Physical Contact and Financial Risk Taking

Jonathan Levav and Jennifer J. Argo

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Jonathan Levav[1] **and Jennifer J. Argo**[2]
[1]Columbia University and [2]University of Alberta

Abstract

We show that minimal physical contact can increase people's sense of security and consequently lead them to increased risk-taking behavior. In three experiments, with both hypothetical and real payoffs, a female experimenter's light, comforting pat on the shoulder led participants to greater financial risk taking. Further, this effect was both mediated and moderated by feelings of security in both male and female participants. Finally, we established the boundary conditions for the impact of physical contact on risk-taking behaviors by demonstrating that the effect does not occur when the touching is performed by a male and is attenuated when the touch consists of a handshake. The results suggest that subtle physical contact can be strongly influential in decision making and the willingness to accept risk.

Keywords

interpersonal touch, risk taking, affect, financial decision making, physical contact

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Physical contact is a hallmark of human and animal life. It is the most developed sensory modality among newborns (Hertenstein, Verkamp, Kerestes, & Holmes, 2006), and its effect is evident in behaviors that range from communication of status (Mehrabian, 1970) and neural threat response (Coan, Schaefer, & Davidson, 2006) to restaurant tipping (Crusco & Wetzel, 1984). Indeed, early work in developmental psychology and animal behavior demonstrated that physical contact is the cornerstone of the connection between mother and infant—even as important as hunger and thirst reduction (Bowlby, 1951; Harlow, 1958). In this vein, studies of World War II orphans documented the importance of maternal physical contact and nurturance for the subsequent mental health of children (Bowlby, 1951). The beneficial effect of physical contact also extends to domains of physical health, as such contact is associated with better weight gain and greater sensory responsiveness among newborns (Korner, 1990).

The importance of maternal physical contact is well documented with nonhuman primates as well. For instance, in his classic study on attachment, Harlow (1958) observed that infant macaque monkeys became more attached to a soft-cloth surrogate mother than to a harsh-wire surrogate mother. More important, this preference was observed even though the infant's sole source of food was a bottle of milk attached to the wire mother. Among young capuchin monkeys, even reconciliation following aggressive conflict with an unrelated adult is influenced by their degree of maternal physical contact (Weaver & de Waal, 2003).

The primary function of physical contact in early life is for the mother to create a sense of attachment in her infant (Harlow, 1958). Such attachment engenders feelings of security and thereby increases the (animal and human) infant's tendency to engage in exploratory behavior in unfamiliar contexts and strange situations (Ainsworth, Blehar, Waters, & Wall, 1978; Harlow, 1958). The influence of maternal physical contact is so pervasive that its effect is observed even in arachnids; young lycosid spiderlings who experience a greater degree of maternal contact subsequently exhibit more extensive exploratory behavior in a novel open field arena (Punzo & Alvarez, 2002). In the absence of maternal attachment and physical contact, both human and animal infants display behaviors that are antithetical to security—fear and wariness—and evince a reduced tendency to explore their physical space (Ainsworth et al., 1978; Harlow, 1958). The implication of these findings is that the sense of security that arises from the attachment evoked by maternal physical contact makes infants more willing to accept the risk involved in exploring new, uncertain stimuli.

Despite the importance of physical contact as a determinant of exploratory, or risk-taking, behavior among children, the effect of physical contact on adult exploratory behavior is not

Corresponding Author:
Jonathan Levav, Columbia University, Columbia Business School, 509 Uris Hall, 3022 Broadway, New York, NY 10027
E-mail: jl2351@columbia.edu

yet understood. In this article, we report three experiments that examined whether physical contact affects adults' tendency to engage in exploratory behavior. Specifically, we studied the effect of minimal physical contact on a form of risk taking that is common in everyday adult life: financial risk taking.

