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FlashReport

The powerful size others down: The link between power and estimates of others' size

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HIGHLIGHTS

- ► Power distorts impressions of another person's physical size.
- ► The powerful systematically underestimated the size of the target.
- ► The powerless systematically overestimated the size of the target.
- ► Results emerged whether the target was in a photograph or face-to-face.
- ► Power leads people to misperceive complementary power cues in others.

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ABSTRACT

The current research examines the extent to which visual perception is distorted by one's experience of power. Specifically, does power distort impressions of another person's physical size? Two experiments found that participants induced to feel powerful through episodic primes (Study 1) and legitimate leadership role manipulations (Study 2) systematically underestimated the size of a target, and participants induced to feel powerless systematically overestimated the size of the target. These results emerged whether the target person was in a photograph or face-to-face. These findings suggest that the experience of powerfulness and powerlessness leads people to misperceive complementary power cues in others, and in doing so, distorts what they actually see. We discuss how these findings elucidate the interplay between how psychological states influence perception, and through this, facilitate social coordination.

Introduction

A growing body of research suggests that the visual system is not a passive recording device that relies exclusively on a bottom-up sensory-triggered process (Bar, 2004, 2007; Cheung & Bar, 2012; Proffitt, 2006). Instead, the visual system is proactive and constructive. It draws as much on a priori knowledge and past experiences in identifying objects, as on spatial frequency, color and other sensory information reaching the retina (Atkinson & McClelland, 1948; Bruner & Minturn, 1955; Markus & Zajonc, 1985). Indeed, people tend to interpret ambiguity in stimulus properties in a manner that confirms their beliefs, expectations and motivations (Balcetis & Dunning, 2006; Biederman & Cooper, 1991; Carter & Schooler, 1949; Dubois, Rucker, & Galinsky, 2010). An open question is whether perception is also affected by power. Power is a fundamental and pervasive force in all social relationships. The present research tested and demonstrated that the psychological experience of powerfulness and powerlessness distort impressions of others by causing one to misperceive complementary power cues in others.

Power, the capacity to influence other people through asymmetric control over valued resources (Blau, 1964; Keltner, Gruenfeld, & Anderson, 2003; Magee & Galinsky, 2008), is widely conceived of as a force around which social relationships are organized (Fiske, 1992; Russell, 1938). By providing clues about which interpersonal conflicts to avoid, to whom one should defer, and how best to coordinate interdependent action, power serves a relational heuristic function (Chance, 1967; Keltner, Van Kleef, Chen, & Kraus, 2008). Consistent with the view that power streamlines social interactions by helping people efficiently decide how to interact and coordinate with others, people are acutely sensitive to cues that signal who does and who does not control shared resources (Anderson, Srivastava, Beer, Spataro, & Chatman, 2006; Mason, Zhang, & Dyer, 2010). For example, Anderson et al. (2006) demonstrated that group members achieve impressive levels of consensus about the existing power structure after just a few weeks of interaction.

Importantly, people also have an unconscious desire for hierarchically differentiated relationships (Tiedens, Unzueta, & Young, 2007). This desire results in dominance complementarity, whereby people view interaction partners as contrasting with the self in terms of dominance (i.e., a powerful person views his/her partner as powerless and vice versa). Since people are effective at recognizing power cues and tend to contrast themselves in terms of power with others,

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our concern is whether power could lead people to misperceive complementary power cues, in a way that distorts their perception of others. For instance, would a powerful person perceive another person in ways consistent with expectations about how a powerless person should look? In the present research, we examine if power affects one's perception of another's physical stature.

Expectations about power and size

Physical properties such as size and height are considered symbols of hierarchical authority across a range of animal species (Fiske, 1992, 2004; Jacob et al., 2007). In non-human primates, status, which translates to preferential access to food, mates, shelter and other desirable commodities, is conferred to group members who are physically large. In fact, the existing literature suggests that animals strategically use this association to their advantage (Darwin, 1872; Freedman, 1979). For example, the chimpanzee holds its breath and expands the chest in a bid to augment its apparent size as an assertion of hierarchical rank (de Waal, 1998).

