I Can, I Do, And So I Like:

From Power to Action and Aesthetic Preferences

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Abstract

The current work tested the hypothesis that power increases reliance on experiences of motor fluency in forming aesthetic preferences. In four experiments participants reported their aesthetic preferences regarding a variety of targets (pictures, movements, objects, and letters). Experiments 1, 2 and 3 manipulated power and motor fluency (via motoric resonance, extraocular muscle training, and dominant hand restriction). Experiment 4 manipulated power and assessed chronic inter-individual differences in motor fluency. Across these experiments power consistently increased reliance on motor fluency in aesthetic preference judgments. This finding was not mediated by differences in mood, judgment certainty, perceived task-demands or task-enjoyment, and derived from the use of motor simulations rather than from power differences in the acquisition of motor experiences. This is the first demonstration suggesting that power changes the formation of preference judgments as a function of motor fluency experiences. The implications of this research for the links between power and action, as well as the understanding of fluency processes are discussed.

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A growing body of evidence suggests that perceivers rely on experiential information to construe judgments (for reviews, see Forgas, 1995; Schwarz, 2004; Schwarz & Clore, 2007). While a great deal of this evidence has focused on the roles of affective and cognitive feelings (for rewiews, see Bless & Forgas, 2000; Clore, 1992; Koriat & Levy-Sadot, 1999; Schwarz & Clore, 2007; Strack, 1992), recent findings show that motor processes also enter as an input in judgment (Topolinski & Strack 2009a; Topolinski & Strack 2010). Specifically, it was found that training and ease of motor execution facilitate action simulation and the appreciation of stimuli that necessitate matching motor codes (Beilock & Holt, 2007; Casasanto & Chrysikou, 2011; Elder & Krishna, 2012; Leder, Bär, & Topolinski, 2012; Shen & Sengupta, 2012; Topolinski, 2010). This reliance on motor processes has been assumed to be universally used by perceivers. Nevertheless, recent research suggests that states of individuals, for example mood (Ruder & Bless, 2003), and social factors, such as power (Guinote, 2010; Weick & Guinote, 2008), are capable of altering reliance on experiential information (for a review, see Greifeneder, Bless, & Pham, 2011; Guinote, 2015). In particular, social power (Guinote, 2010; Weick & Guinote, 2008) increases reliance on experiential information. This research shows that individuals automatically monitor their relative power in social interactions and derive their information processing strategies from their relative power. Thus reliance on motor experiences could also be affected by such social factors. In the present article we propose that an actor’s social power affects reliance on motor processes during the construction of aesthetic judgments.

Power is for doing. Power holders are on the go. Those possessing power talk and interrupt others more (Guinote, Judd, & Brauer, 2002; Schmid Mast, 2002), have disinhibited and richer action repertoires (Keltner, Gruenfeld, & Anderson, 2003), and are the first to take action in incidental (Baumeister, Chesner, Senders, & Tice, 1988; Galinsky, Gruenfeld, & Magee 2003) and planned contexts (Vescio, Snyder, & Butz, 2003). These effects have been associated with the activation of the Behavioral Approach System (Keltner et al., 2003), which facilitates the approach of rewards and opportunities. Indeed, power holders more easily cause an impact in their social environments and attain goals. Could, however, the actions of power holders have consequences beyond the outcomes they intend to produce?

Consistent with findings that the motor system has consequences beyond the production of action (e.g., for language comprehension; Zwaan & Taylor, 2006), and that motor experiences can be re-enacted and used in the construction of judgments, we propose that power increases reliance on action components in the construction of judgment. Based on evidence that subsidiary components of action are used in the construction of aesthetic judgments (Beilock & Holt, 2007; Casasanto & Chrysikou, 2011; Elder & Krishna, 2012; Leder, Bär, & Topolinski, 2012; Shen & Sengupta, 2012; Topolinski, 2010), and that power holders use more bodily experiences (Guinote, 2010a; Weick & Guinote, 2008), we argue that power increases reliance on motor fluency in aesthetic judgments. Thus, when it comes to power, actions can have more far reaching consequences than considered so far.

Demonstrating that current social factors –such as power differences–are crucial in determining to what extent motor fluency is integrated in the construction of preference judgments would inform research about the joint effects of social and basic motor processes in judgment construal.

Motor Fluency in Aesthetic Judgments

A long-standing question in psychology has been what creates aesthetic pleasure (Lipps, 1903). Reber, Schwarz and Winkielman (2004) proposed an interactionist perspective, suggesting that aesthetic pleasure and beauty are grounded in metacognitive experiences. Metacognitive experiences are subjective, cognitive feelings caused by factors such as figure-ground contrast, stimulus repetition, or prototypicality, which affect the ease or fluency of stimulus processing; when fluency is high stimuli are liked more (cf. Alter & Oppenheimer, 2009). For example, classification fluency (processing speed) increases aesthetic appreciation of art while analytic thought disrupts the fluency-liking relationship (Halberstadt & Hooton, 2008).

Recently motor components have also been found to influence fluency and subsequently judgment (Topolinski & Strack 2009a; Topolinski & Strack 2010). Leder et al. (2012) proposed that performing hand movements corresponding with the style of observed paintings would increase aesthetic appreciation, as perceiving a painting style elicits covert simulations of concordant hand movements in viewers (Calvo-Merino, Urgesi, Orgs, Aglioti, & Haggard, 2010; Taylor, Witt, & Grimaldi, 2012). Indeed, performing a stippling movement while observing neo-impressionist/pointillist-style paintings or performing a stroking movement while observing post-impressionist/stroke-style paintings increased participants' aesthetic appreciation of these pictures compared to performing non-corresponding hand movements. Thus, motor fluency stemming from resonance in motor representations, that is from a functional correspondence between the states in the motor system of the observer and that of the executor of the action (Uithol, van Rooij, Bekkering and Haselanger (2011),[1] increased aesthetic judgments.

Similarly, Topolinski (2010) demonstrated that training the extraocular muscles (EOMs; muscles that move the ocular bulb and are necessary in vision) to follow specific stimulus movements resulted in an increased preference for these movements. Training the EOMs increased preference for stimulus movements that had not been seen before but were – because of the training – easier on the eye. Thus, fluency stemming from unconsciously enhancing people's extracocular motor activation and preparedness entailed greater aesthetic

[1] The term motor resonance is also used to indicate conditions in which "the motor system of the observer of an action resonates with her own perceptual system" (Uithol et al., 2011, p. 390).

pleasure of what was later seen.

Relatedly, Shen and Sengupta (2012) examined the consequences of restrictions of the dominant hand for the liking of objects typically used by this hand. In one experiment (Study 3), participants who held a fork with their dominant hand (*vs.* non dominant hand) experienced reduced fluency of movement simulation towards a graspable object in view (a pen). Subsequently, they liked the target object less. Hence, reduced motor fluency stemming from unobtrusively restricting people's spontaneous motor system activation driven by object affordances (Tucker & Ellis, 1998) decreased liking of other graspable objects (for a similar finding, see Elder & Krishna, 2012).

Finally, Beilock and Holt (2007) reasoned that for skilled typists letter-dyads typed with the same finger of the same hand (e.g., FV) compared to dyads typed with different fingers of different hands (e.g., FJ) create motor interference, because typing experience results in the association between letters and motor programs used to type them (i.e., letter perception automatically activates corresponding motor plans; Rieger, 2004; Prinz, 1997). Indeed, skilled – but not novice – typists liked non-interference dyads more than interference dyads (see also Van den Bergh, Vrana, & Eelen, 1990). In other words, motor disfluency experiences stemming from chronic differences in the preparedness of the motor system reduced liking of interference letter dyads.

In summary, across different domains and different sources of motor (dis)fluency, the resonance of the motor system or its preparedness to perform the actions that were trained generated an experience of motor fluency that was then used in the construction of aesthetic judgments. Here we reasoned that factors affecting an individual's access and use of bodily experiences should modulate the motor system's impact on aesthetic judgments (cf. Häfner, 2013). As power increases reliance on bodily information (Guinote, 2007a, 2010b) we hypothesize that it should increase reliance on motor fluency.

