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# Motive-Modulated Attentional Orienting: Implicit Power Motive Predicts Attentional Avoidance of Signals of Interpersonal Dominance

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Implicit motives are commonly believed to orient behavior. Despite only sparse empirical evidence for this claim, an interplay of implicit motives and the attentional system seems plausible. In 2 preregistered eye-tracking studies (total $N$ = 263 after exclusions), we tested whether the implicit power motive (*n*Power), the capacity to derive pleasure from having impact on others, measured via the Picture Story Exercise, predicted participants' attentional orienting. Participants were simultaneously presented neutral faces and facial expressions of emotion (FEEs), with the latter signaling either dominance or submission. In both studies, *n*Power predicted initial avoidance of anger FEEs, which were deemed to be an aversive dominance signal. Initial orienting toward submissive FEEs was not predicted significantly by *n*Power. Results are discussed in the light of recent findings in neuroscience and with reference to limitations of our design. Our findings suggest that implicit motives do have an orienting function regarding initial responses to the encounter of interpersonal dominance signals.

*Keywords:* implicit motives, need for power, attentional orienting, eye-tracking, facial expressions of emotion

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Implicit motives are nonconsciously operating motivational dispositions that select, energize, and orient behavior (McClelland, 1987). Although this conceptualization is widely accepted in implicit motive research (e.g., Hofer et al., 2006; Köllner et al., 2019; Schüler et al., 2013; Schultheiss, 2008; Wang et al., 2011; Winter et al., 1998), the assumption of an attentional orienting function is based on a surprisingly small amount of empirical evidence (Schultheiss & Hale, 2007). Because implicit motives act as affect amplifiers and thus determine the reinforcer value of motive-specific incentives (see Schultheiss & Köllner, 2021), it is plausible to expect that they also modulate attentional orienting toward these incentives, considering the attentional system's sensitivity to reward and punishment (Bourgeois et al., 2016; Bromberg-Martin et al., 2010). Nevertheless, we know of only one published paper by Schultheiss and Hale (2007) that shows that implicit motives predict attentional orienting during presentation of motive-specific visual stimuli. In the present paper, we replicate and extend this earlier study by focusing on the role of the implicit power motive (*n*Power) in attentional orienting to interpersonal signals of dominance and submission in two eye-tracking studies.

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Kevin T. Janson wrote the manuscript. Kevin T. Janson and Oliver C. Schultheissde designed Studies 1 and 2. Kevin T. Janson programmed the experiments, assisted by Ksenia Khalaidovski. Kevin T. Janson and Alexandra Rudnaya recruited participants and conducted Study 1. Kevin T. Janson and Lea-Sarah Pülschen recruited participants and conducted Study 2. Martin G. Köllner provided coder training and supervised the coding process. PSEs were coded by Alexandra Rudnaya in Study 1, and by Lea-Sarah Pülschen and LS in Study 2. Kevin T. Janson prepared data, assisted by Ksenia Khalaidovski. Kevin T. Janson analyzed the data, assisted by Oliver C. Schultheiss and Martin G. Köllner. All authors contributed to and have approved of the final manuscript.

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All participants gave their informed consent prior to their inclusion in the studies. The manuscript does not contain clinical studies or patient data. Procedures were approved by the ethics committee of the Friedrich-Alexander University in Erlangen (No. 181_17 B) and complied with APA ethical standards.

The authors have no conflict of interest.

Reproducible analysis scripts for all reported results, data files, as well as output files are available at the Open Science Framework (https://osf.io/c7ena/).

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## The Need for Power

*n*Power describes the capacity to derive pleasure from exerting an influence on others, while experiencing the influence of others on oneself as aversive (Schultheiss & Köllner, 2021; Winter, 1973). It is assessed by standardized content-coding of imaginative stories that individuals write in response to depictions of ambiguous social situations (Schultheiss & Pang, 2007). Coding rules were derived from systematic comparisons between stories written after experimental arousal of power motivation and stories written under neutral conditions (Winter, 1991). *n*Power's measurement therefore has causal validity (see Borsboom et al., 2004; see also McClelland, 1958). *n*Power must not be equated with thematically related motivational constructs measured via self-report because implicit motive measures show no reliable variance overlap with such measures of self-attributed motives (Köllner & Schultheiss, 2014; Spangler, 1992).

Past research provides ample evidence for *n*Power's predictive validity (for review, see Schultheiss & Köllner, 2021). In particular, *n*Power is associated with behaviors that allow having interpersonal impact, especially if activity inhibition (AI) is taken into account. AI is measured by determining the frequency of negations in running text and is considered to be a marker of right-hemispheric brain activation during stress (Schultheiss et al., 2009). As a common moderator of behavioral expression in power-motivated individuals, its simultaneous assessment allows distinguishing two meaningful dispositional configurations of power motivation (see Schultheiss, 2008): The inhibited power motive (high *n*Power, high AI), which has been described as a socially considerate manner of seeking impact, and the uninhibited power motive (high *n*Power, low AI), which has been described as an impulsive style of seeking impact (Langens, 2010; Schultheiss, 2008). Consistent with this characterization, correlations of *n*Power with distal indicators of success in the interpersonal world, such as managerial success and work accomplishment, emerge primarily for the inhibited power motive (McClelland & Boyatzis, 1982; Steinmann et al., 2015).

Schultheiss and Köllner (2021) suggested that power-motivated individuals' proficiency in having impact builds on their special sensitivity to motive-specific environmental cues. In the case of *n*Power, relevant cues are signals of interpersonal dominance and submission (Stanton et al., 2010), as they imply either the impending influence of others on oneself or one's successful influence on others, respectively (Donhauser et al., 2015; McClelland, 1987). *n*Power augments the affective response to these cues and thus makes them attractive or aversive, respectively (Schultheiss & Köllner, 2014; Stanton et al., 2010). Supporting evidence comes from studies by Fodor and colleagues, who used electromyography to assess the activity of the corrugator muscle with heightened activity as an indicator of negative affect. They observed that *n*Power predicted less corrugator activation responses to a submissive-acting person and more corrugator activation responses to a dominant-acting person (Fodor et al., 2006). The latter pattern of association was also obtained when research participants received negative audience reactions while giving a speech (Fodor & Wick, 2009).

Salient cues that signal a sender's interpersonal dominance to a perceiver are facial expressions of emotion (FEEs; Hess et al., 2000; Knutson, 1996). While anger FEEs are hypothesized to signal a sender's high dominance and thus represent a disincentive for high-*n*Power individuals, expressions of surprise are assumed to signal a sender's low dominance, making them attractive incentives for high-*n*Power individuals (see Stanton et al., 2010). In support of these arguments, Rösch et al. (2013) showed that affective responses to FEEs depend on the viewer's *n*Power and are particularly discerning when coupled to high AI.

Power-motivated individuals' responsiveness to FEEs extends beyond affective responses. For instance, *n*Power predicts a faster recognition speed (Donhauser et al., 2015) and better classification of FEEs (Vongas & Al Hajj, 2017). Moreover, studies assessing event-related potentials indicate that high-*n*Power individuals—compared to low-*n*Power individuals—perceive anger FEEs to be more salient (Wang et al., 2011) and they are more sensitive to dynamic changes in the intensity of such FEEs (Wang et al., 2014).