The main hypothesis we tested is that certain forms of physical contact will evoke a sense of security in experimental participants, and that this sense of security, in turn, will increase their willingness to make risky financial decisions. The notion that touch can evoke a feeling of security is partly drawn from the literature on the embodiment of emotion (Niedenthal, 2007), which proposes that "modality-specific states that represent perception, action, and introspection when one is actually in interaction with a particular entity, or in a specific situation, are also used to represent these ideas when the original entity or situation is not present" (Niedenthal, Winkielman, Mondillon, & Vermeulen, 2009, p. 1121). We conjectured that certain forms of touch would remind participants of the feelings of security elicited by similar maternal physical contact in early life. Our proposed connection between these feelings and risk taking is derived from the observation that decision makers often gauge risk by their feelings at the time of choice—rather than by analytic considerations—so that feelings can be expected to have an effect when people are presented with risky options (Loewenstein, Weber, Hsee, & Welch, 2001). An important aspect of our experiments is that participants' feelings of security were illusory; thus, these experiments contrast with previous research that has investigated the influence of social interdependence (i.e., actual security) on choice under risk (Hsee & Weber, 1999). Furthermore, we show that the effect of physical contact is not due to changes in overall mood, which have been linked to changes in attitudes toward risk (Mano, 1994).

We tested our hypothesis in three laboratory experiments that required participants to make financial decisions with both hypothetical and real consequences. All participants were undergraduate business students who had completed an introductory course in finance; the magnitudes of payoffs and losses in the experiments were commensurate with those in typical experimental economics studies. Participants were recruited under the aegis of an experiment about consumer behavior. The experiments were run individually for each participant and were conducted by experimenters who were of average attractiveness relative to other members of their gender.[1] The physical contact that we focused on was a light pat on the back of the shoulder. We selected this form of contact because it is reminiscent of maternal touch and has been shown to evoke mild feelings of support (Burgoon, 1991) and relaxation (Burgoon, Walther, & Baesler, 1992).

Experiment 1

Our first experiment tested the effect of a light touch on the back of the shoulder on choice between hypothetical sure payoffs and risky gambles. We expected that participants who were touched would show a greater preference for the gambles compared with participants who were not touched.

Method

Participants (N = 67; 30 males, 37 females) completed the study individually. Upon arrival, each participant was greeted by a female experimenter and was verbally ushered to a cubicle where the experimental task awaited. In the touch condition, the verbal instruction was accompanied by a light, open-palmed touch on the back of the shoulder blade, right below the deltoid; this touch lasted approximately 1 s. In the no-touch condition, the verbal instruction was unaccompanied by any form of touch. Following this manipulation, the experimenter—who was blind to the hypothesis—retreated to a cubicle on the other side of the room so as not to be visible to the participant. The experimental task required making a series of 14 hypothetical choices between a cash payoff and a risky gamble that offered a 50% chance of winning a cash prize (or nothing). The amounts to be received or won varied across the choices. This task was adapted from Hsee and Weber's (1999) research on the role of social interdependence in risk taking. Risk-seeking behavior was defined as the overall propensity to choose the risky gambles over the sure amounts.

Results

To analyze participants' choices, we counted the number of gambles that they indicated they were willing to accept. We found that participants in the touch condition were significantly more likely to select the risky gambles (M = 6.47, SD = 2.44) than were participants in the no-touch condition (M = 4.10, SD = 2.33), $t(65) = 4.05$, $p < .001$. This effect did not vary by gender of the participant; male and female participants were equally influenced by the experimenter's touch.[2]

Experiment 2

In our next experiment, we explored both the boundaries of and the processes underlying the link between physical contact and risk taking that we observed in Experiment 1. To this end, we manipulated the type of touch and varied the gender of the experimenter (the "toucher"). In particular, we contrasted the effects of a touch on the shoulder (as in Experiment 1) and a handshake. Because research on the effects of physical contact specifically links maternal touch with exploratory behavior, and given research showing that reactions to a male's touch differ from reactions to a female's touch (e.g., Hewitt & Feltham, 1982), we did not expect physical contact by a male toucher to have an effect on risk taking. This prediction also follows from the perspective of embodied emotion: Certain types of female physical contact reactivate the sensory and perceptual states that are associated with the feelings of security originally evoked by maternal physical contact in infancy (Niedenthal 2007). For the female toucher, we reasoned that a

handshake would not confer the same perceived sense of security as a touch on the shoulder (Burgoon, 1991; Hewitt & Feltham, 1982). As a result, we expected to observe elevated levels of risk taking (relative to a condition in which no touch took place) in the event of a (female's) touch on the shoulder, but not in the event of a (female's) handshake.

