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WHEN MONA LISA SMILED AND LOVE WAS IN THE AIR: ON THE COGNITIVE ENERGETICS OF MOTIVATED JUDGMENTS

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We describe two experiments on the determinants of motivated judgments. They explored the conjoint effects of three factors: (1) dominant judgmental motivation (geared toward accuracy or directional bias), (2) task demands, and (3) the availability of cognitive resources. We find that where a *directional motivation is dominant* and task demands are high (making biasing difficult), the presence (vs. absence) of resources promotes wishful judgments. Conversely, where *accuracy motivation* is dominant and wishful judgments are the default, resources reduce the likelihood of their occurrence. Finally, where a directional motivation is dominant and task demands are low (making biasing easy), or where the accuracy motivation is dominant and task demands are high, resources have relatively minor effects on bias.

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The notion that human judgments are susceptible to wishful thinking has long been recognized in lay lore and psychological science alike (e.g., Allport, 1968; Dunning, 1999; Festinger, 1957; Freud, 1920; Kelley, 1967; Kunda, 1990; Pareto, 1916; Petty & Cacioppo, 1986). Though early controversy raged (cf. Bem, 1967; Miller & Ross, 1975), it is now agreed that wishful judgments are *real* rather than representing non-motivational (e.g., expectancy) effects in disguise (Dunning, 1999; Kunda, 1990; Kunda & Sinclair, 1999). It is also known that *stimulus ambiguity* may facilitate desired judgments (Dunning, Meyerowitz, & Holzberg, 1989; Hsee, 1996; Kunda & Sanitioso, 1989). Relatedly, it has been concluded that “reality constraints” (Kunda, 1990; Tesser, 1976), referring to stimulus information that is clear and unambiguous, undercuts the ability to “spin” judgments in the direction of one’s wishes.

Yet significant questions remain. First, the exact nature of “reality constraints” (Kunda, 1990; Kunda & Sinclair, 1999) needs to be clarified: It would seem important to ascertain how *absolute* these are and whether their impact might be overcome under some conditions. In the same connection, it would seem important to determine whether *stimulus ambiguity* represents a unique variable relevant to wishful biases or whether additional factors play a role in this regard. We address these issues in our CET-based model of motivated perception described next.

COGNITIVE ENERGETICS THEORY

Wishful biases in judgment are an instance of motivated cognition (cf. Kruglanski, 1996) wherein the opinion formed represents an attainment of the perceiver’s cognitive goal. Conditions for such outcome were described in Cognitive Energetics Theory (CET; Kruglanski et al., 2012). According to the CET, attainment of any cognitive goal is enabled where the individual’s (*potential*) *driving force*, defined as a product of *cognitive resources* available to the person, and magnitude of her or his *focal goal*, is at least equal to the *restraining force* comprising *task demands*, the individual’s degree of “*cognitive miserliness*,”¹ and the magnitude of currently active *competing goals*.

In wishful, or directional, judgments (Kunda, 1990), the *focal goal* is to form an opinion that is congruent with one’s desires (e.g., feeling socially accepted, having a positive self-image). Magnitude of the focal goal is assumed to combine with available cognitive resources to produce a driving force in direction of a motivated bias. Yzerbyt, Coull, and Rocher (1999), for example, demonstrated that maintaining out-group derogating, stereotypic biases in the face of disconfirming evidence is contingent on having sufficient cognitive resources to engage in motivated discounting of the inconsistent information. Similarly, Moreno and Bodenhausen (1999) showed that discounting of counter-stereotypic information is *limited* to conditions where accuracy motivation is low (and presumably the biasing motivation is high) and processing resources are ample. However, whether bias will

1. Defined as a stable individual tendency to refrain from cognitive effort.

ultimately result should also depend on magnitude of the *restraining force*. In the instance at hand, the later consists of (1) *task demands*, that is, the hardship of arriving at the desired judgment given the informational stimulus at hand, (2) the magnitude of competing goals, and in particular the goal of *accuracy* assumed to constitute the default motivation in all judgments (Chaiken, Lieberman, & Eagly, 1989; Petty & Cacioppo, 1986), and (3) individual's personal reluctance to expend cognitive effort (i.e., her or his cognitive miserliness).

