



Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

Affective implications of the mating/parenting trade-off: Short-term mating motives and desirability as a short-term mate predict less intense tenderness responses to infants



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ARTICLE INFO

Article history:

Received 24 December 2013
 Received in revised form 11 March 2014
 Accepted 29 March 2014

Keywords:

Life history theory
 Mating
 Relationships
 Tenderness

ABSTRACT

Drawing on life-history theory, it is predicted that individuals' attitudinal orientation toward unrestricted short-term mating behavior, as well as their ability to engage in such behavior, are inversely related to nurturant emotional responses (tenderness) to infants. To test these hypotheses, participants ($N = 305$) completed measures assessing individual differences in short-term mating orientation, self-perceived physical attractiveness, dispositional tendency to experience tenderness, and their affective responses to photographs of human infants. Results revealed that (when controlling for other relevant individual difference variables) men's short-term mating orientation and self-perceived attractiveness were inversely associated with dispositional tenderness. Also, among men only, short-term mating orientation and self-perceived attractiveness predicted less intense tenderness responses to infants.

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1. Introduction

Human reproductive fitness depends not only on adults' capacity to produce offspring, but also on their capacity to provide protection and care to those offspring. Emotional responses to infants play an important role in motivating these nurturant behaviors. McDougall (1908, p. 66) identified this characteristic affective response as "the tender emotion." An emerging body of literature now empirically differentiates tenderness from other, superficially similar affective states (such as empathy, sympathy, and love; Kalawski, 2010). It will therefore be useful to document more fully the various causes, consequences, and correlates of tenderness.

If the emotional experience of tenderness evolved to facilitate parental care for offspring, then the most obvious correlates are psychological attitudes and aptitudes that define parent/child relationships. Less obviously, tenderness responses may also be predicted by attitudes and aptitudes that define relationships between adults. In this article, we focus on short-term mating relationships. We report results showing that individuals' desire to engage in short-term sexual relations, and their ability to successfully attract short-term sexual partners, both independently

predict the extent to which they experience a tenderness response to infants.

2. Mating attitudes and aptitudes as predictors of tenderness

Within the context of close relationships, there is a distinction between dispositions regarding long-term and short-term mating relationships. *Long-term mating orientation* is characterized by the extent to which individuals desire the commitment of an enduring long-term relationship such as marriage. *Short-term mating orientation* is characterized by the extent to which individuals desire casual sexual relationships. Long-term and short-term mating orientation are conceptually distinct constructs, can be measured separately, and have empirically distinct implications (Jackson & Kirkpatrick, 2007).

Given that long-term mating relationships have historically functioned to facilitate biparental care for offspring, it follows that individuals with a stronger long-term mating orientation will have more positive attitudes regarding parenting, which is likely to manifest in a stronger tenderness response to infants. But what about short-term mating orientation? One conceptual approach to this question—based on life history theory—predicts that (even when controlling for long-term mating orientation) short-term mating orientation and tenderness are *negatively* related.

Life history theory draws upon principles of evolutionary biology and developmental plasticity to yield predictions about the

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timing, duration, and frequency of developmental events, and about behavioral patterns that unfold throughout organisms' lives (Kaplan & Gangestad, 2005). Central to life history theory is the concept of *trade-offs*. One fundamental trade-off is between mating and parenting (Gangestad & Simpson, 2000): To the extent that bioenergetic resources are devoted to physiological systems involving the production of new offspring, those resources cannot be devoted to physiological systems involving the provision of care to existing offspring, and vice-versa. In addition to many implications for between-species differences, this trade-off between mating effort and parenting effort also has important implications for within-species differences. Some of these differences reflect adaptive responses to developmental milestones. For species that produce relatively few offspring (such as humans), the actual production of offspring triggers a predictable change in the manner in which the mating/parenting trade-off is resolved, with relatively more resources allocated to physiological systems facilitating parental care and fewer resources allocated to mating effort. This developmental change is evident in actual behavior (i.e., more caregiving behavior and less mating behavior) and also in hormonal changes—among both mothers and fathers—following the birth of a child (Gray, Kahlenberg, Barrett, Lipson, & Ellison, 2002; Kuzawa, Gettler, Huang, & McDade, 2010). The mating/parenting trade-off may also be resolved differently for the different sexes. In species characterized by differences in obligatory parental investment, the sex with greater obligatory investment (e.g., gestation) is characterized by relatively greater allocation of resources to parental care, and fewer resources allocated to mating effort. In humans, this manifests in a variety of sex differences (Geary, 1998)—including differences in short-term mating orientation (generally higher among men; Simpson & Gangestad, 1991), and in dispositional tendencies toward caregiving (generally higher among women; Taniguchi, 2006).