In addition to manipulating these factors, at the conclusion of the experiment, we asked participants to rate their mood and their feelings of security. We expected to find that physical contact would evoke risk taking through its influence on feelings of security, rather than simply positive or negative mood.

Method

We randomly assigned undergraduate participants (N = 105; 59 males, 46 females) to one of six experimental groups in a 3 (touch: shoulder, handshake, control) × 2 (toucher: male vs. female) between-subjects design.

As in the first experiment, participants were ushered verbally to a cubicle, the verbal instruction being either unaccompanied by a touch (control condition) or accompanied by physical contact (either a touch on the shoulder or a handshake) by the male or female experimenter, who was blind to the hypothesis. The experimenter then retreated to a cubicle on the other side of the room so as not to be visible to the participant. The task in this experiment required participants to make an investment decision using $5 Canadian (CAD$5) that they had been granted by the experimenter upon arrival to the laboratory. Participants were asked to allocate their money between two investment vehicles: a bond that delivered a fixed, 4% yearly return or a risky equity (stock) that delivered an uncertain return. The stock information was based on the actual financial performance of a publicly traded Canadian company whose name we omitted from the experimental materials (see the appendix). Participants were provided with information about the company, including its revenues, net income, assets, liabilities, shareholder equity, and stock price on the last day of a past earnings quarter. They were told to imagine that each $1 in cash was equivalent to $100, so that they would be "investing" $500 (an amount sufficient to purchase up to 10 shares of the stock). Participants were told that whatever money was not invested in the risky equity would be automatically invested in the fixed-return bond. In the case of the stock, the return on the investment was determined on the basis of the company's performance in the subsequent earnings quarter.

Following the investment task, participants completed the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen 1988) and six measures intended to assess their feelings of security: Using scales from 1 (*not at all*) to 7 (*very*), they indicated how "at ease," "secure," "protected," "safe," "comfortable," and "accepted" they felt. Because the six ratings of security were highly correlated (α = .97), we collapsed them into a single-measure security index, which we used in our analysis.

At the end of the experiment, participants were given their winnings or asked to pay off their losses.

Results

An analysis of variance (ANOVA) on the amount invested in the risky equity yielded a significant interaction between touch and toucher, $F(2, 99) = 5.35$, $p < .01$. Specifically, the type of touch influenced risk taking when participants were touched by the female toucher, $F(2, 50) = 14.66$, $p < .001$, but not the male toucher, $F(2, 49) = 0.382$, $p > .60$ (see Fig. 1). Participants who were touched on the shoulder by the female toucher invested an average of CAD$3.44 ($SD$ = 1.45) in the risky equity, which was significantly greater than the average amount invested in this stock in the female-handshake condition (CAD$2.04, SD = 1.18), $t(99) = 2.77$, $p < .01$, or the female-control condition (CAD$1.05, SD = 1.33), $t(99) = 4.72$, $p < .001$. The corresponding mean amounts invested in the male-toucher conditions were CAD$2.63 ($SD$ = 1.85), CAD$2.18 ($SD$ = 1.44), and CAD$2.59 ($SD$ = 1.71), and were not statistically different from each other (all ps > .20). Further, the amount invested in the stock in the female-shoulder condition was greater than the amount invested in the stock in any of the male conditions, $t(99) = 2.41$, $p < .05$. Thus, it appears that a subtle comforting touch by a female leads to greater financial risk taking.

