Sartorial symbols of social class elicit class-consistent behavioral and physiological responses: A dyadic approach

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Abstract

Social rank in human and non-human animals is signaled by a variety of behaviors and phenotypes. In this research, we examined whether a sartorial manipulation of social class would engender class-consistent behavior and physiology during dyadic interactions. Male participants donned clothing that signaled either upper-class (business-suit) or lower-class (sweats) rank prior to engaging in a modified negotiation task with another participant unaware of the clothing manipulation. Wearing upper-class, compared to lower-class, clothing induced dominance in participants—measured in terms of negotiation profits and concessions, and testosterone levels. Upper-class clothing also elicited increased vigilance in perceivers of these symbols: Relative to lower-class symbols, perceiving upper-class symbols increased vagal withdrawal, reduced perceptions of social power, and catalyzed physiological contagion such that perceivers' sympathetic nervous system activation followed that of the upper-class target. Discussion focused on the dyadic process of social class signaling within social interactions.

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In mammalian social life, social rank is a powerful influence on a wide range of life outcomes (Sapolsky, 2004). As such, the capacity to signal one's rank in social encounters with others is beneficial across social domains: Accurate communication of social rank helps individuals to predict others' behavior, find desirable mates, and avoid potential costly aggressive encounters (Krebs, Davies, & Parr, 1993). In human societies, social rank is defined, at least in part, by one's position in the social class hierarchy (Adler et al., 1994; Kraus, Tan, & Tannenbaum, 2013; Marmot et al., 1991). Symbols of social class—expressed in a variety of ways including in one's manners, tastes, and preferences—communicate the social rank of individuals during everyday interactions (Gillath, Bahns, Ge, & Crandall, 2014; Kraus & Keltner, 2009). The present research examines the extent that sartorial symbols of social class shape social interactions by changing the behavioral and physiological responses of both the wearers and the perceivers of these symbols.

Social Class as Rank vis-à-vis Others

Researchers typically define social class as contrasting levels of material and social resources that individuals possess, and measure the construct using indices of annual income, educational attainment, and occupation status (Kraus & Stephens, 2012; Oaks & Rossi, 2003). Together, these measures make up the objective material substance of social class.

Social class is more than simply one's level of available material resources: Social class environments, defined by varying levels of material and social resources, socialize and produce unique conceptions of the self that are expressed in class-specific behavioral profiles (see Fiske & Markus, 2012; Markus & Kitayama, 2010; Stephens, Markus, & Fryberg, 2012; Weininger &

Lareau, 2009). When expressed during public life, these behaviors become signals of social class that are used by perceivers to infer relative position in the social class hierarchy—by virtue of comparing the class-based behaviors of the self to that of others. Thus, every time a person in America engages in behavior consistent with relatively lower-class models of the self (e.g., attends a Nascar event) or with the relatively upper-class self (e.g., drinks a local craft beer), the information carried in those behaviors can be used to accurately discern a target's position in the social class hierarchy. It is through this social class signaling process that individuals learn their position on the social ladder of society at a chronic level, in comparison to society as a whole, and specific to a particular situation or context (for a review, see Kraus et al., 2013).

One implication of this dynamic social class signaling process is that symbols of social class allow individuals to dynamically judge others' social class rank at levels above chance accuracy. In support of this perspective, viewing 60s slices of a social interaction between two University students led a sample of naïve observers to accurately predict the social class position of the students on a ten rung ladder representing ascending levels of social class, based solely on behavior during the interaction (Kraus & Keltner, 2009). In other work, a similar sample of naïve observers was able to accurately discern the social class of participants after viewing a selection of profile photographs from Facebook.com (Rheinschmidt, Kraus, & Keltner, 2014; Kraus et al., 2013). In a study examining sartorial symbols, a sample of naïve judges were able to accurately discern a person's income and a host of other personality characteristics based only on a standardized photograph of their shoes (Gillath et al., 2014).

A second implication of this class signaling process is that merely expressing symbols of social class, regardless of the objective social class environment in which a person developed, will shape an individual's own experience of their rank in society vis-à-vis others. Data in

support of this overarching hypothesis is limited but suggestive: For instance, nonverbal behaviors that communicate socially valued success (e.g., dominance, victory) have been shown to elicit behavioral changes on the part of targets expressing these behaviors. In one experiment, people randomly placed in a dominant body position, expanding the chest and body, tended to be more focused on gambling rewards—they were more likely to wager a sure $2 for the chance to double their money—relative to individuals positioned submissively by constricting the arms and torso (Carney, Cuddy, & Yap, 2010). In another study using sartorial symbols, wearing a lab coat—a form of clothing presumably associated with attention to detail and precision—induced increased performance on attention-related tasks whereas just seeing a lab coat or wearing the same coat labeled as a "painter's coat" did not improve performance (Adam & Galinsky, 2013). Based on the above conceptual analysis, we tested the overarching hypothesis that merely wearing sartorial symbols associated with a particular social class will be enough to elicit changes in the class-consistent behavior and physiology of both the targets who display these symbols as well as the perceivers who view these symbols expressed by others.

Evidence suggesting that sartorial symbols of social class elicit changes in behavior and physiology is theoretically important for two reasons: First, though mounting evidence suggests that social class environments influence patterns of behavior, that evidence is correlational in nature and subject to several alternative causal explanations (e.g., neighborhood effects, political and economic trends). That an experimental manipulation of symbols of a person's social class can shift patterns of behavior establishes these symbols as a causal force in shaping a person's experience of their own social class rank in society relative to others (see Kraus, Côté, & Keltner, 2010). Moreover, examining this process in a dyadic social interaction adds to our understanding of the origins of class-based behavioral profiles observed in prior research: These

profiles do not solely arise from socialization processes; rather, they also occur based on relative comparisons of the symbols of social class one expresses in interactions and perceives on others (Kraus et al., 2013).

