The Ergonomics of Dishonesty: The Effect of Incidental Posture on Stealing, Cheating, and Traffic Violations

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Abstract

Research in environmental sciences has found that the ergonomic design of human-made environments influences thought, feeling and action. Here, we examine the impact of physical environments on dishonest behavior. Four studies tested whether certain bodily configurations—or postures—incidentally imposed by our environment lead to increases in dishonest behavior. The first three experiments found that individuals who engaged in expansive postures (either explicitly or inadvertently) were more likely to steal money, cheat on a test, and commit traffic violations in a driving simulation. Results suggested that participants' self-reported sense of power mediated the link between postural expansiveness and dishonesty. Study 4 revealed that automobiles with more expansive driver's seats were more likely to be illegally parked on New York City streets. Taken together, results suggest that: (1) environments that expand the body can inadvertently lead us to feel more powerful, and (2) these feelings of power can cause dishonest behavior.

Keywords: design, dishonesty, embodiment, human factors, nonverbal behavior, power

The Ergonomics of Dishonesty: The Effect of Incidental Expansive Posture on Stealing, Cheating, and Traffic Violations

The ergonomics and physical geography of our everyday environments are powerful. They determine our social networks and relationships (Werner, Altman, & Brown, 1992), personal and interpersonal functioning (Altman, Taylor, & Wheeler, 1971), our workplace productivity (Knight & Haslam, 2010), and our subjective well-being (Kaplan & Kaplan, 2009; Leonard, 2012). The current research examines the impact of our environment on an important social behavior—dishonesty. Each day, our bodies are continually stretched and contracted by our working and living environments—by the seats and levers positioned in our cars, and by the furniture and workspaces in our homes and offices. Although we may pay very little attention to ordinary and seemingly innocuous shifts in our bodily posture, these subtle postural shifts can have tremendous impact on our thoughts, feelings and behavior (Damasio, 1994; Niedenthal, 2007; Niedenthal, Barsalou, Winkielman, Krauth-Gruber, & Ric, 2005). Most central to the current research is the finding that expansive body postures lead to a psychological state of power (Bohns & Wiltermuth, 2012; Carney, Cuddy, & Yap, 2010; Fischer, Fischer, Englich, Aydin, & Frey, 2011; Huang, Galinsky, Gruenfeld, & Guillory, 2011). And power—caused by myriad laboratory manipulations and real-world structural features—appears to be linked to increases in a wide range of dishonest behaviors (Boles, Croson, & Murnighan, 2000; Guinote, 2007; Keltner, Gruenfeld, & Anderson, 2003; Lammers, Stapel, & Galinsky, 2010; Lammers, Stoker, Jordan, Pollmann, & Stapel, 2011). Is it possible that expansive postures *incidentally shaped* by our environment could lead to dishonest behavior? This question was the focus of the current research.

The idea that the human body has the ability to shape the mind has piqued the interest of scholars for centuries. Darwin (1872/1904) and the father of experimental psychology, William James (1884), were among the first to theorize about mind-body connections. But it wasn't until the 1970s that the bi-directional connection between bodily displays and psychological states was empirically demonstrated (Duclos et al., 1989; Laird, 1974; Rhodewalt & Comer, 1979; Riskind, 1983; Riskind & Gotay, 1982; Strack, Martin, & Stepper, 1988; Wells & Petty, 1980). For example, Laird (1974) hooked participants up to facial EMG and asked them to "furrow eyebrows" (i.e., frown) or "clench teeth" (i.e., smile). When participants' teeth were clenched they reported more happiness and humor. Strack, Martin and Stepper (1988) later replicated and extended this work. Similarly, Wells and Petty (1980) demonstrated that participants who nodded their heads (in an agreement motion) while listening to messages found the messages to be more persuasive than those who shook their heads (in a disagreement motion).