To sum up, there is broad empirical support for *n*Power's sensitivity to cues related to dominance and submission, which also implies that attentional processes are involved. The argument for an orienting function becomes even more compelling if one considers affective amplification of reward values as a potential mechanism that is intrinsically tied to the attentional system's properties.

## The Attentional System and Reward Sensitivity

As an adaptive neurobiological system, attention is sensitive for reward and punishment (see Bourgeois et al., 2016; Bromberg-Martin et al., 2010; Hikosaka et al., 2013). Individuals preferably (e.g., Chelazzi et al., 2014), quickly (e.g., Rothkirch et al., 2013), and accurately (e.g., Hickey & van Zoest, 2012) shift their attention toward stimuli promising reward. Although this sensitivity applies in principle to intense aversive stimuli predicting punishment, too (Peck & Salzman, 2014; Pourtois et al., 2013), low-intensity aversive stimuli are more likely to be avoided, as they are unpleasant but not quite as threatening and therefore may not have to be dealt with immediately (Schultheiss & Hale, 2007; Wilson & MacLeod, 2003). The absence of punishment resulting from the avoidance of aversive stimuli without immediate disadvantageous consequences, in turn, has reinforcing effects (see Kim et al., 2006). It becomes evident that environmental stimuli do not only hold mere physical salience originating in their objective properties or become relevant when they are consciously sought-after, but also, based on their value for the perceiver, hold *motivational* salience (see Bromberg-Martin et al., 2010).

Past research indicates that value-based attentional control is neuroanatomically distinct from classical bottom-up and top-down control (see Bourgeois et al., 2016). Processes of stimulus-driven and goal-driven selection are usually linked to frontoparietal cortical networks (see Fiebelkorn & Kastner, 2020) projecting to the superior colliculus, which is the key structure for the initiation of saccadic eye-movements (Wurtz & Albano, 1980) and critically involved in attentional orienting (Krauzlis et al., 2013).

In experiments featuring single neuron recordings in nonhuman primates, Hikosaka and colleagues have demonstrated that visual information, which is conveyed from the cortical networks to the superior colliculus, becomes value-laden in a subcortical side path (Hikosaka, 2007; Hikosaka et al., 2013; Kim et al., 2015). This happens in the caudate nucleus, a part of the striatum, where spatial information from cortical areas is integrated with signals from midbrain dopamine neurons (Hikosaka, 2007; Hikosaka et al., 2013), which encode motivational value (i.e., reward or punishment) and concurrent motivational salience (Bromberg-Martin et al., 2010; Kim et al., 2015; Matsumoto & Hikosaka, 2009). The resulting valuated information is then conveyed to the superior colliculus via areas of the substantia nigra, resulting in a facilitation of attentional orienting toward motivationally salient stimuli (Hikosaka, 2007; Hikosaka et al., 2013).

There is also compelling evidence for a comparable dopamine-dependent valuation of visual stimuli occurring in the human midbrain (Anderson et al., 2016; Anderson et al., 2014; Hickey & Peelen, 2015; Krebs et al., 2012), although additional structures, such as the anterior cingulate and amygdala as well as certain cortical areas may be involved (see Bourgeois et al., 2016; for an overview).

## The Need for Power and Attentional Orienting

In his review, Hikosaka (2007) concludes that the process of midbrain dopamine neurons informing the valuation of visual stimuli in the striatum is well-described but also that it remains unclear which processes and associated structures inform these neurons about a stimulus's incentive value in the first place. When it comes to interpersonal signals of dominance and submission, brain areas associated with *n*Power might act as such an informant, altering affective responses and reward values and thus, creating motivational salience in a stimulus-specific manner (see also Wang et al., 2014; Wang et al., 2011). This was previously suggested by Schultheiss and Schiepe-Tiska (2013), who synthesized findings from neuroimaging and experimental studies to introduce several hypotheses concerning the brain basis of *n*Power. It has been shown that, when confronted with FEEs, brains of high-*n*Power individuals in fact show stronger activation in several regions implicated in the valuation of visual stimuli, especially in the caudate nucleus area of the dorsal striatum (Hall et al., 2010; Schultheiss et al., 2008).

However, so far only Schultheiss and Hale (2007) have tested the link between *n*Power and attentional orienting by assessing *n*Power with a Picture Story Exercise (PSE; McClelland et al., 1989) and attentional orienting with a dot-probe task (MacLeod et al., 1986). Differences in reaction times to probes replacing either an FEE or a neutral face, which were presented side by side, indicated that *n*Power indeed predicted attentional bias. As expected, individuals high in *n*Power were prone to shift their attention toward surprise FEEs and away from anger FEEs.

Nevertheless, the Schultheiss and Hale (2007) studies were limited by their low statistical power (*N*s = 52 and 60) and their use of the dot-probe task, a measure whose reliability has been criticized (Kappenman et al., 2014; Schmukle, 2005) and that does not allow direct assessment of the time course of attentional orienting. Also, Schultheiss and Hale (2007) had expected that high-*n*Power individuals would switch back from avoidance to vigilance when confronted with anger FEEs for longer periods of time because stimulus threat increases with presentation time but did not observe such an effect. Thus, Schultheiss and Hale's (2007) findings need to be replicated with higher statistical power and research designs that do not rely solely on the dot-probe paradigm as an indirect measure of attention.

## The Present Research

We extended research on *n*Power and attentional orienting with two eye-tracking experiments that allowed us to assess attentional orienting more directly and to observe its time course. Following the general design of the Schultheiss and Hale (2007) studies, after administering a PSE to assess *n*Power, we measured participants' attentional orienting while they were shown pairs of FEEs and neutral faces. In both studies, participants subsequently worked on an Approach-Avoidance-task (AAT; Rinck & Becker, 2007) that was included to aid our interpretation of eye-tracking data[1]. Based on previous research, we stated and preregistered the following hypotheses (https://aspredicted.org/sd29t.pdf):

When presented both a neutral face and an FEE, high-*n*Power individuals, compared to low-*n*Power individuals, are more likely to initially orient their gaze toward signals of submission (surprise FEEs; *Hypothesis 1*) and away from signals of dominance (anger FEEs; *Hypothesis 2*). When presented both a neutral face and an anger FEE, the former individuals should switch back more rapidly than the latter toward the anger FEE after showing initial avoidance, as stimulus threat increases with presentation time (*Hypothesis 3*). Therefore, high-*n*Power individuals, compared to low-*n*Power individuals, do not only look at surprise FEEs (*Hypothesis 4*) but also at anger FEEs for longer periods of time (*Hypothesis 5*).

As stated in our preregistration, we tested whether our results are dependent on AI as a common moderator of *n*Power's behavioral expression.