Social Class, Dominance, and Threat Vigilance

We make two theoretical predictions with respect to how symbols of social class shape behavior and physiology of targets and perceivers: First, we predict that wearing upper-class symbols will activate concepts in memory and behavioral scripts that are consistent with expectations for how people wearing upper-class clothing feel and behave. Specifically, we expect that wearing upper-class symbols will elicit behavior and physiology associated with elevated dominance. Dominance includes a variety of social behaviors that involve tendencies to value the self, or one's in-group, over others (Sidanius, Pratto, & Bobo, 1994), engaging in self-benefitting actions or actions to gain or maintain social influence (Goodwin, Operario, & Fiske, 1998), and in men, elevated levels of testosterone (Mazur & Booth, 1998). Dominance elicits similar influences on social behavior, to other rank-related constructs like social power (Goodwin et al., 1998; Keltner, Gruenfeld, & Anderson, 2003), but is a theoretically distinct construct because, unlike social power, it does not necessarily include control over others' rewards and punishments.

A wealth of research indicates that people from relatively upper-class backgrounds tend to engage in dominance, specifically related to behaviors and perceptions that benefit the self: For instance, prior research indicates that people from relatively upper-class backgrounds evaluate the self more positively than their lower-class counterparts (Twenge & Campbell, 2002), tend to think that high status groups in society obtain their positions legitimately (e.g., Brandt, 2013), and are also less likely to engage in pro-social behaviors to help others in need

relative to their lower-class counterparts (Piff, Kraus, Côté, Cheng, & Keltner, 2010). Thus, we predict that wearing upper-class sartorial symbols will elicit increased self-benefitting patterns of behavior relative to lower-class symbols.

Given that sartorial symbols of social class communicate one's relative position in society in comparison to others, wearing these symbols, we predict, will influence hormone responses related to dominance (i.e., testosterone). Specifically, wearing lower-class sartorial symbols will elicit decreases in testosterone levels (Akinola & Mendes, 2013; Mazur & Booth, 1998; Mehta, Jones, & Josephs, 2008; c.f. Mehta & Josephs, 2006) relative to wearing upper-class sartorial symbols. We make this prediction based on prior research indicating that low status contexts reduce testosterone levels whereas high status contexts maintain those levels: For instance, research on chess tournament winners and losers found that losing chess matches decreased testosterone whereas winning chess matches maintained testosterone levels (Mazur, Booth, & Dabbs, 1992).

For our second prediction, we expect that upper-class sartorial symbols will elicit increased vigilance of threats in perceivers of these symbols. Upper-class symbols observed within an interaction, we predict, will increase the likelihood that perceivers will scan their external environments for potential social- and survival-related threats. This will occur, we reason, because having subordinate status relative to an interaction partner elevates expectations that one may have lower standing in society and reduced resources to cope with demands of the social context (for a review, see Kraus et al., 2012).

Several studies suggest that, within social interactions, perceiving the elevated social class of interaction partners elicits heightened vigilance: An eye tracking study revealed that individuals focus more of their visual attention on targets who behave dominantly during social

interactions (e.g., aggressively stating their opinion; Cheng, Tracy, Foulsham, Kingstone, & Henrich, 2013). In related research in which two friends engaged in an interaction where they were required to tease each other, participants exhibited heightened perceptions of hostile emotions when interacting with an upper-class interaction partner (Kraus, Horberg, Goetz, & Keltner, 2011).

In the present study, we predicted that perceivers of sartorial symbols of high social class would exhibit increased threat vigilance—indexed in terms of cardiac vagal withdrawal. Cardiac vagal withdrawal occurs during active tasks when the vagal brake on the heart is released and as a result, the heart presents with reduced inter-beat variability (Grossman & Taylor, 2007). Vagal withdrawal is indexed by examining changes in heart rate variability (HRV), which is the variability between heart beats (Porges, 2007). In prior research, vagal withdrawal has been linked to a variety of psychological states including greater conscious control and effort, reports of psychological distress, and threat vigilance (e.g., Grossman & Taylor, 2007).

Increased threat vigilance is also likely to manifest in the form of affect contagion. Affect contagion is the extent that people pass on the emotions they experience to others (Barsade, 2002; Hatfield, Cacioppo, & Rapson, 1994). We predict that perceivers of upper-class symbols will be more likely to catch others' affective states than perceivers of lower-class symbols. Given that upper-class symbols elicit vigilance and increased attentional focus, targets wearing these symbols are likely to be used as informational guides for appropriate behavioral and emotional responses during social interactions. Thus, the affect and physiological responses of targets wearing upper-class symbols are more likely to influence their interaction partner than the reverse.

Several correlational studies are suggestive that symbols of high status result in greater attention from low status partners, which will elicit contagious affect: Low-status individuals tended to modulate their voices to become more similar in tone to a high-status partner over the course of a live televised interview (Gregory & Webster, 1996), and low-status individuals are more likely to engage neural circuitry involved in *mentalizing*—thinking about others thoughts and feelings—than individuals higher in social status (Muscatell, et al., 2012). In an example specific to social class, during the aforementioned laboratory interaction between close friends, individuals were more likely to shift their self-reported emotions over the course of a social interaction to become more similar to the emotions of their interaction partner, if that partner was upper-class (Kraus et al., 2011).

Affect contagion can be assessed in multiple ways including coordinated changes in facial expressions and behavior (Chartrand & Bargh, 1999), autonomic physiology (Levenson & Reuf, 1992; Waters, Mendes, & West, 2014), neuroendocrine responses (e.g., Saxbe & Repetti, 2010), and vocal frequency (Gregory & Webster, 1996). We have chosen to examine physiological changes, specifically changes in sympathetic nervous system (SNS) activation, as our measure of affect contagion. We view SNS responses as an ideal way to examine affect contagion because physiological responses vary as a function of arousal states, a key component of affective experiences (Barrett & Russell, 1999; Mendes, 2009; Waters, Mendes, & West, 2014). Moreover, unlike self-reports of affect, SNS responses capture affective states as they occur during interactions thereby allowing us to examine moment-to-moment changes in affect (e.g., Blascovich, Mendes, Vanman, & Dickerson, 2010; Kassam & Mendes, 2013; Waters et al., 2014).