Power and Reliance on Motor Fluency

Power refers to the ability to influence others or to control their outcomes (Keltner et al., 2003; Thibaut & Kelley, 1959; Vescio et al., 2003). According to the situated focus theory of power (Guinote, 2007a, 2010b), having power enhances reliance on subjective experiences that arise on moment-to-moment basis, such as experiences that occur during thought processes (e.g., feelings of familiarity, ease of retrieval; Weick & Guinote, 2008) and bodily feelings (Guinote, 2010). Conversely, powerless individuals tend to engage in more controlled and extensive information processing in order to increase predictability and control (Fiske & Dépret, 1996; Goodwin, Gubin, Fiske, & Yzerbyt, 2000; Guinote, Brown, & Fiske, 2006; Keltner et al., 2003), placing experiential information at a relative disadvantage. For example, feelings of hunger predicted the amount of food eaten by powerful but not by powerless individuals (Guinote, 2010a). Power holders also relied more on cognitive feelings that arose during thought processes, such as ease/difficulty of retrieval (Weick & Guinote, 2008). Finally, power holders acted more in line with feelings that arose when relating to their surroundings and reacted more strongly when encountering annoying stimuli compared to powerless individuals (Galinsky et al., 2003). In line with these findings, we derive the novel hypothesis that power increases reliance on motor experiences during the construction of judgments.

Overview of the Present Research

The present research tests the hypothesis that powerful, more than powerless, individuals form their aesthetic preferences based on subjective motor fluency. This hypothesis was tested in four experiments designed to examine fluency stemming from resonance in motor representations (Experiment 1), from motor activation and preparedness derived from extraocular muscle training (Experiment 2), from restrictions of spontaneous motor system activations (Experiment 3), and from differences in chronic preparedness of the motor system (Experiment 4). By using chronic motor experiences we ruled out that the effects of power derive from the *acquisition* of motor experiences rather than the *use* of motor fluency experiences *per se*. Together, these experiments examined facilitative effects of increased motor fluency (Experiments 1-2), as well as detrimental effects of motor interference and restriction of motor fluency (Experiments 3-4) on aesthetic judgments. Experiments 1-3 manipulated power (powerful vs. powerless) and motor fluency. Experiment 2 also included a control group. The roles of mood, judgment certainty, as well as perceived task-demands or –enjoyment and reported subjective feelings of fluency were also examined.

Experiment 1: Covert Painting Simulations

Experiment 1 examined effects of power on the use of covert motor programs activated by resonance in motor representations from seeing artwork to construe aesthetic judgments. Viewing artwork activates those motor programs in observers that were produced when the artwork was created (Freedberg & Gallese, 2007). For example, participants asked to simulate painters' movements with their hands subsequently preferred paintings painted in the style matching (*vs*. mismatching) their hand movements (Leder et al., 2012). Using this paradigm, it was hypothesized that powerful participants would rely more strongly on covert motor programs, showing stronger movement/picture style concordance preferences than powerless participants.

Method

Participants and design. Participants participated for €3 or course credit and were randomly assigned to the conditions of a 2 (power: powerful vs. powerless; between-subjects) x 2 (hand-movement: stippling vs. stroking movement; between-subjects) x 2 (art style: neo-impressionist vs. post-impressionist; within-subjects) mixed design. We aimed at recruiting 140 participants (i.e., roughly 3 times the number of participants in the experimental condition of Leder et al., 2012), and stopped recruitment once this number was reached by enough participants (i.e., 142) signing up. Because of difficulties in the recruitment of participants, data was collected in two waves. Eight participants were excluded because they did not complete the power manipulation (*n*=1), the debriefing accidently remaining on the computer screen from a previous participant (and they thus knew our hypothesis; *n*=2), they guessed the study's purpose (e.g., "making pulsating movements promotes liking of pointillism and the opposite for the other style"; *n*=3), or because they had difficulty using their non-dominant hand to provide responses (see below; *n*=2). This left 134 participants (80 females, 53 males, 1 intersex/transgender; M_{age}=22.67, SD_{age}=2.07) in the sample.

Procedure and materials. Power was manipulated by asking participants either to write an essay of a past event in which they had power over another individual/other individuals (powerful condition), or in which someone else had power over them (powerless condition; Galinsky et al., 2003). In an ostensible second study participants evaluated 10 artworks on a scale from 1 (*I do not at all like this painting*) to 7 (*I very much like this painting*). Five neo-impressionist/pointillist-style and five post-impressionist/stroke-style paintings were presented to participants in random order. The paintings were taken from Leder et al. (2012; one painting was replaced due to resolution problems).

Participants were told that the study dealt with effects of dual tasking on art evaluation. During the picture presentation and rating, participants performed the hand movements with their dominant hand. In the *stippling condition* they held a pencil with an eraser tip and were asked to tap it on the table surface at a convenient pace. In the *stroking condition* they moved it in strokes of approximately 20 cm from left to right on the table.

Subsequently, participants reported on 7-point scales how much they were in charge (1=*not at all* to 7=*fully*) and how much influence they had (1=*very little* to 7=*very much*; r=.70, p<.001) in the situation described earlier.

To rule out alternative accounts, the role of perceived task-demands, mood, and task-evaluation was assessed. Task-demands was measured by asking: "To what extent did you find the task exhausting?" (1=*not at all* to 7=*very much*); mood by asking participants how they felt (1=*sad, bad, discontent,* and *tense* to 7=*happy, well, content,* and *relaxed*, respectively; α=0.79); and task-evaluation by asking to what extent participants thought the task was nice (reversed), irritating, pleasant (reversed), and boring (1=*not at all* to 7=*very much*; α=0.81). Because power increases confidence (Fast, Sivanathan, Mayer, & Galinsky, 2012), we assessed participants' judgment certainty by asking how confident/certain they were concerning their evaluations (1=*not at all* to 7=*very much*; r=0.91, p<.001). We did not run any additional conditions or measure any additional dependent variables not mentioned here or in the footnote[2].

Results

Manipulation check. An ANOVA with the between subjects factors power and hand-movement revealed that participants in the powerful condition felt more in control (M=5.43, SD=1.17) than participants in the powerless condition (M=2.62, SD=1.36), $F(1,130)$=163.54, p<.001, η_p^2=.56, $CI_{95\%}$ [2.368, 3.234]. The power manipulation was therefore successful.

Aesthetic preferences. Preliminary analyses indicated that judgment certainty tended to be higher when performing a hatching (M=4.36, SD=1.52) compared to a stippling movement (M=3.96, SD=1.42), $F(1,130)$=2.43, p=.12, η_p^2=.02. Also, task-evaluation was dependent on the joint effects of power and hand movement, $F(1,130)$=4.14, p=.044, η_p^2=.03, such that powerful participants liked the task more when performing a stippling rather than a

[2] We explanatorily assessed with four items each to what extent participants based their judgments on thoughts (e.g., "I based myself …on my thoughts about the pictures' contents and arrangements"; α=.36), knowledge (e.g., "… on my knowledge of painting styles"; α=.45) and feelings about the paintings (e.g., "… on the feelings the pictures evoked"; α=.77) and to what extend participants felt in harmony with the painter and certain paintings (e.g., "My feelings of harmony played an important role in my evaluations; I felt in harmony with some works but not with others"; α=.64). We refrain from interpreting variables with unacceptably low internal consistencies. The only result obtained was a power x movement interaction for feelings, $F(1,127)$=4.97, p=.027: high power participants provided similar ratings regardless of their movement ($M_{stippling}$=4.88 and $M_{stroking}$=4.77; F<1.7, p>.19), low power participants making a stippling movement (M=4.20) tended to provide lower ratings than those making a stroking movement (M=4.80), $F(1,127)$=3.46, p=.065.

hatching movement ($M_{stippling}$=3.80, $SD_{stippling}$=1.33 vs. $M_{hatching}$=3.05, $SD_{hatching}$=1.19), which reversed for low power participants ($M_{stippling}$=3.46, $SD_{stippling}$=1.33 vs. $M_{hatching}$=3.66, $SD_{hatching}$=1.55). Task-evaluation, judgment certainty and the certainty x power interaction (cf. Yzerbyt, Muller, & Judd, 2004)[3] were therefore entered in the analyses below. There were no effects for mood or task-demands, Fs<1, ps>.46.