## Study 1

### Method

#### *Participants*

Studies were approved by the ethics committee of Friedrich-Alexander University's Faculty of Medicine (No. 181_17 B). Power analyses based on the standard effect size in social psychology (meta-analytically derived from more than 25,000 studies; Richard et al., 2003) suggested that 176 participants were needed for sufficient test power (80%) to recover a population effect of $\rho = .21$ in a sample at a *p*-level of .05. We anticipated high attrition rates, which are common in eye-tracking research (see Holmqvist et al., 2011), and therefore initially recruited 223 participants via opportunity sampling (psychology students were excluded) from January to April 2018. 174 participants were assigned to the eye-tracking experiment after a prescreening that ruled out the presence of severe eye diseases or participants' reliance on corrective lenses. Participants who did not pass the prescreening were assigned to another study that was unrelated to our eye-tracking approach. The eye-tracking experiment was completed by only 165 participants, with attrition due to experimenter error (*n* = 6), intentional cancelation (*n* = 2), and technical

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[1] The planned triangulation relied on affective responses to FEEs as the shared core component of an overlap between *n*Power, eye-tracking measures and the AAT. However, we learned only after pre-registering our hypotheses that the AAT does not reliably reflect affective responses (see Phaf et al., 2014), which may explain why our analyses involving this task remained inconclusive. We present all information concerning the AAT in an online supplemental materials.

problems ($n = 1$). Two additional participants were excluded after finishing the experiment because of their late disclosure of being a psychology major. Further participants had to be excluded only for specific sets of analyses, as their data collected in specific tasks was considered invalid. Details are given below. A sample description after general exclusions and numbers of specific exclusions can be found in Table 1.

## Design

The eye-tracking paradigm had a repeated-measures design with eye-tracking outcome measures (initial orienting and gaze duration) as dependent variables, FEE type (anger vs. surprise) as experimentally varied within-subjects factor as well as *n*Power and AI as measured continuous between-subjects predictors. Sender sex (female vs. male) and hemifield of FEE presentation (left vs. right) were balanced across trials.

### *Materials*

**Motive Assessment.** *n*Power and AI were measured with a PC-administered standard PSE (Pang & Schultheiss, 2005), following procedures described in Schultheiss and Pang (2007). Six pictures were presented in random order and for 10 seconds each. After each presentation, participants had up to four minutes to type a short imaginative story into a textbox.

The resulting stories were coded for power motive imagery based on the *Manual for Scoring Motive Imagery in Running Text* by Winter (1994). In brief, *n*Power was coded for (a) strong, forceful actions, (b) control or manipulation, (c) impressing, persuading, or convincing others, (d) providing unsolicited help, (e) a concern with fame or prestige, and (f) the elicitation of strong emotions in others. Deviating from Winter’s (1994) recommendations, motive imagery was scored in each sentence in which it occurred and in multiple instances per sentence if imagery differed by subcategory (a to f). This approach increases reliability by reducing the occurrence of coding errors (Schönbrodt et al., 2013) and has been used previously (e.g., Janson et al., 2018). Two coders who previously exceeded 85% interscorer-agreement with an expert in training materials and who were blind with regard to participants’ eye-tracker data independently coded all PSEs using *PSEcoder* (Frisch & Schultheiss, 2012).

**Table 1**

*Sample Descriptions After General Exclusions and Number of Specific Exclusions*

| Variable | Study 1 | Study 2 |
|---|---|---|
| *N* | 163 | 187 |
| Sex | 102 ♀ 61 ♂ | 108 ♀ 79 ♂ |
| Age (*M*, *SD*) | 24.65, 6.83 | 25.63, 7.59 |
| Education | 88% | 87% |
| Nationality | 87% | 87% |
| Exclusions: PSE | 11 | 1 |
| Exclusions: ET | 18 | 58 |
| Exclusions: PSE & ET | 29 | 58 |

*Note*. Education describes the proportion of participants with the German *Abitur* (≈ A levels) or higher as their highest educational attainment in our samples. Nationality describes the proportion of native Germans in our samples. Additional exclusions refer to sets of analyses involving Picture-Story-Exercise (PSE) and/or eye-tracking (ET).

Motive sum scores, word count, and AI (German words “nicht” and “Nicht” as well as common alternative spellings “NICHT” and “nihct”; see Langens, 2010; Schultheiss, Riebel, et al., 2009) were automatically determined by *PSEcoder.* Interrater reliability for *n*Power was excellent (Pearson’s $r = .90$) and scores of both coders were averaged to arrive at a final *n*Power score. Because 11 participants had not provided stories for every picture and/or had written less than 30 words per story on average, they were excluded from further analyses including PSE-variables (see Smith, 1992). Because raw scores for *n*Power and AI were skewed, we subjected them to a square-root transformation after adding 1 (see Smith, 1992). To account for individual differences in writing fluency, the resulting scores were residualized for story word count using linear regression analysis and then transformed into *z*-scores (see Schönbrodt et al., 2020; Schultheiss & Pang, 2007).

**Stimulus Material.** Stimuli for the eye-tracking experiment were chosen from the *Standardized and Motivated Facial Expression of Emotion Stimulus Set* (*SMoFEE*), a picture pool that was developed and validated by Skiendziel et al. (2019). The picture sets contain series of standardized colored photographs of Caucasians showing neutral facial expressions and FEEs. First, we sorted the FEEs of interest by their rated intensity based on Rösch (2012) and then eliminated pictures with a correct classification rate $<$ 0.80. Next, we chose the required number of pictures by intensity rank. Female and male pictures were selected in equal proportions. Contingent on FEE selection, neutral expressions for the same individuals who were included in the FEE set were used to form pairs. This approach ensured that the resulting pairs were naturally matched in terms of physical properties (e.g., luminance, coloring, size and contrast) and facial physiognomy (see Köllner et al., 2019).

**Eye-Tracking.** Gaze data were recorded with a Tobii TX300 desk-mounted eye-tracker operated at 120 Hz, using a dark-pupil corneal reflection method. Participants were seated 660 mm away from the screen and head position was maintained using a chinrest. According to the manufacturer, the eye-tracker achieves an average accuracy of 0.4° and an average precision of 0.15° after successful 5-point-calibration (Tobii Technology, 2010). Temporal precision was controlled via integration of tracking device, monitor (23″ TFT, 1920 x 1080 pixel resolution), and a software plugin provided by the manufacturer. As the eye-tracker software does not provide exact scores for accuracy and precision, participants completed an additional calibration validation procedure (see Holmqvist et al., 2011) before they proceeded to the eye-tracking task. It took place immediately after calibration and required participants to attend three points on the screen that were relevant for the experiment (center, location of left/right stimulus) for 2000 ms each.

The eye-tracking task was designed to recreate the key properties of the dot-probe task used by Schultheiss and Hale (2007) and was similar in this regard to previous studies of attentional orienting (e.g., Field et al., 2004; Mogg et al., 2003). Each trial started with the presentation of a central fixation cross for 1500 ms, which participants were instructed to attend to. When participants’ gaze did not align with the fixation cross after this time period, the fixation cross was shown again with a warning that reminded participants to attend to the fixation cross. Only when participants had complied, the fixation cross vanished and a picture pair of the same individual (FEE vs. neutral expression) appeared for 2000 ms to the left and right with their midpoints deviating 7.56° from center and a size of 5.17° x 7.58°. The task was comprised of 20 trials each featuring anger FEEs and surprise FEEs. Trials were balanced regarding sender sex and hemifield of FEE presentation. Ten trials with fear FEEs were added for explorative purposes. All 50 trials were presented in random order. Blinks and other events that caused the device to lose pupil and corneal reflection were cleaned from raw data. Cleaning resulted in the loss of 0.64% of data in the eye-tracking task after exclusion of invalid cases. To account for differences in response time and saccades toward the fixation points, the first 500 ms were cut from calibration validation trials. Calibration validation resulted in an average accuracy of 1.02° and average precision of 0.32° after exclusion of invalid cases, which we deemed acceptable for our purposes, considering stimulus size and extracted oculomotor events.