Based on the above analysis, we expected that wearing sartorial symbols of higher social class would elicit dominance-related behavior and physiology whereas perceiving these upper-class symbols would elicit increased threat vigilance—indexed in terms of vagal withdrawal and affect contagion. We tested these two predictions in an experiment wherein one participant (the target) donned clothing of upper-, neutral, or lower-class rank prior to a negotiation exercise.

Methods

Overview

In this study, male participants arrived at the experiment separately. One of the participants (i.e., the *target*) was randomly assigned to a condition where he would wear lower-class, neutral, or upper-class clothing. The target then joined his interaction partner (i.e., the *perceiver*) in a large experiment room where the two would engage in a negotiation exercise from prior research (Galinsky & Mussweiler, 2001). The perceiver was always unaware of the target's clothing change. Autonomic physiology was recorded prior to, during, and immediately following the negotiation. The experiment was completed in two hours.

Participants

Our sample was recruited through Craisglist.org, and consisted of 134 healthy adult males from the San Francisco Bay Area ranging in age from 18 to 34 (M_{age}=24.14). Participants completed the study in dyads and we confirmed, prior to the study, that they did not know each other. Two experimental sessions encountered errors and so the data for the four participants in those sessions could not be used in analyses. In one other session, a participant expressed suspicion about the bogus physiological sensors and was excluded from analyses along with his partner. The final sample consists of the remaining 128 participants (64 dyads). Participants (allowed to check multiple ethnic categories) were European American (n=88), Latino (n=22),

Asian American (*n*=21), African American (*n*=15), Native American (*n*=9), or other (*n*=2) and were from diverse social class backgrounds: Seventy-one participants were, at most, high school educated, and the median family income was between $50,001 and $75,000 annually.

Procedure

Participants arrived, scheduled 10 minutes apart and were seated in different rooms to avoid meeting until the designated time. Disposable sensors were applied to the participants' torso and limbs and they sat quietly for a 5-minute baseline/resting period (Mendes, 2009). Following baseline, participants provided a saliva sample. After baseline, half of participants (i.e., *perceivers*) were instructed that they would move to another room where they would meet another participant.

The other half of participants, (i.e., *targets*), were instructed after baseline that they were taking part in a test of ambulatory physiological equipment embedded in clothes that were to be validated against the stationary equipment. This "cover story" distracted participants' attention from the purpose of the clothing manipulation in an attempt to reduce demand characteristics. One of two types of clothing, which had visible sensors that were sewn into the lining, was then presented to participants. Participants in the neutral condition (n_{dyad} =24) were allowed to remain in their current clothing and were instructed that the laboratory needed to run some additional tests on the stationary physiological sensors. Photos of the upper- (n_{dyad} =20) and lower-class (n_{dyad} =20) sartorial symbols are displayed in Figure 1.

Following this clothing change, targets and perceivers were placed in the same experiment room, initially separated by a portable dividing wall, where they would sit for the remainder of the study. We then removed the portable wall allowing the participants to see each other for the first time. We confirmed that the participants did not know each other, and had

them get acquainted. Following this interaction, we provided instructions for a negotiation task. After the negotiation, a second saliva sample was collected, and questionnaires were completed. The *target* then changed back into his original clothing and all participants were probed for suspicion, debriefed, and paid for their participation.

Materials and Measures

Clothing manipulation. The upper-class clothing consisted of a black suit, a white long-sleeve button-down collared shirt, black socks, and a pair of black leather dress shoes all purchased at Macy's. The lower-class clothing consisted of a white short-sleeve t-shirt, blue sweat pants, and plastic sandals all purchased at Walgreens.

The experimenter described to targets that the laboratory was attempting "to test a new version of advanced ambulatory physiological sensors that can record a person's physiological responses while they conduct normal daily activities." The experimenter then showed participants the "experimental physiological sensors," which were bogus sensors that were sewn into the clothing inside one leg, under one arm, and inside the shoes. The experimenter described the sensors while showing them to participants. Participants were then disconnected from the physiological monitoring station and went to an adjacent room to put on the clothing.

After the clothing change, participants viewed themselves in a full length mirror before returning to the laboratory room. Upon return, the experimenter re-attached the leads to the monitoring equipment and then placed an IPhone in the pocket of the suit or the sweats with the explanation that the sensors would "transmit the participants' physiological responses wirelessly to the IPhone." To enhance the realism of the procedures, the experimenter spent time with the participant, pretending to validate the lab sensors against the sensors in the clothing.

Negotiation task. In the negotiation task, participants role play as the chief financial officer of a biotechnology company—Synertech or Dosagen (see Galinsky & Mussweiler, 2001). As in prior research, participants were given written and verbal instructions for the negotiation that included shared information about the negotiation (e.g., estimates of real estate market changes) and confidential information about their own company (e.g., the cost of building a new plant). The confidential information included a best alternative to a negotiated agreement (BATNA) as in prior research—for the seller, the profit from stripping the plant and selling the parts, and for the buyer, the cost of building a new plant. With this information, a fair sale price for the manufacturing plant, where both parties benefit equally is $20.5 million, but because the buyer and seller have confidential information, neither party knew this true compromise value.

Given that Masters in Business Administration (MBA) students are the typical participants for this negotiation task, we modified the procedures for our community sample who, based on pilot testing, had far less negotiation experience: To give participants more information about successful negotiation behavior, we provided several examples (e.g., not settling for an unfair offer, taking the full allotted time to mull over an agreement, holding out for more than just an opponent's first offer). To encourage competition between our participants, the experimenter informed participants that they could win up to an additional $5 for engaging in these types of successful negotiation behaviors. We also imposed a 6-minute limit on the negotiation because pilot testing revealed this time limit was sufficient for reaching agreement in most dyads. Specifically, during experimenter training, all but one of our practice dyads (made up of research assistants) reached agreement prior to 6-minutes of negotiation. Participants were instructed that they did not need to reach an agreement in the 6-minute time period. If participants did not agree on a sale price (which occurred in 18 dyads), the last offer a participant

made during the negotiation was used as the final price offer in the analyses. A chi-square analysis revealed no differences in reaching agreement during the negotiation by condition (X^2=1.13, p=.57).

