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Relying on intuition increases receptivity to bullshit

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ABSTRACT

We experimentally examine the effect of intuitive thinking (via instructing to rely on first thought that comes to mind and implementing response time constraint) and reflective thinking (via instructing to rely on reason and not allowing to submit the response quickly) on perceived profundity of bullshit statements. In addition, we apply the same manipulations in elicitation of mundane statements and motivational quotes profundity. We find that relying on intuition results in significantly higher receptivity across all three statement categories. On the other hand, we find no significant effects of our reflective thinking manipulation. Finally, we find that bullshit receptivity is significantly higher in individuals who possess more epistemically suspect beliefs and lower in individuals with better analytic thinking.

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Receptivity to bullshit; intuition; reflection; epistemically suspect beliefs; analytic thinking

1. Introduction

Given the volume of information individuals encounter each day, the ability to discern fact-based claims from those designed only to impress or trick people, has become increasingly important. Consider a friendly suggestion that in order to improve your job situation, you should remember that attention and intention are the mechanics of manifestation, so you should focus on your inner light and align your chakras to attract abundance and manifest the outcomes you desire. Such statement is an example of bullshit, i.e. an utterance made with no concern for truth (Frankfurt, 2005). In contrast with lying (i.e. intentional hiding of truth), bullshit is typically obscure and vague enough so that its negation has no effect on its degree of plausibility (Cohen, 2002). While people tend to judge bullshit less harshly than lying (Petrocelli et al., 2023), falling for it can result in suboptimal choices, for example in the realm of health (Ackerman & Chopik, 2020; Fuhrer & Cova, 2020) or politics (Petrocelli, 2021).

In this paper, we experimentally investigate the link between bullshit receptivity and intuitive vs. reflective thinking. We draw from dual-process theories (e.g. Evans & Stanovich, 2013; Kahneman, 2011), according to which, the evolutionarily older, automatic, and fast *intuitive thinking* (also referred to as experiential thinking) operates mainly through perceived similarities, associations, and emotions triggered by the stimulus, while the slower and conscious *reflective thinking* (also referred to as deliberative thinking) operates through more structured process of information evaluation and judgment. Within the dual-process theory framework, bullshit receptivity can be understood as a result of over-reliance on intuitive thinking along with a failure to engage in reflective thinking which may enable the individual to see through the superficial pompousness of vague and nonsensical statements.[1]

The relationship between thinking styles and bullshit receptivity has received a considerable attention in recent psychological research. For example, Pennycook et al. (2015) show that those who were more likely to employ analytic thinking (measured by heuristic & biases task, numeracy and verbal intelligence) were less receptive to bullshit (and were also more sceptical towards religious, and paranormal beliefs). Interestingly, bullshit receptivity did not correlate with self-reported analytic thinking, measured by need for cognition, but it positively correlated with intuitive thinking, measured by faith in intuition (Pennycook et al., 2015). The negative relationship between performance-based analytic thinking and bullshit receptivity has been later found in many follow-up studies, regardless of how bullshit receptivity was measured (e.g. A. Evans et al., 2020; Brown et al., 2019; Čavojová et al., 2022, 2002; Littrell et al., 2021; Pennycook & Rand, 2020).

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[1]In general, dual-process models assume that people tend to first produce a quick, intuitive response, which may later be suppressed (and possibly corrected) by slower and more deliberative processing. However, De Neys (2014) shows that even the first reaction may often result in a correct and logical solution. Other factors, such as patience or fatigue, can also play a role. For example, an incorrect response may result from cognitive overload, while a correct response might be a random guess.