Each critical trial was analyzed regarding initial orienting and gaze duration after FEEs and neutral expressions had been overlaid with distinct areas of interest (AOIs) corresponding to stimulus size. Considering the quality of our data, we refrained from detecting and analyzing fixations. Initial orienting was defined as the first entrance into an AOI after stimulus onset and served as an indicator of oculomotor approach/avoidance reflecting motivational salience (Bromberg-Martin et al., 2010). A first entrance into the FEE AOI was coded as "1" and a first entrance into the neutral-face AOI was coded as "0." Within each category of stimulus type, scores were summed and divided by the number of trials during which participants had shown any oculomotor reaction. Resulting values could range from 0 (maximum bias toward neutral faces) to 1 (maximum bias toward FEE) with .50 as a midpoint of the scale (no bias). Gaze duration (in ms) was defined as the total time participants' gaze dwelled within AOIs and was used as an indicator of interest in and information value of a stimulus (Holmqvist et al., 2011). Values of gaze duration were averaged within categories of stimulus type. Specifically for the testing of *Hypothesis 3*, we also determined a switch-back latency (in ms), which was defined as the entry time (latency from stimulus onset until the first entrance into the FEE AOI) in trials that participants had begun with an initial avoidance of the FEE. Task structure and computation of basic eye-tracking measures is shown in Figure 1.

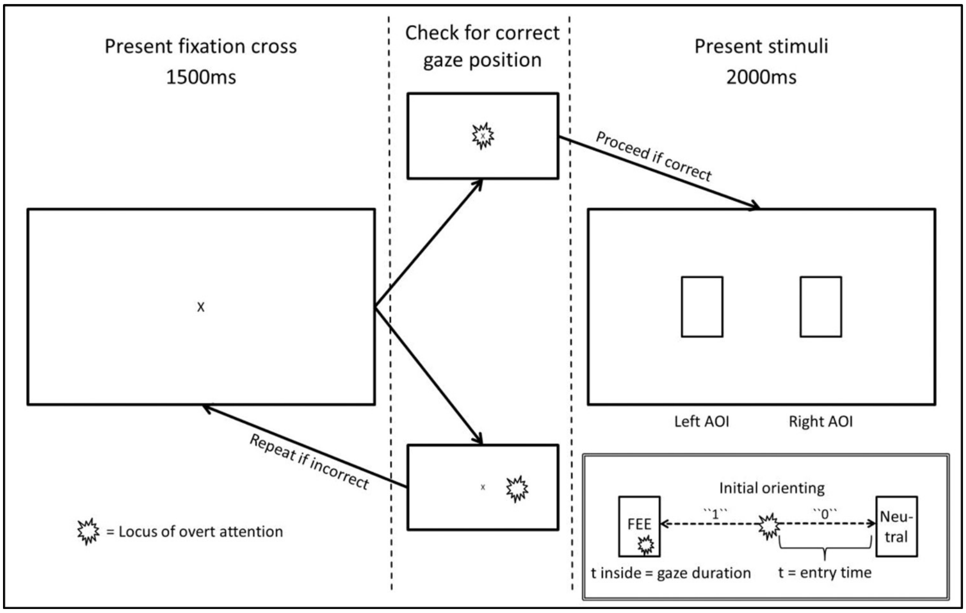
After preparation of gaze data, it became apparent that several data sets had to be excluded for analyses involving eye-tracking measures. First, we excluded four participants because more than 20% of critical data points were deleted in the process. Second, three additional participants were excluded because their gaze had not left the central AOI in more than 20% of critical trials. Deviating from our preregistration, we had to apply the following additional restrictions that we had not foreseen: Six participants were excluded because they had shown stereotypical behavior (always orienting to the right/left, irrespective of presented stimuli) and five participants were excluded because the average accuracy of their gaze data was beyond 3° in spite of a seemingly successful calibration. Gaze durations were not normally distributed. Thus, gaze durations were winsorized (1.5%), yielding improved distribution characteristics.

### Procedure

After they had signed an informed consent form and passed the prescreening, participants worked on standardized computer tasks in single cabins with artificial ceiling lighting. Tasks were programmed in Inquisit 5.6.0. Sessions began with the PSE to reduce influences originating from the test situation on our motive

**Figure 1**

*Task Structure and Computation of Basic Eye-Tracking Measures*



*Note*. FEE = facial expression of emotion; AOI = area of interest. Schematic visualization of task structure is true to scale. Basic eye-tracking measures are illustrated in the double-lined box in the bottom-right corner.

measure (Bosson et al., 2000; Schultheiss & Pang, 2007). The eye-tracking task and AAT came next. Before eye-tracking, participants had to remove corrective lenses and their make-up to improve the validity of the image analysis algorithm (see Holmqvist et al., 2011). Then, participants worked on several tasks that were unrelated to our hypotheses and provided demographic information. After completion of all tasks, participants received their reward (money or the opportunity to obtain individual feedback) and were debriefed.

### *Statistical Analyses*

We used SYSTAT 13.00.05 for data management, preparation, and analyses. Oculomotor events were extracted from gaze data with MATLAB 9.1.441655. Bayesian analyses were performed in JASP 0.14.1. Analysis scripts for all reported results, data files, and output files are available at the Open Science Framework (Janson et al., 2021, September 29; https://osf.io/c7ena/).

## Results

### *Descriptive Statistics*

Table 2 shows descriptive statistics and intercorrelations of all variables. High correlations between temporal eye-tracking measures should not be overinterpreted as their interdependence most likely arises from fixed trial durations (see Holmqvist et al., 2011) and participants' oculomotor signature (see Bargary et al., 2017).

### *Hypothesis Testing*

In line with our preregistration, we tested our hypotheses using multiple regression analyses with *n*Power and AI as predictors of the respective target variables (see Table 3). Main and interaction effects were tested hierarchically. As expected, we observed that *n*Power predicted initial orienting away from anger FEEs. Thus, *Hypothesis 2* was supported. Additionally, we observed that AI had an additive opposing effect, predicting initial orienting toward anger FEEs. We had to reject all other hypotheses. All interaction terms remained insignificant. Analyses were rerun after exclusion of flagged outliers but statistical conclusions regarding our hypotheses remained unchanged. Figure 2 visualizes the time courses of average attentional orienting in high- and low-*n*Power individuals and compares them to the prototypical time courses representing our hypotheses.

## Summary

In study 1, *n*Power only predicted initial orienting away from anger FEEs but not switch-back latency or gaze durations. Initial orienting toward anger FEEs was associated with AI. Meaningful associations with attentional orienting toward surprise FEEs were absent. Relationships with *n*Power were not moderated by AI.

# Study 2

## Method

### *Overarching Design Features*

In study 2, we aimed to replicate our findings from study 1 with higher-quality eye-tracking data. We tested the same preregistered hypotheses, but readjusted the eye-tracking task, its implementation and associated exclusion criteria (https://aspredicted.org/xv5pp.pdf).