Physiological Assessments

Cardiac Vagal Withdrawal. Mendes (2009) provides a comprehensive and detailed review of methods to collect and score autonomic physiology. Inter-beat variability between heart beats, i.e., cardiac vagal tone, was measured using electrocardiography (ECG, Biopac, Goleta, CA). Two pre-gelled snap electrodes were placed directly on the skin of participants in a Lead II configuration (right arm, left leg). Signals were integrated with Biopac MP 150 hardware and ECG responses were edited and scored offline by the first author. ECG responses were visually examined and HRV scores were calculated using Mindware software (Mindware Technologies, Gahanna, OH; HRV 3.0), averaged in 30s intervals, and computed using a Fast Fourier Transformation (Mendes, 2009). Heart rate variability (HRV) reactivity scores were calculated by subtracting HRV scores during the last 30 seconds of the 5-minute baseline (presumably the most relaxed interval) from the HRV scores collected during the negotiation task (Mendes, 2009). Rates of breathing (i.e., respiration rates), measured from this same time interval, were assessed from impedance cardiography (see below). We controlled for participant's respiration rate in all analyses of HRV data given that respiration influences inter-beat variability (Grossman & Taylor, 2007).

Sympathetic Nervous System. Pre-ejection period (PEP) is a measure of sympathetic nervous system activation representing the time interval between the contraction of the left ventricle and the opening of the aortic valve. We used PEP scores to calculate affect contagion, as in prior research (Waters et al., 2014). The benefits of this measure include that PEP reactivity

is responsive to affective states, responds in a short-time frame (3 to 5 seconds), can be measured unobtrusively and continuously, and has extant literature linking the responses to psychological states, primarily general *arousal,* that are directly related to a specific underlying biological system—the sympathetic nervous system.

PEP is derived from both ECG and impedance cardiography. Cardiac impedance was collected using four strips of disposable tetrapolar aluminum/mylar electrodes that are placed directly against the skin and completely encircled participants' neck and torso (Mendes, 2009). PEP also was scored in 30s intervals using Mindware (IMP 3.0) and is calculated as the duration between the Q-point on the ECG waveform, and the b-point on the $\Delta z/\Delta t$ waveform obtained from impedance cardiography. Data were visually inspected by the authors for any recording artifacts and following numerous published studies the b-point was manually adjusted rather than relying on algorithms (e.g., Blascovich & Mendes, 2010; Mendes, 2009; c.f., Lozano et al., 2006).

Testosterone assays. Participants passively drooled 1ml of saliva into a 2ml vial (IBL salicap) using plastic straws ($M_{baseline}$=111.57pg/ml, $SD_{baseline}$=51.79pg/ml). These samples were stored in a -80°C freezer and then shipped to be assayed at Kirschbaum's laboratory in Dresden, Germany. The testosterone assay used 25ul of saliva per determination, has a lower limit of sensitivity of 1 pg/mL, and average intra-and inter-assay coefficients were below 11% (IBL International, Hamburg, Germany).

Negotiation Outcomes

We used two common outcome measures from the negotiation exercise as indices of performance during the negotiation: profit earned and concessions offered (e.g., Galinsky & Mussweiler, 2001). To determine the amount of profit earned and concessions offered during the

negotiation, two coders watched video recordings of the negotiation and recorded the first and last price that each participant offered. First (*M*=$1.93m, *SD*=$4.12m) and final (*M*=$0.25m, *SD*=$3.39m) offers were coded to indicate amount of profit buyers and sellers would earn over and above the $20.5m fair price. These two price values were also subtracted from each other to indicate the total amount of concessions, in millions, during the negotiation (*M*=$2.02m, *SD*=$2.10m).

Sense of Power

Prior to the start of the social interaction, participants indicated their baseline sense of power on 7-point Likert scales (1 = *strongly disagree*, 7 = *strongly agree*). A sample item from the eight-item scale is "I can get people to listen to what I say." (*M*=4.95, *SD*=0.86; Anderson, Keltner, & John, 2012). Participants indicated their sense of power right after the negotiation and at the end of the experiment by answering the question: "During the negotiation/experiment, I felt I had power and influence." These two items were highly correlated (r=.54, p<.05) and so a composite measure was created indicating sense of power during the experiment (*M*=5.00, *SD*=1.09). We then computed changes in sense of power by subtracting standardized scores of the mean for power in the experiment from the baseline mean (*M*=0.00, *SD*=1.16).

Results

Manipulation Check

To determine the success of our sartorial manipulation, a team of three coders rated photographs of targets in the upper- and lower-class clothing conditions taken prior to the clothing change using a 7-point Likert scale indicating ascending levels of sartorial formality (1 = *"sweats or clothing for exercising"*, 7 = *"dress shirt and slacks or business suit"*). The three coders' ratings of participants clothing correlated highly (*rs* between .71 and .98, *ps* < .01; α

= .88). In general, participants wore moderately informal clothing when arriving at the experiment (M=3.25, SD=0.82) and this clothing was uncorrelated with the assigned social class of participants (coded "-1" for lower-class, "0" for neutral, and "1" for upper-class) during the experiment (r=.03, p=.70).

Our manipulation of sartorial symbols was effective in shifting participant clothing formality: In the lower-class symbols condition, we determined if coder judgments of target clothing differed from a value of 1 ("*sweats or clothing for exercising"*). This analysis revealed that targets in the lower-class condition had significantly more formal clothing when they arrived at the experiment (M = 3.43) than the clothing they were assigned by the manipulation $t(19)$=12.15, p<.01. We then compared upper-class targets' rated clothing to a value of 7 *("dress shirt and slacks, or business suit"*). Again, this analysis revealed that targets in the upper-class condition had significantly less formal clothing (M = 3.53) than they were assigned by the manipulation $t(19)$=-15.06, p<.01.

We also determined if the sartorial manipulation was successful in manipulating perceptions of social status using a separate sample of 200 observers who were collected online through Mechanical Turk (www.mturk.com). The online observers were instructed to view still photographs of the first 10 of our laboratory participants assigned to the upper- and lower-class symbols conditions wearing either their assigned clothing or their own neutral clothing prior to the clothing change. The online observers were instructed to make various judgments about the person based solely on the photographs. These stimuli were randomly presented such that each of the observers had an equal chance of seeing the 10 laboratory participants in the manipulated clothing or their own neutral clothing. In addition to a number of filler measures, participants

responded to the single item "This person has high social status." using a 7-point Likert scale (1 = *disagree strongly*, 7 = *agree strongly*).