The tendency to assume that large group members have power is also common among humans. Taller individuals are ascribed greater power (Judge & Cable, 2004), perceived to be more successful and persuasive, and are more likely to be looked upon to lead than their small-bodied counterparts (Higham & Carment, 1992; Stogdill, 1948). Indeed, recent research suggests that this association between power and physical stature can lead powerful people to overestimate their own physical size (Duguid & Goncalo, 2012). Like their primate counterparts, humans express power non-verbally through the taking up of physical space (Carney, Hall, & Smith LeBeau, 2005; Ellyson & Dovidio, 1985; Hall, Coats, & Smith LeBeau, 2005). An emerging body of work also reveals that the taking up of space induces neuroendocrine and behavioral changes that embody power (Bohns & Wiltermuth, 2012; Carney, Cuddy, & Yap, 2010; Huang, Galinsky, Gruenfeld, & Guillory, 2011). Not only do people associate size with power (Higham & Carment, 1992; Schubert, Waldzus, & Giessner, 2009), they also use size to gauge their relative social standing.

We argue that people see not only themselves but also others through the lens of power. We propose that psychological states of powerfulness and powerlessness lead people to view interaction partners as contrasting with the self in terms of power, and they use others' power or lack thereof, as a direct indication of their physical stature. Accordingly, we hypothesized that: (1) Powerful individuals will underestimate the size (height and weight) of others and (2) Powerless individuals will overestimate the size of others.

The current research

We tested the hypothesis that power influences one's perception of another's physical size in two experiments. In Study 1, we examined whether priming power affects judgment of another individual's size from a photograph. In Study 2, we tested the hypothesis in a naturalistic, face-to-face social interaction, and where the powerful has actual control over monetary resources.

Study 1

Method

Participants and design

Eight-five students (65 females) from the United States were randomly assigned to two experimental conditions (powerful, powerless) in the laboratory. Participants first completed a power manipulation. Following Galinsky, Gruenfeld, and Magee (2003), they wrote about a past experience where they had power over another individual or where someone else had power over them. They then viewed a picture of a person of their gender (see Fig. 1) and were asked to estimate that person's weight and height. Accuracy indices for weight and height were computed by subtracting the participant's estimates from the target's true weight and height. Accordingly, positive scores denote an overestimation and negative scores denote an underestimation. For example, a participant's estimation of the target's weight is 200 lbs but the target's true weight is 180 lbs—this would produce an overestimated index of 20 lbs. Similarly, a participant's estimation of target's height is 5′9″ but the target's true height is 5′3″—this would produce an overestimation of 3 in.). A composite size estimate was then computed by transforming the indices of weight and height into z-scores and then summating these values.

Results and discussion

We predicted that powerful participants would underestimate the target's size and powerless participants would overestimate it. As hypothesized, a one-way ANOVA revealed a significant effect of power on the accuracy scores, $F(1, 83) = 7.3$, $p < .01$, $r = .28$. Powerful participants were more likely to underestimate ($M = -.35$, $SD = 1.50$) the target, whereas powerless participants were more likely to overestimate ($M = .52$, $SD = 1.45$) the target. It is possible that participants' own size would affect their estimates, hence we controlled for it in an ANCOVA and found that the effect of power remained significant, $F(1, 83) = 11.26$, $p < .01$.

Thus, the experience of powerfulness and powerlessness led people to misperceive cues of powerlessness and powerfulness, respectively, in others.

Study 2

In Study 2, we wanted the power dynamics to be consequential to the perceivers. Participants engaged in a naturalistic social interaction, where the power holder had control over the other party's actual monetary outcomes. This also created an opportunity for them to interact face-to-face and observe each other's size.

Method

Participants and design

Thirty-two students from the United States arrived at the laboratory in pairs. Because physical size varies by sex and ethnicity, only Caucasian males were recruited. The experiment had a single factor: Power role (powerful, powerless) between-subjects design. Upon arrival, participants were introduced to each other and informed that they were participating in a study involving how compensation decisions are made in organizations and could possibly earn up to $10 in this exercise. The experimenter explained that they would either play the role of an Offerer (Powerful) or a Receiver (Powerless), and that the Offerer would have complete control over the distribution of the money. To determine who would play which role, participants had to fill out a "Leadership Questionnaire" (adapted from Anderson & Berdahl, 2002) on a computer in separate rooms. Research suggests that to appropriately and effectively manipulate power, the power must be perceived as legitimate by all parties involved (Anderson & Berdahl, 2002; Lammers, Galinsky, Gordijn, & Otten, 2008). Legitimacy was established by informing participants that the computer would compare the results of the leadership questionnaire and pick the most suitable person for the Offerer role. However, in actuality, the roles were randomly assigned. In addition to the leadership questions, participants answered demographic questions and questions about their weight and height. The latter were used to assess the accuracy of their partner's size judgments.