According to CET, availability of resources would make bigger difference to focal goal attainment where resources are needed, that is where attainment is difficult to accomplish. The CET assumes additionally that resources are "blind" in their effects, lacking a mind of their own as it were. Instead, they are assumed to be utilized to promote whatever goal was currently in focus. Thus, if the focal goal was to form a motivationally biased judgment *and* biasing was difficult to accomplish (i.e., high task demands), availability of ample cognitive resources should augment bias; however, if biasing was easy to accomplish (i.e., low task demands) it should occur relatively independently of resource availability. Similarly, if the focal goal was to form an unbiased judgment and doing so was difficult to accomplish, availability of resources should attenuate bias, whereas if making an unbiased judgment was easy, such judgment may be made relatively independently of resources.

Consistent with the foregoing analysis, we carried out two studies on the interactive role of *task demands*, *focal motivation*, and *cognitive resources* in promoting wishful judgments in the domain of social perception.

STUDY 1: MONA LISA SMILING

In Study 1, the biasing motivation of interest was the need to belong, to be accepted by others (Baumeister & Leary, 1995). We assumed that individuals are generally sensitive to rejection cues and when subjected to them they become motivated to restore their motivation to belong and to be socially included (Lakin & Chartrand, 2005; Pickett & Gardner, 2005). Extrapolating from prior findings, we thus assumed that the latter motivation would induce a bias to perceive others as friendly and warm. We hypothesized that individuals primed with rejection words (hence, presumably motivated to restore their sense of belonging) would perceive greater warmth in others' facial expressions, except where the directional biasing of perceptions is difficult to accomplish (i.e., high task demands) and participants' resources are depleted by cognitive load.

Furthermore, where the focal goal is to reach an accurate judgment and where doing so is relatively easy (i.e., low task demands), individuals will not succumb to biasing cues, and will generally reach unbiased judgments, irrespective of the amplexness of their cognitive resources. In contrast, where avoiding bias is difficult, individuals with an accuracy focal goal yet lacking in cognitive resources would allow themselves to be influenced by the directional cues and form a biased judgment, despite their accuracy motivation.

METHOD

Participants and Design

Two hundred and twenty-six University of Maryland undergraduates (126 women, $M_{\text{age}} = 19.92$ years, $SD_{\text{age}} = 2.17$) participated in this study in return for course credits. Participants were randomly assigned to a 2 (Motivation: accuracy vs. rejection) \times 2 (Cognitive resources: load vs. no-load) \times 2 (Task demands: eyes vs. mouth) between-subjects design.

Materials and Procedure

Upon arrival at the lab, participants were invited to take part in two unrelated studies. The first allegedly investigated people's speed of distinguishing words from non-words. Participants engaged in a lexical decision task during which they were subliminally primed with either 8 words relating to accuracy (e.g., accurate, correct, true), or 8 words related to rejection (e.g., rejected, isolated, castaway). In the lexical decision task, participants indicated whether strings of letters constituted meaningful words. Some of the letter strings were neutral words (e.g., lamp), or pronounceable non-words (e.g., pagie).

Manipulating Participants' Focal Goal. Prior to each letter string, subliminal primes were presented to participants for 17 milliseconds, backward masked. It was expected that the *rejection primes* would activate participants' goal of seeking *social acceptance*, whereas the *accuracy primes* would activate their *accuracy goal*. Participants were then ushered to another room for the presumed second study, allegedly pertaining to artistic judgments. There, they were to see a painting on a computer screen for 20 seconds, and to express their aesthetic opinion about that painting.

Load Manipulation. Following these instructions, participants in the *cognitive load* condition were told that the researchers were interested in how people perceive art when they are thinking of something else; therefore, they would memorize and retain a 9-digit number until the end of the experiment. Participants in the no-load condition waited 20 seconds for the next part of the study without receiving the memorization instructions.