However, most of the extant research is correlational. To date, only a handful of studies examined the effect of thinking styles on bullshit receptivity experimentally. As a notable example, Littrell et al. (2022) show that receptivity to pseudo-profound bullshit (but not necessarily to scientific bullshit) can be reduced by "explanatory reflection", i.e. by requesting participants to provide their explanations for why they thought the presented statements were profound or not. Brown et al. (2019) manipulated cognitive disfluency, by asking participants to rate the profundity of various bullshit statements printed in either easy or hard to read format, and found that disfluency triggered more deliberative responses. However, given that numerous studies (e.g. Klein et al., 2018; Meyer et al., 2015; Sirota et al., 2021; Yilmaz & Saribay, 2016) failed to promote reflective thinking using disfluency tasks, caution is warranted.[2] While experimentally inducing more deliberate thinking is, in general, notoriously difficult (see, e.g. Ballová Mikušková & Čavojová, 2020; Većkalov et al., 2024), inducing intuitive responses seems much easier. Typical, generally quite successful manipulations include instructing participants to think intuitively, introducing response time constraints, or employing cognitive overload (see, e.g. Bago et al., 2022; Čavojová & Hanák, 2014; Deck et al., 2017; Isler & Yilmaz, 2022).

We contribute to the literature exploring the relationship between thinking styles and bullshit receptivity by causally examining the effect of (1) intuitive thinking, induced by instruction to rely on first thought that comes to mind as well as by response time constraint, and of (2) reflective thinking, induced by instruction to consider the response carefully as well as by not allowing the participant to submit the response quickly. To control for individual characteristics, we also measure preference-based thinking dispositions (namely need for cognition and faith in intuition), performance-based analytic thinking (using cognitive reflection test), and also epistemically suspect beliefs, which are typically positively correlated with bullshit receptivity (Čavojová et al., 2022; Pennycook et al., 2015). To explore the effects of our manipulations more broadly, in addition to elicitation of bullshit statements profundity, we also employ our manipulations in elicitation of profundity of mundane statements and motivational quotes. Our experiment was designed to address the following hypotheses:.

Hypothesis 1a: Intuitive thinking results in higher perceived profundity of presented stimuli and therefore in higher receptivity to bullshit, mundane statements, as well as motivational quotes.

Hypothesis 1b: Conversely, reflective thinking results in lower perceived profundity of presented stimuli and therefore in lower receptivity to bullshit, mundane statements, as well as motivational quotes.

Hypothesis 2: Bullshit receptivity is positively associated with faith in intuition and epistemically suspect beliefs, while being negatively associated with need for cognition and analytic thinking.

2. Methods

2.1. Participants and procedure

We recruited a community sample of Slovak adults, consisting of 291 participants (59% female), aged 18–80 years, with a mean age of 37.3 years ($SD = 13.5$ years), 1% with completed elementary education, 33% with completed secondary education, and 65% with completed university education. Data were collected online, using the Qualtrics platform, from November 2023 to February 2024. The median time to complete the experiment was 17 min. All materials and data are available at https://osf.io/svz4r/.

After informed consent, participants completed the demographics, measures of *thinking dispositions*, and *analytic thinking*. Next, participants were randomly assigned to one of our three treatments (control, intuition, or reflection) and completed the measures of *bullshit receptivity*, *mundane statements receptivity* and *motivational quotes receptivity*. The manipulations were operationalised as follows. Participants in the Intuition treatment ($N = 104$) were instructed to rely on their emotions and respond in a way what comes to mind first. They were also given a time limit of 10 s to respond to each item. Participants in the Reflection treatment ($N = 88$) were instructed to rely on reason and think about their answers carefully. They were also forced to stay at the screen with each item for at least 15 s. Participants in the Control treatment ($N = 99$) were given no specific instructions or constraints. Finally, all participants completed the measures of *epistemically suspect beliefs*. Items in all measures were presented in random order for each participant.[3]

[2] In a similar vein, recent high-powered pre-registered study (Većkalov et al., 2024) failed to replicate the results of Swami et al. (2014) which show that priming reflective thinking (either by scrambled sentence verbal fluency task or using difficult-to-read font) lowers conspiracy beliefs.

