



For Powerholders ‘More is More’: Power Shapes Judgments of Logically Equivalent Comparative Statements

RESEARCH ARTICLE

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ABSTRACT

Human judgments are inherently comparative. Recently, a so-called more-less asymmetry in comparative communication has been demonstrated: ‘more than’ comparisons are preferred to corresponding ‘less than’ comparisons. Here we show that a ubiquitous social-structural factor – social power – shapes biases in such comparisons. Powerholders, relative to powerless individuals, liked more, agreed more with and considered more likely to be true ‘more than’ compared to ‘less than’ statements. This was true despite the fact that the differently formulated statements were logically equivalent. In Study 1 ($N = 153$), induced high power (vs. control or low power) led to believing that ‘more than’ statements were more likely to be true. In Studies 2A/B ($N = 449$) the judgments of participants in high power conditions were more favorable when comparisons were made using ‘more than’ comparisons. This was also the case in a pilot study ($N = 149$) in which individual differences in chronic sense of power were assessed. These findings suggest that powerholders’ decisions based on comparative information are especially prone to the more-less judgmental bias resulting in asymmetry. They are in line with approaches positing that power increases and lack of power decreases reliance on subjective experiences, including – but not limited to – ease of information processing and the use of fast and frugal strategies in judgment and decision-making.

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'They're making a mistake because I have a gut and my gut tells me more sometimes than anybody else's brain can ever tell me.' – President Donald Trump regarding the Federal Reserve (*Washington Post*, 27.11.2018).

Consider whether the following two pieces of information about gender differences are true: 'men listen to the radio more often than women' versus 'women listen to the radio less often than men'. Even though both statements describe logically equivalent – and indeed unfounded – information, recent research shows that people have a larger propensity to deem the first sentence as more likely to be true than the second. The same holds for people's liking of and agreement with opinions expressed through 'more than' rather than 'less than' comparative statements. As such, this so-called more-less asymmetry (Hoorens & Bruckmüller, 2015) is of relevance in the context of fake news, persuasion, and decision-making – to name but a few domains. Indeed, emerging work demonstrated the impact of the more-less asymmetry in different contexts, for example in relation to uncertainty communication around climate change (Hohle & Teigen, 2017) and the perceived legitimacy of economic inequality between social groups (Bruckmüller et al., 2017).

The asymmetry has been proposed to at least in part stem from the fact that 'more than' statements are more easily processed than 'less than' statements – in other words from differences in fluency experiences (Hoorens & Bruckmüller, 2015). However, to date little is known regarding factors that might affect the magnitude of this asymmetry. The current work is a first step in addressing this lacuna by examining the moderating role of social power. As the opening quotation illustrates, high (relative to low) power entails stronger reliance on internal experiences as sources of information for judgment and decision-making (Fiske, 2010; Keltner et al., 2003). Conversely, low (relative to high) power entails the need to attentively consider multiple sources of information to increase predictability and control (Goodwin et al., 2000; Guinote et al., 2006; Keltner et al., 2003). We thus propose the more-less asymmetry to be relatively stronger among the powerful. If this is indeed the case, apparent implications would be broad and important: Powerholders are arguably often tasked with making decisions based on comparative judgments concerning resources, strategies and people that, in turn, affect individuals and policies at the organizational and societal levels.

We first review the scarce research on the more-less asymmetry and relevant theoretical approaches. We then deduct predictions regarding the impact of social power on the asymmetry, before proceeding to test them in a series of studies.

PROCESSING OF COMPARATIVE INFORMATION AND THE MORE-LESS ASYMMETRY

Comparative information is ubiquitous and there is accumulating support that preferences are derived directly from comparison processes, with comparisons between options impacting judgment and decision-making above and beyond the perceived absolute value of different options (for a review, see Vlaev et al., 2011). Importantly, comparative information can be stated in 'more than' (e.g., X creates more revenue than Y) or 'less than' terms (e.g., Y creates less revenue than X). Despite these being logically equivalent comparisons, psychologically they are not equivalent. Indeed, previous research from diverse perspectives points to people having a preference for 'more than' comparative statements: they are faster at verifying their truth (Fores d'Arcais, 1970), judge them as sounding better (Segui & Fourment, 1979), and draw upon them more strongly when generating explanations for observed group differences (Hegarty & Pratto, 2001). Also, people have been found to be faster at verifying sentences conveying comparisons akin to more-than relations (e.g., 'dogs are larger than cats' = *more* big) compared to less-than relations (e.g., 'cats are smaller than dogs' = *less* big; Holyoak et al., 1979); they also prefer 'larger' comparatives (e.g., *more*, taller, higher) to 'smaller' comparatives (e.g., *less*, shorter, lower; Matthews & Dylman, 2014). But why?

According to Hoorens and Bruckmüller (2015), 'more than' compared to 'less than' statements are cognitively easier to process (more fluent), and this difference in (dis) fluency gives rise to the so-called more-less asymmetry in comparative judgment and decision-making. Cognitive fluency can be broadly defined as the ease with which a stimulus or information can be retrieved, perceived, or processed. It can stem from several sources, but whatever the source, people use such experiences of ease (or, in the case of disfluency, difficulty) as information in their construction of various judgments (e.g., of liking, truth, familiarity; Alter & Oppenheimer, 2009; Greifeneder et al., 2011; Schwarz, 2004). Of interest here, fluency has been found to underlie intuitive judgments (Topolinski, 2011; Topolinski & Reber, 2010) and to constitute a heuristic cue in decision making (Gigerenzer & Gaissmaier, 2011; Unkelbach & Greifeneder, 2013). Moreover, fluency is inherently positive, as the fluency signal is hedonically marked (Winkielman et al., 2003). For instance, conditions that facilitate fluent processing result in more positive evaluations of targets of judgments, such as events or objects, and elicit positive affect. Indeed, fluent processing can lead to positive evaluations even when other information, such as base rates, suggests the opposite (Silva & Unkelbach, 2021). In agreement

with the positive nature of fluency experiences, in their series of studies Hoorens and Bruckmüller (2015) found that participants were more likely to evaluate positively, consider true, and agree with 'more than' rather than 'less than' comparative information. Moreover, the otherwise robust more-less asymmetry was reduced when participants were warned to expect to experience difficulty (i.e., disfluency) while evaluating 'less than' statements (Hoorens & Bruckmüller, 2015, Study 7). This is supportive of a cognitive fluency account, because positive effects of fluency on evaluative judgments have been found to be reduced when people are led to misattribute fluency to a different, unrelated source (Winkielman et al., 2003) and when drawing people's awareness to the fact that the difficulty of processing of a given stimulus can impact their judgments (e.g., accented speech impacting their judged credibility of uttered sentences; Lev-Ari & Keysar, 2010; low visual clarity impacting their judged familiarity of words; Whittlesea et al., 1990).