Participants' picture ratings were subjected to a 2 (power: powerful vs. powerless; between-subjects) x 2 (hand movement: stippling vs. stroking; between-subjects) x 2 (art style: neo-impressionist/pointillist-style vs. post-impressionist/stroke-style; within-subjects) mixed ANOVA. This analysis revealed a power x hand movement x art style interaction, $F(1,127)=4.24$, $p=.042$, $\eta_p^2=.03$ (see Fig. 1), all other within-subject effects Fs<1.65, all other ps>.20, all $\eta_p^2<.014$; concerning between-subject effects, all Fs<2.3, all ps>.13, all $\eta_p^2<.017$, except for a main effect of task-evaluation, $F(1,127)=10.16$, $p=.002$, $\eta_p^2=.07$, and a marginal main effect of hand movement, $F(1,127)=2.55$, $p=.113$, $\eta_p^2=.02$, indicating that on average the paintings were evaluated more positively when performing stroking compared to stippling movements. Not controlling for judgment certainty and task-evaluation resulted in a similar, albeit marginal interaction, $F(1,130)=3.11$, $p=.08$, $\eta_p^2=.02$.

As expected, for powerful participants the hand movement x art style interaction was significant, $F(1,127)=4.86$, $p=.029$, $\eta_p^2=.04$, $CI_{95\%}$ [-1.224, -0.066], whereas this interaction was not significant for powerless participants, F<1, p>.45. Powerful participants' liking of post-impressionist and pointillist paintings was dependent on the congruency between their hand movements and the paintings. Those performing a stoking movement liked post-impressionist/stroke-style paintings more (M=4.40, SD=1.07) than neo-

[3] Yzerbyt and colleagues demonstrated that when testing interactions, simply including a covariate correlated with an independent variable is in most cases an inadequate model. This is the case because the interaction between the two independent variables is only estimated without bias when the interaction between the covariate and the independent variable is included in the analysis. To illustrate, if the independent variables X_{1i} and X_{2i} were manipulated and their interaction is of interest, but at the same time covariate C_i is affected by X_{1i}, then the $X_{1i}X_{2i}$ interaction is confounded with the $C_i X_{2i}$ interaction, which needs to be included.

impressionist/pointillist-style paintings (*M*=4.08, *SD*=1.02), $F(127)=3.65$, $p=.058$, $\eta_p^2=.03$. A non-significant reverse tendency occurred for powerful participants performing a stippling movement (neo-impressionist/pointillist-style paintings: *M*=3.94, *SD*=1.08; post-impressionist/stroke-style paintings: *M*=3.74, *SD*=1.06), $F(127)=1.62$, $p=.205$, $\eta_p^2=.01$.

Discussion

Powerful participants' aesthetic preferences depended on the (in)congruence of their covert painting simulations in relation to observed paintings (i.e, their movements' simulation of the presented artistic styles and thus their resonance in motor representations). In contrast, powerless participants remained unaffected by their hand movements/paintings (in)congruence.

The current experiment provides evidence for fluency stemming from resonance in motor representations affecting judgments of the powerful more strongly than those of the powerless. However, it does not speak to the direction this effect. Therefore, Experiment 2 included a control condition. Furthermore, it sought to go beyond motor representations and to directly target muscular fluency.

Experiment 2: Trained Motor Programs

Experiment 2 employed muscular training to induce motor fluency. Following Topolinski (2010), the training temporarily induced ocular motor fluency experiences stemming from increased motor activation and preparedness for certain stimulus movements participants saw. Importantly, participants in this paradigm are unaware of being trained. Nonetheless, this training promotes preference for trained-to-see (*vs.* not trained-to-see) movements. We expected effects to be especially pronounced for powerful (*vs.* powerless) individuals. A control condition was included to explore whether power increases or powerlessness decreases motor fluency reliance.

Method

Participants and design. We aimed at recruiting 100 participants (i.e., roughly 2 times the average number of participants in the experiments of Topolinski, 2010) and stopped recruitment once enough participants had signed up. One hundred and one participants participated in this study. They were randomly assigned to the conditions of a 3 (power: powerful vs. control vs. powerless; between-subjects) x 2 (EOM-matching: matching vs. nonmatching; within-subjects) mixed design, and received £6 for their participation. Four participants were excluded: One indicated not having complied with the head movements instructions, one did not turn up the volume and therefore missed instructions, one quit the task, and one non-native speaker had difficulties understanding the instructions and took almost double the average time. This left 97 participants (56 females, 40 males, 1 transgender; M_{age}=23.90, SD_{age}=5.03) in the sample.

Procedure and materials. Participants completed the power induction task as in Experiment 1, with an additional control condition in which participants wrote about their day "yesterday" (Galinsky et al., 2003). In an ostensible second experiment participants then underwent the procedure designed by Topolinski (2010). They watched film clips of a black dot filling white circles in a matrix (see Fig. 2). The dot always started in a randomly chosen matrix corner and moved clock- or counterclockwise along its edges toward a diagonally opposite corner in seven steps, remaining at each position for 500ms, and featuring both a vertical and a horizontal trajectory (see Fig. 2). This allowed for eight different dot-movement sequences that were presented to participants twice in random order. They evaluated the 16 dot-movements on a 9-point scale (1=*not at all pleasant*, 9=*very pleasant*).

To train EOM kinematics to follow specific dot-movements, prior to each film clip participants received instructions over headphones to move their heads in a vertically or horizontally trajectory and then in the respective other trajectory, while keeping their eyes on the fixation cross at the center of the computer screen. In eight *matching trials*, the head-movements trained the EOMs to perceive the following dot-movements (e.g., moving the head downwards and then left while keeping the eyes at the fixation cross induces the same EOM kinematics as watching the dot move upwards and right). In eight *mismatching trials*, one of the two head-movement directions did not train the EOMs for the following dot-movement (in the example above a head-movement *upwards* and left).

Participants completed the same two-item manipulation check as in Experiment 1 (r=.75, p<.001; 9-point scales). We explored task-evaluation (4 items; α=0.71), mood (4 items; α=0.82), and task-demands by asking participants "How mentally [physically] demanding was the dot-task?" (1=*not at all* to 9=*very much*; r=0.51, p<.001). We did not run additional conditions or measure additional dependent variables not mentioned here.

Results

Manipulation check. An ANOVA on participants averaged scores revealed that the power manipulation was successful, $F(2,94)=49.18$, $p<.001$, $\eta_p^2=.51$. Participants in the powerful condition reported more control (M=7.31, SD=1.47) than participants in the powerless (M=2.95, SD=1.82), $t(94)=9.66$, $p<.001$, d=2.64, $CI_{95\%}$ [3.462, 5.253], or in the control condition (M=6.11, SD=2.12), $t(94)=2.68$, p=.009, d=0.66, $CI_{95\%}$ [0.311, 2.088]. The control and powerless conditions also differed as expected, $t(94)=6.90$, $p<.001$, d=1.60, $CI_{95\%}$ [2.249, 4.067].

Aesthetic preferences. Preliminary analyses indicated that power did not affect participants' task-evaluation or mood, Fs<1.56, ps>.21, all $\eta_p^2<.033$, and only marginally affected perceived task-demands, $F(2,94)=2.33$, p=.103, $\eta_p^2=.05$ [indicating that in the control (M=4.53) compared to the powerful (M=3.45) or powerless (M=3.97) condition participants tended to perceive the task as more demanding]. Task-demands and dot-movement evaluations were not correlated in any condition, rs<.24, ps>.18; including task-demands as covariate, the power x EOM-matching interaction reported below remained significant, $F(2,93)=3.20$, $p=.045$, $\eta_p^2=.06$.