[3] A slight imbalance in sample sizes across the three treatments was likely caused by marginally higher attrition in the Reflection treatment. We suspect that some subjects did not wish to wait at least 15 s before submitting each response and decided to leave the survey. However, given that we do not find virtually any differences between the outcomes of the Reflection and the Control treatment, we assume that the attrition did not substantially influence the presented results.

Table 1. Descriptive statistics for the whole sample.

Measure	Scale	Mean	SD	Min	Max	Cronbach's α
Need for cognition	REI	3.36	0.70	1	5	0.57
Faith in intuition	REI	3.69	0.72	1	5	0.77
Analytic thinking	CRT	3.51	1.94	0	6	0.76
Receptivity to bullshit	BSR	2.86	0.85	1	5	0.86
Receptivity to mundane statements	MSS	2.42	1.15	1	5	0.93
Receptivity to motivational quotes	MQS	3.42	0.78	1	5	0.81
Epistemically suspect beliefs	ESB	2.83	0.65	1.25	4.13	0.90

2.2. Materials

Thinking dispositions, namely the need for cognition and faith in intuition, were measured by a shortened 10-item version of the Rational-Experiential Inventory (REI; Epstein et al., 1996), on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). Need for cognition measures the preference to focus on logical connections and to be guided by reason (e.g. "I prefer complex problems to simple ones".), while faith in intuition measures the orientation toward emotions and associative contexts (e.g. "My first impressions of people are almost always correct".).

Analytic thinking was measured by the number of correct answers to the six items from the modified Cognitive Reflection Test (CRT): three from the numerical version (Frederick, 2005; e.g. "If it takes 5 machines 5 min to produce 5 products, how long will it take 100 machines to produce 100 products?"), and three from the verbal version (Sirota et al., 2020; e.g. "Emily's father has three daughters. The first two are named April and May. What is the name of his third daughter?").

Receptivity to bullshit (e.g. "Good health lends subtle creativity to reality".), *mundane statements* (e.g. "Lazy people usually fail in life".), and *motivational quotes* (e.g. "A creative adult is a child survivor".) was measured by respective 10-item scales (i.e. BRS, MSS, MQS) from Pennycook et al. (2015). BRS measures general receptivity to bullshit, MSS measures a general bias to find even mundane statements profound, and MQS measures ability to detect statements that are generally considered profound. Participants indicated their agreement with each statement on a 5-point Likert scale (1 = *not profound at all*, 5 = *very profound*).

Epistemically suspect beliefs were measured by 16 items from Šrol (2022; e.g. "There is evidence that extraterrestrials have visited Earth, but governments are covering it up".), on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). Basic descriptive statistics (means, standard deviation, minimum, maximum) and psychometric analysis (Cronbach's alpha) of each measure for the whole sample are shown in Table 1.

3. Results

Table 2 shows descriptive statistics (means and standard deviations) of all measures by our three treatments, as well as results of two-way ANOVA tests comparing the respective outcomes across the treatments. We find significant differences in all three main outcome measures affected by our treatment manipulation (i.e. bullshit receptivity, mundane statements receptivity, motivational quotes receptivity). As is apparent from the Figure 1, the differences are driven almost exclusively by higher receptivity to the statements in the Intuition treatment. Interestingly, while we find no significant differences in the outcomes measured before the manipulation took place (i.e. need for cognition, faith in intuition, and analytic thinking), we do find differences, albeit not reaching statistical significance ($p = 0.09$), across the three treatments in epistemically suspect beliefs. Similarly to our main outcome measures, the difference is driven by higher beliefs in the Intuition treatment.

To formally test our hypotheses regarding the effects of our treatment manipulations on receptivity to our main outcome measures, i.e. bullshit (BSR), mundane statements (MSS), and motivational quotes (MQS), we conduct a regression analysis presented in Table 3. Models 1–3 include treatment dummies only. In Models 4–6 we also control for need for cognition, faith in intuition and analytic thinking. Finally, in

Table 2. Outcomes (means, SD) by treatments.