Of note, the more-less asymmetry was also found when participants evaluated texts comparing two objects regarding their positive and *negative* characteristics, and when stating their agreement with desirable and *undesirable* stereotypes. This indicates that more-less framing should not be equated with positive-negative framing (cf. Hilbig, 2009, 2012, for the negativity bias in judgments of truth). However, the authors acknowledge that whilst cognitive (dis)fluency contributes to the more-less asymmetry, 'a number of other mechanisms may be at play' (Hoorens & Bruckmüller, 2015, p. 764f). In other words, the asymmetry is thus likely to be multiply determined. For example, from an embodiment perspective people might generally associate 'more than' and 'less than' with a vertical or horizontal dimension and, in turn, valence, such that 'more' = high/right = positive, and less = low/left = negative (for the vertical dimension, see Meier & Robinson, 2004; for the horizontal dimension, see Casasanto, 2009). Furthermore, from a linguistic perspective it is conceivable that because of a preponderance of positive elements in natural language (Boucher & Osgood, 1969) people associate 'more' as well as 'more than' with 'more of something good' – and thus positive valence.

In summary, more-less comparative statements bias judgments and decisions, such that 'more than' comparisons are favored. This has been proposed to stem from these comparisons entailing an advantage in terms of processing ease, as well as other potential factors such as embodied and linguistic associations of 'more' with positive valence and of 'less' with negative valence. Drawing on theoretical notions and empirical evidence that relative power affects reliance on subjective experiences in processing of information, we posit that compared to low power individuals the more-less asymmetry might be intensified among high power individuals.

POWER AND THE MORE-LESS ASYMMETRY

The conjecture that powerholders tend to rely on subjective experiences and feelings that arise while thinking features in several prominent theoretical approaches (Fiske, 2010; Keltner et al., 2003). For example, according to the approach theory of power (Keltner et al., 2003; Cho & Keltner, 2020) high-power individuals are guided more strongly by inner states and experiences and more likely rely on automatic, less complex reasoning due to their heightened reward sensitivity and approach motivation. Conversely, the theory assumes low power individuals to engage in more controlled cognition and to make more systematic inferences due to their heightened threat sensitivity and avoidance motivation. Moreover, according to the situated focus theory of power, not only are the powerful more flexible in their processing of information depending on priorities and motivations, but inner experiences are also one of the factors guiding more unequivocally the cognitions of the powerful (Guinote, 2010a; Guinote, 2017). In contrast, powerlessness is assumed to be associated with extensive information processing strategies largely insensitive to internal cues while attending to multiple sources of information.

For example, compared to the powerless the powerful readily rely on their affective experiences regarding action initiation (e.g., against annoying objects; Galinsky et al., 2003) and emotion expression (e.g., anger; Petkanopoulou et al., 2019). Also concerning affective experiences, their self-reported affect is more strongly conveyed in their facial expressions (e.g., smiles; Leach & Weick, 2020). Regarding bodily experiences, the powerful more strongly rely on perceived physiological arousal in ratings of attractiveness (Jouffre, 2015), their hunger predicts the amount of food eaten by them (Guinote, 2010b), and powerful participants show a stronger correspondence between circadian rhythm and self-reported mood (Leach & Weick, 2018) as well as between movements and self-reported liking of objects (Woltin & Guinote, 2015) than powerless participants. This is also observed in applied settings: senior managers and executives self-report to ignore or to reanalyse data contradicting their 'gut feelings' or intuitions (Bird & Swabey, 2014) and to draw on their intuition in decision making (Dane & Pratt, 2007), especially in unstable environments (Khatri & Ng, 2000).

Of importance for the current research, evidence shows that the powerful more strongly rely on and use their gut feelings linked to cognitive experiences as well as effortless strategies in decision-making whilst the powerless engage in more controlled and systematic strategies. To illustrate, relative to low power, high power increases the use of the anchoring heuristic, which entails assimilating one's judgment to an activated anchor of any sort, both regarding numeric judgments (Lammers &

Burgmer, 2017; but also see Johnson & Lammers, 2012) and judgments of others' internal states (Overbeck & Droutman, 2013). Across multiple operationalizations, power entailed a stronger use of intuitive processes cumulating in the so-called planning fallacy (Kahneman & Tversky, 1979) when making time predictions (Weick & Guinote, 2010), as well as the use of stereotypes when judging others – whilst low-power participants more strongly attended to individuating and other social information (Fiske, 1993; Guinote & Phillips, 2010; but see Schmid Mast et al., 2009, for inferences of others' feelings). Finally, powerful participants more strongly rely on the ease of retrieval (i.e., the subjective ease versus difficulty experienced during thought processes): they expressed more favorable attitudes regarding a project when generating a few (which is easy) rather than many (which is difficult) favorable arguments; powerless participants' attitudes were instead affected by the generated content of the arguments (Weick & Guinote, 2008).

In sum, across several domains the powerful have been found to more strongly make use of and rely on subjective experiences when making judgments and decisions than the powerless (who tend to more strongly rely on controlled and systematic processing of several information sources). To the extent that the more-less asymmetry in comparative communication at least in part rests upon the differentially experienced ease/difficulty of 'more than'/'less than' statements (Hoorens & Bruckmüller, 2015), it thus stands to reason that relative to low power, high power might intensify the asymmetry.

Importantly, alternative perspectives not involving ease but rather building on embodied and linguistic associations would predict a similar modulation of the asymmetry. For example, people associating the frames with the vertical dimension (see above) along with a demonstrated association of 'power' = 'up' (Schubert, 2005) would jointly suggest that 'more than' comparisons should more naturally fit a power than a powerless mindset. Furthermore, and from a linguistic perspective, activating a mindset of power might make people reflect on situations in which they had 'more' power over others than others had over them, thus likewise rendering 'more than' comparisons a more natural fit. Moreover, one might speculate that the previously mentioned plausible association of 'more than' with 'more of something good' due to people's language showing a predominance to use evaluatively positive words (Boucher & Osgood, 1969) should be especially strong among the powerful, who are prone to optimism (Anderson & Galinsky, 2006). To this point, after failure the powerful engage in more self-focussed predominantly additive counterfactual thinking (i.e., considering alternatives about what they could have done more compared to what they actually did; Scholl & Sassenberg, 2014). Finally, we thank an anonymous reviewer for drawing our attention to the

fact that 'more than' comparisons might express more confidence than 'less than' comparisons and thus more readily align with a powerful mindset, as power has been shown to increase confidence (Briñol et al., 2007; Fast et al., 2012; Lammers et al., 2013).

THE CURRENT RESEARCH

We tested the hypothesis that high compared to low power would prompt a more pronounced more-less asymmetry. To this end, we carried out a series of studies drawing on different operationalizations of power – induced, chronic, and linked to occupational roles – and considered the consequences of comparative format for truth judgments, decision making, and evaluations. These studies aim to contribute to a better understanding of comparative judgments among people differing in power, and at the same time inform about conditions that strengthen or weaken the asymmetry and the resulting bias.