Powerful Postures

Across humans and animals, power and dominance are expressed through expansive, open-bodied postures (spreading out and occupying more space), whereas powerlessness and subordination are expressed through relatively more contractive, closed-bodied postures (Carney, Hall, & LeBeau, 2005; Darwin, 1872/1904; de Waal, 1998; Ellyson & Dovidio, 1985; Hall, Coats, & Smith LeBeau, 2005; Tiedens & Fragale, 2003; Weisfeld & Beresford, 1982). Research also shows these expansive nonverbal "power poses" may activate mental concepts and emotional feelings associated with power and may go so far as to initiate a physiological trajectory resembling a powerful state (Bohns & Wiltermuth, 2012; Carney, et al., 2010; Carney et al., 2013; Huang, et al., 2011). These findings demonstrated that when men and women engaged in expansive (vs. contractive) postures, they felt more powerful, became more approach-oriented and risk-seeking, and appeared to evidence a physiological pain and stress-buffer. Similarly, Riskind and Gotay (1982) demonstrated that slumped and constricted postures induced a state of learned helplessness and feelings of stress (versus upright/confident postures). Finally, Harmon-Jones and Peterson (2009) found that supine (i.e., lying down) versus upright body posture reduces approach motivation.

Power and Dishonest Behavior

Regardless of how power is manipulated or observed in the lab or field, power is consistently related to dishonesty. For example, power is associated with cheating to improve odds-of-winning (Lammers, et al., 2010), lying (Boles, et al., 2000), lying more easily (Carney, et al., 2013), hypocrisy (Lammers, et al., 2010), and infidelity (Lammers, et al., 2011). According to Keltner, Gruenfeld and Anderson (2003), power activates the Behavioral Approach System, which causes powerful individuals to focus on rewards and act on their own self-interests and goals (Galinsky, Gruenfeld, & Magee, 2003; Guinote, 2007; Inesi, 2010).

If expansive postures can lead to a state of power, and power can lead to dishonest behavior, this suggests something of real concern—the ordinary expanded (vs. contracted) nonverbal postures forced upon us by our environments, which we happen or choose, could impact our decisions and actions in ways that render us less (or more) honest.

The Focus of the Current Research on The Ergonomics of Dishonesty

We tested the hypothesis that expansive postures would lead to dishonest behaviors in four studies conducted in the field and the laboratory. The first study was a field experiment that examined whether expansive (vs. contractive) postures, as employed in previous research (Bohns & Wiltermuth, 2012; Carney, et al., 2010; Huang, et al., 2011), would lead to stealing in an "overpayment" paradigm. The second study manipulated the expansiveness of workspaces in the lab and tested whether *incidentally* expanded bodies (shaped organically by one's environment) led to more dishonesty on a test. The third experiment examined if participants in a more expansive driver's seat would be more likely to "hit and run" when incentivized to go fast in a video-game driving simulation. We also tested the mediating role of sense of power in these effects. Finally, to extend results to a real-world context, an observational field study tested the ecological validity of the effect by examining whether automobile drivers' seat size predicted the violation of parking laws in New York City. Consistent with recommendations from Simmons, Nelson, and Simonsohn (2012), we report how we determined our sample size, all data exclusions, all manipulations, and all measures in the studies.

(Field) Experiment 1

Method

Participants and Procedure. Eighty-eight[1] (31 women) community members were recruited from South Station in Boston, MA and outside a library at the city campus of Columbia University to participate in a study that ostensibly examined the relationship between stretching and impression formation. Participants were told they would receive $4 for participation. Postural expansiveness was manipulated using a procedure similar to

Carney et al. (2010). Here, we used a cover story about the effects of stretching on impression formation, participants were randomly assigned to hold either an expansive or a contractive pose (Figure 1) for one minute while they formed impressions of faces shown to them by the experimenter. Next, in order to bolster the cover story, participants indicated their impressions of a best friend[2]. Finally, though participants believed they would receive $4 payment as they were initially told, the experimenter handed them $8, which was comprised of $1, $1, $5, and $1 bills, fanned out (Figure 2) and presented such that participants noticed the "accidental" overpayment. The dependent measure was whether or not the participant kept the overpayment. The experimenter coded for whether participants checked the money after they had received it.[3]

Results and Discussion

Consistent with our theorizing, a χ^2 analysis found that participants who performed the expansive pose were significantly more likely to keep the overpayment (i.e. "steal by omission"), $\chi^2(1, N=78)=13.0$, $p<.001$, $\boldsymbol{\Phi}=.41$. Seventy-eight percent of the expanded-posture participants kept the overpayment, compared to 38% of contracted-posture participants.