	Treatment			ANOVA	
	Control ($N = 99$)	Intuition ($N = 104$)	Reflection ($N = 88$)	*F*-statistic	*p*-value
Need for cognition	3.56 (2.02)	3.52 (1.94)	3.45 (1.88)	0.06	0.94
Faith in intuition	3.29 (0.70)	3.33 (0.65)	3.48 (0.75)	2.02	0.13
Analytic thinking	3.67 (0.72)	3.61 (0.72)	3.80 (0.73)	1.57	0.21
Receptivity to bullshit	2.75 (0.80)	3.02 (0.84)	2.78 (0.88)	2.97	0.05
Receptivity to mundane statements	2.31 (1.04)	2.80 (1.20)	2.11 (1.10)	9.72	<0.01
Receptivity to motivational quotes	3.31 (0.77)	3.60 (0.67)	3.34 (0.87)	4.49	0.01
Epistemically suspect beliefs	2.79 (0.65)	2.94 (0.64)	2.75 (0.65)	2.44	0.09

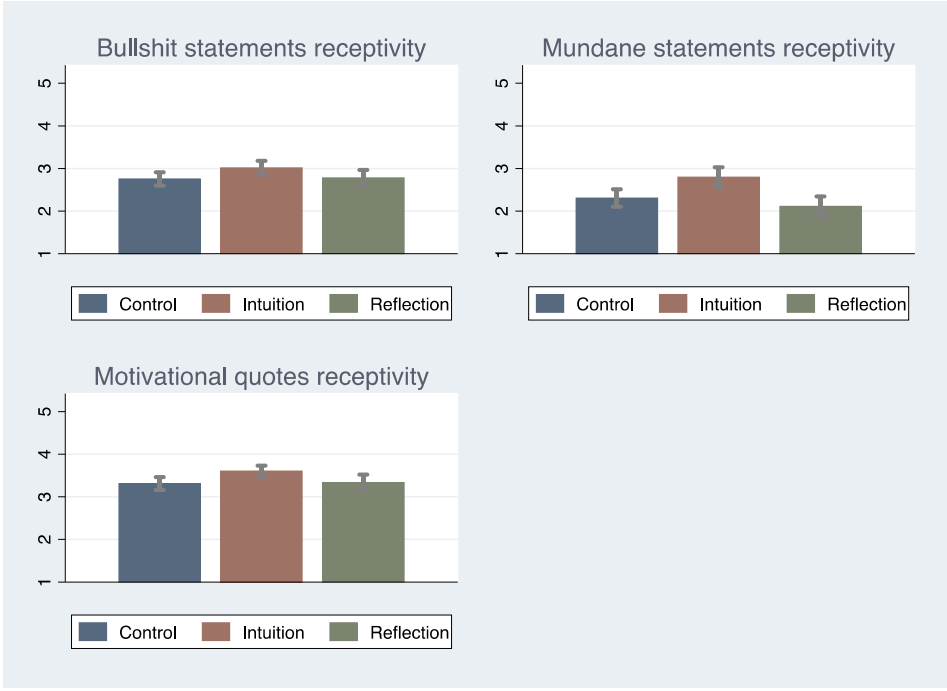

Figure 1. Receptivity to bullshit, mundane statements and motivational quotes, by treatment.

Table 3. OLS regressions.