Participants' feelings of security reflected their propensity to make risky decisions (see Fig. 2). An ANOVA on feelings of security yielded a significant interaction between touch and toucher, $F(2, 99) = 14.51$, $p < .001$. In particular, different types of touch led to differing perceived degrees of security when the toucher was female, $F(2, 50) = 22.37$, $p < .001$, but not when the toucher was male, $F(2, 49) = 0.375$, $p > .60$. Participants feelings of security were stronger when the female experimenter touched them on the shoulder (M = 5.59, SD = 1.16) than when she shook their hand (M = 3.70, SD = 1.71), $t(99) = 4.78$, $p < .001$, or did not touch them at all (M = 2.35, SD = 1.50), $t(99) = 8.15$, $p < .001$. The fact that feelings of

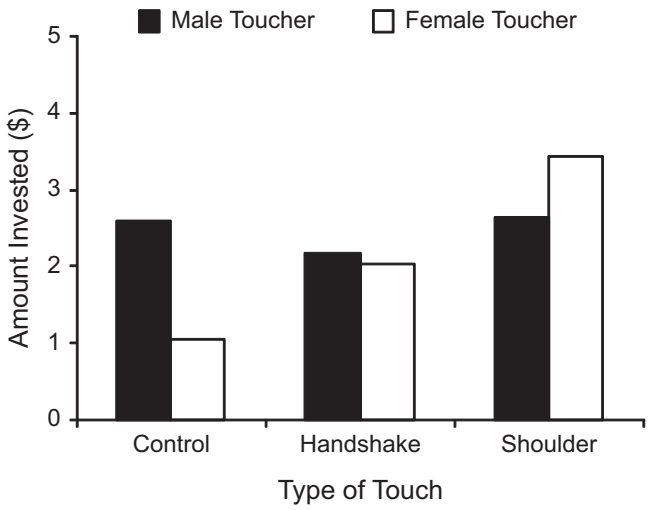

Fig. 1. Investment decision results in Experiment 2: the amount (in Canadian dollars) invested in the risky equity as a function of type of touch and gender of the toucher.

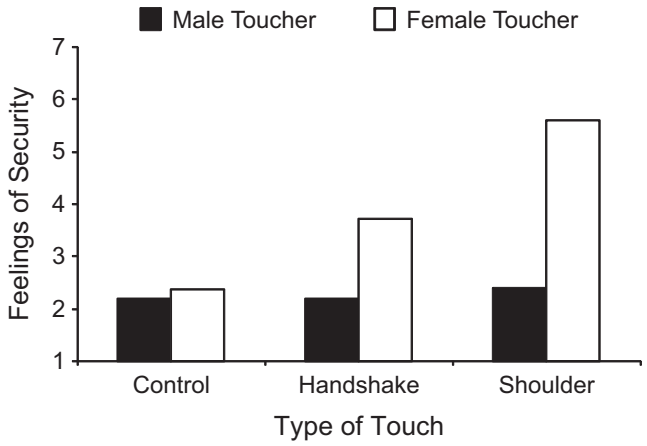

Fig. 2. Mean security ratings in Experiment 2 as a function of type of touch and gender of the toucher. The security index was an average calculated from six questions.

security were stronger in the female-handshake condition than in the female-control condition likely explains why risk taking was greater in the former condition than in the latter (indeed, the mediation analysis we report later in this section supports this point). This finding is consistent with our theorizing and is likely due to the fact that a handshake by a female leads to very mild ratings of relaxation (Burgoon, 1991). In contrast, when the toucher was male, mean ratings of security were statistically indistinguishable across the touch and control conditions (shoulder: $M = 2.38$, $SD = 0.82$; handshake: $M = 2.17$, $SD = 0.78$; control: $M = 2.18$, $SD = 0.88$).

The PANAS items that relate to feelings of security and insecurity revealed a pattern that was consistent with the results we obtained using our own security measures. In particular, participants felt the least nervous, jittery, afraid, and scared ($\alpha = .63$) when they had been touched on the shoulder by the female experimenter. However, physical contact did not appear to alter the overall positive or negative mood of our participants, $F(2, 99) = 1.19$, $p = 0.31$, and $F(2, 99) = 1.57$, $p = 0.21$, respectively.[3]

The pattern of results in the female-toucher conditions suggests that physical contact influences risk taking by evoking feelings of security. To examine this possibility, we conducted a mediation analysis for the female-toucher conditions (see Fig. 3). As expected, we found that feelings of security mediated the effect of touch (shoulder vs. handshake vs. control) on financial risk taking (Sobel $z = 3.75$, $p < .001$). Touch was not a significant predictor in the presence of the mediator.