Experiment 1 found initial evidence that expansive postures can lead to dishonest behavior. Participants in this study were explicitly instructed to assume a specific pose, yet the main focus of the current research is posture imposed by the ergonomics of the environment. With this first experiment establishing the link between posture and dishonesty, Studies 2-4 investigated the impact of *incidentally induced* expansive (vs. contractive) postures on dishonest behavior. Participants in these studies were not explicitly instructed to assume specific poses, nor were they made explicitly aware that their posture was being manipulated. Instead, posture was naturally shaped by ordinary chairs and workspaces.

(Laboratory) Experiment 2

Method

Participants and Procedure. Thirty-four university students[4] (20 women) from Columbia University participated in a study for monetary compensation that supposedly examined how *Feng Shui* influences creativity.

Participants worked in individual cubicles at a desk set up with either a large (24” by 38”) or a small (12” by 19”) desk pad (Figure 3). Participants saw only their own workspace and not that of other participants. They were then instructed to complete two creativity tasks.

First was an anagram test on which unbeknownst to participants, they would later have an opportunity to cheat. This cheating paradigm was adopted from Ruedy and Schweitzer (2010). Participants received a packet of materials contained in a manila folder and were allotted four minutes to unscramble 15 anagrams that were printed on the first page. They were incentivized by the experimenter’s promise of one dollar for every anagram solved. When time was called, participants were instructed to detach and retain the first page and return the folder and its remaining contents to the experimenter. Participants were unaware that an imprint of their test answers were created by a sheet of carbonless copy paper hidden at the back of the folder.

Incidental posture was manipulated in the next task, which ostensibly measured inductive creativity. Participants were allotted seven minutes to create a collage using materials that were placed around the edges of their desk pad. During the task, participants were only allowed to use the space on the desk pad. Posture was incidentally manipulated by the size of participants' desk pads. The large desk pad arrangement forced participants to stretch and reach for materials, thus incidentally imposing expansive postures. These participants also had chairs that were high enough to help them reach for the materials. In contrast, the small desk pad arrangement constrained participants arm extensions as materials were within close reach, thus incidentally imposing contractive postures.

At the completion of the collage task, the experimenter, appearing very busy, rushed to each cubicle and handed participants the answer key for the anagram test. The experimenter explained that he had to manage another study in the adjacent lab and asked that the participant grade his/her own test. Participants were thus given an opportunity to alter their original answers in private. We used participants' number of altered answers as a measure of cheating, which we identified by comparing their self-graded test to the carbon copy containing their original answers.

Results and Discussion

We hypothesized that expanded-posture participants would alter more answers, which would earn them more bonus money. As predicted, a one-way ANOVA revealed that expanded-posture participants altered more answers (M=1.20, SD=1.70) than contracted-posture participants (M=.27, SD=.59), $F(1, 29)=4.04$, $p=.05$, $d=0.73$.[5]

Experiments 1 and 2 found consistent evidence that expansive postures, whether posed or incidentally imposed, lead to more dishonest behavior. In the third experiment, we examined whether drivers' seat expansiveness can lead to more traffic violations in a driving simulation. Importantly, we also tested the mechanism of this effect. If expansive posture leads to a state of power, and power leads to increases in dishonest behavior, then the link between expansive posture and dishonest behavior should be mediated by participants' sense of power.

Laboratory Experiment 3

Method

Participants and Procedure. Seventy-one students[6] (48 women) from the University of California, Berkeley were recruited to participate in a study ostensibly about physiology and video games. A realistic driving simulator was set up with a Playstation 3 and a Logitech driving force GT racing wheel, which included a steering wheel and foot-pedals. Participants were randomly assigned to sit in an expansive or contractive driver's seat (See Figure 4 for visual display of the setup) [7]. Participants played the game "Need for Speed: Hot Pursuit," which challenges players to race to the finishing line as fast as possible. Participants were allotted one initial practice race to become accustomed to the game controls. They were then offered a chance to win $10 if they could complete the same race within five minutes. Importantly, we implemented a rule that participants must stop and count-to-ten after a collision with any object in the race. Violation of this rule would shorten participants' total race time, and thus help them to win the bonus money. Rule violation, specifically the number of times a participant hit an object and did not stop, served as our measure of cheating. Races were video recorded and coded by two research assistants for the number of "hit and runs." Inter-rater reliability was determined by having the two coders rate the same subset of videos (10%). Once inter-rater reliability was established (*r*=.95), the remaining videos were divided equally between coders. After the race, participants reported how powerful they felt on a 1 (*Not at all*) to 5 (*Extremely*) Likert-type scale.