The implications of this fundamental trade-off are not limited just to these categorical differences between parents and nonparents and between men and women. If indeed the development (or maintenance or deployment) of physiological systems devoted to mating effort occurs at the expense of the development (or maintenance or deployment) of physiological systems devoted to parental care, this implies a more general tendency for approach-oriented attitudes toward mating and care-giving responses to infants to be mutually inhibitory (Apicella & Marlowe, 2007). If so, then (even when controlling for differences in long-term mating orientation, sex, and parenthood) short-term mating orientation may be *inversely* correlated with tenderness responses to infants.

The preceding analysis focused specifically on individuals' mating *attitudes*—dispositional desires regarding short-term sexual relationships. But, just as individuals may differ in their mating attitudes, they also differ in their mating *aptitudes*—ability to actually succeed in attracting mates. In the context of short-term mating, individuals' attitudes may be largely independent of their aptitudes—which depend substantially on superficial appearances. When deciding whether or not to enter into a short-term mating relationship, both men and women place a relatively high priority on the physical attractiveness of any potential short-term mate. Therefore, regardless of their *attitude* toward short-term mating, individuals who are more physically attractive have greater *aptitude* to actually engage successfully in a short-term mating strategy.

Self-perceived attractiveness can be thought of as an indication of an individual's anticipated success in the mating game. And, because people are more likely to engage in behaviors that they expect to produce successful outcomes, it may also serve as an additional indication of their inclination to devote energetic resources to short-term mating behavior. Given the bioenergetic trade-off between mating effort and parenting effort, the functional logic of life history theory therefore implies a second

hypothesis that conceptually parallels the hypothesis linking short-term mating orientation to tenderness: Self-perceived physical attractiveness may be inversely correlated with tenderness responses to infants.

Although recent research has applied the principles of life history theory to the prediction of human individual differences (e.g., Ellis, 2004; Figueredo et al., 2005), no prior empirical research directly tests either of these two hypotheses. There is some evidence that physically attractive individuals may be less empathic (Holtzman, Augustine, & Senne, 2011), but it is unknown whether this relationship extends also to the conceptually distinct emotion of parental tenderness. Similarly, while Apicella and Marlowe (2007) found some evidence that fathers' self-perceived mate value is negatively correlated with investment of effort and attention to their children, that study focused only on fathers (no results were reported for men and women more generally), and did not include measures of tenderness or other emotional responses. Nor has any prior research examined the hypothesized linkages between short-term (or long-term) mating orientation and the emotional experience of tenderness.

3. Overview of the study

Our study was designed to test both the hypothesized negative correlation between short-term mating orientation and tenderness towards infants, and the hypothesized negative correlation between self-perceived attractiveness and tenderness.

We assessed tenderness in two ways. Chronic dispositional tendency to experience tenderness was assessed with a 15-item self-report inventory modeled after other measures that assess individual differences in other specific emotional states (e.g., disgust sensitivity; Haidt, McCauley, & Rozin, 1994). In addition to assessing this chronic dispositional tendency (“trait” tenderness) we also assessed individual's temporary affective response to relevant perceptual stimuli: We presented individuals with photographs depicting babies, and measured emotional responses (“state” tenderness).

In order to provide a rigorous test of the first hypothesis, we assessed both short-term mating orientation (STMO) and long-term mating orientation (LTMO). Because LTMO tends to be negatively correlated with STMO, and because it is likely to be positively correlated with tenderness, we statistically controlled for LTMO in order to test for any unique relation between STMO and tenderness.