Participants' dot-movement evaluations were submitted to a 3 (power: powerful vs. control vs. powerless; between-subjects) x 2 (EOM-matching: matching vs. nonmatching; within-subjects) mixed ANOVA, which yielded an EOM-matching main effect, $F(1,94)=4.30$, $p=.041$, $\eta_p^2=.04$, ($M_{matching}=5.53$, $SD_{matching}=1.30$) vs. $M_{nonmatching}=5.37$, $SD_{nonmatching}=1.35$), replicating Topolinski (2010). Crucially, this was qualified by a power x EOM-matching interaction, $F(2,94)=3.26$, $p=.043$, $\eta_p^2=.07$ (see Fig. 3). As expected, participants in the powerful condition rated matching dot-movements as more pleasant ($M=5.47$, $SD=1.20$) than nonmatching dot-movements ($M=5.09$, $SD=1.17$), $t(33)=2.70$, $p=.011$, $d=0.57$, $CI_{95\%}$ [0.095, 0.677]. In contrast, participants in the powerless condition evaluated dot-movements similarly ($M_{matching}=5.41$, $SD_{matching}=1.26$ vs. $M_{nonmatching}=5.49$, $SD_{nonmatching}=1.36$), $t(30)<1$, $p>.54$, and so did participants in the control condition ($M_{matching}=5.71$, $SD_{matching}=1.47$), vs. $M_{nonmatching}=5.55$, $SD_{nonmatching}=1.50$), $t(31)=1.47$, $p>.15$, $d=0.19$. According to Bonferroni post-hoc tests in an ANOVA on participants' difference scores for matching vs. nonmatching movement evaluations, the control condition did not differ from the powerful, $p=.648$, or the powerless condition, $p=.592$, but the powerful and the powerless conditions significantly differed from each other, $p=.037$. Thus, the effects of motor fluency seemed to linearly increase with power. Nevertheless, only the powerful relied on motor fluency to construe aesthetic judgments.

Discussion

Powerful participants integrated the increased fluency generated by trained-to-see (*vs.* not trained-to-see) movements in their aesthetic preferences; they demonstrated increased aesthetic preferences for movements their eyes had been temporarily trained to follow. Importantly, participants were unaware of being trained to perceive certain dot-movements, ruling out demand effects[4].

Whilst this experiment speaks to the direction of the effect (power increasing reliance on motor fluency rather than a lack of power decreasing it) and involved direct muscular training, it would be important to not only investigate motor fluency, but also motor interference/disfluency. To this end, Experiment 3 investigated effects of motor fluency being reduced by restricting participants' motor program activation.

Experiment 3: Restricted Motor Programs

Previous research found that pictures of frequently grasped objects are sufficient to spontaneously induce mental representations of grasping and holding the objects – that is, people's motor system is spontaneously activated based on the observation of the object's affordances (Tucker & Ellis, 1998).

Furthermore, it has been demonstrated that visual depictions that portray an object oriented towards participants' dominant (*vs.* non-dominant) hand facilitate mental simulations of motor responses, and increase purchase intentions of the object (i.e., an indicator of product liking; Elder & Krishna, 2012). However, interference with grasping movements decreases perceived fluency and liking of the target objects. For example, holding a restricting object (a fork) in the dominant hand impairs participants' perceived fluency of the grasping simulation, and results in them liking the graspable target object (a pen) less compared to holding the restricting object in their non-dominant hand (Shen & Sengupta, 2012).

This paradigm is important because it shows the effects of motor interference on

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[4] To test participants' awareness of our hypothesis, they answered several questions, probing if they noticed anything special (in general, with the dot- or the head-movement), what they thought the study was about, if they had an idea why we asked them to make the head-movements, and if they were able to detect the connection between the head- and the dot-movement. One participant reported: "Head left/down is eyes right/up", but could not state our hypothesis relating to power. Most participants stated ideas concerning possible connections between the essays and the dot-task (e.g., "if feeling power makes people more likely to quit a rather boring task"), but none connected power to visual ease.

linking judgments. Whilst the online assessment of fluency from motor system activation is rather difficult (and often achieved via proxy variables, such as reaction times; Tucker & Ellis, 1998), similar information can be gained from assessing motor interference[5]. In addition, the paradigm allows examining whether participants' perceived fluency contributes to differences in liking judgments (cf. Shen & Sengupta, 2012).

Experiment 3 followed Shen and Sengupta's (2012) paradigm. We expected powerful participants' liking judgments of the viewed, graspable object (the pen) to be more strongly guided by their restricting (*vs*. non-restricting) motor condition causing (*vs*. not causing) interference than those of powerless participants. We also assessed liking for the restricting, held object (the fork). Because dominant hand movement simulations are more fluent than non-dominant hand movement simulations we expected participants to like more this object when in their dominant hand (*vs*. in the non-dominant hand). Crucially, this tendency should be more pronounced for powerful participants. Finally, we explored whether power would affect perceived fluency of imagined reaching movements towards the graspable object, and if this could account for differences in liking.

Method

Participants and design. We aimed at recruiting 100 participants (i.e., roughly two times the average number of participants in the experiments of Shen & Sengupta, 2012). Recruitment stopped once enough participants had signed up. One hundred and two participants took part in this experiment for either £2 or course credit. They were randomly assigned to the conditions of a 2 (power: powerful vs. powerless) x 2 (motor restriction: dominant vs. non-dominant hand) between-subjects design. Participants took part in individual cubicles, received all instructions and completed the task on a computer. Participants were excluded if they guessed the experiment's purpose (e.g., "Possibly the

[5] We thank an anonymous reviewer for suggesting this approach.

interaction between the position of the pen on the screen and the hand in which I was holding the fork; and how power has an influence on how much we like the fork/pen depending if it is in the congruent position"; *n*=3), reported difficulties with the experiment (*n*=1), or when they were outliers in the analyses below (determined by Cook's D values, studentized residuals and graphical examination of the index plot as described in analysis procedures by Cohen, Cohen, West, and Aiken, 2003; *n*=2). The final sample thus comprised 96 participants (59 females, 37 males; M_{age}=22.08, SD_{age}=5.33).

Procedure and materials. Participants allegedly took part in two unrelated studies, one on past events (which entailed the power manipulation of Experiment 1) and one on product evaluations (which followed the procedure of Shen & Sengupta, 2012, Experiment 3). For this second study, participants were invited to provide feedback about a fork and, for this purpose, they were first asked to hold it for a while. They randomly received instructions to hold the fork either in their left or in their right hand; their restriction conditions (dominant vs. non-dominant hand) were coded based on their report of handedness, assessed at the very end of the experiment.

While holding the fork participants were invited to participate in a filler task in which they were presented with a picture of a pen on the computer screen (taken from Shen & Sengupta, 2012) and were asked to form an impression of it. After having seen the pen for 10 seconds, participants received instructions to put down the fork and to respond to a set of questions (all using 7-point scales, with the question sequence following Shen and Sengupta, 2012).

Participants were first asked to what extent they had imagined reaching toward and holding the pen[6] (imagination; 1 item; 1=*not at all* to 7=*a lot*), and how imagining holding

[6] This question was only included because we wanted to keep the same sequence and set of questions as in Shen and Sengupta (2012); they included this item, for which they "did not make a priori predictions" (p. 527), so that participants would not find it strange to be asked the subsequent question regarding fluency.

the pen felt (fluency of imagination; 4 items; anchors on 7-point scales at *difficult-easy, unpleasant-pleasant, wrong-right, uncomfortable-comfortable*; α=0.81). Subsequently they were requested to rate the fork and the pen (3 items; anchors on 7-point scales at *unattractive-attractive, unfavourable-favourable, negative-positive*; α_{fork}=0.88; α_{pen}=0.90).

Participants then completed the same two power manipulation check items as in Experiment 1 (*r*=.72, *p*<.001) and we again assessed their task-evaluation (4 items; α=0.73) and mood (4 items; α=0.91). Finally they provided demographic information, and their handedness. We did not run additional conditions or measure additional dependent variables not mentioned here.

Results

Manipulation check. An ANOVA with the between-subjects factors power and motor restriction indicated that the power manipulation was successful, as participants in the powerful condition felt more in control (*M*=5.88, *SD*=0.81) than in the powerless condition (*M*=2.82, *SD*=1.15), *F*(1, 92)=226.14, *p* <.001, η_p^2=0.71, $CI_{95\%}$ [2.687, 3.504].

