Physical Contact and Financial Risk-Taking

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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, we show that a light, comforting pat on the shoulder by a female leads 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 establish 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 type of touch is a handshake. The results suggest that subtle physical contact can be strongly influential in decision-making and the willingness to accept risk.

Word count: 126
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 demonstrates 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, such as better weight gain and greater sensory responsiveness among newborns (Korner, 1990).

Maternal physical contact is equally important for non-human primates. In his classic study on attachment, Harlow (1958) observed that infant macaque monkeys became more attached to a soft-cloth surrogate mother compared to a harsh-wire surrogate mother. More importantly, this preference was observed notwithstanding that 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 even observed 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 (Harlow, 1958; Ainsworth et al., 1978). 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 its importance as a determinant of exploratory, or risk-taking, behavior among children, the effect of physical contact on adult exploratory behavior is not yet understood. In this paper we examine whether physical contact affects the tendency to engage in exploratory behavior by adults. Specifically, we study the effect of minimal physical contact on a form of risk-taking that is common in everyday life: financial risk-taking.

The main hypothesis that we test is that certain forms of physical contact will evoke a sense of security in our experimental participants, which in turn will increase their willingness to make riskier 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). In our context, we conjecture that certain forms of touch will remind participants of the feelings of security elicited by similar maternal physical contact in early life. The connection between these feelings and risk-taking is derived from the observation that risk is often gauged by a decision-maker’s feelings at the time of choice—rather than 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 are illusory, in contrast with previous research that has investigated the role of social interdependence (i.e., actual security) on choice under risk (Hsee & Weber, 1999). Furthermore, we will show that the effect of physical contact is not due to changes in overall mood, which have been linked to changes in risk attitudes (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 and for whom the payoffs or losses involved were of a reasonable amount. 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 in our studies is a

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1 A separate sample (N =18; 9 females) drawn from the same population of undergraduate participants in our studies was shown ten photographs of males and females, including those of the male and female experimenters that assisted in our experiments. Participants were asked to rate the attractiveness of the subjects in the photographs relative to the subject’s respective gender on a 1 (“not at all attractive”) to 7
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 documents 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.

*Method.*

Participants ($N = 67$; 30 males) completed the study individually. Upon arrival, each participant was greeted by a female experimenter and was either verbally ushered to a cubicle where the experimental task awaited (no-touch condition) or was verbally ushered to a cubicle in conjunction with a light, open-palmed touch on the back of the shoulder blade, right below the deltoid, that lasted for approximately one second (touch condition). Following the touch (or no-touch) manipulation, in this and subsequent studies, the experimenter—who was blind to the hypothesis—retreated to a cubicle across the room so as not to be visible to the participant. The experimental task required participants to make a series of 14 hypothetical choices between certain cash payoffs and risky gambles that offered a 50% chance of winning a cash prize (or nothing). The amounts to be received or won varied across 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.

(“extremely attractive”) scale. The mean attractiveness of our experimenters was 4.60 for the female and 4.42 for the male, a non-significant difference ($t(17) = .48, p > .63$).
Results.

To analyze participants’ choices, we counted the number of gambles that they indicated that they were willing to accept. We found that participants in the touch condition were significantly more likely to select the risky gambles (\(M = 6.47, \text{SD} = 2.44\)) than participants in the no-touch condition (\(M = 4.10, \text{SD} = 2.33; t(65) = 4.05, p < .001\)). This effect did not vary by gender of the participant; both male and female participants were equally influenced by the experimenter’s touch. (This finding was consistent across all three studies and will not be discussed further.)

Experiment 2

In our next experiment we explore 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 effect of a touch on the shoulder (as in Experiment 1) with a handshake. Because research on the effects of physical contact specifically links maternal touch with exploratory behavior and consistent with research on how reactions to a male touch differ from reactions to a female 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). In contrast, 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, compared with a control condition where no touch takes place, we expected to observe elevated levels of risk-taking in the event of a (female’s) touch on the shoulder, but not in the event of a (female’s) handshake. In addition to these manipulated factors, at the conclusion of the experiment we asked participants to rate their mood and their feelings of security. We expected to show that physical contact evoked risk-taking via the influence of feelings of security rather than simply positive or negative mood.