Upon completing the questionnaires, the computer displayed a screen with the following instructions: "Your personality and leadership capabilities are being assessed, please wait." They were then told which role they would play by the computer. At this point, the

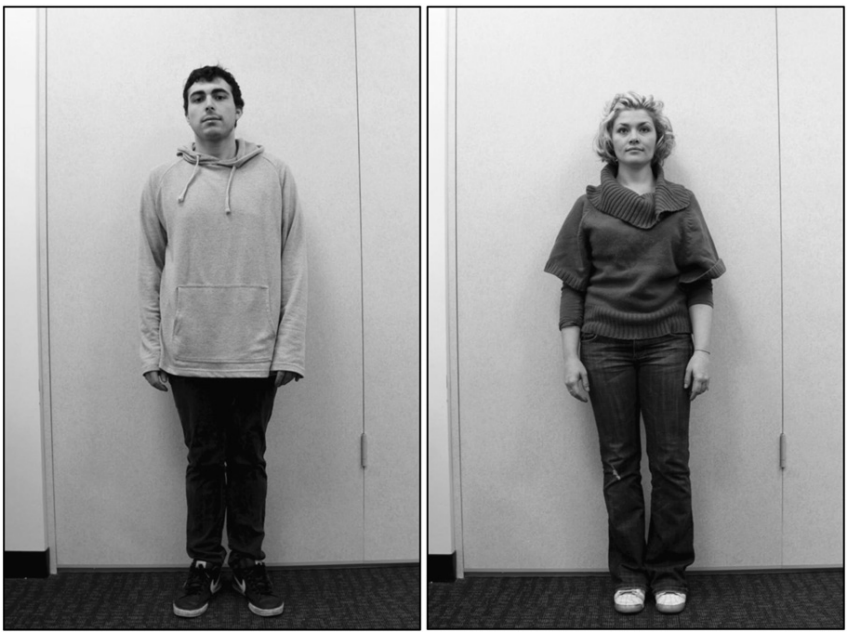

Fig. 1. Pictures of targets used in Study 1. Male participants saw the male target; female participants saw the female target.

experimenter brought both participants to a common room and explained the rules of the compensation distribution exercise. This exercise was the Dictator game (Sivanathan, Pillutla, & Murnighan, 2008) and was employed to: 1) enhance the power manipulation such that the Offerer would be perceived by the Receiver to possess control over his monetary outcome, and 2) provide an opportunity for participants to interact face-to-face subsequent to receiving the power manipulation.

In this exercise, the Offerer had to distribute $10 between him and his counterpart. He had complete control over how much of the money he keeps for himself and how much to offer his partner. Once the Offerer decided on his offer, participants went back to their respective computer stations to fill out another questionnaire that contained the dependent measures. They were informed that the results of the distribution exercise would be announced after they completed this questionnaire.

This questionnaire included the items "What is your counterpart's weight?" and "What is your counterpart's height?". An accuracy index of size was computed using the same approach employed in Study 1.

Results

Consistent with Study 1, a one-way ANOVA revealed that powerful participants were more likely to underestimate ($M = -.57$, $SD = .95$), and powerless participants were more likely to overestimate ($M = .64$, $SD = 1.64$) the size of their partners, $F(1, 30) = 6.55$, $p < .02$, $r = .41$. Additionally, an ANCOVA controlling for participants' size revealed that the effect remained significant, $F(1, 29) = 6.17$, $p < .02$.