Manipulating Task Demands. Subsequently, all participants were presented with the Mona Lisa painting for 20 seconds. The Mona Lisa painting was selected because of its manifest capacity to elicit perceptual and judgmental biases. Specifically, Livingstone's work (2002) on the biological mechanisms of perception uncovered an intriguing optical illusion whereby the Mona Lisa's smile (often referred to as *elusive*) can be perceived differently depending on how one looks at this painting. Livingstone's research indicates that the famous Mona Lisa smile is almost entirely drawn in low-spatial frequencies² which are best seen via peripheral visi-

2. Spatial frequency is a measure of how detailed an image is. Pictures with higher spatial frequency are sharper and more detailed than pictures with lower spatial frequency. In the case of the Mona Lisa, her smile is drawn in a low-spatial frequency pattern which is more easily seen by the peripheral vision.

on (Livingstone, 2000). Hence, by looking at the Mona Lisa's *eyes* or the painting's background, her expression appears more cheerful than when one focuses directly at her mouth. As Livingstone (2000) put it: "She (the Mona Lisa) smiles until you look at her mouth, and then it fades, like a dim star that disappears when you look directly at it" (p. 1299).

We developed a manipulation in which Mona Lisa's *eyes* or *mouth* was made salient by adding glitters for a few milliseconds (every 5 seconds) in these particular areas. This served as a way to direct attention to certain places on the painting thus leading the smile to be perceived with either focal vision or peripheral vision. Based upon Livingstone's evidence, stimulus constraints suggesting lack of smiling should be more difficult to overcome when the mouth is made salient than when the eyes are made salient. Hence, the *eye* glitters manipulation (readily prompting the perception of a smile) was assumed to operationalize the *low task demands* condition for directionally motivated participants and a *high task demands* condition for the accuracy motivated participants. Conversely, the *mouth* glitters manipulation counterindicating the perception of a smile, operationalized the *high task demands* condition for the directionally motivated participants and a *low task demands* condition for participants with an accuracy motivation. Consequently, we assumed that where the glitters manipulation rendered motivationally consistent judgments difficult to make, cognitive resources—available in the no-load condition, and depleted by the load—would be needed to extricate one's attention from constraints of the salient stimulus, and relocating it to the part of the field which enabled a judgment congruent with one's focal goal.

After exposure to the painting, participants were asked to rate the extent to which the Mona Lisa is *agreeable*, *friendly*, *welcoming*, and *smiling*, on a 7-point Likert scale ranging from -3 (*Not Agreeable at All*) to +3 (*Very Agreeable*). Participants in the cognitive load condition were asked to type in the 9-digit number they had been asked to retain throughout the experiment.

According to our theoretical analysis, participants exposed to the rejection prime were expected to perceive the Mona Lisa as more agreeable, welcoming, friendly, and smiling, except in the *cognitive load, high task demands* condition where her mouth was made salient (counterindicating the perception of a smile). Similarly, participants primed with the accuracy words were expected to perceive the Mona Lisa as friendly and warm only in the *cognitive load, eyes salient* condition (defining *high task demands* for accuracy motivated participants) and neither particularly friendly nor unfriendly otherwise.

RESULTS

Manipulation Check. To ensure that participants in the cognitive load condition functioned under constrained resources, we examined whether they remembered the 9-digit number that they were asked to retain throughout the experiment. Based on Miller's (1956) work on information processing capacity, individuals who remembered at least 7 out of 9 digits were kept in the sample. Nine individuals who fell below this cut-off point were removed, leaving 217 participants for subsequent analyses.

Perceptions of Warmth. As a first step, we subjected the agreeable, friendly, welcoming, and smiling items to a principal-components analysis (PCA). This analysis produced a one-component solution that accounted for 71% of the total variance. The scree test, eigenvalue (2.58), and Kaiser's rule all indicated the extraction of one component. Consequently, the four items were averaged into a single score indicating the perception of warmth.

Main Analyses. A 2 (Motivation: accuracy vs. directional) \times 2 (Cognitive resources: load vs. no load) \times 2 (Task demands: eyes vs. mouth) ANOVA was performed on the perception of Mona Lisa's warmth. Results indicated that the three-way interaction was not significant, $F(1, 209) = .02, p = .86$. Although the omnibus ANOVA was nonsignificant, a 2 (Cognitive resources: load vs. no load) \times 2 (Task demands: eyes vs. mouth) ANOVA was performed on the perception of Mona Lisa's warmth for each motivational state in order to test our specific predictions. Table 1 displays the means and standard deviations for all experimental conditions.