All studies received ethical approval from the ethics committee at the university they were conducted at and supplemental information regarding them (de-identified data, analysis scripts, materials) is available via the Open Science Framework (OSF) at: <https://osf.io/hfuy3/>. We report how we determined our sample sizes, all data exclusions (if any), all manipulations, and all measures in the respective studies (Simmons et al., 2011).

STUDY 1

The aims of Study 1 were twofold. First, we sought to replicate the previously found more-less asymmetry, and specifically regarding judgments of truth (Hoorens & Bruckmüller, 2015; Study 6). Second, we sought to provide initial evidence for the more-less asymmetry being modulated by power. Overall, we expected the more-less asymmetry to be larger in a high power compared to low power and control conditions. We did not have predictions regarding possible differences between the control and low power conditions. However, previous research including control conditions and considering reliance on feelings and cognitive experiences did not find such differences (Jouffre, 2015; Overbeck & Droutman, 2013; Woltin & Guinote, 2015).

METHOD

Power Considerations

We based our power analysis on Study 6 in Hoorens and Bruckmüller (2015; $\eta_p^2 = 0.16$, $f = 0.44$), as we relied on the same experimental materials and procedures (see below). However, whilst we anticipated the effect to be present across conditions, we also expected it to be moderated by power. We thus decided to base our

power calculation on half of the effect size reported in the original study ($\eta_p^2 = 0.08$, $f = 0.29$). Using G*Power 3.1 (Faul et al., 2007) this analysis showed that we would need 117 participants to detect the effect with $\alpha = 0.05$ and 80% power. Research assistants were instructed to recruit roughly 50 participants per experimental condition and overall recruited a total of 155 participants.

Participants and Design

Undergraduate students took part on a voluntary basis or for course credit. Overall, 155 participants were recruited in the university library or via the student participation pool. We excluded two participants who did not comply with instructions.¹ The final sample thus comprised 153 participants (23 males, 129 females, 1 preferred not to state their gender; $M_{\text{age}} = 20.18$, $SD_{\text{age}} = 3.80$).

Our study had a 2 (Framing: 'more than' vs. 'less than'; within-subjects) \times 3 (Power: high vs. control vs. low; between-subjects) mixed design. Participants were randomly assigned to the power conditions.

Procedure and Materials

Participants provided informed consent and demographic information, and were randomly assigned to the power conditions (Galinsky et al., 2003). In the low power condition, they wrote about an occasion in which someone else had power over them, in the control condition about their last visit to a supermarket or a department store, and in the high power condition about an occasion in which they had power over another individual or individuals.

In an allegedly unrelated second part of the study participants were presented with materials and scales directly taken from Hoorens and Bruckmüller (2015; Study 6). They read 12 statements comparing women and men, each six with a 'more than' (e.g., 'Men listen to the radio more often than women') and a 'less than' format (e.g., 'Men are less likely to have fish as pets than women'). These statements were pretested to ensure they relate to neutral valence domains for which it would be difficult to guess if gender differences actually exist; which statement appeared in which format and whether it compared men to women or vice-versa was counterbalanced.

Participants were asked to state whether they thought each statement was true or not (dichotomous choice). As the original study sought to ensure that effects could not be attributed to differences in judgmental certainty (cf. Hoorens & Bruckmüller, 2015; Study 6), we likewise asked participants how certain they were of each of their twelve answers (1 = *not at all certain*; 7 = *very certain*). Additionally, we deemed assessing certainty worthwhile as some previous research found power to increase judgmental confidence (Briñol et al., 2007; Fast et al., 2012). Participants were fully debriefed and thanked.

RESULTS AND DISCUSSION

Analytical Strategy

We created a series of two orthogonal contrasts, a strategy which provides a more precise and conservative test of the specific predicted pattern of results (Rosenthal & Rosnow, 1985). The first contrast compared the high power condition (coded 2) to the low power and control conditions (both coded -1). The second focussed on comparing the control condition (coded -1) to the low power condition (coded 1; in this contrast the high power condition was coded 0). Thus, a pattern of results in line with our hypothesis would be indicated by an interaction between the first contrast and the within-subjects factor (i.e., truth judgments regarding more vs. less statements differing more strongly in the high power than the other conditions).

Judgments of Truth

We calculated the proportion of 'more than' and 'less than' statements guessed to be true and subjected this score to a mixed ANOVA with the following independent variables: Framing (the within-subjects factor), the two contrasts (the between-subjects factors) as well as the interactions between framing and each of the contrasts. Replicating Hoorens and Bruckmüller (2015, Study 6), participants more strongly believed that the 'more than' ($M = 0.42$, $SD = 0.25$) rather than the 'less than' statements were true ($M = 0.31$, $SD = 0.23$), $F(1,150) = 28.29$, $p < 0.001$, $\eta_p^2 = 0.16$ (of note, this is precisely the effect size reported in the original work).

This effect was qualified by the interaction between the first contrast and framing, $F(1,150) = 4.15$, $p = 0.043$, $\eta_p^2 = 0.03^2$ (see Figure 1). In line with expectations, the difference in mean levels of truth judgments for 'more than' compared to 'less than' statements was larger in the high power condition ($M_{\text{more}} = 0.48$, $SD_{\text{more}} = 0.25$; $M_{\text{less}} = 0.31$, $SD_{\text{less}} = 0.24$) compared to the control and the low power conditions ($M_{\text{more}} = 0.39$, $SD_{\text{more}} = 0.25$; $M_{\text{less}} = 0.31$, $SD_{\text{less}} = 0.23$). The interaction between the second contrast and framing was not reliable, $F(1,150) = 0.16$, $p = 0.687$, $\eta_p^2 < 0.01$, indicating that the difference in mean levels of truth judgments for the differently framed statements was not different in the control ($M_{\text{more}} = 0.40$, $SD_{\text{more}} = 0.23$; $M_{\text{less}} = 0.33$, $SD_{\text{less}} = 0.22$) compared to the low power condition ($M_{\text{more}} = 0.38$, $SD_{\text{more}} = 0.26$; $M_{\text{less}} = 0.28$, $SD_{\text{less}} = 0.24$). There were no main effects of the contrasts, highest $F = 1.83$, $p = 0.178$, $\eta_p^2 = 0.01$.