General discussion

In the last decade, there has been a surge of interest in understanding how power affects our thoughts, feelings and behavior (Keltner et al., 2003). This work reveals that powerful people have distinctive behavioral approach tendencies, for example, they are more agentic (Galinsky et al., 2003), reward-seeking (Anderson & Galinsky, 2006), and are more inclined to initiate competitive interpersonal exchange (Magee, Galinsky, & Gruenfeld, 2007) than powerless people. Recent work has also considered power's effect on cognitive functioning. These findings suggest that having power enhances higher cognitive processes like goal pursuit and executive functioning (Guinote, 2007; Smith, Jostmann, Galinsky, & van Dijk, 2008). The current research adds to the literature on power by showing that power permeates the visual perceptual system, influencing how and what we see. In two experiments, powerful participants underestimated and powerless participants overestimated the size of others. This effect was observed across different manipulations of power—a subtle prime and an elaborate leadership role manipulation—and when participants were asked to judge a target in-person and in a photograph.

Contributions and future directions

These findings have implications for both social and personality psychologists as well as vision scientists. To our knowledge, this is the first demonstration that power shapes how people perceive each other. This work suggests that power constrains the way we view each other's physical attributes, but one might wonder if this could correspondingly alter the way we perceive each other's more subjective traits and personality. Since traits such as extraversion have been found to be related to leadership (Judge & Bono, 2000) and possessing social status (Anderson, John, Keltner, & Kring, 2001), one might form impressions of others according to these cues based on how much power they themselves have. Future research might explore this possibility.

This work adds to the "New Look in Perception" research of the 1950s (Bruner, 1957a, 1957b; Markus & Zajonc, 1985). Like The New Look, our findings provide evidence that perception is a constructive process. We contribute to the burgeoning work that argues that visual perception is governed by one's goals, beliefs, and other psychological states (Balcetis & Dunning, 2006; Kunda, 1990). Additionally, the current research emphasizes the social coordination function these biases support—the powerful persist to feel powerful because s/he perceives others to be physically smaller—inadvertently maintaining the status-quo.

Although the current studies were not designed to explore mediating mechanisms, it is important to consider how power affects perception. In almost all social interactions, people bring both shared and idiosyncratic expectations that streamline and shape the meaning of the interaction experience (Jones, 1986). We have proposed that since people have expectations about how a powerful and powerless

person should look, and because people tend to infer others' power from their own, a powerful person would perceive his counterpart in ways consistent with expectations about how a powerless person should look. Hence, a powerful person would underestimate the size of others because the powerless are expected to be physically small. Similarly, a powerless person would overestimate the size of others because the powerful are expected to be physically large.

An alternative explanation might be the accentuation bias (Dubois et al., 2010), which is the tendency for the powerless to augment the subjective worth of valued items by distorting their physical size. For instance, powerless individuals were found to overestimate the size of valued objects such as quarters and poker chips. A powerless participant in our study might overestimate the size of his counterparty because the counterparty controls valued resources. While it is a compelling account for the effect of powerlessness on perception, the accentuation bias cannot explain why the powerful underestimated their counterparty's size.

Another potential mechanism could be mood. Although the power manipulations in our studies were not likely to induce any differences in specific emotions (see Anderson & Berdahl, 2002; Smith & Galinsky, 2010), it is possible that participants, particularly in Study 2, experienced a positive mood when they had supposedly performed well on the leadership test or a negative mood when they did poorly, and perhaps these changes in mood could have influenced their judgments. Future research might examine this possibility.

Finally, it's possible that power causes people to overestimate their own size (Duguid & Goncalo, 2012) and therefore reduce the size of others by comparison. While we cannot rule out this explanation, it seems unlikely given the procedures used in Study 2. Unlike Duguid and Goncalo (2012), who *measured* participants' height, our participants *reported* their height and weight before the power manipulation. Having just reported their size, it seems unlikely that they would overestimate their own size post-manipulation. Nonetheless, this is a possible mechanism and future research should address it.

Appendix A. Supplementary data

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.jesp.2012.10.003.

References

Anderson, C., & Berdahl, J. L. (2002). The experience of power: Examining the effects of power on approach and inhibition tendencies. *Journal of Personality and Social Psychology*, *83*, 1362–1377.

Anderson, C., & Galinsky, A. D. (2006). Power, optimism, and risk-taking. *European Journal of Social Psychology*, *36*, 511–536.

Anderson, C., John, O. P., Keltner, D., & Kring, A. M. (2001). Who attains social status? Effects of personality traits and physical attractiveness in social groups. *Journal of Personality and Social Psychology*, *81*, 116–132.