Under accuracy motivation, results yielded a marginal main effect of resources, $F(1, 103) = 3.54, p = .06, \eta_p^2 = .03$. Participants perceived greater warmth under cognitive load ($M = 1.30, SD = .87$) than in the no-load condition ($M = .98, SD = .85$). Results also indicated a main effect of task demands. Consistent with Livingstone's (2000) findings, participants perceived greater warmth in the eyes focus condition ($M = 1.40, SD = .90$) than in the mouth focus condition ($M = .84, SD = .72$), $F(1, 103) = 12.04, p = .001, \eta_p^2 = .10$. More importantly, these effects were qualified by a significant interaction, $F(1, 103) = 4.29, p = .04, \eta_p^2 = .04$. Orthogonal planned comparisons were performed to test our first hypothesis that under dominant accuracy motivation judgments would be more likely to succumb to the stimulus bias in the eyes focus condition, where participants had low cognitive resources to process more fully the information given, and hence to overcome the bias. Accordingly, participants' perceptions in the accuracy/eyes focus/cognitive load condition (+3) were simultaneously compared to those made in the other three accuracy motivation conditions (all given a weight of -1). This planned comparison revealed that participants in the accuracy/eyes focus/cognitive load condition perceived the Mona Lisa as warmer than participants in the other three accuracy motivation conditions, $t(103) = 4.52, p < .001, r = .40$. Additional comparisons revealed that the latter three conditions did not significantly differ from one another (all $ps > .05$).

Under the (directional) motivation for social acceptance, results yielded a marginal main effect of resources, $F(1, 106) = 3.29, p = .07, \eta_p^2 = .03$, indicating that participants perceived greater warmth in the no-load condition ($M = 1.41, SD = .87$) than in the load condition ($M = 1.14, SD = .97$). Results also yielded a main effect of task demands. Participants perceived greater warmth in the eyes focus condition ($M = 1.46, SD = .84$) than in the mouth focus condition ($M = 1.02, SD = .99$), $F(1, 106) = 6.08, p = .01, \eta_p^2 = .05$, replicating, again, Livingstone's (2000) findings. These main effects were qualified by a significant interaction $F(1, 103) = 4.55, p = .03, \eta_p^2 = .04$. Orthogonal planned comparisons tested our second hypothesis that under a dominant biasing motivation, individuals would perceive greater warmth in the Mona Lisa, except in the absence of necessary cognitive resources to overcome

TABLE 1. Means and Standard Deviations of Perceived Warm Traits as a Function of Motivation, Stimulus Ambiguity, and Cognitive Resources (Study 1)

Estimate	Accuracy				Rejection			
	Load		No-Load		Load		No-Load	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Mouth	.82	.78	.85	.67	.70	1.07	1.38	.76
Eyes	1.70	.74	1.07	.96	1.49	.74	1.43	.97

task demands. Participants in the directional/mouth focus/cognitive load condition (+3) were thus simultaneously compared to participants in the three other directional motivation conditions (all given a weight of -1). This planned comparison revealed that participants in the directional/mouth focus/cognitive load condition gave lower warmth ratings to the Mona Lisa than their counterparts in the other three directional motivation conditions, $t(106) = -3.65$, $p < .001$, $r = .33$. Additional comparisons revealed that the latter three conditions did not significantly differ from one another (all $ps > .05$).

DISCUSSION

Results of Study 1 support our CET-based analysis of motivated reasoning highlighting the joint role of motivation, cognitive resources, and task demands in producing or preventing wishful judgments. Under *accuracy motivation*, when task demands were low (mouth focus condition) participants' perception of Mona Lisa's warmth was moderate and remained unaffected by the availability of resources. In contrast, when task demands were high (eyes focus condition) the moderate perception of Mona Lisa's warmth was retained in the presence of resources, but not in their absence. In the latter condition, participants' apparently succumbed to the biasing cue and judged the Mona Lisa as particularly friendly, more so than did participants in the remaining three accuracy motivation conditions.