	(1) BSR	(2) MSS	(3) MQS	(4) BSR	(5) MSS	(6) MQS	(7) BSR	(8) MSS	(9) MQS
Intuition treatment	0.26*	0.49**	0.29**	0.27*	0.50***	0.31**	0.20	0.40**	0.26**
	(0.12)	(0.16)	(0.10)	(0.11)	(0.15)	(0.10)	(0.11)	(0.14)	(0.10)
Reflection treatment	0.03	−0.20	0.03	0.02	−0.22	−0.00	0.05	−0.18	0.01
	(0.12)	(0.16)	(0.12)	(0.12)	(0.14)	(0.12)	(0.12)	(0.13)	(0.11)
Need for cognition				−0.08	−0.12	−0.03	0.03	0.05	0.04
				(0.08)	(0.09)	(0.07)	(0.08)	(0.09)	(0.07)
Faith in intuition				0.13*	0.19*	0.25***	−0.00	0.01	0.14*
				(0.07)	(0.09)	(0.06)	(0.06)	(0.09)	(0.06)
Analytic thinking				−0.06*	−0.22***	−0.02	−0.01	−0.13***	0.02
				(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Ep. suspect beliefs							0.47***	0.56***	0.28***
							(0.09)	(0.10)	(0.08)
Female							−0.06	−0.02	0.27**
							(0.10)	(0.11)	(0.09)
Age							0.01	0.02***	0.00
							(0.00)	(0.01)	(0.00)
Education							0.06	−0.10	−0.02
							(0.05)	(0.06)	(0.04)
Constant	2.75***	2.31***	3.31***	2.75***	2.79***	2.55***	1.05*	0.58	1.65***
	(0.08)	(0.10)	(0.08)	(0.35)	(0.45)	(0.30)	(0.46)	(0.53)	(0.40)
N	291	291	291	291	291	291	291	291	291
Test $I = R$	0.06	<0.01	0.02	0.05	<0.01	<0.01	0.20	<0.01	0.02
R^2	0.02	0.06	0.03	0.06	0.24	0.09	0.17	0.36	0.16

Notes: The table shows beta coefficients and standard errors (in parentheses). *, **, and *** indicate significance at the 5%, 1%, and 0.1%-level, respectively. The second to last row of the table shows *p*-values of post-estimation tests comparing the effects of the Intuition treatment against the Reflection treatment.

Models 7–9 we include controls for epistemically suspect beliefs and demographics. We find that the Intuition treatment results in significantly higher receptivity across all three statements categories, and (with one exception) the effect remains significant even after all control variables are included. The exception refers to Bullshit receptivity (Model 7) in which Intuition treatment yields only marginally statistically significant difference ($p = 0.06$) compared to the Control treatment. On the other hand, across all models we find no significant effect of Reflection treatment. The second to last row of Table 3 shows *p*-values of post-estimation tests comparing the effects of the Intuition treatment against the Reflection treatment. We find that in most

Table 4. Correlation matrix of our outcome variables for the whole sample (in regular font, bottom part) and for the Control treatment only (in italics, upper part).

	1.	2.	3.	4.	5.	6.	7.
1. Receptivity to bullshit	–	*0.42****	*0.34****	*−0.19*	*−0.22**	*0.15*	*0.42****
2. Receptivity to mundane statements	0.43***	–	*0.18*	*−0.39****	*−0.20**	*−0.03*	*0.35****
3. Receptivity to motivational quotes	0.45***	0.33***	–	*−0.04*	*0.03*	*0.28***	*0.25**
4. Analytic thinking	−0.16**	−0.39***	−0.05	–	*0.35****	*0.00*	*−0.34****
5. Need for cognition	−0.10	−0.16**	−0.04	0.19**	–	*0.11*	*−0.24**
6. Faith in intuition	0.11	0.10	0.22***	−0.02	0.02	–	*0.41****
7. Epistemically suspect beliefs	0.37***	0.45***	0.29***	−0.32***	−0.32***	0.33***	–

Note: Table shows Pearson correlation coefficient values. *, **, and *** indicate significance at the 5%, 1%, and 0.1%-level, respectively.

models, the receptivity to statements in the Intuition treatment is significantly higher compared not only to the Control treatment, but also to the Reflection treatment.

The regressions in Table 3 also show that receptivity across all statement categories is positively and significantly associated with epistemically suspect beliefs, meaning that those who tend to believe in epistemically weak claims tend to find profundity in (any) claims, even in bullshit statements. In Models 4–6, i.e. before controlling for epistemically suspect beliefs, we find that receptivity to all statement categories is significantly positively linked to faith in intuition, while being (mostly) significantly negatively associated with analytic thinking.