Certainty Ratings

We subjected participants' mean certainty ratings of all statements to the same mixed ANOVA as above. There were no effects, highest $F = 1.11$, $p = 0.295$, $\eta_p^2 < 0.01$. Thus, as in Hoorens and Bruckmüller (2015), framing did not affect certainty ratings. Based on previous research (Briñol et al., 2007; Fast et al., 2012), one could have expected higher certainty amongst the powerful. This was not the case. One possible explanation for this could

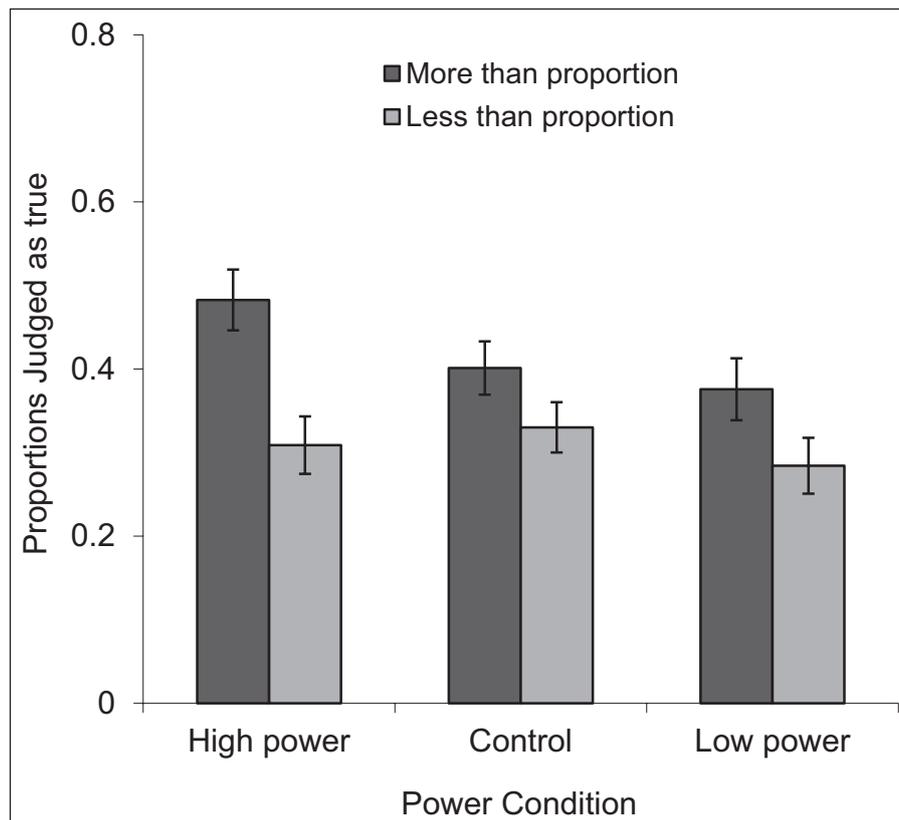


Figure 1 Proportions of ‘more than’ versus ‘less than’ statements about gender differences participants believed to be true as a function of condition (Study 1). Error bars represent standard errors. Scale range 0 to 1.

be that we assessed certainty rather than confidence. In any event, certainty ratings cannot account for the findings reported above.

Overall, the present findings replicate the more-less asymmetry for judgments of truth and additionally show that the asymmetry emerged more strongly for high power. One main shortcoming of the present study is that manipulating comparison format within participants can be assumed to have provoked the asymmetry especially strongly. Furthermore, generalization to different contexts is limited as all the statements were neutral. Consequently, we sought to replicate the difference between high and low power regarding the manifestation of the more-less asymmetry in two further studies manipulating comparison format between subjects and using different outcome variables. To do so we first designed a pilot study aimed at generating new material.

PILOT STUDY

As the more-less asymmetry is a relatively novel phenomenon, we deemed it important to also examine it in a context different from the ones used by Hoorens and Bruckmüller (2015), namely decision making. We therefore created a series of ‘more than’ versus ‘less than’ statements comparing two art forms (i.e., the visual and performative arts) and asked participants to make decisions regarding the distribution of funds between

them. One art form was always presented more favorably as a consequence of these comparisons and participants indicated to what extent they supported a policy monetarily favoring the favorably presented art form.

We also measured participants’ chronic sense of power. Despite this not being the main aim of the study, we reasoned that this allowed a first exploration of the role of power when comparison format was manipulated between participants. We proceed likewise as the cost of including the chronic sense of power scale was minimal and its informative value could be important for the determination of the sample size in an ulterior study.

METHOD

Power Considerations, Participants, and Design

On Prolific Academic (www.prolific.ac) 150 participants were recruited and compensated with £0.40 for their participation. Due to a data recording error for one participant, only 149 responses were correctly recorded (70 males, 79 females; $M_{\text{age}} = 30.97$, $SD_{\text{age}} = 9.68$). Framing (‘more than’ vs. ‘less than’) was manipulated between participants and their chronic sense of power was measured. Participants were randomly allocated to experimental conditions. Which specific art form served as comparison object or target was counterbalanced. Power analyses with G*Power (Faul et al., 2007) based on the average effect size found by Hoorens and Bruckmüller (2015) in their between-subjects designs (i.e., Studies 2, 3 and 5; $\eta_p^2 = 0.09$, $f = 0.31$) indicated that we would need

a sample of 82 participants with an alpha of 0.05 and 80% power. We increased this sample size to be able to detect an eventual effect of counterbalancing.

Procedure and Materials

Participants first provided informed consent and demographic information. Subsequently, their chronic sense of power was measured with the personal sense of power scale ($M = 4.62$, $SD = 1.00$; $\alpha = 0.86$; Anderson et al., 2012), consisting of eight items (e.g., ‘In my relationships with others, I can get people to listen to what I say’) to which responses are given on a 7-point scale (1 = *strongly disagree* to 7 = *strongly agree*).

In an allegedly different section, participants were then presented with the information that the Art Council England would implement a policy changing the allocation of funds for the performing and visual arts. They furthermore read that opinions were divided regarding the appropriate funding ratio between them and that both were considered important. Finally, they were instructed to pay attention to a text informing them about differences between these art forms, which would favor one of them over the other. Participants were then randomly presented with different versions of a text comparing the art forms, using either ‘more than’ or ‘less than’ statements. For example, they were told that the performing (or visual) arts were more (or less) effective in creating additional revenue than the visual (or performing) arts.

The dependent variable of interest consisted of participants’ agreement with a policy decision favoring funding of the art form that was favored in the text as a consequence of the comparisons made on a 7-point scale (1 = *strongly disagree* to 7 = *strongly agree*).³ Finally, participants were fully debriefed and thanked.

RESULTS

Regressing participants’ agreement with funding allocations for the favored art form on the mean-centred chronic sense of power score, framing (coded -1 for ‘less than’ and 1 for ‘more than’ comparisons), counterbalancing (which specific art form served as comparison object or target) and all interactions between these predictors revealed the expected main effect of framing: Participants’ agreed more strongly with funding the favored art form (whether performing or visual) when comparisons were made with a ‘more than’ rather than a ‘less than’ format, $B = 0.33$, $SE = 0.11$, $CI_{95} [0.116, .545]$, $t(141) = 3.07$, $p = 0.003$, $\eta_p^2 = 0.06$. This main effect shows that we successfully generated material able to replicate the more-less asymmetry in a decision-making context.