A different pattern of results were obtained when participants rendered their judgments under directional (acceptance) motivation. In that case, when task demands were low (eyes focus condition), participants perceived the Mona Lisa as particularly warm and friendly whether or not they possessed many or few resources at their disposal. However, when task demands were high, participants perceived the Mona Lisa as particularly warm in the presence of cognitive resources, whereas in the absence of resources participants perceived her as only moderately friendly.

Our second study conceptually replicated its predecessor with a different directional motivation, the desire to find a romantic partner, and with different judgmental measures focused on a target person's likability.

STUDY 2: LOVE QUEST

METHOD

Participants and Design

One hundred and sixty-nine University of Maryland heterosexual undergraduate students (90 women; $M_{\text{age}} = 20.24$ years, $SD_{\text{age}} = 2.02$ years) participated in a speed-dating study in exchange for payment. Participants were recruited via mass e-mails and flyers around campus. They were randomly assigned to a 2 (Motivation: accuracy vs. love-seeking) \times 2 (Cognitive resources: load vs. no load) \times 2 (Task demands: positive vs. negative framing) between-subjects design.

Materials and Procedures

The speed-dating events were conducted in an enclosed suite of rooms within the psychology department. Participants were told that the speed-dating event would consist of two parts: an individual profile task, followed by actual speed-dating sessions. The measures of present interest took place during this first task. Participants were individually ushered to a private room where they recorded a personal 30 second audio profile about themselves. The experimenter ostensibly captured these audio profiles on a smartphone and told participants that these would be transferred onto the lab computers where they would be played for a participant of the opposite sex.

Manipulating the Focal Goal. After participants recorded their audio profile, they were led to a separate private room where the experimental procedures took place. All participants were told they would listen to the audio profile of another person. The motivation manipulation was embedded in the introductory instructions. Participants in the *accuracy motivation* condition were given the following additional instructions:

Before listening to his (her) profile, please consider the following: When meeting someone new it is extremely important to pay close attention to all details that person might reveal. One must take into account all available information in order to create an accurate picture of that person. Only then may one decide if that person is a good match to oneself.

Participants in the *love quest*, directional motivation, condition were given instead the following instructions:

Before listening to his (her) profile, please consider the following: Try to imagine how nice it would be to find that precious someone with whom you could share amazing moments. Try to imagine as well how wonderful it would feel to fall in love and be connected with that person.

Manipulating Cognitive Resources. Following these instructions, all participants were told that the researchers were interested in how people perceive others when distracted. Therefore, they would memorize and retain a number until the end of the experiment. Participants in the load and no-load condition had to retain a 9

or a single-digit number, respectively. All participants were given 20 seconds to memorize their assigned number.

Manipulating Task Demands. Participants then listened to the fictional profile of a potential partner of the opposite sex (Michael or Jessica). During the audio profile, the partner described himself/herself in terms of four positive and four negative characteristics. The serial position of these characteristics was manipulated in order to create a positively or negatively framed message (Deese & Kaufman, 1957; Ebbinghaus, 1913; Murdock, 1962). We created a positively framed message by positioning two positive characteristics at the salient and memorable *beginning* and *end* of the audio profile (e.g., I'm always there for my friends when they need me), with the four negative characteristics in the non-salient, difficult to retrieve, middle (e.g., I tend to get upset easily). Conversely, we created a negatively framed message by reversing that order. The positively framed message was assumed to operationalize the low task demands condition for directionally motivated participants and a high task demands condition for the accuracy motivated participants. Conversely, the negatively framed message operationalized the high task demands condition for the directionally motivated participants and a low task demands condition for participants with an accuracy motivation.

After listening to the audio profile, participants were asked to give their impression of Michael or Jessica. Specifically, they rated the extent to which the character they listened to was *agreeable, warm, friendly, and had a nice voice*. Participants indicated their choices using a 7-point Likert scale ranging from -3 (*Do Not agree at All*) to +3 (*Extremely Agree*).

RESULTS

Likeability. In our first analysis, we subjected the agreeable, warm, friendly, and nice voice items to a principal-components analysis (PCA). This analysis produced a one-component solution that accounted for 67% of the total variance. The scree test and Kaiser's rule indicated the extraction of one component. The eigenvalue for this component was 2.68, thus the four items were averaged into a single score of likeability ($\alpha = .83$).