Analogously, when testing the second hypothesis, we assessed not only the extent to which individuals perceived themselves to possess traits that made them attractive to short-term mates, we also assessed the extent to which they perceived themselves to possess additional traits that connote their likelihood of being a good long-term romantic partner. These self-perceptions are likely to be positively correlated with tenderness, and also positively correlated with self-perceived physical attractiveness (because of individual difference in self-evaluation more broadly). Consequently, we statistically controlled for these additional self-perceptions in order to test the unique relation between self-perceived physical attractiveness and tenderness.

We also assessed, and statistically controlled for, demographic variables (such as sex and parenthood) that might otherwise produce spurious correlations between the variables of focal interest.

4. Method

4.1. Participants

Participants were 305 residents of the United States (164 men, 141 women; 109 parents, 196 non-parents; *M* age = 31.49 years

[$SD = 11.30$] who were recruited through Amazon.com's Mechanical Turk website in exchange for a payment of \$0.50 USD, and who fully completed the measures described below. These procedures were administered online, on SurveyMonkey.com.

4.2. Mating orientation

Participants completed 20 items from the revised Sociosexual Orientation Inventory (Jackson & Kirkpatrick, 2007). Ten of these assessed *short-term mating orientation* (STMO; sample item: "I can easily imagine myself being comfortable and enjoying 'casual' sex with different partners"); 10 additional items assessed *long-term mating orientation* (LTMO; sample item: "I would like to have a romantic relationship that lasts forever"). Participants responded by indicating their agreement on a 7-point rating scale (1 = Strongly disagree; 7 = Strongly agree). We computed mean responses to each of the 2 sets of items, in order to create separate composite indices of STMO and LTMO (Cronbach's alphas = .97 and .94, respectively).

4.3. Self-perceived traits

Participants were asked to rate the extent to which they possessed the following traits (all of which are generally perceived to be evaluatively positive): *Sex appeal, Kindness and understanding, Health, Qualities of a good parent, Physical fitness, Physical attractiveness, Faithfulness/Loyalty, Responsibility, Stable personality*. They recorded their self-ratings on 7-point scales (1 = Not at all; 7 = Very much). A principal components analysis, with varimax rotation, revealed 2 underlying factors with eigenvalues >1 . (The same 2 factors emerged when the analysis was conducted separately for men and women). Four traits (Sex appeal, Health, Physical fitness, Physical attractiveness) loaded highly on a factor that assesses qualities pertaining to one's desirability as a short-term mate. The other five traits (Kindness and understanding, Qualities of a good parent, Faithfulness/Loyalty, Responsibility, and Stable personality) loaded highly on a separate factor that assesses qualities pertaining to one's desirability as a long-term partner. We created two composite indices accordingly, which we refer to here as *desirability as short-term mate* and *desirability as long-term partner* (Cronbach's alphas = .75 and .85, respectively).

4.4. Emotional responses to cute infants (state tenderness)

Participants were presented, one at a time, with 8 photographs, each depicting a different human infant. (Photographs were sourced from a Google Images search with the keywords "cute baby" and "adorable baby." A separate sample of participants [$N = 156$] viewed the stimulus photos and were asked to rate "To what extent were the photographs cute?" on a 6-point scale. The mean rating was 4.88, indicating that infants in the images were perceived to be high on "cuteness"—the subjective assessment expected to elicit caretaking responses [Sherman, Haidt, & Coan, 2009]).

After viewing the full set of 8 photographs, participants were asked to "rate how much you experienced each of the following emotions while looking at the set of photographs." On 6-point rating scales (1 = Not at all; 6 = Very much), participants provided ratings for: *Tenderness, Caring, Responsibility, Anxiety, Sadness, Pride, Affection, Happiness, Compassion, Fear, and Disgust*. We computed mean ratings of Tenderness, Caring, Affection, and Compassion in order to create a composite index of *state tenderness* (Cronbach's alpha = .97).