Study design was the same as in study 1 and data was collected from January to April 2019. Apart from changes in the eye-tracking task, procedures were identical.

Interscorer agreement for *n*Power was .76. One participant had to be excluded due to an average story length $< 30$ words.

### *Participants*

261 participants were recruited via opportunity sampling. 191 participants were assigned to the eye-tracking experiment after prescreening. The experiment was completed by only 188

**Table 2**

*Descriptive Statistics and Correlations for Studies 1 and 2*

| | Study 1 | | Study 2 | | Correlation matrices: Study 1\Study 2 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variable | *M* | *SD* | *M* | *SD* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1. *n*Power | 7.54 | 3.78 | 4.67 | 2.77 | — | .06 | −.02 | −.15 | −.06 | −.13 | .05 | −.09 |
| 2. AI | 5.44 | 3.63 | 4.85 | 3.66 | .09 | — | .01 | .06 | −.05 | −.01 | −.01 | −.04 |
| 3. Story word count | 590.40 | 168.04 | 567.52 | 186.22 | .00 | .00 | — | .06 | −.17 | −.03 | −.17 | .18* |
| Anger FEEs | | | | | | | | | | | | |
| 4. Initial orienting | .50 | .07 | .50 | .06 | −.17 | .17 | .07 | — | .05 | −.02 | .00 | −.08 |
| 5. Switch-back latency | 925.47 | 170.80 | 726.23 | 108.84 | .00 | −.11 | .10 | .03 | — | .04 | .16 | .08 |
| 6. Gaze duration | 816.51 | 99.14 | 717.99 | 114.45 | −.02 | .07 | .11 | .00 | −.10 | — | .04 | .45** |
| Surprise FEEs | | | | | | | | | | | | |
| 7. Initial orienting | .53 | .08 | .53 | .06 | −.07 | .04 | −.07 | −.06 | .00 | −.04 | — | −.08 |
| 8. Gaze duration | 854.01 | 107.46 | 771.94 | 129.75 | .10 | .01 | .14 | −.09 | −.13 | .59** | .02 | — |

*Note.* *N* ranges from 134 to 152 in study 1 (below diagonal) and from 129 to 186 in study 2 (above diagonal) depending on respective tasks. *n*Power = implicit need for power; AI = activity inhibition; FEE = facial expression of emotion. Motive raw scores were used for computation of *M* and *SD*; word-count residualized scores were used for calculating correlation coefficients. Bias scores that were significantly different from the midpoint of the scale were underlined.

$^{*} p < .05$. $^{**} p < .01$.

**Table 3**

*Hypothesis Testing by Hierarchical Regression Analyses and Bayesian Linear Regression in Studies 1 and 2*

| | Study 1 | | | | | | | Study 2 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Effect | *B* | *SE* | β | *t* | *p* | $BF_{10}$ | $BF_i$ | *B* | *SE* | β | *t* | *p* | $BF_{10}$ | $BF_i$ |
| | *Hypothesis 1*: *n*Power predicts initial orienting toward surprise FEEs | | | | | | | | | | | | | |
| *n*Power | −0.006 | 0.007 | −.08 | −0.87 | .39 | 0.26 | 0.19 | 0.003 | 0.005 | .05 | 0.54 | .29 | 0.58 | 0.51 |
| AI | 0.003 | 0.007 | .04 | 0.44 | .66 | 0.20 | 0.16 | −0.001 | 0.006 | −.01 | −0.13 | .90 | 0.69 | 0.60 |
| *n*Power × AI | 0.002 | 0.007 | .02 | 0.28 | .78 | 0.03 | 0.05 | −0.005 | 0.006 | −.07 | −0.80 | .42 | 0.31 | 0.33 |
| | *Hypothesis 2*: *n*Power predicts initial orienting toward anger FEEs | | | | | | | | | | | | | |
| *n*Power | −0.012 | 0.006 | −.17 | −2.04 | .02 | 1.02 | 1.43 | −0.009 | 0.005 | −.16 | −1.76 | .04 | 2.98 | 3.11 |
| AI | 0.012 | 0.006 | .17 | 2.02 | .05 | 0.98 | 1.40 | 0.004 | 0.005 | .07 | 0.82 | .41 | 0.78 | 1.42 |
| *n*Power × AI | −0.001 | 0.006 | −.02 | −0.24 | .81 | 0.50 | 0.45 | −0.002 | 0.005 | −.03 | −0.29 | .77 | 2.23 | 1.32 |
| | *Hypothesis 3*: *n*Power predicts switch-back latency toward anger FEEs | | | | | | | | | | | | | |
| *n*Power | 0.27 | 14.79 | .00 | 0.02 | .99 | 0.19 | 0.16 | −0.008 | 0.013 | −.06 | −0.65 | .26 | 0.83 | 0.75 |
| AI | −19.29 | 15.50 | −.11 | −1.24 | .22 | 0.38 | 0.27 | −0.007 | 0.013 | −.04 | −0.49 | .63 | 0.78 | 0.74 |
| *n*Power × AI | 17.05 | 15.64 | .09 | 1.09 | .28 | 0.06 | 0.09 | 0.005 | 0.014 | .03 | 0.39 | .70 | 0.48 | 0.51 |
| | *Hypothesis 4*: *n*Power predicts gaze duration on surprise FEEs | | | | | | | Long trials | | | | | | |
| *n*Power | 10.18 | 8.80 | .10 | 1.16 | .12 | 0.34 | 0.24 | −10.83 | 11.49 | −.08 | −0.94 | .35 | 0.40 | 0.38 |
| AI | 0.78 | 9.22 | .01 | 0.08 | .93 | 0.19 | 0.16 | −4.05 | 11.88 | −.03 | −0.34 | .73 | 0.73 | 0.57 |
| *n*Power × AI | 7.47 | 9.32 | .07 | 0.80 | .42 | 0.04 | 0.07 | −4.53 | 12.33 | −.03 | −0.37 | .71 | 0.17 | 0.19 |
| | | | | | | | | Short trials | | | | | | |
| *n*Power | | | | | | | | 0.15 | 4.51 | .00 | 0.03 | .97 | 0.19 | 0.15 |
| AI | | | | | | | | −3.55 | 4.66 | −.07 | −0.76 | .45 | 0.25 | 0.17 |
| *n*Power × AI | | | | | | | | 0.92 | 4.84 | .02 | 0.19 | .85 | 0.02 | 0.04 |
| | *Hypothesis 5*: *n*Power predicts gaze duration on anger FEEs | | | | | | | Long trials | | | | | | |
| *n*Power | −1.87 | 7.74 | −.02 | −0.24 | .81 | 0.19 | 0.14 | −15.18 | 10.09 | −.13 | −1.51 | .13 | 1.07 | 0.99 |
| AI | 6.15 | 8.12 | .07 | 0.76 | .45 | 0.24 | 0.17 | 0.39 | 10.43 | .00 | 0.04 | .97 | 0.68 | 0.71 |
| *n*Power × AI | 3.63 | 8.22 | .04 | 0.44 | .66 | 0.03 | 0.04 | −0.35 | 10.83 | .00 | −0.03 | .97 | 0.52 | 0.55 |
| | | | | | | | | Short trials | | | | | | |
| *n*Power | | | | | | | | −5.23 | 3.68 | −.13 | −1.42 | .16 | 0.46 | 0.33 |
| AI | | | | | | | | 0.99 | 3.81 | .02 | 0.26 | .80 | 0.19 | 0.18 |
| *n*Power × AI | | | | | | | | −4.75 | 3.93 | −.11 | −1.21 | .23 | 0.08 | 0.13 |

