Running Head: SUBMISSIVE, INHIBITED, AND AVOIDANT

Submissive, Inhibited, Avoidant, and Escape Motivated: The Correlates and Consequences of Arm-Crossing

Adam K. Fetterman[1], Jessica L. Bair[2], and Michael D. Robinson[2]

[1]Knowledge Media Research Center, Tübingen, Germany

[2]North Dakota State University, USA

Note: Correspondence can be sent to Adam Fetterman, Knowledge Media Research Center, Schleichstrasse 6, 72076 Tübingen, Germany. Internet correspondence can be directed to A.Fetterman@iwm-kmrc.de (Phone: +49 7071 979-226; Fax: +49 7071 979 200).

Abstract

Some scholars of nonverbal behavior contend that arm-crossing indicates a defensive orientation to the social environment, but relevant evidence is sparse. Three studies (N = 242) sought to investigate whether there is truth to this idea. Consistent with it, Study 1 found that people reporting higher arm-crossing frequencies scored higher in interpersonal submissiveness and were more inhibited in their social decision-making. To investigate causal processes, Studies 2 and 3 manipulated arm-crossing using a hypothesis-disguising cover story. Study 2 found that arm-crossing activated thoughts of the self's submissiveness and social vulnerability. Study 3 focused on activated strategies for handling potential interpersonal violence. Participants in an arm-crossing condition, relative to a control condition, indicated that they would be more inclined to escape and less likely to attack. The studies converge on the idea that arm-crossing can signify and cause a defensive social orientation.

KEYWORDS: Nonverbal Behavior, Arm-Crossing, Submissiveness, Inhibition, Avoidance

Submissive, Inhibited, Avoidant, and Escape Motivated: The Correlates and Consequences of Arm-Crossing

Darwin (1872) attributed psychological meaning to nonverbal behaviors. For example, his functional analysis of bared teeth proposed that this expression reflects a hostile disposition with a possible intent to aggress (e.g., by biting). Darwin's (1872) ideas have been influential to the emotions literature, which has sought to establish a correspondence between internal feeling states and their potential outward manifestations (Hess & Thibault, 2009). The vast majority of this work has concentrated on the face, which has an exquisite musculature and is often the focus of attention as people interact with each other (Rosenthal & DePaulo, 1979). A number of state-expression correspondences have been reasonably well established. As examples, smiles are more likely when people view their circumstances as pleasant and eyebrow furrows are more likely when goal obstacles are perceived (Smith & Scott, 1997).

The idea that expressions mirror internal state is Darwin's (1872), but James (1890) added an important extension. According to the extension, adopting a particular expression can *create* a corresponding internal state. Evidence in support of this idea has come from the facial feedback literature, which has shown, among other effects, that cartoons are perceived as more humorous following a manipulation of smiling relative to frowning (Strack, Martin, & Stepper, 1988). Facial feedback can also bias information processing in an expression-congruent direction (Hawk, Fischer, & Van Kleef, 2012).

The face is highly expressive and it is not surprising that it has received the lion's share of attention in research inspired by Darwin (1872) and James (1890). Yet, nonverbal behavior encompasses far more than just what the face does. People also have trunks, arms, and legs that

can be configured in a variety of ways, some of which may signal psychological meaning. There are difficulties here, however. There are many positions that the body can take, a large number of them may have no particular meaning, and there is no overarching theoretical framework to guide the intrepid "body language" researcher (Dael, Mortillaro, & Scherer, 2012). Under such circumstances, one could measure a number of bodily movements and see which can be mapped to underlying states or, alternatively, could focus on one particular gesture and its likely meaning. We adopt the latter strategy for the behavior of arm-crossing.

Intuitively, arm-crossing signifies *something* about the state of the individual. Also intuitively, that something would seem to be about establishing a barrier between the self and the external world. The arms, in manifest terms, are blocking a direct approach to the chest area (Lewis, 2000). This barrier analysis seems generative, but a barrier could be enacted for several reasons. A person might enact a barrier as a signal of superiority, as suggested in studies of inferred pride (Tracy & Robins, 2007). Pictured targets crossing their arms were seen to be higher in pride than pictured targets with arms at their sides, though inferred pride was stronger for some other expressions such as raised arms. We think that these findings are consistent with the idea that arm-crossing implicates a barrier between the self and others, here in favor of the superiority of a target. However, the impressions that people have of posed expressions could be very different than what expressions do to the self (Hall, Coats, & LeBeau, 2005). The present research pursues the latter sort of question.