4.5. Chronic dispositional capacity for tenderness (trait tenderness)

Participants responded to a 15-item questionnaire designed to assess a general dispositional tendency to experience tenderness in the presence of infants. For 5 of the items, participants rated their agreement with statements that are consistent with a chronic capacity for tenderness (e.g., "Babies melt my heart"). Ratings were made on 5-point scales (1 = Strongly disagree; 5 = Strongly agree). The remaining 10 items presented participants with brief scenarios involving babies—5 of which depicted babies being cute (e.g., "A newborn baby curls its hand around your finger") and 5 of which depicted babies in need of assistance (e.g., "You need to change a baby's soiled diaper")—and participants rated how much tenderness they would feel in response to each scenario. Ratings were made on 5-point scales (1 = No tenderness at all; 5 = A lot of tenderness). We computed the mean ratings across all 15 items to create a composite index of *trait tenderness* (Cronbach's alpha = .94).

4.6. Demographic information

Participants also completed a questionnaire assessing demographic details, including their age, sex, and whether they had any children.

5. Results

Preliminary regression analyses were conducted that included three key demographic variables (sex, parenthood, age) as predictors of the tenderness measures. Results revealed no unique effects of age (p 's $> .77$); but there were significant effects of sex (binary coding: Males = 1; Females = -1) and parenthood (binary coding: Parents = 1, Non-parents = -1) on both trait tenderness (p 's $< .001$) and state tenderness (p 's $< .01$). In the analyses reported below, we statistically controlled for any effects of sex and parenthood. Additional preliminary analyses revealed no meaningful correlation between short-term mating orientation (STMO) and self-rated desirability as a short-term mate ($r = .07, p = .244$), indicating that these two variables can be analytically treated as independent constructs. Therefore, we tested the two primary hypotheses in separate regression analyses.

5.1. Short-term mating orientation (STMO) as a predictor of tenderness

STMO and LTMO were negatively correlated, $r = -.33$ ($p < .001$); therefore, in order to assess the unique relationship between STMO and emotional tenderness, we statistically controlled for LTMO (in addition to sex and parenthood).

We first conducted a regression analysis on the combined sample of men and women to test the unique predictive effect of STMO on chronic dispositional tendencies toward tenderness (trait tenderness). STMO was included as a predictor, along with LTMO, sex, parenthood, and the 3 interaction terms involving STMO (STMO x Sex; STMO x parenthood; STMO x Sex x Parenthood). In addition to main effects of sex, parenthood, and LTMO (indicating greater dispositional tenderness among women, parents, and people with higher levels of LTMO, p 's $< .001$), there was a marginally significant main effect of STMO ($\beta = -.11, p = .07$) that was qualified by a statistically significant interaction between STMO and sex ($\beta = -.10, p = .04$).

Next, regression analyses were conducted separately for men and women. (Each regression analysis included STMO, LTMO, parenthood, and the STMO x Parenthood interaction term as predictors). The results of these analyses are summarized in Table 1. These results revealed no relation between STMO and trait

tenderness among women ($\beta = .00$, $p = .98$). In contrast, among men, there was a significant negative relationship ($\beta = -.23$, $p = .006$).

Because emotional states are, to some extent, situation-specific manifestations of dispositional tendencies to experience those emotional states; it follows that any predictive effect of STMO on state tenderness may be somewhat weaker than its effect on trait tenderness. Also, given the preceding results, it follows that the effect is likely to be observed primarily among men. These expectations were borne out by the results of regression analyses on emotional responses to photographs of cute babies (state tenderness). A preliminary regression analysis that included STMO, LTMO, sex, parenthood, and the 3 interaction terms involving STMO revealed higher levels of state tenderness among women, parents, and people with higher levels of LTMO (p 's $< .05$); but neither the main effect for STMO nor the STMO x Sex interaction were significant (p 's = .10 and .13, respectively).

Although the latter interaction was non-significant, it may be useful to conduct regression analyses separately for men and women, in order to avoid over-general conclusions. Indeed, separate analyses on male and female data reveal patterns of results similar to, but weaker than, the results on trait tenderness (see Table 2). There was a negligible relation between STMO and state tenderness among women ($\beta = -.02$, $p = .78$), and there was a significant negative relationship between STMO and state tenderness among men ($\beta = -.19$, $p = .03$).