Results and Discussion

Consistent with our theorizing, being seated in an expansive seat lead participants to drive somewhat more recklessly (*Mean number of objects hit*=7.11, *SD*=8.51) than being seated in a contractive seat (*M*=4.33, *SD*=3.60), *F*(1,67)=3.02, *p*=.087. Importantly, participants in the expansive seat (*M*=6.31, *SD*=8.45) were more likely to "hit and run" than those in the contractive seat (*M*=2.94, *SD*=2.61) after controlling for the number of objects hit, *F*(1, 66)=4.12, *p*=.046, *d*=.54. The effect was significant when number of objects hit was not included as a covariate, *F*(1, 67)=4.81, *p*=.032. [8]

We also predicted that participants' sense of power would mediate this effect. Bootstrapping analyses (Preacher & Hayes, 2004) based on 5000 bootstraps were conducted for estimating direct and indirect effects. The total effect of expansive posture on incidence of hit and run (total effect=3.37, *p*=.03) became nonsignificant when sense of power was included in the model (direct effect of expansive posture=2.65, *p*=.09). Additionally, the total indirect effect (i.e., the difference between the total and direct effects) of expansive posture on hit and run through sense of power was significant (point estimate=.72, bias-corrected bootstrap 95% confidence interval .0197, 2.775)—zero fell outside this interval, indicating a significant mediation effect [9] (Figure 5).

Three experiments found consistent evidence that expansive posture, whether posed, or shaped incidentally by one's desk space or driver's seat can lead to dishonest behavior. While the emergence of these effects in the lab may be intriguing, to understand their generalizability and pervasiveness, we examined whether the same pattern of results would occur naturally -in the real world- in Study 4.

(Observational Field) Study 4

With three lab experiments in hand, we thought it was critical to test the real world generalizability of the incidental posture effect. Thus, Study 4 used observational field-study methods, to investigate whether drivers in expansive automobile seats were more likely to commit parking violations, an established measure of corrupt behavior in the economics literature (Fisman & Miguel, 2007). Specifically, we focused on double-parking—the parking of a car in an open lane such that adjacent vehicles are blocked in and active driving space is partially obstructed, which forces other drivers to maneuver through tighter spaces.

Method

Participants and Design. Two hypothesis-blind research assistants recorded instances of double-parking on East-West streets between 116th and 102nd street in New York City from 12pm to 7pm on weekdays. The research assistants recorded information about each double-parked vehicle as well as information about the legally parked adjacent vehicle (in the event that more than one legally parked vehicle was blocked in by the double-parked vehicle, information about the legally parked vehicle that overlapped most with the double parked car was recorded). The legally parked vehicles served as our control sample. A total of 126 automobiles were recorded.

Measure of driver's seat (space) size. As an index of the expansiveness of the each automobile's driver's seat, we calculated the volume of the space using information posted on respective car manufacturers' websites. Volume was computed by halving the product of the wheelbase (length between the front wheels and the back wheels), height, and width of the car (Figure 6).

Measure of status of automobile brand. Because social status has been found to predict unethical behavior (Piff, Stancato, Cote, Mendoza-Denton, & Keltner, 2012), we controlled for the status of vehicle brands by including it as a covariate in our analyses. To create an index of status, we did a stimulus-rating study of each of the observed vehicle brands (participants were N = 95 Americans). The status of each vehicle brand was rated using a scale of 1 (*Extremely low status*) to 7 (*Extremely high status*). Responses were averaged to form a measure of vehicle status for each specific brand.

Results and Discussion

Consistent with our theorizing, a binary logistic regression controlling for status[10] of cars indicated that vehicles with larger driver's seats were more likely to be double-parked (B=.020, SE=.005, p<.001). For a standard deviation increase in driver's seats size from the mean, the probability that the vehicle would be double-parked increases from 51% to 71%.

To account for the fact that drivers of lengthy cars might be more likely to double park due to increased difficulty of finding large enough parking spots in a congested city like New York, we controlled for status and car length in another regression. The relationship remained marginally significant (B=.015, SE=.009, p=.087) despite the fact that length was very strongly correlated with driver's seat size (r=.83, p<.001).