People may also use their arms as a barrier because they wish to discourage others from interrupting task-focused efforts. Spiegel and Machotka (1974) suggested such a meaning when they stated that arm-crossing is linked to an "unyielding attitude" and Friedman and Elliot (2008) offered relevant empirical results. In the Friedman and Elliot (2008) studies, a manipulation of

arm-crossing led participants to work harder on a non-social intellectual task. Even so, the authors suggested that arm-crossing is likely to have different proprioceptive meanings in different (e.g., social versus non-social) contexts, a sentiment that we agree with (Tamir, Robinson, Clore, Martin, & Whitaker, 2004). The focus of the present studies was on what arm-crossing does to the social self, not the intellectual self.

A primary function of barriers is protection and this meaning seems likely when people cross their arms in social contexts (Argyle, 1988; Fast, 1970; Lewis, 2000). Consistent with this idea, Baxter and Rozelle (1975) found that people crossed their arms for a greater proportion of time when uncomfortably crowded and Gifford (1994) found that wrapped arms were more commonly observed among introverts than extraverts. Additionally, restrictions of the arms (and legs) are thought to occur among people and animals with less social power and therefore greater vulnerability (Carney, Cuddy, & Yap, 2010; de Waal, 1998; Tiedens & Fragale, 2003). There is meta-analytic evidence in favor of this idea in the context of greater postural restriction (e.g., legs together, arms wrapped, elbows close to body, making the body look smaller) among less powerful individuals (Hall et al., 2005).

Postural restriction encompasses a wide variety of bodily actions, however (Carney et al., 2010; Hall et al., 2005). Because this is true, it is uncertain whether arm-crossing – as a specific social cue – is associated with wariness of the social environment, as suggested by Argyle (1988). We sought to determine whether this is the case in one correlational study and two experimental studies. The premise for experimental studies is that nonverbal behaviors (e.g., smiling) not only reflect one's psychological state (e.g., enjoyment), but can actually cause that psychological state (Riskind & Gotay, 1982; Strack et al., 1988; Wells & Petty, 1980). In the

present case, that is, it is possible that the simple act of crossing one's arms can make one more socially inhibited and wary than might otherwise be the case.

The research studies were comprehensive in two ways. First, Study 1 adopted an individual difference approach and Studies 2 and 3 adopted an experimental approach. Second, we administered a diverse set of outcomes to converge on the idea that arm-crossing has a self-protective social function. Studies 1 and 2 focused on submissiveness because submissiveness and social self-protection are closely linked (de Waal, 1998; Tiedens & Fragale, 2003). In addition, we included a scenario-based measure of social inhibition in Study 1, a measure of social avoidance in Study 2, and a measure of escape-proneness in Study 3. In total, we followed the lead of Argyle (1988) and Lewis (2000) in hypothesizing that arm-crossing would be associated with greater submissiveness, inhibition, avoidance, and proneness to escape.

Study 1

In Study 1, we asked people how often they tend to cross their arms as an individual difference predictor. If arm-crossing serves a self-protective social function, then people who cross their arms more frequently should score higher in interpersonal submissiveness (de Waal, 1998). We investigated this hypothesis by administering a scale of dominance-submission as well as a scenario-based measure of socially inhibited decision making.

Method

Participants and Procedures

We recruited a sample of 124 (66 female) undergraduate participants from a medium-sized university in the Midwest who received course credit. They signed up for the study through a SONA registration system and arrived to the laboratory in groups of 6 or less. They completed the study in private cubicles on personal computers equipped with MediaLab software. We did

not collect age or ethnicity information, but the participant pool tends to be ~20 years old and 90% Caucasian. The studies were run for a pre-determined period of time, one that had typically produced sample sizes in the neighborhood of 80-100 in previous studies in the lab. No participants or conditions were dropped, either from Study 1 or from the remaining studies.[1]

Individual Differences in Arm-Crossing Frequency

Participants were asked "to what extent do you often cross your arms?" and "when your hands are free, do you find yourself crossing your arms?" Participants answered both questions using a 7-point scale (1 = not very much; 7 = very much) and we averaged responses to the two questions to quantify arm-crossing frequency (*M* = 4.38; *SD* = 1.78; alpha = .74). The questions came at the end of the survey to avoid revealing our interest in nonverbal predictors of behavior.