There was no main effect of chronic sense of power, $B = 0.05$, $SE = 0.11$, $CI_{95} [-0.172, .275]$, $t(141) = 0.46$, $p = 0.648$, $\eta_p^2 < 0.01$, and no effects involving counterbalancing (highest $t = 1.22$, $p = 0.225$, $\eta_p^2 = 0.01$). However, we found an interaction between framing and chronic sense of power, $B = 0.26$, $SE = 0.11$, $CI_{95} [0.037, 0.485]$, $t(141) = 2.31$, $p = 0.023$, $\eta_p^2 = 0.04$. Simple slope analyses (Aiken

& West, 1991) indicated that for participants with a higher sense of power ($SD +1$) the more-less asymmetry strongly emerged, $B = 0.59$, $SE = 0.16$, $CI_{95} [0.279, 0.902]$, $t(141) = 3.75$, $p < 0.001$, $\eta_p^2 = 0.09$, but this was not the case for participants with a lower sense of power ($SD -1$), $B = 0.07$, $SE = 0.16$, $CI_{95} [-0.236, 0.378]$, $t(141) = 0.46$, $p = 0.647$, $\eta_p^2 < 0.01$. We did not design and, importantly, did not power this study with the goal of investigating this interaction. However, the fact that we nonetheless found the asymmetry to be moderated by power in the expected direction is promising.

STUDIES 2A AND 2B

Studies 2A and 2B were designed to test our hypothesis in a full between-participants designs and across two different contexts. Sample size was determined based on the interaction effect found in the pilot study (i.e., $\eta_p^2 = 0.04$, $f = 0.20$). We included in the G*Power power analysis (Faul et al., 2007) not only our main predictors (i.e., power, framing and their interaction), but also the main effects and interactions involving study and order of the object versus target of comparison (i.e., counterbalancing) with our independent variables. Despite not expecting our predicted framing by power interaction to vary as a function of either study or order, we nonetheless took these predictors in account, given that we tested potential effects involving them. This analysis indicated that we would need a sample of 427 participants to detect the expected effect with an alpha of 0.05 and 80% power.⁴

Study 2A was similar to the above pilot study in all aspects except for power being manipulated between participants using the same procedure as in Study 1. Thus, participants again read bogus articles comparing art forms and were asked to indicate to what extent they agreed with a policy decision favoring funding of the art form favored as a consequence of ‘more than’ or ‘less than’ comparisons.

Study 2B used the exact same material of Study 3 in Hoorens & Bruckmüller (2015). That is, participants were presented with bogus articles comparing, using ‘more than’ or ‘less than’ statements, two allergy medicines through a description of their effects (strengths) and side effects (weaknesses), with neither medicine being presented as superior. This material allows testing our predictions in contexts in which both positive and negative qualities are presented. Power was operationalized through pre-screening participants in powerful or powerless occupational roles (i.e., executives and managers or subordinates in various occupational positions).

METHOD

Participants and Design

Both studies had a framing (‘more than’ vs. ‘less than’) by power (high vs. low) between-participants design. Which specific art form (Study 2A) or medicine (Study 2B) served

as comparison object or target was counterbalanced. We recruited a total of 449 participants (Study 2A $N = 209$; Study 2B $N = 240$), $M_{\text{age}} = 29.61$, $SD_{\text{age}} = 11.37$, 289 female, 156 male, 3 preferred not to state their gender, 1 stated 'other'. Native English-speaking participants in Study 2A were recruited in the university library or via the student participation pool to fill in paper and pencil questionnaires; participants in Study 2B were recruited through Prolific Academic and received £1 for their participation. To ensure equal participant numbers in the power conditions, two parallel versions of Study 2B were run. Participants in the low (high) power condition were only eligible to take part if they had responded with 'no' ('yes') to a pre-screening question: 'At work, do you have any supervisory responsibilities? In other words, do you have the authority to give instructions to subordinates?' Subordinates reported to and received instructions from $M = 1.83$ ($SD = 1.32$; $Med = 2$) executives or managers; executives and managers gave instructions to and managed $M = 7.96$ ($SD = 9.46$; $Med = 5$) employees. Participants were also asked to report some examples of giving, respectively receiving orders. Participants, whose pre-screening responses did not match their study responses regarding their executive or subordinate position ($n = 18$), who failed an embedded attention check ($n = 28$), and one participant who wrote nonsense when providing examples from work (see below), were eliminated prior to data analysis.

Procedure and Materials

In Study 2A, after providing informed consent and demographic information, participants were randomly assigned to power conditions and engaged with the task (Galinsky et al., 2003; see Study 1). They were then presented with the same information and completed the same task as in the pilot study (i.e., reading texts comparing two art forms and making funding decisions).

In Study 2B, after providing consent and demographic information, participants were asked whether they had any supervisory responsibilities at work and the authority to give instructions to subordinates, or if they held a manager or leadership position. Participants high (low) in occupational power who responded with yes (no) were then asked how many people they had the authority to give instructions to (*they reported to and received instructions from*). Participants were also asked to provide three short examples of situations illustrative of them instructing or directing other employees and of them being in charge of evaluating their work or determining their compensation (*following the instructions or directions of a manager and of their work being evaluated by or their compensation being determined by a manager*). These examples were asked to activate social power (or the lack thereof) linked to occupational roles in participants. Participants were then presented with materials and scales directly taken

from Hoorens and Bruckmüller (2015; Study 3). They first read an article, allegedly written at the occasion of a forthcoming decision regarding the reimbursement of two (fictitious) allergy medicines (called Xylon and Medovan). In the more than condition, one medicine was described as more effective against headaches and teary eyes, the other as more effective against symptoms of the respiratory system. One medicine was also described as being more quickly absorbed, the other as having more prolonged effects. Negative side effects (e.g., more absentmindedness) were likewise stated with 'more than' comparisons. The article stated that both medicines were similarly priced and that it was unclear which, if not both, would be reimbursed by health insurances. The less than condition included the same information, but with all comparisons formulated in 'less than' terms. The specific combination of negative side-effects and positive effects of the medicines was counterbalanced.

Participants evaluated the article they read ($M = 5.14$, $SD = 0.84$; $\alpha = 0.92$) on 7-point scales (1 = *totally disagree* to 7 = *totally agree*), responding to sixteen items about its writing and content ('The article is well structured/is logically organized/is fun to read/is fluently written/is easy to understand/has an engaging style/uses correct language/has the right length; the content of the article is convincing/balanced/engaging/thought-provoking/interesting/believable/objective/important'; $\alpha = 0.92$; $M = 5.14$, $SD = 0.84$).⁵ They were then debriefed and thanked.