A repeated measures Analysis of Variance (ANOVA) comparing observer ratings of social status for laboratory participants in the upper-, neutral, and lower-class symbols conditions yielded significant mean differences in observer-rated social status between participant clothing conditions $F(2,380)=112.40, p<.01$, $\mu_p^2=.37$. Examination of the specific means reveals a pattern aligning with our expectations: Laboratory participants wearing a business suit were judged to be highest in social status ($M = 4.65$, *95% CI* [4.51 to 4.78]) with participants wearing the t-shirt and sweats rated the lowest in status ($M = 3.42$, *95% CI* [3.24 to 3.59]) and neutral participants in between ($M = 3.61$, *95% CI* [3.48 to 3.73]). These results indicate that the sartorial manipulation was successful in shifting participant social status, as rated by observers viewing static photographs.

Dominance in the Negotiation

Profits and concessions. Our overarching hypothesis was that sartorial symbols of social class would shift the behavior and physiology of both the wearers and perceivers of these symbols in class-consistent ways. To test this prediction, we first examined negotiation outcomes with the expectation that targets wearing upper-class symbols would optimize their own self-interests during the negotiation relative to their partner, which we operationalized as obtaining a higher relative profit beyond the $20.5m fair compromise value. Given that the negotiation was a competitive interaction between the target and perceiver, we conducted an Analysis of Variance (ANOVA) predicting negotiation profit with dyad as the unit of analysis, target versus perceiver profit as the within subjects factor, and dyad social class as the between subjects factor (Kenny, Kashy, & Cook, 2006). This ANOVA technique allows us to compare differences in profit

between members of the same dyad, which is the most appropriate comparison for our relative profit hypothesis. For all subsequent analyses, we use a hierarchical linear model (HLM) controlling for dyad-level dependence (Kenny et al., 2006). Unlike the ANOVA technique which compares outcomes within the same dyad, the HLM technique allows for the independent testing of target and perceiver effects on behavior and physiology.[1]

The ANOVA revealed no main effects for target vs. perceiver role $F(1,59)=1.14$, $p=.29$ or dyad social class $F(2,59)<1$, but as predicted, a significant interaction emerged between dyad social class and target versus perceiver role $F(2,59)=3.39$, $p<.05$, $\mu_p^2=.06$. Examination of 95% confidence intervals surrounding the calculated profit mean revealed that targets wearing upper-class symbols obtained significantly higher profits (M=$2.06m, 95% CI [$0.47m to $3.65m]) than did perceivers (M=-$1.20m, 95% CI [-$2.63m to $0.24m]) beyond the $20.5m fair compromise value. Targets and perceivers did not differ in profits in the lower-class (M_{target}=$0.68m, $M_{perceiver}$=-$0.50m) or neutral dyads (M_{target}=-$0.66m, $M_{perceiver}$=$1.15m).

We also expected sartorial symbols to influence concessions in the negotiation, with lower-class targets offering more concessions than upper-class targets. To conduct this analysis, we predicted negotiation concessions with *target* and *perceiver* clothing condition (coded "-1" for lower-class symbols, "0" for neutral, and "1" for upper-class symbols) in a HLM analysis controlling for dyad-level dependence (Kenny et al., 2006).

As expected, lower-class targets made significantly more concessions than did upper-class targets $b=-1.01$, $t(105.79)=-2.95$, $p<.01$, $d=.41$ (see Table 1 for means). For perceivers, no significant differences in concessions emerged by condition b=-0.56, $t(105.79)=-1.63$, $p=.11$. Target ($t<1$) and perceiver ($t=-1.04$, *ns*) social class did not influence first offers in the

negotiation. This latter result suggests that differences in the amount that participants offered in concessions were not driven by differences in starting offers.

Testosterone. Next, we examined the influence of sartorial symbols on testosterone (T) change. To the extent that lower status reduces feelings of dominance relative to elevated rank, we expected that participants wearing lower-class sartorial symbols would show lower levels of salivary T after the negotiation relative to upper-class targets (Mazur & Booth, 1998). The HLM analysis revealed that lower-class targets showed a significant reduction in percent of T relative to upper-class targets b=9.87, t(122.23)=2.25, p<.05, d=.15. Perceivers showed no differences in T change based on their partner's social class symbols b=1.22, t(122.39)=0.27, p=.79. The sartorial symbols manipulation effect on T change held when controlling for target and perceiver age b=11.05, t(106.78)=2.49, p<.05 (Table 1). Importantly, targets wearing lower-class sartorial symbols also had significantly lower T levels relative to neutral targets b=8.82, t(98.82)=2.43, p<.05. This latter finding suggests that lower-class sartorial symbols, and not upper-class symbols, are the catalyst of T change. This finding is consistent with prior research examining associations between T change and social status (e.g., Mazur et al., 1992).

Threat Vigilance in the Negotiation

Cardiac vagal withdrawal. Having observed evidence suggesting that sartorial symbols elicit class-consistent changes in self-benefitting behavior and T, we then examined predictions related to physiological reactivity that is correlated with threat vigilance within dyadic interactions. We expected that upper-class sartorial symbols would elicit cardiac vagal withdrawal in *perceivers*. The HLM analysis did not yield a target effect: Participants *wearing* upper- and lower-class clothing did not show differences in HRV reactivity b=0.20, t(116.70)=1.03, p=.30, however *perceivers* were affected by their partner's sartorial symbols.

Specifically, perceivers interacting with targets in upper-class clothing showed greater vagal withdrawal from baseline relative to perceivers interacting with a target in lower-class clothing b=-0.38, t(116.70)=-1.97, p=.05, d=.12 (Table 1). These results suggest that perceivers may have engaged in greater vigilance of their upper-class interaction partner.