Inhibited Social Decision-Making

In daily life, people often encounter situations in which they might choose to inhibit voicing their opinions due to social risk. We created an 8-item scenario-based measure of this type of inhibited social decision-making. One item read: "A man and a woman are talking in front of you at a movie. You ask them to be quiet but they do not listen". For this scenario, participants were asked whether they would "speak louder and demand silence" or "attempt to ignore them and hope they will stop". The other items encompassed similar decisions but in other social contexts (e.g., in class or at a party). To quantify inhibited decision-making, we coded uninhibited responses (e.g., disagreeing with one's boss) as 1, inhibited responses as 2, and then averaged across the scenarios (*M* = 1.54; *SD* = 0.25; alpha = .62).[2]

Submissive Interpersonal Behavior

People vary considerably in whether they are dominant versus submissive in their interpersonal behavior and these differences are a fundamental part of the interpersonal

circumplex model of personality (Wiggins & Trapnell, 1996). Wiggins (1979) developed an adjective scale to assess dominance-submission and Wiggins, Trapnell, and Phillips (1988) subsequently refined it in the form of the revised Interpersonal Adjective Scale (IAS-R), which has good evidence for its reliability and validity (Wiggins & Trapnell, 1996). Accordingly, we asked participants to indicate how well the 16 dominance-submission IAS-R markers (e.g., "timid", "shy") described them (1 = extremely inaccurate; 6 = extremely accurate) and then computed an average after reversing the dominance items (M = 3.82; SD = 0.76; alpha = .90).

Results and Discussion

We hypothesized that a greater frequency of arm-crossing would be linked to inhibited social decision-making and submissiveness. We performed two simple regressions to examine these predictions. Consistent with expectations, arm-crossing frequency was a positive predictor of inhibited social decision-making, t (122) = 2.31, p = .02, Beta = .21, and it was a positive predictor of circumplex-assessed submissiveness, t (122) = 2.02, p = .046, Beta = .18. Arm-crossing frequencies, on the other hand, did not vary by participant sex (with females scored higher), r (122) = .01, p = .91. Furthermore, sex did not interact with arm-crossing frequency in two multiple regressions, one for each outcome, $|t|$s < .25, ps > .80, and main effects for arm-crossing were observed in both of these secondary analyses, ps < .05. Altogether, the Study 1 findings provide initial evidence for the socially inhibited, submissive nature of arm-crossing.

Study 2

The findings of Study 1 are important in revealing the correlates of spontaneous, unprompted arm-crossing, a behavior more typical of submissive than dominant people. Nonetheless, an experimental approach would permit firmer causal conclusions. In adopting this experimental approach, we randomly assigned participants to cross their arms or not during an

early portion of the study and then assessed two submission-related outcomes. We retained the circumplex-based measure of Study 1 and also included another measure to assess thoughts and feelings consistent with having an avoidant personality.

Method

Participants and General Procedures

Sixty-one (31 female) undergraduates at the same medium-sized university as Study 1 received course credit for their participation. They signed up for the study using SONA software and completed the measures on personal computers. Assessment procedures were identical to Study 1, including the use of MediaLab software to collect the data.

Manipulation

At the beginning of the study, we stated that we were interested in the effects of answering questions when using dominant or non-dominant hands. We further stated that participants were in the dominant hand condition and therefore needed to occupy their non-dominant hands for a period of time. At this point, we randomly assigned participants in a given session to a cross-arms condition or to a control condition. In the cross-arms condition, the experimenter modeled arm-crossing, which initially consisted of crossing both arms about the chest and then keeping the non-dominant arm across the chest while answering questions with the dominant hand. In this condition, the experimenter also modeled returning the dominant hand to a fully arm-crossed position in between making filler task responses (see next paragraph). Thus, participants in the experimental condition had repeated experiences of crossing their arms during the task and always had at least one arm across the chest. In the control condition, the experimenter modeled a different behavior consisting of resting the non-dominant hand on the seat of the chair to the non-dominant side of the body. The dominant hand was also placed on the

chair in between making filler task responses. The conditions were comparable aside from the specific bodily behaviors that were enacted.

People find the dominant/non-dominant hand cover story persuasive (Fetterman & Robinson, 2013). In addition, we also instituted three other procedures to ensure the implicit nature of the manipulation. The experimenter did not ask people to cross their arms but rather modeled the behavior nonverbally. Sessions rather than participants were randomly assigned so that participants could not be aware of the alternative body posture manipulated. Finally, we separated the manipulation from the assessment of the dependent measures by describing these consecutive tasks as two separate studies (Bargh & Chartrand, 2000). To support this idea, we had participants answer non-focal questions for 5 minutes while adopting one of the two body postures. Subsequently, they could use both hands in answering questions for the "second" study, which consisted of a separate MediaLab program with the dependent measures.