RESULTS

We submitted participants' judgments (concerning funding of the different forms in Study 2A; regarding the evaluation of the articles about medicines in Study 2B) to an ANOVA with power (high vs. low) and framing (more than vs. less than), as well as order of comparison object/target and study as between-subjects variables. We also included all two-way interactions between these variables as well as the three-way interactions between power, framing and study and power, framing and order.⁶

We found a main effect of framing, $F(1, 436) = 16.79$, $p < 0.001$, $\eta_p^2 = 0.04$, indicating that participants' judgments were more positive under 'more than' than 'less than' framing ($M_{\text{more}} = 5.09$, $SD_{\text{more}} = 1.13$; $M_{\text{less}} = 4.64$, $SD_{\text{less}} = 1.32$). We also found a main effect of study, $F(1, 436) = 28.49$, $p < 0.001$, $\eta_p^2 = 0.06$: judgments were higher in Study 2B (text evaluation; $M = 5.14$, $SD = 0.84$) than in Study 2A (funding support; $M = 4.55$, $SD = 1.25$). We found an unexpected marginal interaction between framing and order, $F(1, 436) = 3.65$, $p = 0.057$, $\eta_p^2 < 0.01$. However, this is likely a spurious effect and moreover it is difficult to interpret, because the variable order refers to fundamentally different contexts as a function of study (i.e., order of presentation of differently favored art forms and equally effective medicines).

More importantly, the predicted power by framing interaction emerged, $F(1, 436) = 5.22, p = 0.023, \eta_p^2 = 0.01$ (see Figure 2). High power participants' judgments were more favorable when comparisons were made under 'more than' framing ($M_{\text{more}} = 5.14, SD_{\text{more}} = 1.07; M_{\text{less}} = 4.45, SD_{\text{less}} = 1.35$), $F(1, 436) = 20.30, p < 0.001, \eta_p^2 = 0.04$. Framing did not affect low power participants' judgments ($M_{\text{more}} = 5.05, SD_{\text{more}} = 1.84; M_{\text{less}} = 4.83, SD_{\text{less}} = 1.27$), $F(1, 436) = 1.65, p = 0.200, \eta_p^2 < 0.01$. In other words, the more-less asymmetry was only present amongst high power participants. However, we predicted a stronger more-less asymmetry for high power, which implies the asymmetry to still be present, albeit weaker, for low power participants, rather than it disappearing. There were no other effects, highest other $F = 2.22, p = 0.137, \eta_p^2 < 0.01$, indicating that the power by framing interaction did not vary as a function of study or order.

GENERAL DISCUSSION

'More than' comparisons are preferred to corresponding 'less than' comparisons and are also more likely to be deemed as true and agreed with (Hoorens & Bruckmüller, 2015). We predicted this so-called more-less asymmetry to be stronger among powerful relative to powerless individuals. We tested this hypothesis in a

series of studies using different operationalizations of power, pertaining to various contexts and judgments (truth ratings of gender differences, support for funding decisions, evaluations of medical information), and using both neutral and valenced materials. Results in line with predictions emerged in Study 1 that varied comparative format within-participants, with the asymmetry being present across conditions but especially strong in the high power compared to the low power and control conditions. When varying comparative format between-participants (Studies 2A/B), results were only partially in line with predictions: whilst we again found an asymmetry for high power, this effect cannot be truly qualified as the asymmetry manifesting more strongly, given that it was absent for low power. Indeed, the results suggest the asymmetry being attenuated or even eliminated from the perspective of the powerless. An interpretation from this perspective dovetails with theoretical approaches and empirical evidence regarding the tendency of the powerless to consider multiple sources of information and to engage in controlled cognition to increase predictability and control. Divided attention limits sensitivity to internal cues, and should overall reduce the impact of fluency or other experiences, for example from linguistic associations or embodiment, in judgment construction (Fiske, 2010; Guinote et al., 2006; Guinote, 2010a; Keltner et al., 2003; Weick & Guinote, 2008).

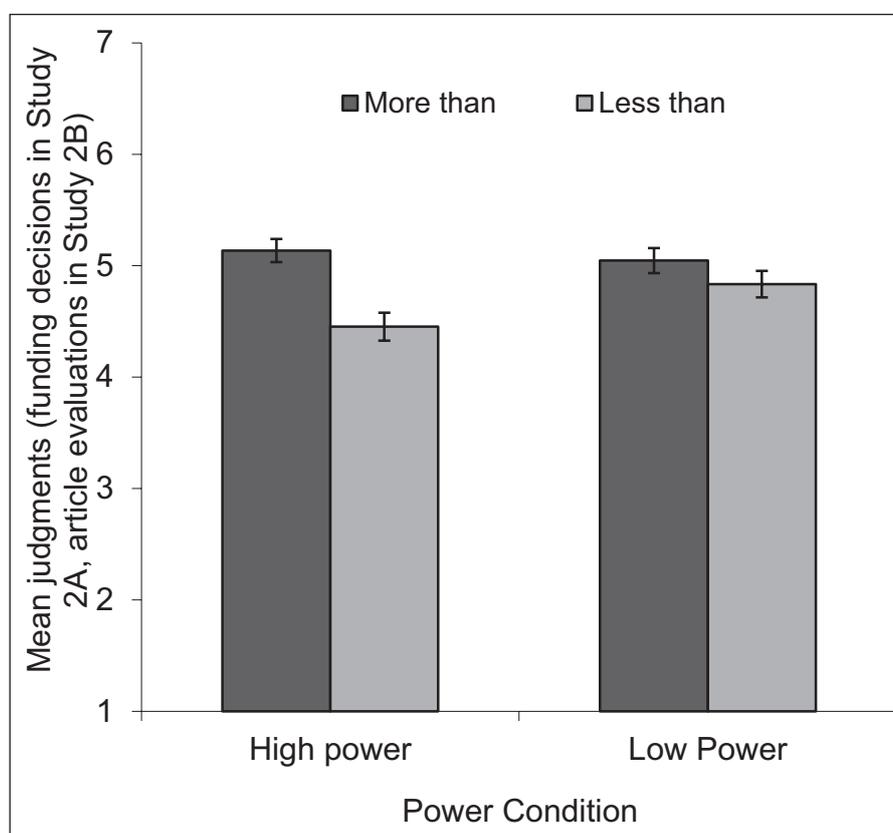


Figure 2 Participants' average judgments (concerning funding of the different art forms in Study 2A and the evaluation of different articles about medicines in Study 2B) as a function of comparative framing and power. Error bars represent standard errors. Scale range 1 to 7.

Recent work shows that powerlessness is challenging, and consequently elicits highly motivated complex attention processes and dynamic social behavior, which in and of itself warrants further attention (for a recent summary see Guinote & Lammer, 2017).