Subjective sense of power. Prior research indicates that low-power individuals tend to exhibit enhanced vigilance relative to high-power individuals (e.g., Galinsky, Magee, Inesi, & Gruenfeld, 2006). Given these data, we tested whether perceivers of upper-class targets experienced increased powerlessness during the competitive negotiation with their partner. We tested this possibility by conducting an analysis predicting self-reported changes in sense of power from baseline with target and perceiver social class symbols while controlling for target and perceiver baseline power. Consistent with the HRV analysis, we observed no effect of *target* social class b=0.03, t(121.65)=0.19, *ns,* but *perceivers* showed a change in sense of power b=-0.32, t(121.65)=-2.17, p<.05, d=.29. That is, perceivers of upper-class targets felt reduced power during the negotiation relative to perceivers of lower-class targets.

Affect contagion. Finally, we hypothesized the upper-class sartorial symbols would catalyze affect contagion in perceivers. To assess affect contagion, we tested whether upper-class targets' physiological responses would influence their partner's in a time-lag design: We examined changes in PEP during the negotiation; where shorter intervals between the ventricle contraction and the aortic valve opening indicate greater sympathetic nervous system (SNS) activation. We computed average correlations representing the association between a participant's PEP at time X and their partner's PEP at time X+1 (M=0.001, SD=0.34). We chose a time lag of one unit (equaling 30 seconds) given the rapid responsiveness of SNS activation.

Higher average positive correlations indicate that the participants' time X PEP predicted his partner's change in PEP at time X+1.

Consistent with our affect contagion hypothesis, when targets wore upper-class clothing their time-X PEP was more positively associated with their partner's time X+1 PEP—indicating physiological contagion—than it was for targets who wore lower-class clothing b=0.11, t(120.78)=2.03, p<.05, d=.13 (Table 1). No perceiver effects for PEP contagion on target's responses were observed b=-.02, t(120.78)=-0.45, p =.65.

Raw correlations between variables reported across analyses are displayed in Table 2.[2] When controlling for respiration rates, heart rate variability (HRV) during the negotiation was significantly positively associated with offering more concessions. One possible explanation of this effect is that activation of the vagus nerve has been associated with pro-social emotional states, such as the experience of compassion, in prior research (Goetz, Keltner, & Simon-Thomas, 2010). Alternatively, lower levels of HRV reactivity have been linked to better decision-making, effort and conscious control, which might explain lower concessions (Kassam, Koslov, & Mendes, 2009). No other correlations were significant. The lack of significant correlations between physiological assessments and self-reports or behaviors potentially reflects the differing psychometric properties of each measure, or that physiological responses are differentially impacted by unconscious processes (Mauss et al., 2005; Mendes, 2013). Self-reports of annual income and educational attainment did not significantly interact with the sartorial manipulation (ts < 1), and controlling for these indices did not change the relationship of the sartorial manipulation to any of the outcome measures.[3]

Discussion

Symbols of rank are communicated across social living animals and organize social life by managing the expectations of those perceiving these symbols (Krebs et al., 1993). In humans, symbols of social class communicate hierarchical position in dyadic interactions, but up to this point, the capacity of these symbols to actually elicit class-consistent behavior and physiology had never been tested. In the present research, we examined the influence of manipulated sartorial symbols of social class within dyads to determine their unique influence on the behavior and physiology of targets who wear the symbols and on perceivers of these symbols.

Consistent with our hypotheses, results suggest that *wearing* sartorial symbols influence both self-benefitting behavior during negotiations and hormone levels related to dominance. With respect to behavior, wearing an upper-class business suit increased profits within a competitive negotiation and decreased concessions offered relative to wearing lower-class sartorial symbols. Wearing sartorial symbols also shifted neuroendocrine responses: wearing lower-class clothing resulted in significantly lower testosterone relative to wearing upper-class symbols.

Perceiving symbols of social class worn by others influenced participants' threat vigilance during the negotiation: Specifically, perceivers of upper-class targets experienced significant cardiac-vagal withdrawal during the negotiation—a physiological state associated with increased vigilance and attention (Grossman & Taylor, 2007)—relative to perceivers of lower-class targets. Importantly, perceivers of upper-class targets also reported reductions in sense of power following the negotiation in comparison to lower-class perceivers. This result dovetails with the HRV findings because, as prior research indicates, low power is also associated with increased vigilance (Keltner et al., 2003). Given that sartorial symbols of social

class were manipulated in the present research, these results represent the first causal evidence suggesting that perceiving others' upper-class symbols in interactions elicits vagal withdrawal.

Finally, upper-class targets catalyzed affect contagion in their partner during the negotiation. That is, the SNS responses of individuals wearing upper-class sartorial symbols were more likely to be *caught* by their partner 30s later in the interaction than were the SNS responses of lower-class individuals. This effect aligns with past correlational evidence suggesting that affect contagion occurs in the direction of upper-class individuals' affect (Kraus et al., 2011) and is, in our estimation, the first evidence suggesting that social class symbols are catalysts in this contagion process.

The current research examined sartorial symbols of social class and we differentiate these social class symbols from other symbols of dominance or status (e.g., social power). We make this distinction because, although measures of social power are correlated with measures of social class in prior research (Bullock & Lott, 2010; Keltner et al., 2003; Kraus et al., 2012), the correlations are only moderate in size and so these rank-based constructs are empirically separate. As well, whereas social power represents direct control over others' resources and ability to administer punishments, symbols of social class are defined within social comparisons between one's own resources and that of others—elevated social class does not necessarily indicate control over others' outcomes. Moreover, research indicates that status and power vary independently of each other: In prior research, high power individuals perceived as low in status tended to be perceived less warmly (Fragale, Overbeck, & Neale, 2011) and behaved more anti-socially than their high power/high status counterparts (Fast, Halevy, & Galinsky, 2012). These results underscore the empirical distinctions between power and status.

Related to this point, it is important to acknowledge that our manipulation of sartorial symbols of social class, though it elicited a higher sense of power in perceivers of lower-class targets, is not a true manipulation of social power. Manipulations of social power typically involve participants thinking of a time when they had control over others or actually give participants control over some resource (e.g., Côté et al., 2011). Participants in the present research had equal control over rewards and punishments during the experiment tasks across the conditions of the sartorial manipulation. Despite these theoretical and methodological distinctions between class and power, it is clear from these results that symbols of social class exert influence on social cognition and behavior in ways that are similar to that of social power (Keltner et al., 2003).