Anderson, C., Srivastava, S., Beer, J. S., Spataro, S. E., & Chatman, J. A. (2006). Knowing your place: Self-perceptions of status in face-to-face groups. *Journal of Personality and Social Psychology*, *91*, 1094–1110.

Atkinson, J. W., & McClelland, D. C. (1948). The projective expression of needs. II. The effect of different intensities of the hunger drive on Thematic Apperception. *Journal of Experimental Psychology: General*, *38*, 643–658.

Balcetis, E., & Dunning, D. (2006). See what you want to see: Motivational influences on visual perception. *Journal of Personality and Social Psychology*, *91*, 612–625.

Bar, M. (2004). Visual objects in context. *Nature Reviews Neuroscience*, *5*, 617–629.

Bar, M. (2007). The proactive brain: Using analogies and associations to generate predictions. *Trends in Cognitive Sciences*, *11*, 280–289.

Biederman, I., & Cooper, E. E. (1991). Priming contour-deleted images: Evidence for intermediate representations in visual object recognition. *Cognitive Psychology*, *23*, 393–419.

Blau, P. M. (1964). Exchange and power in social life. New Brunswick, NJ: Transaction Books.

Bohns, V. K., & Wiltermuth, S. S. (2012). It hurts when I do this (or you do that): Posture and pain tolerance. *Journal of Experimental Social Psychology*, *48*, 341–345.

Bruner, J. S. (1957a). Going beyond the information given. In H. E. Gruber, K. R. Hammond, & R. Jessor (Eds.), *Contemporary approaches to cognition* (pp. 41–69). Cambridge, MA: Harvard University Press.

Bruner, J. S. (1957b). On perceptual readiness. *Psychological Review*, *64*, 123–152.

Bruner, J. S., & Minturn, A. L. (1955). Perceptual identification and perceptual organization. *The Journal of General Psychology*, *53*, 21–28.

Carney, D. R., Cuddy, A. J. C., & Yap, A. J. (2010). Power posing: Brief nonverbal displays affect neuroendocrine levels and risk tolerance. *Psychological Science*, *21*, 1363–1368.

Carney, D. R., Hall, J. A., & Smith LeBeau, L. (2005). Beliefs about the nonverbal expression of social power. *Journal of Nonverbal Behavior*, *29*, 105–123.

Carter, L. F., & Schooler, K. (1949). Value, need, and other factors in perception. *Psychological Review*, *56*, 200–207.

Chance, M. R. A. (1967). Attention structure as the basis of primate rank order. *Man*, *2*, 503–518.

Cheung, O. S., & Bar, M. (2012). Visual prediction and perceptual expertise. *International Journal of Psychophysiology*, *83*, 156–163.

Darwin, C. (1872). The expression of the emotions in man and animals. New York: Oxford University Press.

de Waal, F. (1998). Chimpanzee politics: Power and sex among apes. Baltimore, MD: Johns Hopkins.

Dubois, D., Rucker, D. D., & Galinsky, A. D. (2010). The accentuation bias: Money literally looms larger (and sometime smaller) to the powerless. *Social Psychological and Personality Science*, *1*, 199–205.

Duguid, M. M., & Goncalo, J. A. (2012). Living large: The powerful overestimate their own height. *Psychological Science*, *23*, 36–40.

Ellyson, S. L., & Dovidio, J. F. (1985). Power, dominance, and nonverbal behavior. New York: Springer-Verlag.

Fiske, A. P. (1992). The four elementary forms of sociality: Framework for a unified theory of social relations. *Psychological Review*, *99*, 689–723.

Fiske, A. P. (2004). Four modes of constituting relationships: Consubstantial assimilation; space, magnitude, time, and force; concrete procedures; abstract symbolism. In N. Haslam (Ed.), *Relational models theory. A contemporary overview* (pp. 61–146). Mahwah, NJ: Erlbaum.

Freedman, D. G. (1979). Human sociobiology. New York: Free Press.

Galinsky, A. D., Gruenfeld, D. H., & Magee, J. C. (2003). From power to action. *Journal of Personality and Social Psychology*, *87*, 327–339.

Guinote, A. (2007). Power and goal pursuit. *Personality and Social Psychology Bulletin*, *33*, 1076–1087.