Aesthetic preferences – target object (pen). Preliminary analyses indicated that there were no effect of power or motor restriction on task-evaluation, all *F*s<1.18, *p*s > .28, all η_p^2<.014. However, compared to powerless participants (*M*=4.06, *SD*=1.24), powerful participants (*M*=4.93, *SD*=1.23) reported being in a better mood, *F*(1,92)=11.03, *p*<.01, η_p^2=.11 (all other *F*s<1, *p*s>.36). Therefore, mood and the mood x motor restriction interaction were included in the analyses below (cf. Yzerbyt et al., 2004).

A 2 (power: powerful vs. powerless) x 2 (motor restriction: dominant vs. non-dominant hand) ANOVA on participants' pen evaluation scores revealed a power x motor restriction interaction, *F*(1,90)=4.37, *p*=.039, η_p^2=.05 (for power and motor restriction *F*s <1, *p*s>.76). Not controlling for mood and the mood x motor restriction interaction resulted in a similarly significant interaction, $F(1,92)=5.40$, $p=.022$, $\eta_p^2=.06$ (see Table 1), indicating that these covariates can be ignored. Powerful participants tended to evaluated the pen less favorably when their motor program was restricted ($M_{\text{high power}}=5.31$, $SD_{\text{high power}}=1.18$) than when it was not restricted ($M=5.85$, $SD=0.74$), $F(1,92)=2.84$, $p=.096$, $\eta_p^2=.03$, while this difference was not significant for powerless participants ($M_{\text{unrestricted}}=5.15$, $SD_{\text{unrestricted}}=1.27$; $M_{\text{restricted}}=5.67$, $SD_{\text{restricted}}=0.95$), $F(1,92)=2.57$, $p=.113$, $\eta_p^2=.03$. In addition, when participants' motor program was restricted (their dominant hand was occupied) no pen evaluation differences emerged, $F<1.38$, $p>.24$, $\eta_p^2<.02$, but when participants' motor program was not restricted (their dominant hand was not occupied) powerful participants evaluated the pen more favorably than did powerless participants, $F(1,92)=4.26$, $p=.042$, $\eta_p^2=.04$, $CI_{95\%}$ [0.260, 1.372].

Aesthetic preferences – held object (fork). The same ANOVA on participants' fork evaluation scores revealed a motor restriction main effect, $F(1,92)=5.32$, $p=.023$, $\eta_p^2=.06$, $CI_{95\%}$ [0.820, 1.093], such that participants liked the fork more when holding it in their dominant ($M=4.44$, $SD=1.18$) compared to their non-dominant hand ($M=3.82$, $SD=1.33$). Crucially, this was qualified by a power x motor restriction interaction, $F(1,92)=4.78$, $p=.031$, $\eta_p^2=.05$. Powerful participants liked the fork more when they held it in their dominant ($M=4.72$, $SD=1.14$) rather than their non-dominant hand ($M=3.57$, $SD=1.44$), $F(1,92)=10.12$, $p=.002$, $\eta_p^2=.10$, $CI_{95\%}$ [0.430, 1.860]. Contrary, this difference was not significant for powerless participants ($M_{\text{dominant}}=4.03$, $SD_{\text{dominant}}=1.14$; $M_{\text{non-dominant}}=4.00$, $SD_{\text{non-dominant}}=1.24$), $F<1$, $p>.93$. Given that merely seeing objects activates the simulations of actions in accordance with their affordances (Tucker & Ellis, 1998), this suggests that powerful participants integrated the increased fluency of the motor activation in their judgment.

Imagination and imagination fluency. In line with the findings of Shen and

Sengupta (2012), there were no differences in reported imagination of reaching toward and holding the pen, all *F*s<2.4, all *p*s>.12, all η_p^2<.025. However, concerning the fluency of imagination a marginal power x motor restriction interaction emerged, $F(1,92)=3.13$, $p=.08$, $\eta_p^2=.03$ (see Table1). Decomposing this interaction indicated that whereas powerful participants tended to report less fluency of imagination under motor program restriction ($M_{unrestricted}=4.35$, $SD_{unrestricted}=0.88$; $M_{restricted}=3.73$, $SD_{restricted}=1.04$), $F(1,92)=3.42$, $p=.068$, $\eta_p^2=.04$, the latter did not affect powerless participants ($M_{unrestricted}=4.29$, $SD_{unrestricted}=1.40$; $M_{restricted}=4.51$, $SD_{restricted}=1.14$), $F<1$, $p>.51$. Furthermore, when participants' motor program was restricted powerful participants found it less easy and comfortable to imagine reaching out toward the pen and holding it than powerless participants, $F(1,92)=6.18$, $p=.015$, $\eta_p^2=.06$; however, when participants' motor program was not restricted powerful and powerless participants reported equal fluency of imagination levels, $F<1$, $p>.87$.

Discussion

Going beyond the previous experiments, Experiment 3 investigated motor interference by restricting people's spontaneous motor system activation. Consistent with the results of Experiments 1-2, power increased liking of a graspable object (a pen) that was in view and could (*vs*. could not) be fluently grasped. The experiment also showed increased liking for a utensil (a fork) held in one's dominant (*vs*. non-dominant) hand, thus increasing the fluency of the utensil's afforded actions. This finding is consistent with the greater action facilitation (Galinsky et al., 2003) found in power holders. Here we show for the first time implications for aesthetic judgment.

One can speculate that even stronger effects should emerge when powerful participants are not only visually presented with a target object, but also required to act upon it. For example, Ping, Dhillon, and Beilock (2009) showed that people asked to move an object to a pre-specified location liked an object (e.g. a cup) more when its handle was pointed towards rather than away from them. The current findings also lend preliminary support for the notion that these effects of power on aesthetic judgments are accompanied by differences in perceived motor fluency. Specifically, restricting dominant hand movements decreased the perceived fluency of reaching towards the graspable object in powerful but not powerless participants.

The previous experiments relied on manipulated differences in motor (dis)fluency after the experimental power induction. To rule out that the obtained effects are located in acquisition of fluency rather than in the use of motor fluency experiences, Experiment 4 sought to investigate the extent to which the powerful are guided more strongly in their preferences by fluency stemming from habitual motor experiences. Thus, chronic motor experiences varied independently of the power manipulation.

Experiment 4: Habitual Motor Programs

In the previous experiments, especially the first two, the effects of power could derive from differences in the *acquisition* of motor experiences rather than the reliance on these motor experiences. To rule out this possibility, in the present experiment motor training was acquired *before* the power manipulation, forming part of participants' chronic repertoire. We again focused on motor interference and capitalized on Beilock and Holt's (2007) finding that compared to novices, skilled typists like non-interference letter-dyads (typed with fingers from different hands) more than interference letter-dyads (typed with the same finger). If power holders rely more on chronically accessible motor fluency, then skilled (*vs.* novice) power holders should be more strongly influenced by the motor interference caused by interference letter-dyads. In contrast, powerless participants should remain relatively unaffected by their motor skills.

Method

Participants and design. We aimed at recruiting 60 participants so that based on a median split (see below) we would have a comparable number of experts (i.e., 29) in our sample as Beilock and Holt (2007). Because of difficulties in the recruitment of participants, data was collected in two waves. Participants were recruited for a study demanding basic typing skills (having taken a typing course, using the 10-finger system, or typing at least 3 hours/week; cf. Beilock & Holt, 2007) and paid £5. They were randomly assigned to conditions. Three participants were excluded: One participant who took part twice and had also participated in previous experiments involving the same power induction and one participant who was an outlier in the reported analysis (Cohen et al., 2003). This left 57 participants (41 females; M_{age}=26.82, SD_{age}=9.73) in the sample. Two participants did not fill in the manipulation check and control variable scales.

Procedure and materials. Participants underwent the power manipulation of Experiment 1. Seemingly as part of an unrelated second study, they were then instructed to place their fingers on the ASDFJKL-keys (covered by green stickers) and their thumbs on the space bar. Participants' hands were hidden from their view with a black cardboard, and their verbally stated preferences were recorded (Beilock & Holt, 2007). Over 10 trials they saw two pairs of letters (28-point Courier New font) on the screen, and indicated which of the two dyads they spontaneously preferred by saying "1" for the left and "2" for the right dyad.