Submissive Interpersonal Self-Concept

Participants reported on how dominant versus submissive they are in their interpersonal behaviors, using the same 16 markers (Wiggins et al., 1988) used in Study 1 and again scored in a submissive direction (M = 3.49; SD = 0.71; alpha = .89). Given that participants were randomly assigned to condition, effects on this measure should be viewed in terms of an activated self-concept of submissiveness rather than personality differences in past submissive behavior.

Motivation to Avoid Social Interaction

People with avoidance personality disorder avoid other people due to social anxiety and perceptions of the self as inadequate (Kantor, 2003). Such symptoms are malleable, however, rather than entirely dispositional (Leary, 1991). As a second dependent measure, then, participants completed the avoidant personality disorder symptom scale of Hyler et al. (1988),

which asks people to indicate their level of agreement (1 = very inaccurate; 5 = very accurate) with 7 statements consistent with fearful reasons for avoiding social interaction (e.g., “I am afraid to meet new people because I feel inadequate”). The scale is often used to assess avoidant symptoms and ratings were averaged (*M* = 2.79; *SD* = 0.81; alpha = .78).

Results and Discussion

Manipulation effects were first examined in one-way ANOVAs. Replicating Study 1, but in an experimental context, arm-crossers reported greater interpersonal submissiveness, here conceptualized in terms of an activated self-concept, F (1, 59) = 4.98, p = .03, partial eta square (PES) = .08 (see Table 1 for means and standard deviations). Further, avoidant thoughts and feelings were somewhat higher in the arm-crossing condition than in the control condition, F (1, 59) = 4.02, p = .05, PES = .06 (also see Table 1). We next sought to determine whether sex moderated these effects in two-way ANOVAs, one for each outcome. There were no main effects for sex and interactions involving sex were also non-significant, Fs < 1, ps > .35. By contrast, main effects for condition were significant (submissive self-concept), p = .03, or marginally significant (interpersonal avoidance), p = .053, in these follow-up ANOVAs. Beyond conceptual replication, the results of Study 2 provide experimental support for the idea that arm-crossing leads people to see themselves as more submissive in their social behavior. In Study 3, we sought to extend this analysis to threat-related defensive strategies.

Study 3

Animal work supports the existence of two primary biobehavioral defensive strategies that can be labeled fight or flight (Fanselow, 1994). These same two strategies are available to human beings who encounter strangers who might wish to harm them (Perkins, Cooper, Abdelall, Smillie, & Corr, 2010). In Study 3, we investigated whether arm-crossing could shift

the nature of the strategy chosen and hypothesized that arm-crossing would activate a response mode favoring escape and disfavoring attack, relative to a control condition. We also hypothesized that the strategies chosen would be more generally avoidant (Perkins et al., 2010) in the arm-crossing condition. We examined these hypotheses using the same manipulation as Study 2 followed by a scenario-based assessment of defensive strategies.

Method

Participants, General Procedures, and Manipulation

Fifty-seven (33 female) undergraduates received course credit by their participation. The nature of the participant pool was identical to that described in Studies 1 and 2 and the general laboratory procedures were also the same. For example, participants arrived to the laboratory in groups of 6 or less, an experimenter told them they would complete several unrelated tasks, and the experimenter then seated the participants at personal computers in private cubicles. At this point, we manipulated arm crossing in the same way as in Study 2, using the same dominant hand cover story. Participants adopted the arm-crossing (versus control) gestures during a filler task and the experimenter then told them that this portion of the study was finished. Participants were now free to use both hands during the "next task", which consisted of a separate MediaLab program assessing preferred strategies for handling potential threats.

Escape, Attack, and Avoidant Defensive Strategies

Human beings engage in fight or flight defensive strategies when coping with the possibility of conspecific violence (Fanselow, 1994). Such potential life-and-death situations are fortunately rare and are therefore modeled using scenario-based measures, particularly that of Blanchard, Hynd, Minke, Minemoto, and Blanchard (2001). Each of the 12 scenarios involves the possibility of physical harm from another, albeit in the context of some ambiguity (e.g., "You

are alone as you exit an empty campus building late one night. Just as you get outside, you feel a hand grab your arm"). For each scenario, participants had to choose a preferred way of responding from among 6 options, including hiding, freezing, or attacking (Perkins et al., 2010).[3]