**Method.**

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

As in the first experiment, participants were either ushered verbally to a cubicle (control) or ushered verbally to the cubicle in conjunction with physical contact by the male or female experimenter (either a touch on the shoulder or a handshake). The task in this experiment required participants to make an investment decision using CAD$5 that they had been granted by the experimenter upon arrival to the laboratory. Participants were asked to allocate their money between one of 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 experiment’s stimuli (see Appendix 1 for materials). 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 based on the company’s performance in the subsequent earnings quarter. Following the investment task, participants completed the PANAS mood scale and six measures intended to assess their feelings of security: “at ease,” “secure,” “protected,” “safe,” “comfortable,” “accepted” on 1 (not at all) to 7 (very) scales. At the end of the experiment participants were given their winnings or asked to pay off their losses.

Results.

The type of touch influenced risk-taking only when participants were touched by the female toucher ($F(2,99) = 5.35, p < .01$; simple effect female: $F(2,50) = 14.66, p < .001$; simple effect male: $F(2,49) = .382, p > .60$). See Figure 1. Participants who were touched on the shoulder by the female toucher invested an average of CAD$3.44 (SD = 1.45) in the risky equity, which was significantly greater than the amount invested in the female-handshake condition ($M =$ CAD$2.04, SD = 1.18; $t(99) = 2.77, p < .01$) or the female-control condition ($M =$ 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 $p$s > .20). Further, the amount invested in the female-shoulder condition was greater than 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 Figure 2).\(^2\) In particular, touch led to differing perceived degrees of security only when the toucher was female \(F(2,99) = 14.51, p < .001\); simple effect female \(F(2,50) = 22.37, p < .001\); simple effect male: \(F(2,49) = .375, p > .60\). Participants indicated the strongest feelings of security when the female experimenter touched them on the shoulder \((M = 5.59, SD = 1.16)\), as compared to when she shook their hand \((M = 3.70, SD = 1.71\); \(t(99) = 4.78, p < .001\)) or when she did not touch them at all \((M = 2.35, SD = 1.50, t(99) = 8.15, p < .001\)). The fact that feelings of security in the female handshake condition are greater than the female control condition likely explains the reason that risk-taking was greater in the former condition than the latter (indeed, our subsequent mediation analysis supports this point). This finding is consistent with our theorizing, and is likely due to the fact that a handshake by a female has been shown to lead to very mild ratings of relaxation (Burgoon, 1991). In contrast, when the toucher was male, mean ratings of security were statistically indistinguishable from each other \((M\text{ shoulder} = 2.38, SD = 0.82; M\text{ handshake} = 2.17, SD = 0.78; M\text{ control} = 2.18, SD = 0.88\). The PANAS items that relate to feelings of (in)security revealed a pattern that was consistent with the results we obtain 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 (positive mood index: \(F(2,99) = 1.19, p = 0.31\); negative mood index: \(F(2,99) = 1.57, p = 0.21\)).\(^3\)

\(^2\) Since the six different ratings of security were highly correlated, coefficient \(\alpha = 0.97\), we collapsed them into a single-measure “security index,” which we use in our analysis.

\(^3\) Note that the negative mood index does not include the security-related items in the PANAS scale.
The pattern of results in the female toucher conditions suggests that physical contact influences risk-taking by evoking feelings of security, consequently influencing the riskiness of financial decisions. In order to examine this possibility, we conducted a mediation analysis for the female toucher conditions using our feelings of security index (see Figure 3). As expected, we find that feelings of security mediated the effect of touch on financial risk-taking (Sobel $z = 3.75, p < .001$).

**Experiment 3**

Our third experiment manipulates feelings of security in order to further establish it as a link between physical contact and financial risk-taking. We used an unrelated studies paradigm wherein 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 therefore their investment decisions would be relatively less sensitive to touch. In contrast, participants primed to feel insecure would be much more sensitive to the physical contact, with those touched benefiting from a renewed sense of security and therefore being more likely to seek financial risk than those not touched. Such an interaction, in addition to directly implicating feelings of security as the factor underlying our effect, would also challenge an alternative explanation that relates to the attractiveness of our experimenter. Specifically, Knutson, Wimmer, Kuhnen, and Winkielman (2008) find 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 we should find no interaction between the security prime and touch.
Method.