Ten of the meaningless, minimally pronounceable and not rhyming dyads consisted of letters that would be typed with the same finger of the same hand (e.g. FV) and 10 of letters that would be typed with different fingers from different hands (e.g. FJ). Within each pairing of dyads their left/right position was varied (order had no effect); between each presentation a 750-ms blank screen appeared. Responses were coded 0 for the interference dyads and 1 for the non-interference dyads. A preference score >5 indicates a preference for dyads not creating motor interference, a score of 5 indicates no preference, and a score below 5 a preference for dyads creating motor interference. Finally, participants completed the same power manipulation check as before (r=.67, p<.001). We examined task-evaluation (4 items; α=0.78), mood (4 items; α=0.89), and judgment certainty (2 items; r=0.79, p<.001) as before (for exploratory scales assessed, see supplemental material online). We did not run any additional conditions or measure any additional dependent variables not mentioned here or in the footnote[7].

Participants' typing speed, based on words-per-minute and errors, was measured via an online typing test (www.typingtest.com) *after* the experiment, in order not to raise suspicion amongst participants concerning the experiment's aim. Participants' status as novices or skilled typists (i.e., their typing expertise) was established based on a median split on typing speed. Novices typed more slowly than experts, t(55)=-10.96, p<.001.

Results

Manipulation Check. An ANOVA with the between subjects factors power and typing expertise revealed that participants in the powerful condition felt more in control (M=5.48, SD=1.14) than participants in the powerless condition (M=2.50, SD=1.00), F(1,51)=102.24, p<.001, η_p^2=.67, $CI_{95\%}$ [2.334, 3.491], indicating that the power manipulation was successful.

Aesthetic preferences. Preliminary analyses indicated that, similarly to Experiment 1, judgment certainty differed by expertise: Compared to experts (M=3.81, SD=1.24), novices (M=4.66, SD=1.41) were more certain about their judgments, F(1,51)=5.25, p<.05, η_p^2=.09

[7] Prior to the experiment we assessed the Rational-Experiential Inventory (Epstein, Pacini, Denes-Raj, & Heier, 1996). After the judgment task we assessed the Private Body Consciousness sub-scale (Body Consciousness Questionnaire; Miller, Murphy, & Buss, 1981; α=.81); novices (M=2.46) vs. experts (M=1.89) tended to provide higher ratings, F(1,49)=2.63, p=.111. We assessed the Private Self-Consciousness sub-scale (Revised Self-Consciousness Scale; Scheier & Caver, 1985; α=.80); high (M=2.23) vs. low power participants (M=2.02) tended to provide higher ratings, F(1,49)=2.24, p=.141. With items as in Experiment 1 we assessed if participants felt harmony (2 items, r=.70) and based their judgments on thoughts (2 items, r=.58) and feelings (2 items, r=.36, ps<.01). We only found a power x expertise interaction for thoughts, F(1,49)=4.64, p=.036; high (M=5.63) vs. low power experts (M=4.30) tended to provide higher ratings, low (M=5.46) vs. high power novices (M=4.94) tended to provide higher ratings, but simple effects were not significant, Fs<1.13, ps>.29.

(all other *F*s<1, *p*s>.88). Therefore, judgment certainty and the certainty x power interaction (cf. Yzerbyt et al., 2004) were included in the analysis. There were no effects for participants' task-evaluation and mood revealed no significant effects, *F*s<1.95, *p*s>.16, all η_p^2<.04.

A 2 (power: powerful vs. powerless) x 2 (typing expertise: novice vs. experts) ANOVA, on participants' preference scores revealed a power x expertise interaction, $F(1,49)=6.47$, $p=.014$, $\eta_p^2=.12$, (see Fig. 4; all other *F*s<1.9, *p*s>.17, all η_p^2<.04). Not controlling for judgment certainty resulted in a similarly significant interaction, $F(1,53)=6.25$, $p=.016$, $\eta_p^2=.11$. As hypothesized, compared to powerful novices (*M*=5.06, *SD*=0.99) powerful expert typists preferred the dyads not causing interference (*M*=6.00, *SD*=1.13), $F(1,49)=5.87$, $p=.019$, $\eta_p^2=.11$, $CI_{95\%}$ [0.184, 1.975]. For powerless participants no preference differences emerged, $F<1.35$, $p>.25$, $\eta_p^2<.03$.

Discussion

Compared to powerful novices, powerful expert typists preferred letter-dyads that – if typed – create the least motor interference. They used the fluency that arises from covert sensorimotor preparation to type them (Holt & Beilock, 2007; Van den Berg et al., 1990) to form aesthetic judgments. The powerless demonstrated no such differences based on expertise. Thus, habitual motor experiences guided the preferences of powerful individuals more strongly. This finding locates the effects of power in the use of motor fluency experiences (rather than in their acquisition) because chronic motor experiences varied independently of the power manipulation.

General Discussion

Four studies provided empirical evidence for a link between social power and motor fluency reliance. Power consistently increased reliance on motor fluency, stemming from resonance in motor representations (Experiment 1), extraocular muscle training which increased motor activation and preparedness (Experiment 2), or conversely from motor fluency being reduced by restricting motor program activation (Experiment 3), and by typing motor ease interferences (Experiment 4). Fluency differentially impacted aesthetic judgments concerning pictures, movements, objects and letter-dyads. These effects were obtained regardless of whether motor fluency was manipulated (Experiments 1-3) or resulted from prior expertise (Experiment 4). Furthermore, the experiments ruled out perceived task-enjoyment, task-demands, mood and confidence as alternative explanations for the effect of power. Thus, the current results cannot be explained by these conceivable intervening variables. Finally, including a control group (Experiment 2) suggested that high power increases, more than low power decreases, reliance on motor fluency.

One issue that arises is whether the above effects observed in powerful individuals stem from differences in the *use* of the experience of motor fluency in the construction of judgments or from *increased underlying motor activation* in the first place (for a similar discussion regarding construct accessibility see Higgins, 1996). Although we did not find differences in participants' self-reported reliance on feelings, felt harmony, and body consciousness in Experiments 1 and 4, Experiments 3 and 4 provide some evidence regarding mechanisms.

Specifically, Experiment 4 focused on interference linked to associations previously built in connection to typing motor programs, and the motor system was not directly activated, as participants were not typing. Here the effects seem to derive from interference resulting from previously acquired motor associations. Experiment 3 entailed blocking spontaneous motor programs of half of the participants by occupying their dominant hand (cf. Shen & Sengupta, 2012; Elder & Krishna, 2012). Blocking led to less perceived fluency of action simulation in powerful compared to powerless participants. This experiment provided preliminary support for the notion that differences in perceived motor fluency accompany the effects of power on aesthetic judgments.

The current set of experiments examined a variety of fluency sources involving both strong motor activation (see Experiments 1 and 2) and weak or blocked activation (Experiments 3 and 4). Thus, though it is conceivable that power may also affect motor activations in the first place, this potential additional process does not seem necessary for the current effects.

It is noteworthy that people need not be explicitly aware of their reliance on motor fluency (cf. funneled debriefing result of Beilock & Holt, 2007, and Leder et al., 2012; cf. pilot study on explicit awareness in Topolinski, 2010; also see Footnote 3). This lack of awareness has been shown in other fluency domains; for example, the effects of mood were only found for unobtrusive, but not self-report measures (e.g., zygomaticus major activation, response times; Topolinski, Likowski, Weyers, & Strack, 2009; Topolinski & Strack, 2009b; Winkielman & Cacioppo, 2001). Therefore, participants may make inferences that utilize motor processes even though they are not aware of the ways they construe their judgments, thus being unable to report on this when explicitly asked.

Contributions

The present findings offer several important contributions. Individuals have a supervisory attentional system that regulates the use of automatic and controlled processes depending on contextual factors such as the novelty of the situation (see Norman & Shallice, 1986; Shallice, 2002). The present results suggest that the supervisory attentional system monitors the individuals’ social position and uses this information to establish the inputs that enter in the construction of judgments: When individuals are socially in control this system creates a bias that favors the influence of bodily experiences, in particular motor fluency, at the expense of other sources of information.

Past research showed that power leads to action (e.g., Baumeister et al., 1988;

Galinsky et al., 2003; Guinote et al., 2002; Keltner et al., 2003). Here we show, for the first time, that the actions of power holders have more far reaching consequences than hitherto considered. They are an important source of information with consequences beyond the outcomes they intend to produce, directly impacting evaluations of stimuli present in the environment.