Experiment 3

In our third experiment, we manipulated feelings of security in order to further establish felt security as a link between physical contact and financial risk taking. We used an unrelated-studies paradigm in which we first primed participants to feel secure or insecure and later exposed them to the touch manipulation. We expected to find that risk taking among participants primed to feel secure would already be high and that their investment decisions would be relatively insensitive to touch. In contrast, participants primed to feel insecure would be much more sensitive to the physical contact, with those who were touched benefiting from a renewed sense of security and therefore being more likely to seek financial risk than those who were not touched. Such an interaction, in addition to directly implicating feelings of security as the factor underlying our effect, would challenge an alternative explanation that relates to the attractiveness of our experimenter. Specifically, Knutson, Wimmer, Kuhnen, and Winkielman (2008) found that pictures of attractive females activate the anticipated-reward system in the brain, which subsequently increases risk-taking behaviors. If attractiveness—rather than feelings of security—drives our effect, then an interaction between the security prime and touch would not be expected.

Method

Participants ($N = 80$; 43 males, 37 females) were randomly assigned to one of four conditions in a 2 (essay prime: secure, insecure) × 2 (touch: shoulder touch, no-touch control) between-subjects design.

We primed feelings of security or insecurity in a laboratory room by having participants write a brief essay about a time in their life when they "felt secure and supported" (secure-essay condition) or a time in their life when they "felt insecure and alone" (insecure-essay condition). Next, they were directed to a second room to take part in an experiment that was ostensibly conducted by a different researcher. Upon arrival, they

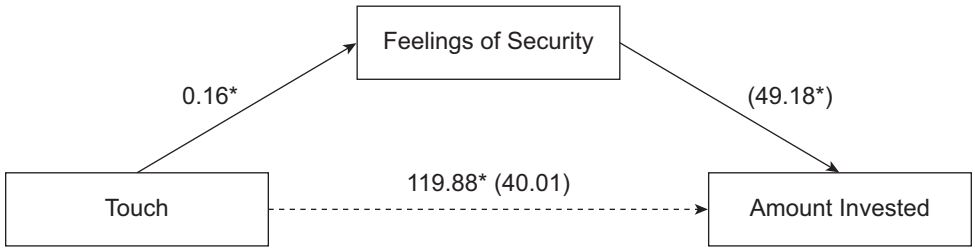

Fig. 3. Experiment 2 mediation analysis. Numbers outside parentheses are standardized regression coefficients; numbers inside parentheses are simultaneous regression coefficients. An asterisk indicates a p value less than .001.

were greeted by a female experimenter. The procedure in this room was identical to that in the no-touch control and shoulder-touch conditions of Experiment 2; participants received the CAD$5 grant, made their investment decision, and then completed the feelings-of-security scales.[4] Participants were paid their winnings or required to pay for their losses at the end of the study.

Results

An ANOVA on the amount invested in the risky equity revealed a significant interaction of touch and essay prime, $F(1, 76) = 4.32$, $p < .05$ (see Fig. 4). Participants in the secure-touch, secure-control (no touch), and insecure-touch conditions invested similar amounts in the risky equity (M = CAD$3.49, SD = 1.80; M = CAD$3.01, SD = 1.49; M = CAD$3.09, SD = 1.56, respectively), $F(2, 57) = 0.509$, $p > .60$, and significantly more than those in the insecure-control (no touch) condition (M = CAD$1.11, SD = 1.54), planned contrast $F(1, 76) = 5.03$, $p < .001$. The slight additive effect of touch and security prime that is evident in the means was not statistically significant, $t(76) = 0.96$, $p = .34$, perhaps because of a ceiling effect.