Although the results of this study provide some insights on the ecological validity of this phenomenon, the methodology has clear limitations (as is often the case with observational work). For example, we were unable to ascertain driver demographics, such as gender or body size, and drivers could not be randomly assigned to the conditions. Without professional appraisal of each car in our sample, we were also unable to accurately determine present value. However, when taken together with the 3 experiments, the package offers a more complete picture. Importantly, Experiment 3 offsets the limitations of Study 4 because in Experiment 3, participants were (1) randomly assigned to expansive or contractive driver's seats, and (2) vehicle attributes like length and price were not an issue because expansiveness (vs. contractiveness) of driver's seat was the only variable manipulated across conditions.

General Discussion

Together, these four studies provide multi-method evidence from both lab and field that expansive postures incidentally shaped by our environment can lead to dishonesty. Studies 1-3 provided consistent evidence for the causal relationship between postural expansiveness and dishonest behavior. The use of different participant populations and real-world parking data suggest the effect may be ecologically valid.

While researchers in design and human factors (Stokols, 1978; Werner, et al., 1992) would not be surprised with our findings, very little research in psychology has ventured into the domain of ergonomics and social behavior. The current research may suggest that dishonesty could be lurking in our ordinary, everyday environments—such as our cars, workstations, and offices. Our bodies are perpetually enslaved by the structure of our physical spaces, and the current findings suggest that when our bodily postures are incidentally expanded by these spaces, we could be lured into behaving dishonestly.

That said, incidentally induced expansive postures could also produce beneficial effects like *resilience from pain and stress*, and bolster executive functioning much like the research on social power has shown (Bohns & Wiltermuth, 2012; Carney, et al., 2013; Smith, Jostmann, Galinsky, & van Dijk, 2008). The theoretical argument in Carney et al. (2013) is one in which power renders a physiological system more willing and able to engage with all acts—whether honest or dishonest. Consistent with this idea, power does seem to promote ethical and socially responsible behaviors under certain conditions (e.g. Chen, Lee-Chai, & Bargh, 2001; DeCelles, DeRue, Margolis, & Ceranic, 2012). How do we reconcile these differences? There are some additionally useful theoretical ideas to consider.

Hirsh, Galinsky and Zhong (2011) proposed that power could be a catalyst that *reveals* the person. Recent research has also found that power enhances moral awareness among individuals with high moral identity, but decreases moral awareness in those with low moral identity (DeCelles, et al., 2012). Similarly, individuals with a communal relationship-orientation are more socially responsible than those with an exchange relationship-orientation, because power amplifies the dominant dispositional cues (Chen, et al., 2001).

Power can also *shape* the person by amplifying the dominant situational cue (Hirsh, et al., 2011). Powerful individuals tend to focus on any contextually activated goals (Guinote, 2007). They are more likely to cheat and take risks when the rewards are attractive like those in the current research (Anderson & Galinsky, 2006; Galinsky, Magee, Inesi, & Gruenfeld, 2006; Inesi, 2010; Lammers, et al., 2010). However, when the most dominant contextual cue is to be cooperative, power would correspondingly promote more other-focused behaviors and less self-interested behaviors (Handgraaf, Van Dijk, Vermunt, Wilke, & De Dreu, 2008). Therefore, it seems that although power and expansive posture could lead to self-focused and dishonest behaviors, they do also lead to prosocial and socially responsible outcomes *if* the situational cues for such goals are salient.

One prescriptive point that could be offered from this work is that we may need to consider the science of ethics more *holistically*—taking into consideration not only the sometimes toxic effect of power itself, but also the nefarious impact of incentivizing the wrong things. Finally, the very ways in which offices and furniture are designed also need examination and consideration. Future research could explore ways in which we could capitalize on even the simplest features of our physical environments toward the goal of promoting ethical, prosocial, and healthy workplace behaviors.

Footnotes

[1]This study includes two samples. Sample size was not predetermined but data-analysis was conducted after completion of each data collection period. Both samples were subject to the exact same procedure with the exception that participants in one sample were administered the Regulatory Focus Questionnaire (Higgins et al., 2001) before the posture manipulation. We followed Schimmack's (2012) recommendation to combine these replications into a single analysis. A meta-analytic approach to combining the samples was also undertaken to verify that our effect was as strong as it seemed when the raw data were combined. Toward that goal, the $\boldsymbol{\Phi}$ effect-size coefficients (which are exactly equivalent to effect size r in a 2x2 chi-squared case) were Fisher's z-transformed, weighted by sample-size, and then averaged. The average *r*z was then converted back into r (and this $\boldsymbol{\Phi}$ in this 2x2 chi-squared case) for presentation. The weighted average effect size $\boldsymbol{\Phi}$ was .41 and the associated combined z-value was 5.03 and $p < .001$.