One noteworthy implication of the findings of the current experiment is that class-based patterns of behavior and physiology, typically thought of as culturally learned and socialized during early environment experiences, are more malleable than researchers have previously argued (e.g., Weininger & Lareau, 2009; Fiske & Markus, 2012). That these patterns change as a function of the symbols of social class that people express in everyday social interactions is indicative of the process by which relative social class is communicated in society more broadly (Kraus et al., 2013). Specifically, individuals enter into social interactions with others, bringing with them symbols of social class that, in turn, both change perceptions of their own position in the social hierarchy and the way they are perceived by others. Understanding the ways in which social class symbols elicit class-consistent behavior in dyadic settings is an exciting area of future research. Importantly, future research on nonverbal status symbols would benefit from considering the simultaneous and dynamic influence of these symbols on both targets and perceivers within dyadic interactions.

Study Limitations

Several important limitations should be noted with respect to this study and its conclusions. The negotiation task we used in the present research was modified in order to accommodate differences in negotiation experience between the typical MBA student participants and our community sample (e.g., Blader & Chen, 2012; Galinsky & Mussweiler, 2001). Thus, we advocate some caution when interpreting the findings from this research with respect to the broader negotiation literature.

Our sartorial manipulation was easily visible for participants, and as such, it is possible that demand characteristics played a role in some of the patterns we observed in our results. Our experiment went to great effort to reduce the demand characteristics inherent in donning suits versus sweats by directing the attention of participants to the goal of validating ambulatory physiological equipment. These steps help us minimize the extent that our results can be explained by participant expectations (Boot, Simons, Stothart, & Stutts, 2013). As well, our examination of funnel debriefing questions asked of participants at the end of the study suggested a lack of awareness of the study hypotheses.

In our results we found some differences between upper- and lower-class sartorial symbols on behavior and physiology. For T change, we also found that participants in the lower-class condition differed from neutral participants, indicating that lower-class sartorial symbols decrease T levels. This finding is sensible given that most research on social status and T change reveals that low status reduces T rather than high status increasing it (Mazur, Booth, & Dabbs, 1992; Mehta & Josephs, 2006). For our other outcome measures, however, neutral participant responses were directly in between upper- and lower-class participants—thereby, limiting the extent we can conclude that our effects were driven by either lower- or upper-class sartorial

symbols. Future research examining the effects of symbols of social class on behavior and physiology, using larger samples, may more definitively answer the question of whether lower- or upper-class symbols drive dominance or threat vigilance.

We made the decision to focus on male dyads rather than female or mixed-gender dyads because we wanted to constrain participants' sartorial options for the clothing manipulation. Because of this, we are limited in what we can conclude about the sensitivity of female dyads to sartorial class symbols.

Additionally, we chose a negotiation context that conceptually matched the upper-class sartorial symbols we used in our manipulation. Because of this, it is unclear how much the "fit" between clothing and context accounts for the effects we observe here. Some of our own exploratory analyses (see Footnote 2) suggest that clothing condition did not influence participant feelings of comfort with the negotiation task. Still, a more definitive test of our hypotheses might occur in an experiment where the sartorial symbols completely misfit the context of the interaction: For example, if we had participants engage in a coaching exercise would the lower-class sartorial symbols have been more effective in terms of affect contagion because the clothes matched this context? Clearly, our arguments regarding social class symbols suggest that, in most cases, we expect social class symbols to elicit a similar pattern of results to what we observed in this study. Future research is necessary in this regard, to completely rule out situational fit as an alternative explanatory variable.

With respect to our affect contagion findings, research indicates that the spread of affect involves both the perception of others' affective states as well as target expressions of affect (Zaki, Bolger, & Ochsner, 2008). In the present research, we cannot completely rule out the possibility that expressivity, and not vigilance, accounts for the affect contagion findings.

However, that overall changes in cardiac output did not differ by experimental condition (see Footnote 2) indicates that targets were not different in activity levels during the negotiation based on the sartorial manipulation. This result further raises the possibility that the enhanced vigilance of perceivers of upper-class targets played a role in the contagious spread of affect.

Future Directions and Conclusions

Our findings generate several promising lines of future inquiry. A first concerns whether there are other symbols that might engender immediate changes in social class (e.g., Gillath et al., 2014). We chose to focus on clothing because of its clear use as symbols of social class in social groups (Bourdieu, 1979). Since the current investigation involved men, it would also be important to determine if similar patterns would be observed both for women and in mixed-gender interactions. For the latter case, perhaps the social class signals inherent in clothing are harder to discern across genders.

Notably, our study involved a context that asked participants to engage in a competitive interaction. Would a similar pattern emerge if participants were instructed to help each other complete a cooperative task? Perhaps incentives for cooperation would lead upper-class individuals to enhanced cooperative patterns. Research showing enhanced cooperation among upper-class individuals induced to experience pro-social emotional states suggests this possibility (Kraus et al., 2012). It was also interesting that mean levels of concessions offered were highest among partners of lower-class targets (see Footnote 1). We speculate that this pattern may have been due to either assumptive helping or disengagement from an "unworthy" opponent, but future research should test these explanations more systematically.

Finally, it is interesting to speculate about how sartorial symbols of social class influence behavior outside the laboratory. For instance, school uniforms have helped schools improve

student conduct in a variety of studies, and this might be because of the way these policies dampen naturally occurring sartorial symbols (Bodine, 2003). Importantly, our research suggests that one of the benefits of "dressing the part" at a job might be that it helps individuals more easily shift their behavior to match their desired position in society.