We were particularly interested in 2 of the 6 response options. We first quantified the number of times (across the 12 scenarios) that individuals would "attack or struggle" (M = 1.56; SD = 1.78). We then quantified the number of times that individuals would "run away, try to escape, remove self" (M = 3.65; SD = 2.11). We also computed a more general avoidance measure using the scoring procedures of Perkins et al. (2010). For each scenario, the maximally avoidant strategies of running away and hiding were scored as +2, the intermediate strategy of freezing was scored as +1.5, and the approach-related strategies (e.g., attacking) were scored as +1 (Perkins et al., 2010). We then quantified general avoidance by averaging across these scores for the 12 scenarios (M = 1.36; SD = 0.20).

Results and Discussion

We ran three one-way ANOVAs to examine the effects of the arm-crossing manipulation on the dependent measures. Following arm-crossing, participants preferred the escape option a greater number of times, relative to the control condition, F (1, 55) = 5.39, p = .02, PES = .09 (see Table 1 for means and standard deviations by condition). By contrast, control participants endorsed the attack option a greater number of times, F (1, 55) = 7.62, p = .01, PES = .12 (also see Table 1). The third ANOVA focused on the more general approach-avoidance score (Perkins et al., 2010). As hypothesized, the preferred way of handling the scenarios was more avoidant in the arm-crossing condition than in the control condition, F (1, 55) = 6.16, p = .02, PES = .21, with scores reported in Table 1. In sum, arm-crossing led people to envision greater avoidance when responding to potential interpersonal threats.

We then performed a follow-up set of ANOVAs with the manipulation and sex as predictive factors. As might be expected, women endorsed escape strategies (M = 4.55; SD = 2.08) more often than men (M = 2.42; SD = 1.44), men endorsed attack strategies (M = 2.46; SD = 1.72) more often than women (M = 0.90; SD = 1.55), and there was also a sex difference for the general approach-avoidance score (males: M = 1.24; SD = 0.15; females: M = 1.45; SD = 0.18), Fs > 8.5, ps < .01. These sex differences were expected and are consistent with prior research on defensive strategies in men and women (e.g., Archer, 2004). Importantly, though, the manipulation was equally effective among both sexes in that there were no Condition by Participant Sex interactions, Fs < 1, ps > .45, and the Condition main effects remained significant in these follow-up ANOVAs, ps < .02. The results of Study 3, then, significantly extend those of Study 2. Crossing one's arms not only activates avoidance-related thoughts of a social anxiety type (Study 2), but also activates a more escape-related mental strategy for handling possible interpersonal violence (Study 3).

General Discussion

People use barriers (e.g., locked doors) to protect their possessions. The body, too, sometimes needs to be protected and there is evidence that barriers are psychologically important in this context (Burris & Rempel, 2004). Arm-crossing can be useful in protecting the vital organs of the chest cavity (Lewis, 2000), which may in turn have led to co-opting this gesture as a sign and symptom of vulnerability and defense (Argyle, 1988; Fast, 1970). We conducted three studies that supported this wariness-related interpretation of arm-crossing.

There are many bodily gestures that people can perform (Dael et al., 2012) and not all of them are likely to have psychological significance (Gifford, 1991). Rather than simultaneously considering numerous gestures in a largely exploratory manner, it can be valuable to focus

squarely on one bodily gesture in a multi-study manner. We adopted this strategy and the findings suggest that arm-crossing may join a handful of other bodily gestures (e.g., a slumped posture: Riskind & Gotay, 1982; Stepper & Strack, 1993) for which there is a sufficient corpus of findings to encourage a continuous line of research.

We used a correlational design in Study 1 but the Study 1 findings should not be devalued for this reason. A correlational methodology is desirable in determining whether there are systematic differences between people who often cross their arms versus those who do not (Funder, 1995). Furthermore, the arm-crossing questions did not ask about personality or social behavior, yet were informative along these lines. At least as a component of the package of studies, the Study 1 results highlight the social inhibition that is likely to characterize frequent arm-crossers. This nomological net should be expanded to other markers of social inhibition (Kagan, Reznick, Snidman, Gibbons, & Johnson, 1988) in future research.

An advantage of the Study 2 methodology, though, was that it permitted firmer causal conclusions. Random assignment to a condition requiring one to cross one's arms resulted in a more submissive view of the self in combination with greater wariness concerning others. These are characteristics of shyness and social anxiety (Leary, 1991). There may be distinctions worth making here, however. For example, people can be socially inhibited either because of concerns about social evaluation or because of uncertainty (Jones, Briggs, & Smith, 1986). These factors or influences might be worth disentangling in future research.