This unexpected finding might prove informative if considered from a fluency perspective: across studies results were more consistent for high compared to low power, suggesting that low power participants were more strongly impacted by variations in experimental designs. Specifically, the asymmetry emerged for low power – albeit weaker than for high power – when participants were able to directly contrast ‘more than’ and ‘less than’ statements (i.e., in the within-participants design of Study 1), but not when such a contrast was less salient (i.e., in the between-participants designs of Studies 2A/B). Fluency experiences are relative and most informative when they are discrepant or deviant from a given standard or expectation (Dechêne et al., 2010; Hansen & Wänke, 2013; Wänke & Hansen, 2015). As such, and not surprisingly, they are generally stronger in within-participants designs. To illustrate, the average effect size in Hoorens and Bruckmüller’s (2015) studies manipulating fluency within participants (i.e., Studies 4a, 4b, and 5) is $\eta_p^2 = 0.28$, whereas the average effect size in studies using between-participant designs (i.e., Studies 2, 3, and 5; excluding Study 7 which also entailed a manipulation to mitigate cognitive fluency effects) is three times smaller at $\eta_p^2 = 0.09$. Though we can only speculate on this given the absence of unequivocal process evidence (which we discuss below), the results suggests that in a within-participants design the experience of (dis)fluency stemming from direct and salient discrepant comparisons was strong enough for the direct contrast to feature in low power participants’ construction of judgments (though, as predicted, to a lesser extent than in high power participants). However, in between-participants designs effects are bound to a previously established standard of comparison being taken into account (e.g., Garcia-Marques et al., 2019, for fluency and the illusion of truth). Whilst it seems reasonable to assume that both high and low power participants would dispose of a similar comparison standard, the present results are suggestive of it having had a lesser influence on low power participants – prone to more strongly considering multiple, and thus additional sources of information, as previously detailed.⁷

Though not our focal interest, but also regarding differences in design features, the data point to the asymmetry reliably found among high power participants to be driven by ‘more than’ (i.e., presumably more fluent) comparisons in the within-participants design (Study 1), but by ‘less than’ (i.e., presumably more disfluent) comparisons in the between-participants design (Studies 2A/B). An alternative explanation might thus reside in

high compared to low power participants being especially sensitive to disfluency experiences in between-subjects designs. This, in turn, would be in line with suggestions that – regardless of power – ‘the metacognitive experience of disfluency (...) is at least partially responsible for the more-less asymmetry’ (Hoorens & Bruckmüller, 2015, p. 763, emphasis added). At the same time, here and in the original work the specific impact of each comparative format is difficult to gauge.

As discussed in the introduction, it is conceivable that ‘the more-less asymmetry is multiply determined, with cognitive (dis)fluency being just one causal mechanism’ (Hoorens & Bruckmüller, 2015, p. 764), and the same holds for the present effects. Our interest was in whether power impacts the strength of the asymmetry and thus to contribute to a better understanding of variables influencing the resulting bias. The current results are in line with a fluency account (see also Holyoak et al., 1979) as proposed by Hoorens and Bruckmüller (2015), and tested in one of their studies. According to a Testing-a-Process-hypothesis-by-an-Interaction Strategy rationale (TPIS; Jacoby & Sassenberg, 2011), if a process is assumed to be responsible for the observed effect (here: the more-less asymmetry), then investigating the phenomenon by taking into account a variable (here: power) that has been shown to impact the process (here: fluency) and finding the observed effect to be impacted strengthens claims regarding the proposed process. Nevertheless, these findings are by no means conclusive regarding the fluency account. Moreover, they cannot rule out other processes potentially involved in producing both the asymmetry and its moderation by power.

However, three alternative explanations set forth in the introduction seem rather unlikely in light of the current findings. First, in Study 1 self-reported certainty ratings did not account for the stronger asymmetry among the powerful, which makes it seem improbable that effect emerged because ‘more than’ comparisons especially align with a powerful mindset due to the proclivity of the powerful to have more confidence than the powerless (Briñol et al., 2007; Fast et al., 2012; Lammers et al., 2013). Second, in Study 2B statements described both desirable (positive) and undesirable (negative) target and referent characteristics in a ‘more than’ format. This is difficult to reconcile with a perspective suggesting that especially the powerful associate ‘more’ with ‘more good’ due to their optimism (Anderson & Galinskiy, 2006) and thus favor ‘more than’ comparisons. Third, especially the operationalization of power in Study 2B did not involve explicit or implicit ‘more than’ comparisons: managers simply stated if they had supervisory responsibilities and thus the authority to give instructions or not. This renders rather implausible that results emerged mainly due to high power experimental instructions activating the notion of ‘more’, which in turn rendered ‘more than’ comparisons a more natural fit for the powerful.

One way to further address the likely multidetermined nature of the asymmetry could be to examine differences in the prevalence of ‘more than’ comparisons among the powerful compared to the powerless; finding that ‘more than’ comparisons are more frequently used by the powerful would corroborate such mindset fit conjectures. Future research interested in the contribution of embodiment (e.g., ‘more than’ & ‘high power’ = ‘up’; ‘less than’ & ‘low power’ = ‘down’; Schubert, 2005) could consider presenting comparative information in high versus low locations and measuring, in addition to the judgmental variables, the response times of participants with differing degrees of power. Reaction times might also provide more unequivocal evidence for a fluency account (Alter & Oppenheimer, 2009; Schwarz, 2012; Unkelbach & Greifeneder, 2013) and theoretical approaches postulating powerholders to more likely rely on subjective experiences (Fiske, 2010; Guinote, 2017; Keltner et al., 2003) to the extent that reaction times are facilitated by heuristic processing and intuitive cues. In addition, future research might consider warning participants of the experiences of difficulty (i.e., disfluency) when evaluating ‘less than’ statements (Hoorens & Bruckmüller, 2015; Schwarz et al., 1991) to gain stronger fluency process evidence.

IMPLICATIONS

The present findings replicate and qualify previous work on the more-less asymmetry (Hoorens & Bruckmüller, 2015) by highlighting the importance of a socio-structural variable: power. They dovetail with research showing that the powerful often rely on simple cues (e.g., Goodwin et al., 2000; Keltner & Robinson, 1997; Ng, 1980), including cues stemming from fluency experiences (Weick & Guinote, 2008; Woltin & Guinote, 2015). The present work suggests that the format in which comparative information is presented to powerholders is likely to bias them. At the same time, available comparative information is also biased, with the more-less asymmetry being a pervasive bias in language: A simple Google Ngram search shows that the word combination ‘more than’ is featured roughly four times more often than the word combination ‘less than’ in English in all print sources available on Google books published 2018–2019. This observation, combined with the present results, suggests that the consequences of powerholders’ affected real-life judgments are likely to be far from trivial in fields including medical, judicial and economic decision-making. To illustrate, medical treatment priorities are often established based on who is more at risk than others (i.e., a triage assessment). Also, the leading charity for senior people in the UK recently published a report showing that along with ‘polypharmacy’ (i.e., the taking of multiple medications at any one time) the prescription of excessive medicines by general practitioners is causing

especially older people avoidable harm, pointing out the need to raise awareness that ‘more isn’t always better with older people’s medicines’ (Age UK, 2019). Indeed, calls for ‘de-prescribing’ medicines have likewise been made regarding the general public (Zelmer, 2016). Turning to financial decision-making under risk, research suggests that judgments and choices are relative, as evidenced by the impact of the rank of presented options conveying ordinal comparative (more/less) information on judgments made (Vlaev et al., 2007). Moreover, risk tolerance in financial decision making is often marked by a so-called projection bias, with investors expecting future trends to be more (rather than less) favorable or unfavorable than they currently are: Holding other factors such as age or income constant, weekly market prices going up increase and prices going down decreases risk tolerance (e.g., Grable et al., 2004).