The present findings contribute to the growing body of evidence showing that the judgments of the powerful are more strongly based on bodily (Guinote, 2010a) and cognitive subjective experiences (Weick & Guinote, 2008; Guinote, 2007b) than those of powerless individuals. They demonstrate a similar attunement to bodily information in the novel domain of motor signals. The findings also show the dynamic nature of cognitive systems that take into account the states of the perceiver, here linked to power, on a moment-to-moment basis, to regulate the relevance of fluency experiences for the to-be-made judgment (cf. Greifeneder et al., 2011).

The findings contribute to the recently established motor fluency domain, corroborating the notion that a further, rather neglected instantiation of metacognitive fluency (Alter & Oppenheimer, 2009) resides in motor components. The current results demonstrate a heightened reliance on interoceptive motor cues amongst the powerful, whether these cues stemmed from resonance in motor representation, increased activation and preparedness of the motor system, motor interferences hindering the spontaneous activation of the motor system in accordance with object affordances, or chronic motor system preparedness.

Häfner (2013) demonstrated that the embodiment of abstract constructs (e.g., of softness in person judgment) is moderated by interoception. Taken together with the current findings, this suggests that those with power may display stronger embodied cognition than those who do not have power (Herbert & Pollatos, 2012; but see Lee & Schnall, 2014). This heightened reliance on interoceptive cues amongst the powerful should furthermore buffer experienced changes in self-other boundaries in response to multisensory stimulation (Tajadura-Jiménez & Tsakiris, 2014) and ultimately may constitute a factor that contributes to the power-social distance link documented in the literature (Lammers, Galinsky, Gordijn, & Otten, 2012; Magee & Smith, 2014). Future efforts will have to spell out to what extent these propositions are sustained by empirical evidence.

It is possible that motor fluency impacts attitude judgments more broadly, including evaluations of another's actions. For example, neural circuits related to action execution are active when observers see others performing an action, thus resonating with the observed motor behavior (Hogeveen & Obhi, 2011; Iacoboni, 2009; Obhi & Hogeveen, 2010). Also, action simulations that occur in the mirror neuron system when observing actions of another individual (see Gallese, 2005) vary in expertise and thus fluency (Bangert et al., 2006; Calvo-Merino, Glaser, Grezes, Passingham, & Haggard, 2005), which could impact social evaluations, in particular in powerful individuals, but only to the extent that others are indeed relevant to the powerful (cf. Hogeeven, Inzlicht, & Obhi, 2014). Examining the consequences of motor fluency for social evaluative judgments remains an important task for future research in light of findings demonstrating that motor resonance constitutes a basis for understanding the actions of interaction partners (e.g., Decety & Summerville, 2009; Grafton, 2009).

Considerations

We acknowledge that the current set of studies did not address factors that might moderate the documented findings. A potentially important factor might be the relevance of the fluency experience to the task at hand. Previous research provided evidence for the powerful having less strong experiences, as evidenced by reaction time data in tasks where the motor interference was *unrelated* to the judgment task. Specifically, in the Tucker and Ellis (1998) paradigm people have to indicate whether presented objects are upright or inverted by pressing a left or a right key, and participants are faster and more accurate when the objects' handles are oriented towards the response hand (i.e., compatible), showing that such peripheral cues activate motor programs associated with them. Guinote (2007c) showed that powerless, but not powerful, individuals were affected by this peripheral, task-irrelevant information and demonstrated delays in action when the peripheral information activated inconsistent responses. Consistent with these findings an examination of event related potentials in brain activity found that power holders more easily inhibit conflicting information and implement desired actions compared to control and powerless individuals (Schmid, Kleiman, & Amodio, 2015). Interestingly, in other research using the same paradigm by Tucker and Ellis compatible trials resulted in larger zygomaticus activity (i.e., an unobtrusive measure of positive affect; see above) – though no effects emerged for explicit liking ratings of compatible compared to incompatible objects (Cannon, Hayes, Tipper, 2010).

On the other hand, for experiences *related* to the judgmental task previous research indicates that the powerful are more attentive to cues of internal experiences, even if these cues are not valid. In one experiment high power individuals paid greater attention than low power or control individuals to bogus variations in their heart rate played back to them when judging the attractiveness of presented individuals, judging them more attractive when their bogus heartbeat indicated heightened arousal (Jouffre, 2015; Experiment 1). However, when this was *unrelated* to the task (with bogus heartbeat feedback allegedly stemming from another person), high power individuals paid less attention to this cue and judged the presented target individuals less attractive than control and low power individuals (Jouffre, 20015; Experiment 2). It is thus conceivable that powerful individuals use fluency experiences flexibly depending on their relevance for the task at hand.

A further question emerging thus seems to be when, rather than whether, the powerful demonstrate greater sensitivity in experiencing motor fluency or greater reliance on motor fluency experiences. The relevance of the experience for the task at hand seems to increase powerful individuals' attention to such cues, which they in turn might perceive with more sensitivity. Future research investigating this proposition would be advised to rely on unobtrusive, ideally neurobiological measures (e.g. fMRI).

A final consideration pertains to the power manipulation used. Because we investigated effects across a range of very different domains and used various paradigms to examine motor fluency, we opted to hold the power manipulation constant throughout the current experiments. Future work focusing on specific domains or paradigms should also consider structural manipulations of power and chronically differing power status.

Conclusion

The present work suggests that power leads people to rely more strongly on motor fluency in the construction of aesthetic preference judgments, whereas lacking power entails more controlled and extensive information processing to increase predictability and control. The current findings thus underscore the recently proposed role of motor fluency in judgment formation and demonstrate that social factors determine the extent to which experiences of motor fluency are integrated in judgment and decision-making process.

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Figure 1. Participants' artwork evaluations as a function of movement type executed and art style, shown separately for power conditions in Experiment 1. Error bars depict standard errors. The evaluation scale ranged from 1 (I do not at all like this painting) to 7 (I like it very much).

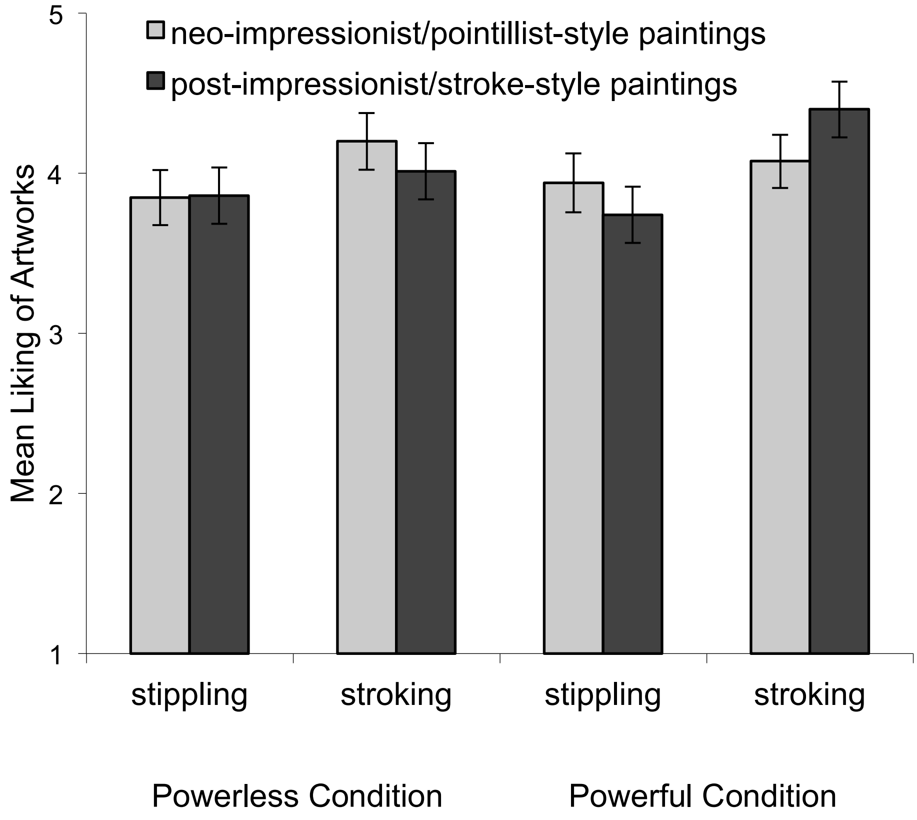

Figure 2. An example of a dot-movement in Experiment 2. The black dot filled a series of empty white circles in a 4 × 5 matrix. The dot always started in a randomly chosen corner of the matrix and moved in seven steps along the edge of the matrix toward a diagonally opposite corner, remaining in each position for 500 ms. The sequence shown, in which the dot moved upward and then to the right, induced the same eye movements as moving the head downward and then to the left while gazing at a fixation point. (Figure from Topolinski, 2010).