5.2. Self-perceived desirability as a short-term mate as a predictor of tenderness

For multiple reasons (e.g., individual differences in self-esteem, rating-scale usage) people who rate themselves highly on one desirable trait tend to rate themselves highly on other desirable traits too. Indeed, self-rated desirability as a short-term mate was positively correlated with self-rated desirability as a long-term partner ($r = .42$, $p < .001$). This creates a suppressor variable situation, in which self-rated desirability as a long-term partner may misleadingly suppress the unique relationship between tenderness and desirability as a short-term mate. Therefore, in order to test this relationship, we statistically controlled for desirability as a long-term partner (as well as sex and parenthood).

We first conducted a regression analysis to test the unique predictive effect of desirability as a short-term mate on trait tenderness. Predictor variables included desirability as a short-term mate, desirability as a long-term partner, sex, parenthood, and the 3 interaction terms involving desirability as a sexual partner. In addition to main effects of sex, parenthood, and desirability as a long term partner (p 's $< .001$), there was also a significant main effect of desirability as a short-term mate STMO ($\beta = -.14$, $p = .01$) and this main effect was qualified by a statistically significant interaction with sex ($\beta = -.11$, $p = .04$).

Next, we conducted regression analyses separately for men and women. (Each regression analysis included four predictor variables: desirability as a short-term mate, desirability as a long-term

Table 1

Results of regression analyses predicting trait tenderness from short-term and long-term mating orientations (STMO and LTMO), conducted separately for men ($n = 163$) and women ($n = 140$).

Variable	Men			Women		
	β	$t(159)$	$p <$	β	$t(136)$	$p <$
STMO	-.23	-2.81	.006	-.002	-0.03	.98
LTMO	.26	3.54	.001	.18	2.34	.02
Parenthood	.17	2.26	.03	.50	5.92	.001
Parenthood X STMO	-.03	-0.31	.76	.16	1.92	.06

Table 2

Results of regression analyses predicting state tenderness from short-term and long-term mating orientations (STMO and LTMO), conducted separately for men ($n = 163$) and women ($n = 140$).

Variable	Men			Women		
	β	$t(159)$	$p <$	β	$t(136)$	$p <$
STMO	-.19	-2.17	.03	-.02	-0.28	.78
LTMO	.25	3.25	.001	.15	1.91	.06
Parenthood	.16	2.15	.03	.41	4.67	.001
Parenthood X STMO	-.06	-0.77	.44	.08	0.90	.37

partner, parenthood, and the interaction between parenthood and desirability as a short-term mate). Results are summarized in Table 3. Among women there was negligible relation between trait tenderness and desirability as a short-term mate ($\beta = -.03$, $p = .67$); but, among men, there was a significant negative relationship ($\beta = -.30$, $p < .001$).¹

An identical, but weaker, pattern of results emerged on the measure of state tenderness (see Table 4). A preliminary regression analysis (that included the same seven predictor variables described above) revealed higher levels of state tenderness among women, parents, and people who perceive themselves to be more desirable as long-term partners (p 's $< .01$); there was no significant effect for desirability as a short-term mate, nor for its interaction with sex (p 's = .10 and .38, respectively).

When conducting regression analyses separately for men and women, the pattern of results were similar to the results on trait tenderness. There was a negligible relation between desirability as a short-term mate and state tenderness among women ($\beta = -.03$, $p = .70$); but, among men, there was a significant negative relationship between desirability as a short-term mate and state tenderness ($\beta = -.18$, $p = .04$).

6. Discussion

The primary results can be summarized as follows: Men who express a greater desire to engage in short-term mating behavior have a less intense tenderness response to infants. Similarly, men who perceive that they are more physically attractive—and thus have a greater ability to successfully attract short-term mates—also have less intense tenderness responses. These effects were observed on a measure that assesses chronic dispositional tendencies (trait tenderness) and also, more weakly, on a measure assessing tender feelings triggered by the visual perception of infants (state tenderness). These effects were observed only among men; no such effects emerged among women.