Even so, consider the results of Study 3. The scenarios involved uncertainty about personal safety rather than social-evaluative factors. That arm-crossing influenced responding to these scenarios suggests the operation of relatively basic processes of a threat-avoidance type. Given this extension, in fact, one plausible idea is that arm-crossing can activate something like

the Behavioral Inhibition System (BIS: Gray, 1982). Activation of this system would interact with context (social versus physical threat, magnitude of threat, whether escape is an option, etc.) to determine how defensive motivation manifests itself. Such a framework has the benefit of parsimony and it can also generate new predictions. For example, arm-crossing may bias the individual toward threatening interpretations of ambiguous stimuli (sensitivity) and toward greater emotional upset when unambiguous punishments are present (reactivity).

Additional Questions and Directions for Research

Through the use of scenarios, we could model how a person might behave in situations that would be impossible to instantiate in the laboratory. Additionally, behavioral intentions are excellent predictors of actual behavior (Ajzen, 2012). Nevertheless, well-chosen behavioral measures would have value in extending the present results. As an example, our results suggest that a prior period of arm-crossing (procedures used in Studies 2 and 3) might lead people to subsequently sit further away from others when given a choice of seating.

Our studies highlight the consequences but not antecedents of arm-crossing. A social defense interpretation of arm-crossing does, however, make predictions concerning antecedents. People should be more likely to cross their arms when they feel vulnerable and threatened. Some support for this idea comes from the crowding study of Baxter and Rozelle (1975), but additional research would be valuable. It is intuitive to predict, for instance, that arm-crossing would increase in response to demeaning rather than affiliative behavior from a research confederate.

We added a temporal separation between the arm-crossing manipulation of Studies 2 and 3 and the dependent measures. This separation not only disguised the hypotheses, but also rendered it less likely that arm-crossing effects were due to gestural discomfort or momentary negative affect. Indeed, Friedman and Elliot (2008) found no effect of arm-crossing on

dependent measures of this type. Accordingly, the effects that we observed should probably not be ascribed to emotion-related factors.

In many cases, people have beliefs about the psychological significance of a gesture that are straightforward (e.g., that smiling signals happiness). Arm-crossing appears more complicated in relation to such beliefs. Gifford (1994) found that targets wrapping their arms for a greater proportion of time were rated as more submissive by observers. However, Carney, Hall, and LeBeau (2005) did not find perceived differences in arm-crossing frequency as a function of target status (e.g., boss versus subordinate). The latter null result could have occurred because different perceivers have different theories, some thinking that arm-crossing signals pride (Tracy & Robins, 2007) and others thinking that it signals defensiveness (Bull, 1983). These subtleties of target perception could be explored in future research.

Our investigation sought to demonstrate and clarify the social significance of the arm-crossing gesture rather than support any particular theory of embodied influence. Nevertheless, a brief discussion of mechanism may be useful. Zajonc and Markus (1985) favored a “hard interface” whereby some embodied manipulations may result in effects that are not cognitively mediated. This was not the case in the present studies because our manipulations activated thoughts consistent with submissiveness, avoidance, and escape. Manipulated body postures may instead exert an influence because people infer their attitudes on the basis of observing their own behaviors (Bem, 1972). Incidental manipulations are thought to bypass such influences (Strack et al., 1988), particularly in combination with the “two study” procedures that we used (Bargh & Chartrand, 2000). We therefore follow Friedman and Elliot (2008) in thinking that crossing one’s arms can unwittingly activate a motivated stance toward the environment. In social-interactive terms, this stance appears to be one of wariness and perceived vulnerability.

References

Ajzen, I. (2012). The theory of planned behavior. In: P. A. M. Van Lange, A. R. Kruglanski, & E. T. Higgins (Eds.), *Handbook of theories of social psychology* (Vol. 1, pp. 438-459). Thousand Oaks, CA: Sage Publications.

Archer, J. (2004). Sex differences in aggression in real-world settings: A meta-analytic review. *Review of General Psychology, 8,* 291-322.

Argyle, M. (1988). *Bodily communication* (2nd ed.). New York: Methuen.

Bargh, J. A., & Chartrand, T. L. (2000). The mind in the middle: A practical guide to priming and automaticity research. In: H. T. Reis & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 253-285). New York: Cambridge University Press.