Main Analyses. A 2 (Motivation: accuracy vs. directional) \times 2 (Cognitive resources: load vs. no load) \times 2 (Framing: positive vs. negative) ANOVA was conducted on the target's perceived likeability. Results indicated that the three-way interaction was not significant, $F(1, 161) = .05, p = .82$. Although the omnibus ANOVA was nonsignificant, a 2 (Cognitive resources: load vs. no load) \times 2 (Framing: positive vs. negative) ANOVA was performed on the target's perceived likeability for each motivational state in order to test our specific predictions. Table 2 displays the means and standard deviations for all experimental conditions.

Under accuracy motivation, results indicated no main effect of resources and no main effect of framing (all $ps > .1$). However, results indicated a marginally significant interaction, $F(1, 78) = 3.37, p = .07, \eta_p^2 = .04$. Orthogonal planned comparisons were performed to test our hypothesis that accuracy motivated decision makers would only succumb to environmentally prompted biases when they do not have sufficient resources to process the judgmentally relevant information. Thus, par-

TABLE 2. Means and Standard Deviations of Perceived Likeability as a Function of Motivation, Message Framing, and Cognitive Resources (Study 2)

Estimate	Accuracy				Love Quest			
	Load		No-Load		Load		No-Load	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Positive	1.17	.85	.20	1.29	.55	.89	.25	.91
Negative	.33	1.43	.48	1.26	-.26	1.20	.39	1.19

participants' perceptions in the accuracy/positively framed message/cognitive load condition (+3) were simultaneously compared to those made in the other three accuracy motivation conditions (all given a weight of -1). This planned comparison revealed that participants in the accuracy/positively framed message/cognitive load condition perceived the audio profile of the potential partner as more likeable than participants in the other three accuracy motivation conditions, $t(78) = 1.91$, $p = .05$. Additional comparisons revealed that the latter three conditions did not significantly differ from one another (all $ps > .05$).

A 2 (positively vs. negatively framed message) \times 2 (load vs. no load) ANOVA was conducted on perceived target's likeability for participants motivated to fall in love. Results yielded no main effect of resources, nor a main effect of framing (all $ps > .1$). However, as predicted, results indicated a significant interaction, $F(1, 83) = 4.12$, $p = .04$, $\eta_p^2 = .04$. Again, orthogonal planned comparisons were performed to test our hypothesis that love-seeking decision makers would make less likeable judgment when they do not have sufficient resources to outmatch the task demands at odds with their motivation. Thus, participants in the directional/negatively framed message/cognitive load condition (+3) were simultaneously compared to the three other directional motivation conditions (all given a weight of -1). This planned comparison revealed that when motivated to fall in love participants in the directional/negatively framed message/cognitive load condition perceived the audio profile of the potential partner as *less* likeable than participants in the other three directional motivation conditions, $t(83) = 2.22$, $p = .02$. Additional comparisons revealed that the latter three conditions did not significantly differ from one another (all $ps > .05$).

DISCUSSION

The results above support the joint role in human judgment of motivation, cognitive resources, and task demands. When motivated by *accuracy*, impressions about a potential romantic partner were relatively positive in all conditions. However, impressions were far more positive when individuals had limited processing capacity and information presentation was positively framed. This pattern of results suggests that when accuracy motivation is coupled with sufficient cognitive resources, individuals are able to resist the pull of salient directional information

and make less inflated judgments of their partner than resource depleted individuals with the same information.

A different pattern of results appeared with participants motivated to fall in love. Individuals with limited processing capacity presented with the negatively framed information formed significantly less positive impressions of the potential romantic partner than did participants in remaining conditions. These results suggest that overcoming reality constraints (i.e., a negatively framed message) requires cognitive work, dependent on sufficient cognitive resources. When driven by the desire to fall in love, overcoming incongruent information (about a potential romantic partner) requires resources in order to spin the information in the direction of one's desire. If such cognitive work is relatively unfeasible (due to one's cognitive constraints), reaching motivationally congruent judgments is less likely.