Beyond the comparative format of information, the vast majority of judgements and decisions are relative in the sense that they involve comparing two or more relevant items and naturally entail more/less comparisons (Mussweiler & Epstude, 2009; Stewart et al., 2005). It is thus especially important to draw powerholders’ attention to this bias and to find ways to mitigate it, given that they are often in positions requiring them to make consequential decisions – including regarding other people – quickly and decisively. Indeed, a recent study found that members of parliament consider decisiveness the most important attribute of a prime minister (Allen et al., 2015). Also, experienced intelligence professionals – routinely in charge of risky decisions with consequences for national security – were found to exhibit larger framing biases in risky-choice problems than college students; ironically, they were also more confident in their decisions (Reyna et al., 2014). Perhaps simply alerting individuals in power to the potentially damaging consequences of their self-reported reliance on ‘gut feelings’, such as illustrated by our opening example and evidenced by research on subjective experiences and intuition (Bird & Swabey, 2014; Dane & Pratt, 2007; Khatri & Ng, 2000) would already suffice.

FUTURE DIRECTIONS

One important avenue for future research concerns examining the more-less asymmetry when comparative judgments involve the self. To our knowledge, to date research only considered comparing external entities to each other. When characteristics of the self are at stake, the valence of characteristics involved in the comparison might result in the more-less asymmetry being especially strong when comparisons favoring the self are made in ‘more than’ terms (‘I am more attentive than X’ vs. ‘I am less distracted than X’) than when such comparisons do not favor the self (‘I am more distracted than X’ vs. ‘I am less attentive than X’). This bias would

be self-serving as individuals are generally motivated to think positively about themselves and to maintain a positive self-image (e.g., Pronin et al., 2004; Sedikides, 1993). Interestingly, some research indicates that the powerful disregard social comparison information when the self is involved (Johnson & Lammers, 2012). As such, in these contexts power might actually lead to an attenuation, rather than an exacerbation, of more-less asymmetries.

One specific and consequential comparative context that might also be worth examining in light of the more-less asymmetry is stereotyping. Stereotypes pertain to group descriptions of one group having a certain feature or attribute more or less than another group (Biernat & Crandall, 1996; Campbell, 1967; Ford & Stangor, 1992). Future research might explore to what extent powerholders' stronger use and endorsement of stereotypes (Fiske, 1993; Goodwin et al., 2000; Guinote & Phillips, 2010; Lammers et al., 2009) might be in part explained by them being more prone to comparative judgmental biases. Relatedly, the legitimization of inequalities between social groups by those in power (Bettencourt et al., 2001; Guimond et al., 2003) could also be in part sustained by the nature and ease of the comparison format employed (Bruckmüller et al., 2017).

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Powerholders make far-reaching decisions with important consequences for others, and such decisions are generally based on comparisons between options (Vlaev et al., 2011). The present findings, showing that they are particularly biased by the more-less asymmetry, thus have broad implications. At the same time, they suggest that implementing measures to decrease the impact of subjective experiences in powerholders' judgments (Greifeneder et al., 2011; Schwarz, 2012) could positively impact on their decision-making quality and mitigate the perils of hubristic leadership (Claxton et al., 2015).

DATA ACCESSIBILITY STATEMENT

The data that support the findings of these studies, as well as data scripts and all materials used, are available via the Open Science Framework at <https://osf.io/hfuy3/>.

NOTES

- 1 Instead of reporting an incident when they had power over someone else, one of the excluded participants in the high power condition wrote: 'I have never been in a situation where I have had power over another individual or individuals. I am a submissive person by nature. I do not tend to take power;

I would classify myself as a follower.' The other excluded participant in the high power condition merely wrote: 'shopping – to get a certain deal on items'.

- 2 This interaction was not qualified by neither of our two counterbalanced variables, meaning that no significant three-way interaction between framing, the orthogonal contrasts, and these variables emerged; largest $F = 1.68$, $p = 0.197$, $\eta_p^2 = 0.01$.
- 3 Participants subsequently were also asked to indicate what proportional funding allocation difference in percentages they would opt for (e.g., 35% to the visual arts and 65% to the performing arts), respectively in Study 2A the percentage of funding they would grant to the two different art forms (distributing 100% between them). A substantial proportion of participants apparently did not understand these questions, with 36.9% indicating a decision that did not match their first response in this study, respectively 49.5% in Study 2A (where 8.2% of participants additionally distributed a total of more or less than 100%, against instructions). Accordingly, these proportional secondary measures are not taken into account.
- 4 Separate analyses for both studies individually are provided in supplementary analyses (see Appendix 1: Supplementary Analyses of Studies 2A and 2B).
- 5 Participants subsequently also rated how they thought the author viewed each medicine on a scale from 1 (*very unfavorably*) to 7 (*very favorably*). Analyses concerning these inferred views ($M_{Medovan} = 4.57$, $SD_{Medovan} = 0.98$; $M_{Xylon} = 4.59$, $SD_{Xylon} = 0.99$) are provided in the supplementary material, as these do not pertain to our main hypothesis and as Study 2A had no similar measure. This measure was included because it was assessed in the original work (i.e., Study 3 of Hoorens & Bruckmüller, 2015).
- 6 There were two outliers with studentized residuals $> |3|$ (Judd et al., 2011). Excluding these participants did not change the significance of the predicted effects. We checked for outliers of the same magnitude in the analysis regarding the main dependent variables in Study 1 and the Pilot Study; there were none.
- 7 To this point, when analyzing only the two self-report measures in Study 2B that directly tapped into fluency experiences (i.e., 'The text is easy to understand', 'The text is fluently written') we find a marginal power by framing interaction, $F(1,231) = 2.79$, $p = 0.096$, $\eta_p^2 = 0.01$, with follow-up analyses indicating the asymmetry being significant for high-power participants, $F(1,231) = 18.58$, $p < 0.001$, $\eta_p^2 = 0.07$, but only marginal for low-power participants, $F(1,231) = 3.58$, $p = 0.060$, $\eta_p^2 = 0.02$. This is suggestive of low-power participants in Study 2B having had weak fluency experiences, but presumably for them other factors weighed more strongly in their ultimate judgments.

ADDITIONAL FILE

The additional file for this article can be found as follows:

- **Appendix 1:** Supplementary Analyses of Studies 2A and 2B. DOI: <https://doi.org/10.5334/irsp.598.s1>

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