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Footnotes

[1] The alternative analyses using the ANOVA method are reported below: In the analysis of participant concessions offered during the negotiation, the ANOVA revealed a significant main effect of target vs. perceiver concessions $F(1,53)=4.08$, $p<.05$, with targets offering more concessions than perceivers. There was also a significant main effect of social class $F(2,53)=5.79$, $p<.05$, with lower-class dyads showing more concessions than neutral or upper-class dyads. The interaction was not significant $F(2,53)=1.10$, $p=.34$. These results indicate that concessions were more likely in the lower-class dyads, and that it was particularly likely among targets that had changed clothing. In the analysis of testosterone change, the ANOVA revealed no main effects of social class $F(2,61)<1$ or target vs. perceiver testosterone change $F(1,61)=2.11$, $p=.15$. However, the analysis did yield a significant interaction $F(2,61)=3.91$, $p<.05$. Examination of the 95% confidence interval surrounding the means revealed that targets (95% CI [-31.79pg/ml to -8.51pg/ml]) had significantly reduced testosterone relative to perceivers (95% CI [-7.89pg/ml to 29.77pg/ml]) in the lower-class condition, whereas no such differences in testosterone emerged for the neutral or upper-class dyads. For HRV reactivity, the Analysis of Covariance (controlling for respiration rate) revealed no main effects for social class symbols $F(2,57)<1$, target v. perceiver HRV reactivity $F(1,57)<1$, or a significant interaction $F(2,57)=2.59$, $p=.08$. Examination of 95% confidence intervals surrounding the means revealed that in upper-class dyads, targets (95% CI [-0.33 to 0.66]) did not exhibit significantly higher HRV reactivity than did perceivers (95% CI [-1.31 to -0.07]), although the pattern was in line with our predictions. No such differences emerged in the neutral or lower-class dyads. For the affect contagion analysis, no main effects for social class $F(2,60)<1$, or target v. perceiver affect contagion emerged $F(1,60)<1$. The interaction was also not significant $F(2,60)=1.75$, $p=.18$.

Examination of 95% confidence intervals with this analytic strategy revealed no mean differences across conditions.

[2] We also examined correlations between partner responses on each of the critical outcome measures. Partner profits were significantly negatively associated $r(60) = -.91$, $p < .05$, as were power and profits $r(57) = -.36$, $p < .05$—the latter indicating that as one participant felt more powerful, their partner tended to earn fewer profits. Partner concessions were positively correlated $r(54) = .26$, $p = .05$, although this latter result did not reach conventional levels of statistical significance. No other significant correlations were observed between partner outcome variables.

[3] It is possible that the behavioral and physiological responses observed in the experiment were driven by a willingness of participants to act in a manner that is consistent with their style of dress, or that dressing in a business suit increased fluency on a negotiation task where this attire is more appropriate (e.g., Oyserman, 2011). A few analyses we conducted suggest that fluency is unlikely to be a mechanism explaining the effects of social class symbols on behavior and physiology: When we examined self-reports of how challenging participants felt the negotiation was using a 6-item scale (e.g., "The previous task was very demanding." $M = 4.64$, $SD = 0.86$, $a = .62$) we found no significant influence of target [$t(122.71) = 1.07$, *ns*] or perceiver [$t(122.71) = -0.98$, *ns*] status on challenge judgments. A single item measure of self-rated performance yielded similar results (i.e., "I think I performed well during the negotiation task." $M = 5.09$, $SD = 1.34$). Participants wearing the business suit also did not enjoy the task more than other participants (i.e., "I enjoyed the negotiation task." $M = 5.94$, $SD = 1.10$) [*t's* < 1]. Examining physiological responses reveals a similar pattern: If participants in the high class symbols condition felt more like they were dressing the part in the negotiation, one might expect

these participants to exhibit physiological responses suggesting their comfort with meeting the demands of the negotiation task—indexed by increases in cardiac output from baseline (M = 0.33, SD = 0.99; Blascovich & Mendes, 2008). Contrary to this prediction, targets show no condition differences in cardiac output during the negotiation [$t < 1$]. Overall, these results cast doubt on the notion that participants in the upper- class symbols condition felt more comfortable than their lower-class symbols or neutral counterparts.

Table 1. Mean differences in hierarchical linear model analyses comparing upper-, neutral, and lower-class symbols of targets and perceivers on key outcome variables. Numbers in parenthesis indicate standard errors of the mean. Significant ($p < .05$) mean differences between upper- and lower-class targets and perceivers are indicated using different subscript letters.

Participant	Target			Perceiver		
Condition	Upper-Class	Lower-Class	Neutral	Partner is Upper-Class	Partner is Lower-Class	Partner is Neutral
Concessions	\$0.83m (0.38)$_a$	\$2.81m (0.41)$_b$	\$1.58m (0.36)	\$2.17m (0.52)	\$3.41m (0.57)	\$1.73m (0.50)
T change	-0.41% (5.82)$_a$	-20.15% (5.82)$_b$	2.96% (5.32)$_a$	0.95% (9.42)	10.94% (9.42)	-4.05% (8.60)
HRV reactivity[+]	0.17 (0.25)	-0.21 (0.25)	-0.35 (0.24)	-0.69 (0.31)$_a$	0.04 (0.31)$_b$	-0.26 (0.30)
Average *r* (PEP)	.09 (.08)$_a$	-.13 (.08)$_b$	.04 (.07)	-.03 (.07)	.02 (.07)	.02 (.07)

T = testosterone; HRV = heart rate variability; Δ = change from baseline; PEP = pre-ejection period

[+]Analysis reports results controlling for target and perceiver respiration rates.

Table 2. Raw correlations between behavioral and physiological responses during the negotiation.

	1.	2.	3.	4.	5.	6.
1. Profit	---					
2. Concessions	-.12	---				
3. T change	-.02	.03	---			
4. HRV[a] reactivity	.17^{+}	.23*	-.00	---		
5. Δ Power	.13	.13	-.11	.08	---	
6. Average r (PEP)	.06	-.13	-.05	.02	.03	---

* $p < .05$, $^{+}$ $p < .10$; T = testosterone; HRV = heart rate variability; PEP = pre-ejection period; Δ Power = change in power from baseline; [a]Analysis reports results controlling for respiration rates.

Figure 1. Lower-class (left panel) and upper-class (right panel) clothing used in the sartorial manipulation. Photos of M. Halverson taken with permission by M. W. Kraus.