*Note*. Study 1: $N = 134$. Study 2: $N = 129$. *n*Power = implicit need for power. AI = activity inhibition; $BF_i$ = inclusion Bayes factor. Tests of effects regarding *n*Power in the predicted direction were one-sided. Main effects were tested in a first step without inclusion of the interaction terms. Interaction terms were tested hierarchically in a second step. Bayes factors were computed by remodeling our analyses as Bayesian linear regressions with Jeffreys-Zellner-Siow parameter priors ($r$ scale = .354) and β-binomial model priors ($\alpha = \beta = 1$). Where possible, Bayes factors for study 2 were computed as evidence-updated replication Bayes factors (see Ly et al., 2019).

participants due to three cases of technical problems. One participant turned out to be intoxicated after completion and was excluded from all analyses. Additional participants had to be excluded only for specific sets of analyses. See Table 1 for a sample description after general exclusions and the number of exclusions resulting from combinations of criteria.

## Materials

**Eye-Tracking.** Gaze data were recorded as described in study 1. Room lighting was changed to indirect lighting, as gaze estimation was more precise under these conditions in a pretest. To reduce vibration inherent to the testing system, chinrest and input devices were moved to a small desk in front of the table that held the tracking device. Positioning was readjusted to maintain a viewing distance of 660mm. Calibration and calibration validation procedures were identical. We included a calibration training procedure at the beginning of the task and a standard 5-point-recalibration that took place after the first half of the task to reduce offset.

While stimuli remained the same, the task was redesigned with the aim of improving data quality. The number of critical trials was doubled to reduce measurement error. The structure of critical trials was almost identical, with the exception that picture presentation times were varied (half the pictures were presented for 1000ms, the other half for 2000ms) to reduce rhythmic predictability. We introduced additional trials with vertical stimulus presentation[2] in between critical trials to lessen carryover effects from one

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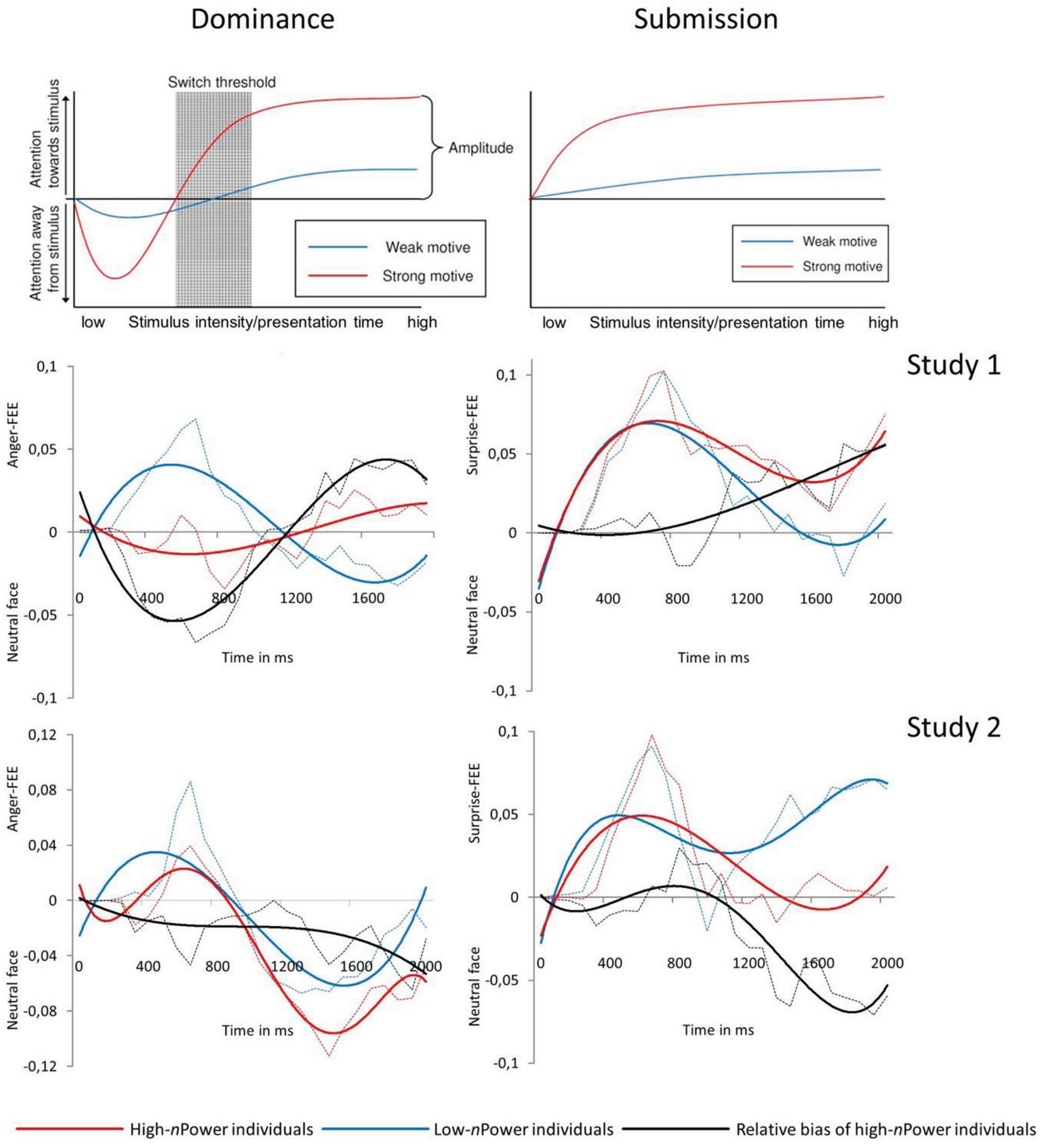
[2] A central fixation cross was presented for 1500ms. If participants' gaze rested on the cross at the end of this time period, the cross vanished and two pictures of houses (7.79° × 5.65° in size) simultaneously appeared above and below (midpoints 8.08° away from center) for 1000ms. Else, the trial was restarted. Additional trials were repeated randomly in 10% of cases to reduce predictability.

**Figure 2**

*Expected and Observed Time Courses of Overt Attentional Allocation*



*Note*. Schematic plots in first row illustrate the expected time courses of overt attentional allocation during presentation of FEEs. Line plots below show the actual averaged results across studies. After assignment of orienting scores to every time stamp (FEE: 1; neutral face: −1; whitespace: 0), trials were divided evenly into partitions of 80ms. Orienting scores were averaged within partitions as well as across trials and participants for both anger and surprise FEEs. Trials without any oculomotor reaction were excluded. Average scores were plotted against time for individuals low and high in the implicit need for power (nPower; assignment via median-split for illustrative purposes only after exclusions and data preparation; dotted lines). Scores for relative attentional bias were computed by subtracting scores of low-nPower individuals from those of high-nPower individuals. Continuous lines show estimated polynomial trends regarding the respective time courses. See the online article for the color version of this figure.

attentional-orienting trial to the next (see Awh et al., 2012). To keep participants engaged during the resulting longer task duration, we asked them not only to attend fixation crosses whenever they appeared but also to count beep sounds (28 in total) presented simultaneously with fixation crosses. The beeps preceded additional trials only to avoid interference with FEE trials.