Finally, we examine the relationships between our measured outcomes in isolation, using correlational analysis. The results are listed in Table 4. We find strong and statistically significant positive correlations in receptivity across all three statement categories. On the other hand, we find that receptivity is negatively correlated with analytical thinking, while being positively correlated with epistemically suspect beliefs.

4. Discussion

In this paper, we experimentally investigated the effect of inducing intuitive vs. reflective thinking style on receptivity to bullshit, as well as to mundane statements and motivational quotes. We observe that intuitive responses made under time pressure led to general bias towards finding more profundity in all three categories of statements. However, we find virtually no effect of our reflective thinking manipulation. There are two possible explanations of this null result. Either our manipulation was not strong enough to induce deeper reflection, or it simply had no room to be effective because reflective responses were already made by default, i.e. even without the manipulation (in the Control treatment). While the former explanation seems more likely, given that measuring actual cognitive effort in an online survey is rather difficult, our data do not allow us to reject the latter. However, since the failure to find effects of reflective thinking manipulation is relatively common (and given that our participants generally consider bullshit statements to be less profound than motivational quotes, which suggests that at least some cognitive effort was employed), we believe it would be worthwhile for future research to disentangle the two competing explanations, for example, by including well-designed manipulation checks, or by measuring response times and switches in selected responses before final response submission.

We also sought to examine the associations between bullshit receptivity, analytic thinking, and epistemically suspect beliefs. In line with the previous literature (e.g. Čavojová et al., 2022; Littrell et al., 2021; Pennycook et al., 2015), we found that individuals with better analytic thinking were less receptive to bullshit (and to mundane statements), as well as to epistemically suspect beliefs in general Interestingly, epistemically suspect beliefs were by far the strongest and most significant predictor of not only bullshit receptivity, but also mundane statements and motivational quotes receptivity, suggesting that some people (e.g. those with lower analytic thinking) may be generally biased towards believing in profundity as well as truthfulness of (any) presented stimuli.

Finally, we examined whether receptivity to bullshit and other statements can be predicted by self-reported thinking dispositions, namely need for cognition and faith in intuition. Resonating with previous studies, while our results directionally support the conjecture that need for cognition is associated with lower receptivity while the opposite holds true for faith in intuition, we note that statistical significance of these associations in our data is generally rather weak, or outright absent. These result can be explained by (1) tendency to overestimate oneself when it comes to socially desirable traits (Coutinho et al., 2019; León et al., 2023), (2) our use of abbreviated instead of full Rational-Experiential Inventory, or (3) the notion that deliberative reasoning is not necessarily the opposite of intuition (Irwin & Wilson, 2013) and that these two dispositions may

operate in parallel (Epstein et al., 1996; Reyna, 2004; Sloman, 1996).

Importantly, while our experimental manipulations and control measures were able to explain some of the variance in receptivity to bullshit and other statements, a large residual part remained unexplained. It is therefore possible, that receptivity can be more strongly predicted by other phenomena, such as overconfidence (Littrell et al., 2021), ontological confusion (Čavojová et al., 2022; Pennycook et al., 2015), or unexamined personality traits, such as openness, conscientiousness, or agreeableness (Čavojová et al., 2002). We believe it would be worthwhile to estimate the associations between these factors and bullshit receptivity in future research.

Author contributions

Mária Hromadová: Conceptualisation and design, data collection, data analysis and interpretation, manuscript drafting and revising; approval of final version for submission. Vladimíra Čavojová: Conceptualisation and design, manuscript drafting and revising; approval of final version for submission. Matej Lorko: Data analysis and interpretation; manuscript drafting and revising; approval of final version for submission.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Data availability statement

Materials and data are publicly available at: https://osf.io/svz4r/.

Ethics approval, guidelines, and consent

All methods were carried out following APA standards and ethical requirements of the Trnava University. Informed consent was obtained from all subjects.

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