As in Experiment 2, participants' feelings of security reflected their investment choices (see Fig. 5). The interaction of touch condition and essay prime was significant, $F(1, 76) = 7.15$, $p < .01$. Participants felt equally secure in the three conditions in which we had intervened to bolster their feelings of security (secure-touch: $M = 5.65$, $SD = 0.88$; secure-control: $M = 5.73$, $SD = 0.63$; insecure-touch: $M = 5.47$, $SD = 1.03$), but less secure when they had been primed to feel insecure and had not experienced touch ($M = 4.17$, $SD = 1.76$), planned contrast $t(76) = 4.85$, $p < .001$). In conjunction with the results of Experiment 2, these findings indicate that physical contact likely leads to greater financial risk taking because of its influence on people's sense of security.

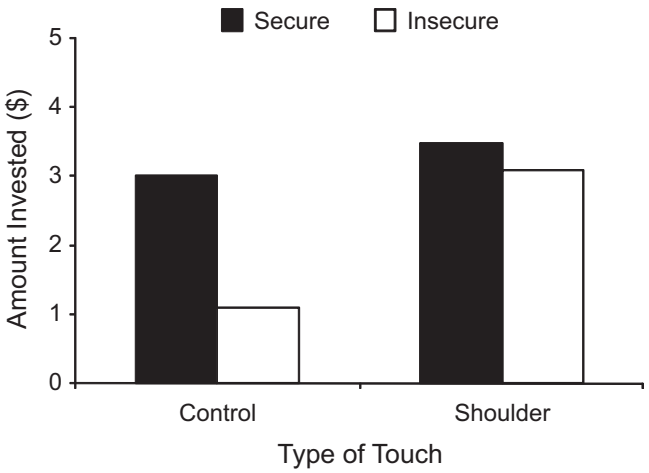

Fig. 4. Investment decision results in Experiment 3: the amount (in Canadian dollars) invested in the risky equity as a function of touch condition (touch on the shoulder or no-touch control) and essay prime (secure or insecure).

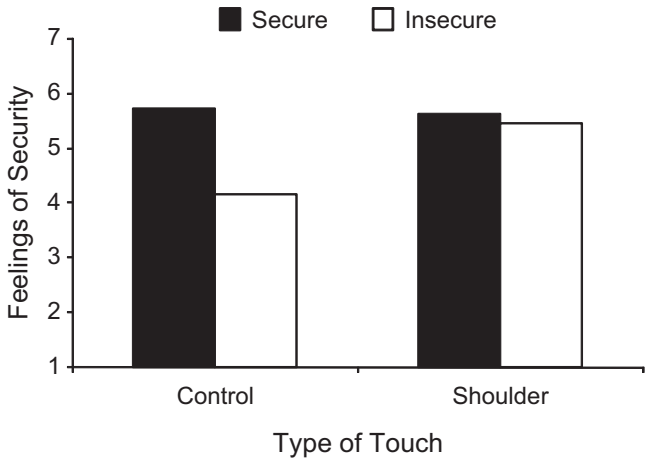

Fig. 5. Mean security ratings in Experiment 3 as a function of touch condition (touch on the shoulder or no-touch control) and essay prime (secure or insecure). The security index was an average calculated from six questions.

Discussion

The three experiments we have reported demonstrate an association between certain kinds of physical contact and financial risk taking. This association was observed despite the subtlety of the manipulation: a momentary touch on the shoulder. We suggest that a simple pat on the back of the shoulder—by a female—in a way that connotes support may evoke feelings that are similar to the sense of security afforded by a mother's comforting touch in infancy. Although the comfort in the case of our studies was illusory, the data indicate that our participants perceived a real sense of security and that it led them to take greater financial risk than untouched participants did. More generally, our findings suggest that minimal physical contact can exert a strong influence on decision making and risk preferences of adults, possibly also outside the financial domain.

Appendix: Materials Used for the Investment Task in Experiments 2 and 3

In a moment, you will be presented with financial highlights pulled from the quarterly report to investors from a random company in the United States. We have randomly selected a quarter from within the past ten years to identify the financial report you will read for this purpose. Using the financial information you will be asked to make an investment decision.