Gaze data were treated the same way as in study 1. Preparation resulted in the loss of .96% of data after exclusion of invalid cases.

Calibration validation resulted in acceptable averaged values for accuracy (0.98°) and precision (0.28°) after exclusions. Initial orienting scores and average gaze durations were determined for each FEE category. Switch-back latencies were determined for anger FEEs. Gaze durations were extracted separately from trials with long and short picture presentation time because gaze durations in short trials are often closely related to initial orienting and because we wanted to facilitate comparisons with study 1 (long presentation times only).

Stereotypical behavior (e.g., only looking to the left on all trials) did not occur in study 2. Therefore, we did not have to deviate from our preregistered exclusion criteria, which mandated the following exclusions: Eight participants had more than 20% of critical data points deleted during data preparation; 24 additional participants' gaze had not left the central AOI in more than 20% of critical trials; 25 participants' average accuracy of their gaze data was above 2° and/or average precision of their data was above 1°; and one additional participant received warnings in more than 80% of trials because they did not comply with the instruction to attend fixation crosses. Gaze durations in short trials were not normally distributed. Thus, gaze durations in short trials were winsorized (1.5%). Switch-back latencies were log-transformed.

## Results

### Descriptive Statistics

Table 2 shows descriptive statistics and correlations. As expected, temporal eye-tracking measures again showed high intercorrelations.

### Hypothesis Testing

In line with our preregistration, we tested our hypotheses using multiple regression analyses with *n*Power and AI as predictors. Interaction terms were added hierarchically. Table 3 shows the results. In line with our findings in study 1, we observed that *n*Power predicted initial orienting away from anger FEEs. Thus, *Hypothesis 2* was supported. In contrast to study 1, AI was not associated with initial orienting toward anger FEEs. We had to reject all other hypotheses. All interaction terms remained insignificant. Figure 2 illustrates the time courses of average attentional orienting in high- and low-*n*Power individuals in study 2.

### Reanalysis With Bayesian Method

To be able to discern "evidence of absence" from "absence of evidence", we remodeled our analyses described above as Bayesian linear regressions with Jeffreys-Zellner-Siow parameter priors ($r$ scale = .354) and beta-binomial model priors ($\alpha = \beta = 1$). Resulting Bayes factors ($BF_{10}$) and inclusion Bayes factors ($BF_i$) are shown in Table 3. Where possible, Bayes factors for study 2 were computed as evidence-updated replication Bayes factors (see Ly et al., 2019). Across both studies, our findings provide moderate evidence that *n*Power predicted initial orienting away from anger FEEs (*Hypothesis 2*; $BF_{10}$ = 3.04, $BF_i$ = 4.45), as well as moderate evidence that *n*Power did not predict initial orienting toward surprise FEEs (*Hypothesis 1*; $BF_{10}$ = .14, $BF_i$ = .10), switch-back latencies (*Hypothesis 3*; $BF_{10}$ = .15, $BF_i$ = .12), gaze durations on surprise FEEs (*Hypothesis 4*; $BF_{10}$ = .14, $BF_i$ = .09), or gaze durations on anger FEEs (*Hypothesis 5*; $BF_{10}$ = .20, $BF_i$ = .14). Furthermore, evidence for AI predicting initial orienting toward anger FEEs was weak ($BF_{10}$ = .76, $BF_i$ = 1.99).

# Study 2

## Summary

We replicated our findings from study 1 with an identical design but with an improved eye-tracking task. *n*Power again exclusively predicted initial orienting away from anger FEEs, but failed to predict switch-back latency, gaze duration and attentional orienting toward surprise FEEs. Relationships were not moderated by AI. An association of initial orienting toward anger FEEs and AI was not present in study 2. Additional Bayesian analyses suggested that our findings provided moderate evidence for our statistical conclusions.

# Discussion

As expected, *n*Power predicted participant's initial avoidance of anger FEEs in both studies. Initial orienting toward surprise FEEs was not predicted by *n*Power. *n*Power was not significantly associated with temporal eye-tracking measures, such as gaze duration or switch-back latency. In both studies, observed relationships were not moderated by AI. An unexpected association of AI and initial orienting toward anger FEEs was inconsistent across studies and overall evidence for such an association was weak.

## The Need for Power and Oculomotor Reactions to Cues of Interpersonal Dominance

Our results concerning the initial avoidance of anger FEEs are consistent with findings by Schultheiss and Hale (2007), who too had observed that *n*Power predicts attentional orienting away from anger FEEs. The replicable observation of early attentional biases for such dominance cues supports the notion that they are motivationally salient stimuli for individuals high in *n*Power (Wang et al., 2014; Wang et al., 2011).

Our results are in line with the neuropsychological framework by Schultheiss and Schiepe-Tiska (2013), who argued that *n*Power is involved in the activation of motivational brain areas during confrontation with anger FEEs (Hall et al., 2010) and influences the striatal preparation of instrumental behavior (Delgado et al., 2004). An involvement of the caudate nucleus in particular (Schultheiss et al., 2008) might explain the consistent modulation of attentional orienting by *n*Power in the presence of motive-specific (dis-)incentives because this structure does not only participate in the value-based processing of visual information but also plays a critical role in subsequent value-modulated oculomotor reactions (Bromberg-Martin et al., 2010; Hikosaka et al., 2013; Kim et al., 2015). Thus, the initial *n*Power-dependent avoidance of anger FEEs is consequential because such signals of interpersonal dominance have stronger aversive qualities for high-*n*Power individuals (Schultheiss & Köllner, 2014; Stanton et al., 2010) and avoiding a disincentive may be reinforcing if no negative consequences ensue from such avoidance (Kim et al., 2006).

From an instrumental perspective on behavior, initial avoidance might reflect an adaptive reaction, allowing individuals high in *n*Power to efficiently cope with opponents, as gaze aversion is a useful tool to reduce aggression in dominance contests among primates (see Kleinke, 1986). However, gaze aversion should only be brief to achieve this goal, because prolonged gaze aversion is associated with subordination (Ellsworth & Carlsmith, 1973; Exline et al., 1975; Kleinke, 1986) and thus opposed to *n*Power's goal of having impact on others (Schultheiss & Köllner, 2021).

Consequently, we expected that high-*n*Power individuals should readily switch from avoidance to vigilance at longer exposure durations. Nevertheless, like Schultheiss and Hale (2007), we could not obtain evidence for such motive-modulated dynamics in attentional approach and avoidance. The study by Schultheiss and Hale (2007), which used a dot-probe task, did not provide a good opportunity to detect such dynamical changes in a straightforward way. In contrast, in our research we were able to chart the dynamic course of oculomotor indices of attention for task durations of up to 2000ms. Nevertheless, we failed to observe an association between *n*Power and switch-back latency or gaze durations. Why?