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

We primed feelings of security or insecurity in one laboratory room by having participants write a brief essay about a time in their life in which they “felt secure and supported” (secure essay condition) or a time in their life in which 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 were greeted by a female experimenter. The procedure in this room was identical to the no-touch control and shoulder touch conditions of Experiment 2, including the CAD$5 grant and the feelings of security scales completed following the investment task. Participants were paid their winnings or required to pay for their losses at the end of the study.

Results.

Participants in the secure-touch, secure-no touch, and insecure-touch conditions invested a greater amount 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; $F(2,57) = .509, p > .60$) than those in the insecure-no touch condition ($M =$ CAD$1.11, SD $= 1.54$; planned

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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 on 7 point scales). There were no differences between conditions on any of these measures ($p$s $>.30$; supportive: $M_{\text{touch}} = 5.73, M_{\text{no touch}} = 5.75$; sympathetic: $M_{\text{touch}} = 5.05, M_{\text{no touch}} = 5.03$). 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. Interestingly, there was no difference between conditions in response to this yes/no question ($p > .90$), attesting to the subtlety of our manipulation.
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 ($t(76) = .96, p = .34$), perhaps due to a ceiling effect. See Figure 4. As in Experiment 2, here, too, participants’ feelings of security reflected their investment choices. Participants felt equally secure in the three conditions where we had intervened to bolster their feelings of security (i.e., secure-touch, $M = 5.65$, SD = .88; secure-no touch, $M = 5.73$, SD = .63; and insecure-touch, $M = 5.47$, SD = 1.03), but less secure where they had been primed to feel insecure and had not experienced touch ($M = 4.17$, SD = 1.76; planned contrast $t(76) = 4.85, p < .001$). See Figure 5. 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.

**Discussion**

The three experiments demonstrate an association between certain kinds of physical contact and financial risk-taking. The results manifested 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. 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 of the financial domain.

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5 The interaction of touch by security essay was significant ($F(1,76) = 4.32, p < .05$).
6 The interaction of touch by security essay was significant ($F(1,76) = 7.15, p < .01$).
References


ACKNOWLEDGMENTS

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Experiment 2 investment decision results. The y-axis is the amount of CAD$ invested in the risky equity. The x-axis refers to the experimental condition.

FIGURE 1
FIGURE 2

Experiment 2 feelings of security ratings. The y-axis is the rating of security (based on the index calculated from the six security questions that respondents completed; see footnote 2). The x-axis refers to the experimental condition.
FIGURE 3
Experiment 2 mediation analysis. Feelings of security mediate the effect of touch on investment in the risky equity. Numbers represent standardized regression coefficients; numbers in parentheses represent simultaneous regression coefficients. A star (*) indicates a $p$-value of less than .001. Touch is not a significant predictor in the presence of the mediator.
FIGURE 4

Experiment 3 investment decision results. The dark bars represent the participants in the secure essay conditions; the white bars represent the participants in the insecure essay conditions. The y-axis is the amount of CAD$ invested in the risky equity. The x-axis refers to the touch condition.
FIGURE 5

Experiment 3 feelings of security ratings. The dark bars represent the participants in the secure essay conditions; the white bars represent the participants in the insecure essay conditions. The y-axis is the rating of security (based on the index calculated from the six security questions that respondents completed). The x-axis refers to the touch condition.
APPENDIX 1:  
Experiment 2 Task

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)

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<td>Revenue</td>
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<td>Expenses</td>
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<tr>
<td>Net Income</td>
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<tr>
<td>Liabilities</td>
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<tr>
<td>Shareholders' Equity</td>
<td>18,783</td>
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</table>

<table>
<thead>
<tr>
<th>Per Share Info</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$49.51</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Units</th>
<th>Price</th>
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</thead>
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<tr>
<td>10</td>
<td>$495.10</td>
</tr>
</tbody>
</table>

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.

How much money do you want to invest?
CAD$_____ in Company Alpha   CAD$_____ in GICS