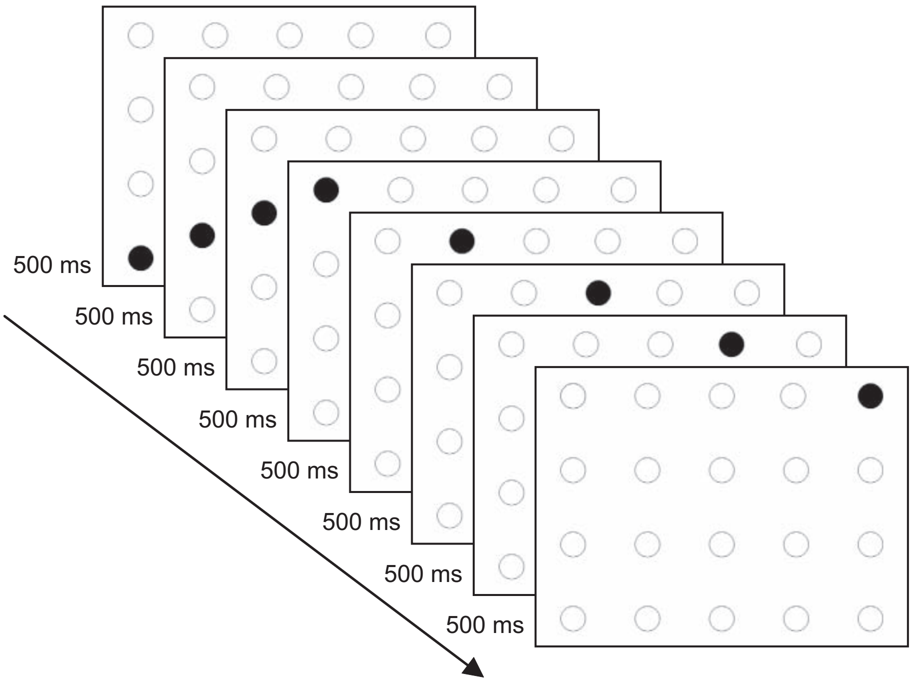

Figure 3. Participants' evaluations of dot-movements matching and nonmatching their prior EOM-training as a function of experimental condition in Experiment 2. Error bars depict standard errors. The evaluation scale ranged from 1 (very unpleasant) to 9 (very pleasant).

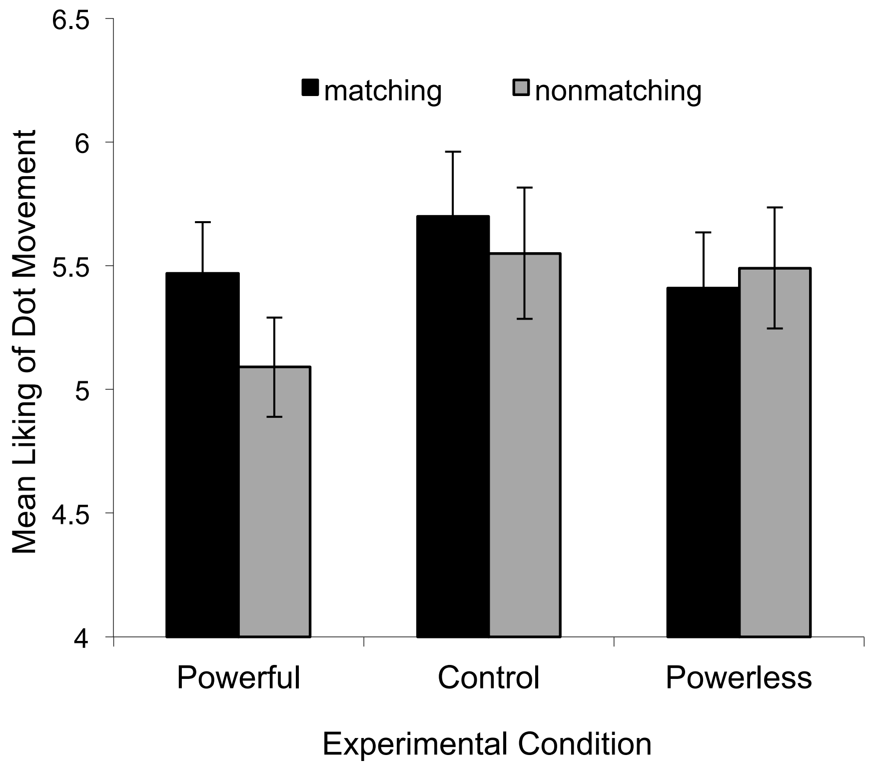

Figure 4. Participants' preference of non-interference over interference letter dyads as a function of power and typing expertise in Experiment 4. Error bars depict standard errors. The scale ranged from 0 to 10, with 5 indicating no preference for either letter dyads type.

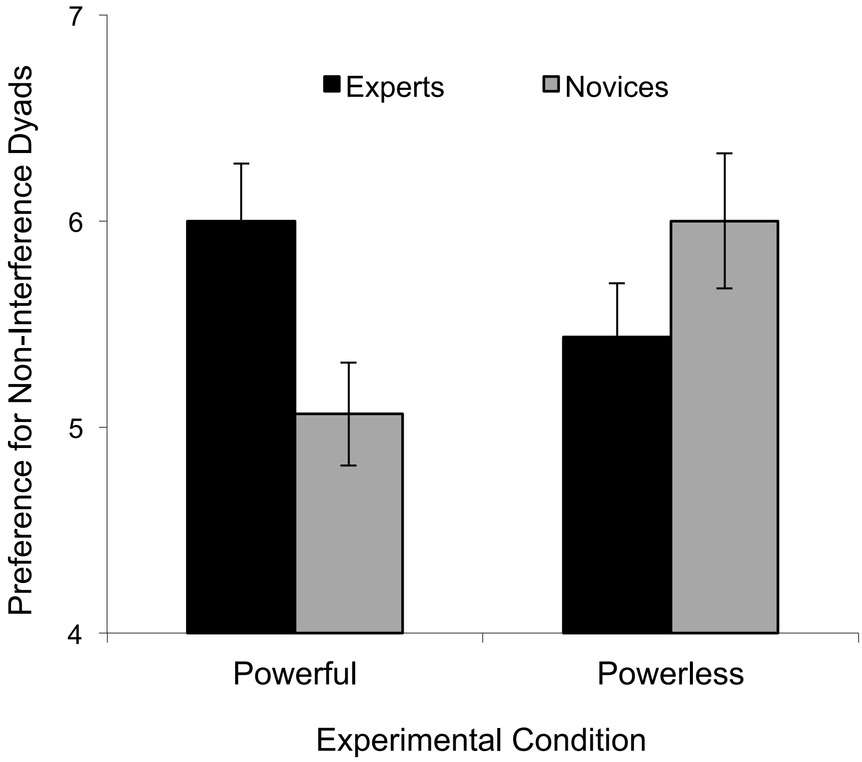

Table 1

Means (Standard Deviations) by Motor Restriction and Power for Participants' Pen Liking and Imagination Fluency in Experiment 3.

	Motor Restriction (dominant hand occupied)		No Motor Restriction (non-dominant hand occupied)	
	Powerful	Powerless	Powerful	Powerless
Pen Liking				
	5.31	5.67	5.85	5.15
	(1.18)	(0.95)	(0.74)	(1.27)
Imagination Fluency				
	3.72	4.51	4.35	4.29
	(1.04)	(1.14)	(0.88)	(1.40)