[2]This survey was administered as part of our cover story. The data were not analyzed.

[3]Eight participants did not count the money and two were aware of our dishonesty measure. We made an *a priori* decision to exclude these participants from our analysis. Including these participants yielded, $\chi^2(1, N=88)=7.28, p=.007$.

[4]We aimed to recruit 40 participants but due to logistical laboratory issues (i.e. an initially small subject population which was further reduced by competition for participants with two other researchers using the same dishonesty paradigm) we were only able to recruit 34 participants during the study time-frame.

[5]Debriefing checks revealed that three participants were aware of our dishonesty

paradigm, and were excluded from analyses. One of them also altered the workspace layout without permission. One outlier, more than 3 *SD*s above the overall mean, was also excluded. Including these participants yielded, $F(1,33)=.29$, $p=ns$.

[6]We aimed to recruit between 70 to 80 participants, but stopped recruitment at 71 because the study time-frame ended.

[7]We asked participants if the task was difficult (on a 7-point Likert-type scale) and we found no significant difference between conditions.

[8]From the video-recording, two participants had problems maneuvering the car, which resulted in them repeatedly crashing into objects throughout the race. We made an *a priori* decision to exclude these participants. Including them yielded, $F(1,69)=.50$, $p=ns$.

[9]Bootstraping analyses considering “hit & run” as a mediator between posture and sense of power as the outcome is marginally significant. However, further analyses revealed that “hit & run” did not significantly predict sense of power for both expansive and contractive participants when analyzed separately.

[10]There was no effect of status, ($B=.45$, $SE=.34$, $p=.18$). When status was not included as a covariate, the effect was significant; ($B=.019$, $SE=.005$, $p=.001$).

Authorship Contribution

All authors contributed to the study design. Data collection was performed by A.J.Y., A.S.W. and D.R.C.’s lab manager under the guidance of A.J.Y. A.J.Y. and A.S.W performed the data analysis and interpretation under the supervision of D.R.C. A.J.Y. and D.R.C. drafted the paper, and A.S.W., B.J.L., and A.J.C.C. provided revisions. All authors approved the final version of the paper for submission.

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Figure 1: Poses employed in (Field) Experiment 1.