Baxter, J. C., & Rozelle, R. M. (1975). Nonverbal expression as a function of crowding during a simulated police-citizen encounter. *Journal of Personality and Social Psychology, 32,* 40-54.

Bem, D. J. (1972). Self-perception theory. In: L. Berkowitz (Ed.), *Advances in Experimental Social Psychology* (Vol. 6, pp.1-62). New York: Academic Press.

Blanchard, D., Hynd, A. L., Minke, K. A., Minemoto, T., & Blanchard, R. J. (2001). Human defensive behaviors to threat scenarios show parallels to fear- and anxiety-related defense patterns of non-human mammals. *Neuroscience and Biobehavioral Reviews, 25*, 761-770.

Bull, P. (1983). *Body movement and interpersonal communication*. Chichester, England: Wiley.

Burris, C. T., & Rempel, J. K. (2004). 'It's the end of the world as we know it': Threat and the spatial-symbolic self. *Journal of Personality and Social Psychology, 86*, 19-42.

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

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

Dael, N., Mortillaro, M., & Scherer, K. R. (2012). The body action and posture coding system (BAP): Development and reliability. *Journal of Nonverbal Behavior, 36,* 97-121.

Darwin, C. (1872). *The expression of the emotions in man and animals*. London, England: John Murray.

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

Fanselow, M. S. (1994). Neural organization of the defensive behavior system responsible for fear. *Psychonomic Bulletin & Review, 1,* 429-438.

Fast, J. (1970). *Body language*. New York: M. Evans and Company.

Fetterman, A. K., & Robinson, M. D. (2013). Do you use your head or follow your heart? Self-location predicts personality, emotion, decision making, and performance. *Journal of Personality and Social Psychology, 105,* 316-334.

Friedman, R., & Elliot, A. J. (2008). The effect of arm crossing on persistence and performance. *European Journal of Social Psychology, 38,* 449-461.

Funder, D. C. (1995). On the accuracy of personality judgment: A realistic approach. *Psychological Review, 102,* 652-670.

Gifford, R. (1991). Mapping nonverbal behavior on the interpersonal circle. *Journal of Personality and Social Psychology, 61,* 279-288.

Gifford, R. (1994). A lens-mapping framework for understanding the encoding and decoding of interpersonal dispositions in nonverbal behavior. *Journal of Personality and Social Psychology, 66,* 398-412.

Gray, J. A. (1982). *The neuropsychology of anxiety: An enquiry into the functions of the septo-hippocampal system.* New York: Oxford University Press.

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

Hawk, S. T., Fischer, A. H., & Van Kleef, G. A. (2012). Face the noise: Embodied responses to nonverbal vocalizations of discrete emotions. *Journal of Personality and Social Psychology, 102,* 796-814.

Hess, U., & Thibault, P. (2009). Darwin and emotion expression. *American Psychologist, 64,* 120-128.

Hyler, S. E., Rieder, R. O., Williams, J. B. W., Spitzer, R. L., Hendler, J., & Lyons, M. (1988). The personality diagnostic questionnaire: Development and preliminary results. *Journal of Personality Disorders, 2,* 229-237.

James, W. (1890). *The principles of psychology*. New York: Henry Holt and Company.

Jones, W. H., Briggs, S. R., & Smith, T. G. (1986). Shyness: Conceptualization and measurement. *Journal of Personality and Social Psychology, 51,* 629-639.

Kagan, J., Reznick, J. S., Snidman, N., Gibbons, J., & Johnson, M. O. (1988). Childhood derivatives of inhibition and lack of inhibition to the unfamiliar. *Child Development, 59,* 1580-1589.

Kantor, M. (2003). *Distancing: Avoidant personality disorder*. Westport, CT: Praeger Publishers.

Leary, M. R. (1991). Social anxiety, shyness, and related constructs. In: J. P. Robinson, P. R. Shaver, & L. S. Wrightsman (Eds.), *Measures of personality and social psychological attitudes* (pp. 161-194). San Diego, CA: Academic Press.

Lewis, M. (2000). *Body language: A guide for professionals.* Thousand Oaks, CA: Sage Publications.

Perkins, A. M., Cooper, A., Abdelall, M., Smillie, L. D., & Corr, P. J. (2010). Personality and defensive reactions: Fear, trait anxiety, and threat magnification. *Journal of Personality, 78,* 1071-1090.

Riskind, J. H., & Gotay, C. C. (1982). Physical posture: Could it have regulatory or feedback effects on motivation and emotion? *Motivation and Emotion, 6,* 273-298.