As many people do not have extensive knowledge of investing, we have provided you with some background information on investing to help you make an informed decision. Below, a few terms related to investing are briefly described. Please take your time to learn them.

1) Revenues – the total amount the company is earnings (the higher the better)
2) Net Income – Difference between revenues and expenses (the higher the better)
3) Assets – something of value that a company either owns or has the right to use (e.g., equipment – the higher the better)
4) Liability – the amount the company owes to others (lower is better – a company whose assets are higher than its liabilities is in good shape)
5) Shareholder's equity – value of the shareholders' interest in the company (positive values are good, the more positive the better)

Financial Information for Company Alpha

(CAD$ millions, except per share information)		
Earnings		
	Revenue	$14,655
	Expenses	11,893
	Net Income	2,762
Balance Sheet Data		
	Assets	$376,956
	Liabilities	358,173
	Shareholders' Equity	18,783
Per Share Info		$49.51

You have been assigned $5.00 for an investment decision. Using the financial statement information you will be asked to decide whether or not you would like to invest any portion of your $5.00 in Company Alpha by buying stock or you can invest this money in a GIC. You may invest any amount between $0.00 and $5.00—it is up to you. If you choose not to invest, your money will be automatically invested in the GIC so you will earn 4%. If you choose to invest some or all of your money you may leave today with more than, less than, or exactly $5.00 depending on your investment decision. Your return on your investment decision for Company Alpha will be based on a comparison between the stock price of Company Alpha in the quarterly statement that you just saw and the stock price on the last day of the following quarter. So, for example, if the randomly selected quarter was the first quarter of the year 2003 and the stock price on the last day of that quarter was $10, your return would be determined by the value of the stock on the last day of the second quarter of the same year. (Note: We mean the stock price for the last day—not the average stock price for the entire quarter.) The GIC will have a guaranteed 4% annual (1% quarterly) return.

1) On the last day of the quarter in the report the stock price at the Company Alpha was $49.51.
2) We would like you to imagine $0.01=$1.00; therefore, $5.00=$500.00.
3) Please refer to the table below to figure out how much various quantities of the stock in Company Alpha will cost.

Units	Price
0	$0.00
1	$49.51
2	$99.02
3	$148.53
4	$198.04
5	$274.55
6	$297.06
7	$346.57
8	$396.08
9	$445.59
10	$495.10

4) Decide on how much stock you would like to buy of Company Alpha and GICs and then please complete the piece of paper provided and hand it to the experimenter who will calculate your return while you complete the rest of the survey.
5) How much money do you want to invest?
6) CAD$_____ in Company Alpha CAD$_____ in GICS

Acknowledgments

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Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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Notes

1. A separate sample (N =18; 9 males, 9 females) drawn from the same population of undergraduate participants was shown 10 photographs of males and females, including photographs of the male and female experimenters who assisted in our experiments. Participants were asked to rate the attractiveness of the subject in each photograph relative to other people of the same gender, on a scale from 1 (*not at all attractive*) to 7 (*extremely attractive*). The mean attractiveness of our experimenters was 4.60 for the female and 4.42 for the male, and these means did not differ significantly, $t(17) = 0.48$, $p > .63$.
2. Participant's gender did not have an interactive effect in any of the experiments and is not discussed further.
3. Note that the negative-mood index does not include the security-related items in the PANAS scale.
4. At the end of the experimental task, we included two items to test whether participants had perceived the experimenter to be supportive and sympathetic (both items were rated on 7-point scales).

There were no differences between conditions on these measures (*p*s > .30; supportive: M_{touch} = 5.73, $M_{no\ touch}$ = 5.75; sympathetic: M_{touch} = 5.05, $M_{no\ touch}$ = 5.03). Thus, participants did not seem conscious of feelings of support that arose from their interactions with the experimenter. In addition, we asked participants whether they recalled being touched by the experimenter. Responses to this yes/no question did not differ between conditions ($p > .90$), a finding that attests to the subtlety of our manipulation.

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