GENERAL DISCUSSION

Both our studies support our CET-based model of motivated judgments that highlights the conjunctive role in this phenomenon of the *focal goal* (the *dominant motivation*), of task demands, and of *resource availability*. In our first study, perceptions of Mona Lisa's warmth were affected by how difficult it was to infer warmth given one's attentional focus, how motivated one was to perceive warmth (i.e., in the rejection versus accuracy prime conditions) and by one's commitment of resources to an alternative activity (in the load versus no-load conditions). Specifically, when participants' focal goal was to perceive warmth and forming such perception was relatively easy (i.e., low task demands), participants perceived warmth irrespective of cognitive load. However, where perceiving warmth was difficult given one's attentional focus (i.e., high task demands), participants perceived it only in the absence of load, but not in its presence. Furthermore, where motivated to render accurate (unbiased judgments) and where doing so was easy—participants' judgments were relatively "neutral" on the warmth dimension reflecting the inherent ambiguity of the Mona Lisa stimulus. This occurred irrespective of the cognitive load conditions. In contrast, where the attentional focus tended to bias perceptions toward warmth, participants succeeded to resist such bias only in the absence (vs. presence) of load.

Our second experiment conceptually replicated these results with a different focal goal (attraction to another, or "falling in love") contrasted, again, with the accuracy motivation, and a different, judgmental context. Here again, task demands and the presence of resources combined to determine motivated judgments. When motivated to perceive the target person in positive terms (in the Love Quest condition) and where the target's positive traits were highly salient (i.e., low task demands)—liking for the target was high irrespective of the load conditions. Under the same motivation, however, where the negative traits were more salient (i.e., high task demands), liking for the target was high only in the absence, but not in the presence of load. Finally, when the focal goal was to reach an accurate, unbiased judgment and where the target's positive traits were non-salient, unbi-

ased (i.e., relatively neutral) judgments were made irrespective of cognitive load. However, where the trait configuration strongly suggested biased, overly positive judgments, resisting them and rendering neutral judgments occurred only in the presence of resources, that is, in the absence (vs. presence) of cognitive load.

In general then, where the focal goal favors a directionally biased conclusion and biasing is easy to accomplish such conclusion appears to be reached relatively independently of resources; yet where the task of biasing is highly demanding, resources are critical and wishful judgments occur only in their presence. As suggested by the CET, the role of cognitive resources *reverses* where the focal goal is accuracy. In that case, when task demands are low, that is, when directionally biased judgments are difficult to reach, relatively neutral judgments occur independently of resources. But when directionally *biased* judgments are strongly suggested by the salient information, and hence are difficult to override, such judgments occur in the absence of resources despite the accuracy motivation. It thus seems that cognitive resources (1) are impactful only when needed, that is where attainment of a cognitive objective is difficult to accomplish, (2) are utilized in the service of the current focal goal. As noted earlier then, cognitive resources do not have a “mind of their own,” and their impact is contingent upon and constrained by the focal goal and task demands. Finally, there are conditions where mental resources have little consequence for bias, namely where the cognitive task in service of the dominant motivation (whether geared toward accuracy or bias) is undemanding, and hence relatively independent of resources.

Dependence of resource availability on the focal goal and on task demands could be one reason why prior research has obtained evidence both that the presence of resources can *reduce* bias (Klauer, Schmitz, Teige-Mocigemba, & Voss, 2010) and that, to the contrary, it can promote or augment bias (e.g., Moreno & Bodenhausen, 1999). Thus, our findings are consistent with Petty and Cacioppo’s (1986) notion that “central route” processing that requires considerable, resource-intensive elaboration can, nonetheless, be systematically biased, hence that more (information processing) does not necessarily mean better (or more accurate) judgments (cf. Kruglanski & Gigerenzer, 2011).

THEORETICAL IMPLICATIONS

The case for motivated reasoning has been a topic of intense debate over the years. After the rivalry between “hot” (motivational) versus “cold” (cognitive) perspectives finally subsided, the motivated reasoning research agenda then prioritized the investigation of the boundary conditions of the influence of motives on judgment. Research’s first forays into these topics concerned the studying of “reality constraints” (Kunda, 1990) and “elasticity” (Hsee, 1996), two analogous concepts addressing the relevance of environmental influences on judgment making. According to these concepts, the extent of motivated distortion is constrained by one’s ability to construct rational justifications to support one’s judgment. As a

consequence, ambiguous information eases off the difficulty of spinning information in a motivationally congruent way.