Rosenthal, R., & DePaulo, B. M. (1979). Sex differences in eavesdropping on nonverbal cues. *Journal of Personality and Social Psychology, 37,* 273-285.

Smith, C. A., & Scott, H. S. (1997). A componential approach to the meaning of facial expressions. In: J. A. Russell & J. M. Fernandez-Dols (Eds.), *The psychology of facial expression* (pp. 229-254). New York: Cambridge University Press.

Spiegel, J., & Machotka, P. (1974). *Messages of the body*. New York: Free Press.

Stepper, S., & Strack, F. (1993). Proprioceptive determinants of emotional and nonemotional feelings. *Journal of Personality and Social Psychology, 64,* 211-220.

Strack, F., Martin, L. L., & Stepper, S. (1988). Inhibiting and facilitating conditions of human smile: A nonobtrusive test of the facial feedback hypothesis. *Journal of Personality and Social Psychology, 54,* 768-777.

Tamir, M., Robinson, M. D., Clore, G. L., Martin, L. L., & Whitaker, D. J. (2004). Are we puppets on a string? The contextual meaning of unconscious expressive cues. *Personality and Social Psychology Bulletin, 30,* 237-249.

Tiedens, L. Z., & Fragale, A. R. (2003). Power moves: Complementarity in dominant and submissive nonverbal behavior. *Journal of Personality and Social Psychology, 84,* 558-568.

Tracy, J. L., & Robins, R. W. (2007). The prototypical pride expression: Development of a nonverbal behavior coding system. *Emotion, 7,* 789-801.

Wells, G. L., & Petty, R. E. (1980). The effects of overt head movements on persuasion: Compatibility and incompatibility of responses. *Basic and Applied Social Psychology, 1,* 219-230.

Wiggins, J. S. (1979). A psychological taxonomy of trait-descriptive terms: The interpersonal domain. *Journal of Personality and Social Psychology, 37,* 395-412.

Wiggins, J. S., & Trapnell, P. D. (1996). A dyadic-interactional perspective on the five-factor model. In: J. S. Wiggins (Ed.), *The five-factor model of personality: Theoretical perspectives* (pp. 88-162). New York: Guilford Press.

Wiggins, J. S., Trapnell, P., & Phillips, N. (1988). Psychometric and geometric characteristics of the Revised Interpersonal Adjective Scales (IAS—R). *Multivariate Behavioral Research, 23,* 517-530.

Zajonc, R. B., & Markus, H. (1985). Affect and cognition: The hard interface. In: C. E. Izard, J. Kagan, & R. B. Zajonc (Eds.), *Emotions, cognition, and behavior* (pp. 73-102). New York: Cambridge University Press.

Footnotes

[1]The show-up rate for Studies 2 and 3 was lower than expected. As a consequence, these studies (but not Study 1) were somewhat underpowered, with post-hoc power estimates ranging from .59 to .78. We encourage larger sample sizes in future manipulation studies while also emphasizing the convergent nature of our findings across both studies and measures.

[2]Other scenarios included "While at a party you see an attractive person looking at you" (uninhibited response: "walk over to this person and begin a conversation"; inhibited response: "stay where you are and chat with your friends") and "Your boss tells you that you need to work overtime without additional pay" (uninhibited response: "disagree with your boss and refuse to do it"; inhibited response: "quietly go along").

[3]As another example, one of the scenarios reads: "You are sleeping in bed during the night, but suddenly wake up to thinking you have heard a suspicious noise. It is dark and you are alone." The response options were identical for all 12 scenarios (Blanchard et al., 2001): "hide", "freeze, become immobilized", "run away, try to escape, remove self (flight)", "yell, scream, or call for help", "attack or struggle", and "check out, approach, or investigate (risk assessment)". These options were listed next to 6 screen buttons and participants clicked the 1 of the 6 buttons that best represented their preferred way of handling the situation.

Table 1

Means (Standard Deviations) by Condition, Studies 2 and 3

	Condition	
Dependent Measure	Control	Crossed Arms
Study 2		
Submissive Self-Concept	1.30 (0.73)	1.70 (0.63)
Avoidant Motives	2.58 (0.94)	2.99 (0.54)
Study 3		
Escape	2.80 (1.70)	4.11 (1.44)
Attack	2.40 (1.96)	1.11 (1.52)
Defensive Avoidance	1.28 (0.18)	1.41 (0.20)

Note: Significant main effects for Condition were found for all dependent measures (see text).