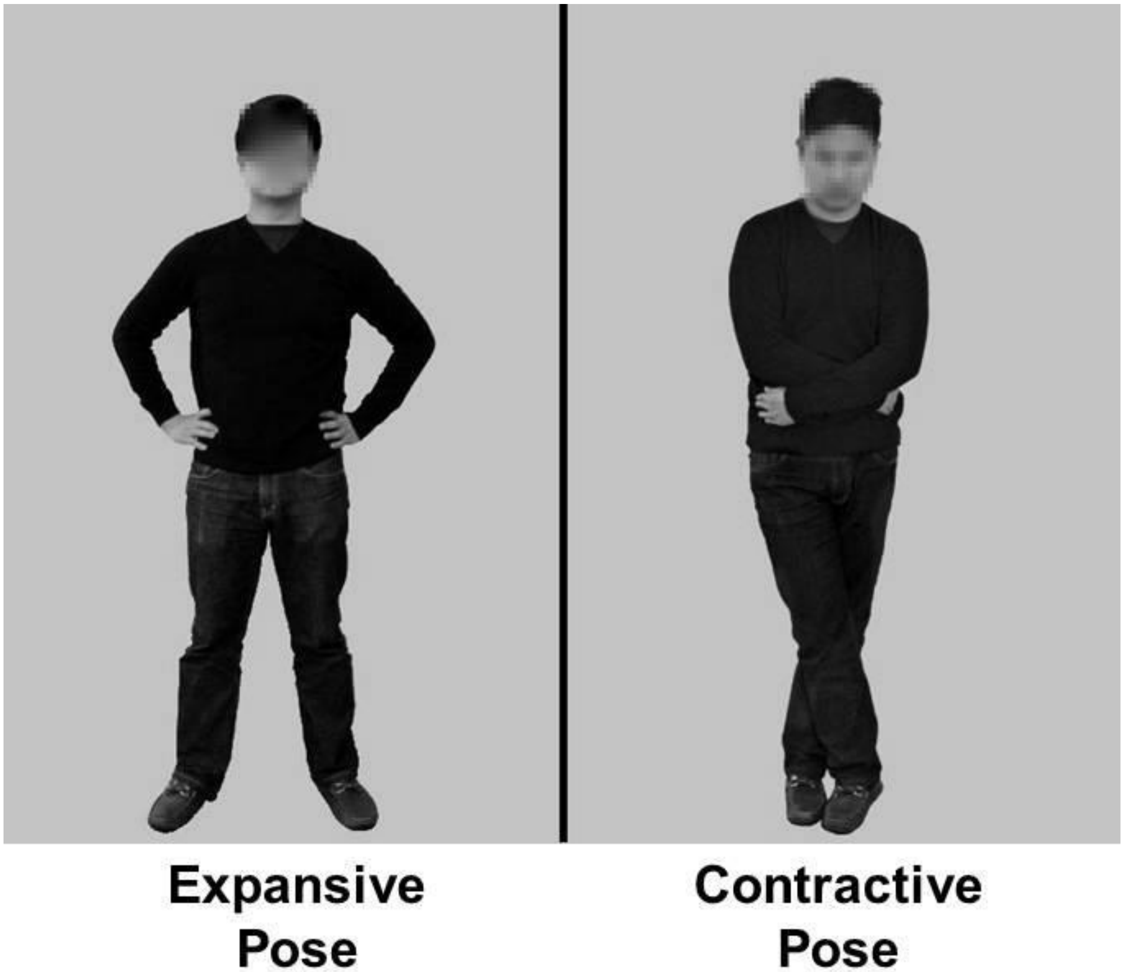

Figure 2: How the money was presented in (Field) Experiment 1.

Figure 3: Desk-space configurations for (Laboratory) Experiment 2.

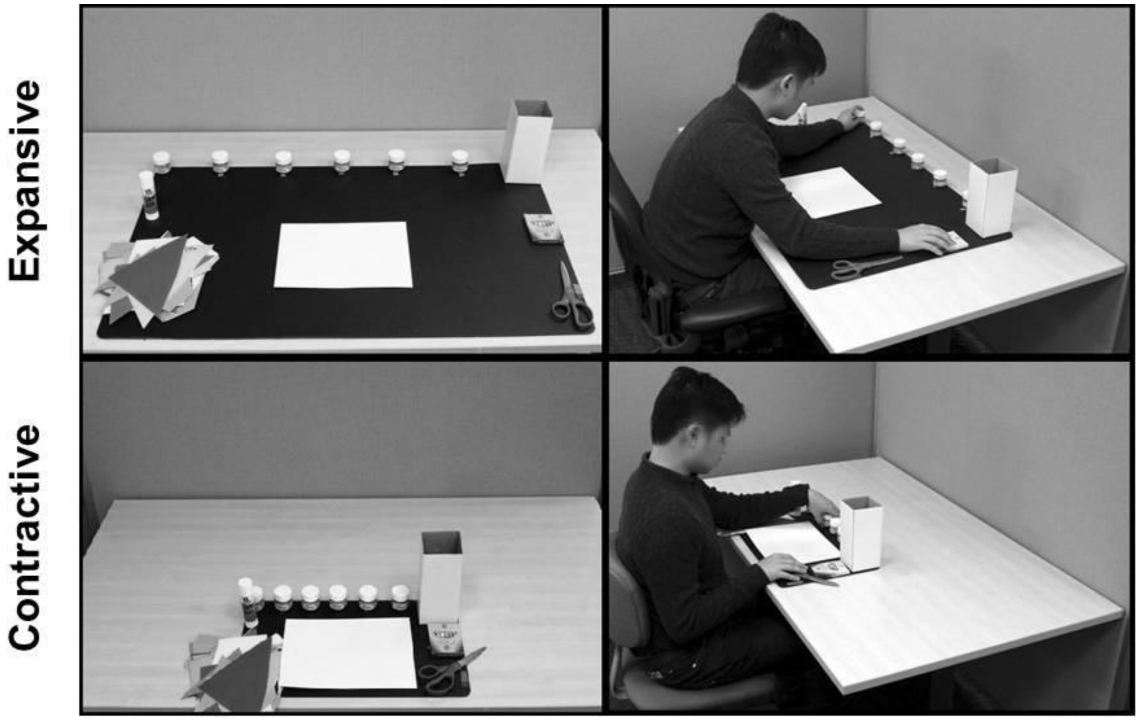

Figure 4: Driver’s seat configurations for (Laboratory) Experiment 3:

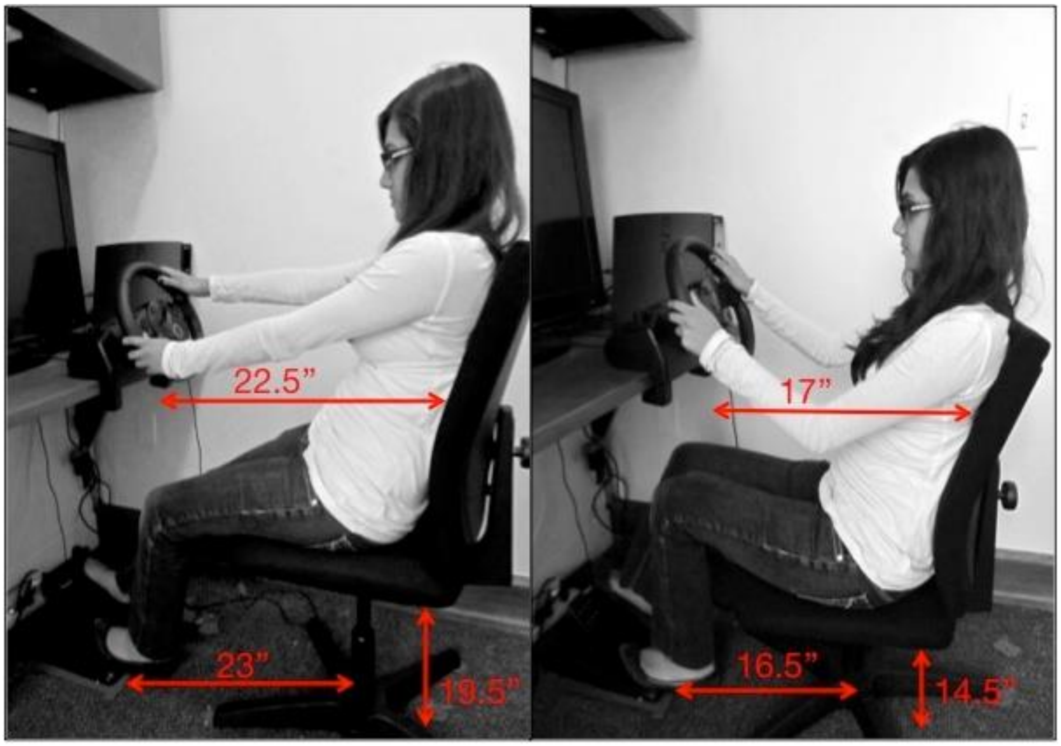

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Figure 5: Results from Experiment 3: mediation analysis predicting “hit and run.” The numbers alongside the arrows are unstandardized regression coefficients; coefficients in parentheses are the values obtained when both Posture and Sense of Power were included as predictors of “hit and run”. Asterisks indicate values, **p* = .058, ***p* < .05.

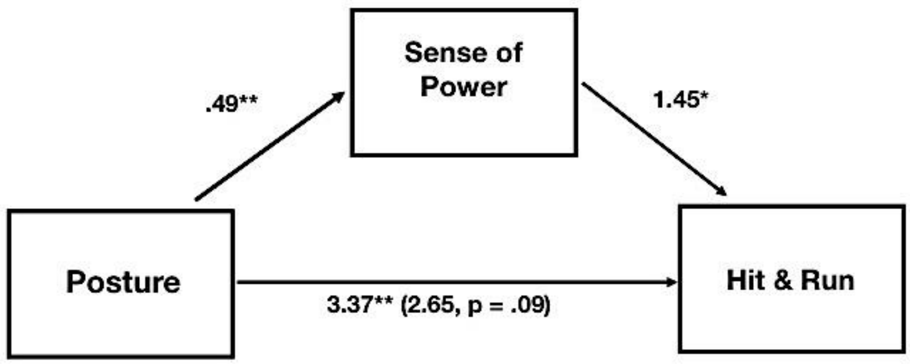

Figure 6: (Observational Field) Study 4: Dimensions of the automobile considered in the size computation.