One explanation may be our task design, for which we had assumed that stimulus threat and the concurrent need for action of the perceiver increases with presentation time. While evidence suggests that this is true for a real-life encounter (see Kleinke, 1986), this might not apply to static, pictorial anger FEEs in an artificial setting, as the "confrontation" ultimately passes without consequence. However, this reasoning alone cannot explain why individuals high in *n*Power did not just keep up their initial avoidance of an unpleasant stimulus but instead showed no prolonged attentional bias.

Another reason may be the multiplicity of attentional control, instantiated in neuroanatomically distinct structures (Bourgeois et al., 2016; Fiebelkorn & Kastner, 2020) and governed by (reward) history, current goals, or physical properties (see Awh et al., 2012). The relative contribution of these types of attentional control to attentional selection is subject to context-dependent variation and periodical changes (Awh et al., 2012; Fiebelkorn & Kastner, 2020). Implicit motives are commonly associated with spontaneous, but not planned, behaviors (Schultheiss, 2008). It therefore seems plausible that *n*Power is more strongly associated with automatic value-modulated attentional orienting but not goal-driven attentional control. Given the consistency of null-findings regarding the associations of *n*Power with switch-back latencies and gaze durations across studies and FEE types, it seems reasonable to assume that, after an initial motive-modulated response, other processes that are unrelated to *n*Power take over attentional control, at least in our experimental setting. Similar findings have previously been documented for attention-drawing capabilities of emotional stimuli, which only emerged regarding initial oculomotor reactions but not regarding prolonged engagement (Calvo & Lang, 2004).

We do not want to make strong claims about the reported relationship between AI and initial orienting toward anger FEEs in study 1, as the effect was not predicted, inconsistent across studies, and evidence had to be considered weak based on our Bayesian reanalysis. Therefore, replication in a preregistered study is required first.

## The Need for Power and Oculomotor Reactions to Cues of Interpersonal Submission

We could not observe meaningful associations of *n*Power and initial orienting to surprise FEEs. This was unexpected, as Schultheiss and Hale (2007) had reported that *n*Power predicts attentional orienting toward these stimuli. Also, previous research points to a motive-modulated incentive value of surprise FEEs as a signal of interpersonal submission (Rösch et al., 2013; Schultheiss et al., 2005), which should ensure their engagement of the attentional system (Donhauser et al., 2015).

However, previous research findings for surprise FEEs are weaker and less clear compared to results obtained during presentation of anger FEEs. For example, reinforcing effects of surprise FEEs were only observed when receiver sex matched sender sex (Schultheiss et al., 2005). Likewise, Schultheiss and Hale (2007) found motive effects on attentional orienting to surprise FEEs only after inclusion of sender sex and presentation time as moderators. In terms of reported effect sizes, associations between *n*Power and surprise FEEs were smaller than for anger FEEs regarding recognition speed (Donhauser et al., 2015) and brain activation (Schultheiss et al., 2008).

One explanation for the absence of stronger effects of surprise FEEs in the context of *n*Power might come from Schultheiss et al. (2008), who argued that anger and surprise FEEs incorporate differences in their meaning for individuals high in *n*Power that go beyond their opposing valence (Stanton et al., 2010). The encounter of surprise FEEs might be a good indicator for the success of an already performed instrumental behavior, signaling the perceiver's impact on the sender (Schultheiss et al., 2008). However, unlike anger FEEs, which point to an imminent dominance contest that has to be resolved, surprise FEEs might not consistently evoke a need for further action in the perceiver (Schultheiss et al., 2008), as dominance is already secure (Schultheiss & Hale, 2007; Schultheiss et al., 2005). In other words, surprise FEEs might have behavioral relevance as a consequence of behavior in the form of a secondary reinforcer (see Schultheiss et al., 2005) but less as a discriminative cue triggering augmented (orienting) behavior in high-*n*Power individuals.

Nevertheless, associations between *n*Power and attentional bias toward surprise FEEs had been observed by Schultheiss and Hale (2007), partly under consideration of several moderating variables, a finding we could not replicate. Given the explanation above, both findings could be valid and coexist, as the dot-probe task used by Schultheiss and Hale (2007) might have grasped quick processes of value-based covert attentional orienting (e.g., Pool et al., 2014) that were not followed by overt attentional orienting, which we capitalized on. Alternatively, Schultheiss and Hale's observation of *n*Power-associated attentional orienting to surprise FEEs may have been a false-positive finding. Thus, future studies still have to resolve whether the findings by Schultheiss and Hale (2007) regarding surprise FEEs simply cannot be replicated in an eye-tracking approach without access to information about covert attentional orienting or are less robust than initially assumed.

## Limitations and Future Directions

One limitation of our study is the lack of independent evidence of the affective meaning of FEEs for our research participants.

Considering a sizable amount of past experimental research, we have theorized that the functional connection between *n*Power and oculomotor behavior is based on (1) affect-based variation of FEEs' reward values (see Schultheiss & Köllner, 2014), (2) resulting in variations of dopamine-dependent valuations of FEEs in the striatum (see Hikosaka et al., 2013). As expected, we found evidence for such a connection on the surface of behavior. Nevertheless, interpretation of results in the light of our theory could benefit greatly from the inclusion of additional data reflecting the direction and intensity of hedonic responses to FEEs. Future research could go one step further in this regard by incorporating facial electromyography over the corrugator and zygomatic muscles as indicators of negative and positive hedonic responses to FEEs (see Cacioppo et al., 1986; Dimberg, 1997). Moreover, neuroimaging methods could reveal whether changes in striatal activation in the context of attentional orienting to FEEs depend on individuals' *n*Power.

Future replications might also benefit from a systematic variation of task design features. First, we see great potential in varying the stimulus material. In our two studies, it remained unclear whether the absence of *n*Power effects on switch-back latencies was a consequence of our design, as increasing presentation time might not have increased the perceived stimulus intensity of static stimuli in a laboratory setting. However, future studies could overcome this limitation by using dynamic stimuli, as past research has shown that individuals high in *n*Power indeed have a special sensitivity for dynamic changes in FEEs (Donhauser et al., 2015; Wang et al., 2014). Varying the stimulus pool could also be a tool for checking whether our results regarding FEEs can be transferred to other cues of interpersonal dominance and submission, such as body postures (Tiedens & Fragale, 2003), bodily orientation (Bee et al., 2009), or facial physiognomy (Oosterhof & Todorov, 2008). Third, future studies could aim at obtaining more detailed information about oculomotor movements, such as (micro-)saccades that would enable stronger inferences about underlying cognitive processes (see Holmqvist et al., 2011). This requires eye-tracking with better accuracy and at higher sampling frequencies than we could achieve in our research.

## Conclusion

Over the course of two eye-tracking studies, we observed consistent associations of participants' *n*Power and the orienting of overt attention. While high-*n*Power individuals showed attentional avoidance of anger FEEs, an association between *n*Power and attentional approach toward surprise FEEs was absent. Beyond a motive-modulated initial reaction, there was no significant relationship of *n*Power and gaze behavior. Nevertheless, our findings indicate that *n*Power indeed plays a role in the early orienting of oculomotor behavior during the encounter of anger FEEs, posing as motive-specific disincentives.

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