The present research offers additional insights into the phenomenon of motivated reasoning by suggesting that “reality constraints” (which we’ve referred to as *task demands* to be consistent with CET’S terminology) aren’t absolute and overcoming them is possible in the presence of sufficiently abundant cognitive resources and the right motivational state. In this sense, “more” (resources) is not necessarily “better” if by that term one understands a lessened bias. Indeed, across our studies we have seen time and again that given the presence of directional motivation and considerable task demands, bias may occur with the aid of adequate resources, presumably affording more extensive processing of the information in service of the desired judgment. In addition to these findings, the present research also illustrates that cognitive resources may also serve to attenuate motivational biases. Specifically, in cases where judgments are made under accuracy motivation, resources may help to override the (biased) conclusions that readily come to mind and therefore, lead to less biased judgments.

One important observation is that prior research has almost exclusively conceived of reality constraints in terms of (a lack of) stimulus ambiguity (Balcetis & Dunning, 2006; Dunning et al., 1989; Tesser, 1976). Consistent with extant research, we evinced in Study 1 that stimulus ambiguity plays a role in facilitating biased conclusions (Study 1). However, our second study attests that reality constraints can also be manipulated by making information more or less accessible using the primacy and recency effect (Deese & Kaufman, 1957; Ebbinghaus, 1913; Murdock, 1962). Thus, the present research makes an additional contribution to the motivated reasoning literature by demonstrating that reality constraints (i.e., task demands) come in different shapes and sizes and are not limited to a single operationalization.

FUTURE RESEARCH DIRECTIONS

Although the present results are compelling, they do not fully address the scope of motivational biases. Additional work is needed to afford a fuller appreciation of the determinants and conditions of the occurrence of motivational biases. Specifically, two research questions require further probing in this regard: (1) the role of motivational magnitude in producing bias and (2) the underlying cognitive processes mediating (motivationally) biased and unbiased judgments. These are briefly considered in turn.

Whereas the present studies varied the presence/absence of cognitive resources needed to accomplish the motivationally guided biasing work, it seems plausible to assume that given sufficient magnitude of the biasing motivation such resources would be mobilized. Indeed, anecdotal evidence suggests that highly motivated individuals (e.g., terminally ill patients, or persons who have lost beloved others) are able to deny what to others appears as undeniable realities, simply by “wish-

ing it so" (Kübler-Ross, 1969; Stroebe, Hansson, Stroebe, & Schut, 2001). Thus, further research is needed to explore the possibility that even highly constraining (i.e., unambiguous) information can be distorted if the biasing motivation is appropriately strong.

Finally, the mechanisms for motivated reasoning also merit a careful empirical exploration. Several possible *underlying mechanisms* mediating the effect of motives on judgment have been proposed. For instance Freud (1920) proposed that desired judgments can be achieved through the suppression, or even the denial, of undesirable anxiety-provoking information. Alternatively, Kunda (1990) has suggested that biased memory search may be able to explain the entire gamut of motivational biases. Further work may seek to empirically document the functioning of such processes in motivated biases and the conditions under which each may be employed to afford the motivationally desired judgments and conclusions.

CONCLUSION

The present research proposes a CET-based model of motivated reasoning where motivation, task demands, and cognitive resources play a pivotal role in predicting human judgment. The findings derived from this model indicate that (1) when *directional motivation is dominant* and task demands are high (making biasing difficult), the presence (vs. absence) of resources promotes wishful judgments, (2) when *accuracy motivation is dominant* and wishful judgments are the default, resources reduce the likelihood of their occurrence, and (3) when directional motivation is dominant and task demands are low (making biasing easy), or where the accuracy motivation is dominant and task demands are high, cognitive resources have relatively minor effects on bias. The current model provides a parsimonious framework to explain a large array of findings in the motivated reasoning literature and pave the way to new theoretically based research into judgment and decision making.

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