Hall, J. A., Coats, E. J., & Smith LeBeau, L. (2005). Nonverbal behavior and the vertical dimension of social relations: A meta-analysis. *Psychological Bulletin*, *131*, 898–924.

Higham, P. A., & Carment, W. D. (1992). The rise and fall of politicians: The judged heights of Broadbent Mulroney and Turner before and after the 1988 Canadian federal election. *Canadian Journal of Behavioral Science*, *24*, 404–409.

Huang, L., Galinsky, A. D., Gruenfeld, D. H., & Guillory, L. E. (2011). Powerful postures versus powerful roles: Which is the proximate correlate of thought and behavior? *Psychological Science*, *22*, 95–102.

Jacob, A., Nusslé, S., Britschgi, A., Evanno, G., Müller, R., & Wedekind, C. (2007). Male dominance linked to size and age, but not to 'good genes' in brown trout (*Salmo trutta*). *BMC Evolutionary Biology*, *7*, 207.

Jones, E. E. (1986). Interpreting interpersonal behavior: The effects of expectancies. *Science*, *234*, 41–46.

Judge, T. A., & Bono, J. E. (2000). Five-factor model of personality and transformational leadership. *Journal of Applied Psychology*, *85*, 751–765.

Judge, T. A., & Cable, D. M. (2004). The effect of physical height on workplace success and income. *Journal of Applied Psychology*, *89*, 428–441.

Keltner, D., Gruenfeld, D. H., & Anderson, C. (2003). Power, approach, and inhibition. *Psychological Review*, *110*, 265–284.

Keltner, D., Van Kleef, G. A., Chen, S., & Kraus, M. W. (2008). A reciprocal influence model of social power: Emerging principles and lines of inquiry. *Advances in Experimental Social Psychology*, *40*, 151–192.

Kunda, Z. (1990). The case for motivated reasoning. *Psychological Bulletin*, *108*, 480–498.

Lammers, J., Galinsky, A. D., Gordijn, E. H., & Otten, S. (2008). Illegitimacy moderates the effects of power on approach. *Psychological Science*, *19*, 558–564.

Magee, J. C., & Galinsky, A. D. (2008). Social hierarchy: The self-reinforcing nature of power and status. In J. P. Walsh, & A. P. Brief (Eds.), *Academy of Management Annals*, *vol. 2*, London, UK: Taylor & Francis.

Magee, J. C., Galinsky, A. D., & Gruenfeld, D. H. (2007). Power, propensity to negotiate, and moving first in competitive interactions. *Personality and Social Psychology Bulletin*, *33*, 200–212.

Markus, H., & Zajonc, R. B. (1985). The cognitive perspective in social psychology. In G. Lindzey, & E. Aronson (Eds.), *The handbook of social psychology* (pp. 137–230). (3rd ed.). New York: Random House Vol. 1.

Mason, M. F., Zhang, S., & Dyer, R. (2010). Male susceptibility to attentional capture by power cues. *Journal of Experimental Social Psychology*, *46*, 482–485.

Proffitt, D. R. (2006). Distance perception. *Current Directions in Psychological Research*, *15*, 131–135.

Russell, B. (1938). Power: A New Social Analysis. New York: Routledge.

Schubert, T. W., Waldzus, S., & Giessner, S. R. (2009). Control over the association of power and size. *Social Cognition*, *27*, 1–19.

Sivanathan, N., Pillutla, M. M., & Murnighan, J. K. (2008). Power gained, power lost. *Organizational Behavior and Human Decisions Processes*, *105*, 135–146.

Smith, P. K., & Galinsky, A. D. (2010). The nonconscious nature of power: Cues and consequences. *Social and Personality Psychology Compass*, *4*, 918–938.

Smith, P. K., Jostmann, N. B., Galinsky, A. D., & van Dijk, W. W. (2008). Lacking power impairs executive functions. *Psychological Science*, *19*, 441–447.

Stogdill, R. M. (1948). Personal factors associated with leadership: A survey of the literature. *Journal of Psychology: Interdisciplinary and Applied*, *25*, 35–71.

Tiedens, L. Z., Unzueta, M. M., & Young, M. J. (2007). An unconscious desire for hierarchy? The motivated perception of dominance complementarity in task partners. *Journal of Personality and Social Psychology*, *93*, 402–414.