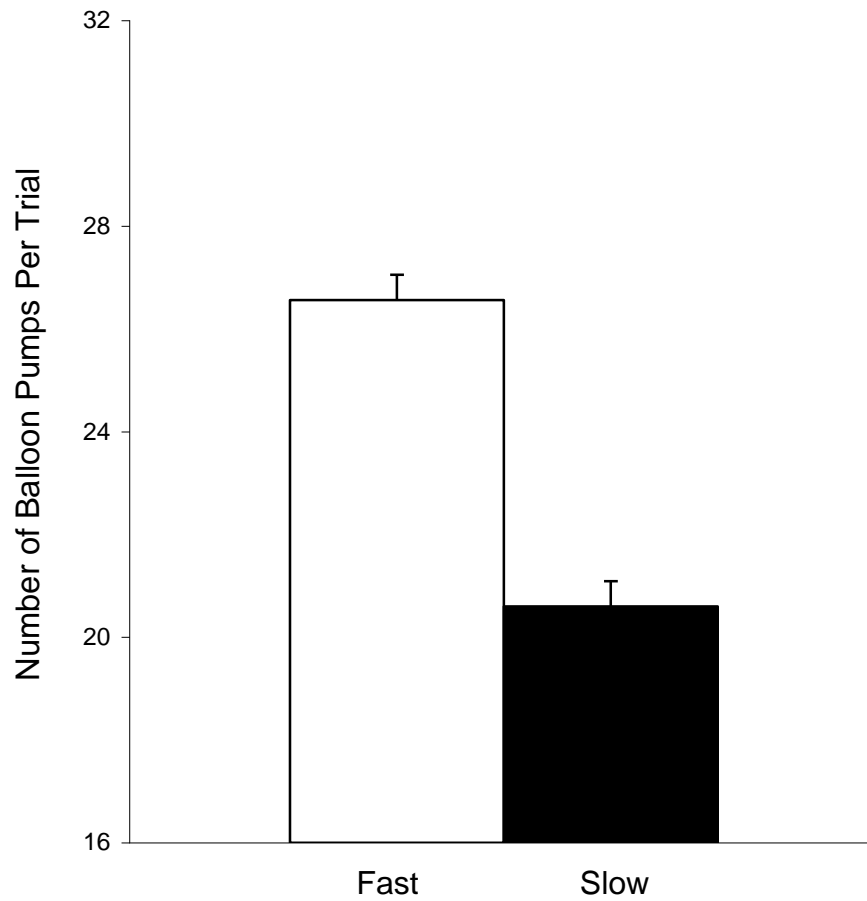


Fig. 2. Means by thought-speed condition for risk-taking intentions in Experiment 2. Y-axis values indicate intentions to engage in risky activities measured by the Cognitive Appraisal of Risky Events scale. Error bars indicate 1 *SE* above the mean.