If indeed these effects are specific to men, why might this be? It could be dismissed simply as a statistical artifact if female responses varied less than male responses on the measures in question; but this was not the case. Although men and women did differ in mean values on all the key variables (women had lower mean values on STMO, and higher mean values on self-perceived desirability as a short-term mate, trait tenderness, and state tenderness; p 's $< .05$), they did *not* differ in the variability around those means (on all key variables, Levene's test for equality of variances was nonsignificant, p 's $> .20$). Nor does it appear that the measurement of tenderness was uniquely problematic among

¹ Table 3 also reveals that, among men only, there was a statistically significant interaction between parenthood and desirability as a short-term mate: The negative relation between desirability as a short-term mate and trait tenderness was stronger among fathers than among male non-parents. A convincing interpretation of this interaction is not immediately evident; and, given that no such interaction emerged in any other analyses involving either desirability as a short-term mate or STMO, it may be premature to draw meaningful conclusions from this single finding.

Table 3
Results of regression analyses predicting trait tenderness from self-perceived desirability as a short-term mate and as a long-term partner, conducted separately for men ($n = 163$) and women ($n = 140$).

Variable	Men			Women		
	β	$t(159)$	$p <$	β	$t(136)$	$p <$
Desirability as short-term mate	-.30	-3.30	.001	-.03	-0.41	.67
Desirability as long-term partner	.44	5.52	.001	.35	4.41	.001
Parenthood	.12	1.55	.12	.34	4.55	.001
Parenthood X Desirability as short-term mate	-.19	-2.33	.02	.00	-0.01	.99

Table 4
Results of regression analyses predicting state tenderness from self-perceived desirability as a short-term mate and as a long-term partner, conducted separately for men ($n = 163$) and women ($n = 140$).

Variable	Men			Women		
	β	$t(159)$	$p <$	β	$t(136)$	$p <$
Desirability as short-term mate	-.18	-2.03	.04	-.03	-0.39	.70
Desirability as long-term partner	.50	6.34	.001	.34	4.11	.001
Parenthood	.12	1.61	.11	.28	3.66	.001
Parenthood X Desirability as short-term mate	-.08	-0.97	.33	.07	0.94	.35

women, given that their tenderness responses were predicted by other conceptually relevant variables (e.g., self-perceived desirability as a long-term mate). It is therefore worth considering more conceptually meaningful explanations.

One possible explanation draws upon the same biological distinction that, in theory, explains why women generally exhibit higher levels of tenderness than men: Differences in obligatory parental investment. Compared to men, women are anatomically obliged to devote more effort and energy to the production and care of offspring and are also more anatomically constrained in the sheer number of offspring that they can produce in their life-span. These differences have implications for the costs and benefits to reproductive fitness that, historically, have been associated with behavior that trades off parental care behavior in favor of short-term mating behavior. For men—especially those who were most likely to successfully attract mates—the fitness costs associated with paternal negligence may often have been outweighed by the fitness benefits associated with short-term mating behavior. In contrast, maternal negligence is likely to have had more profound negative implications the health and welfare of offspring and, thus, more substantial costs to women's own reproductive fitness. To the extent that contemporary human psychology reflects the biological implications of these cost/benefit analyses, it follows that men's capacity for parental tenderness is likely to be functionally attuned to information regarding opportunities for short-term mating, whereas women's capacity for parental tenderness may be less attuned to this kind of information.

Although our results revealed no effects among women, it is possible that specific subsets of women might show effects similar to those observed among men. Recent work suggests that developmental differences in resource scarcity may affect women's reproductive strategies (Griskevicius, Tybur, Delton, & Robertson, 2011). One possible implication is that, among women, socioeconomic status may moderate any effects that mating attitudes and/or aptitudes might have on parental tenderness. We did not assess socioeconomic status (nor any other index of resource scarcity); in future studies it may be useful to do so.

Although the logic of life-history theory may explain why short-term mating attitudes and aptitudes are inversely related to tenderness (and why this may be the case primarily among men), it cannot explain how this occurs. Nor do our results provide answers to questions about physiological processes that might provide a mechanistic account of these inverse relations. One avenue for future research is to investigate the relation between testosterone

and oxytocin as a possible neurochemical basis for the inverse relationship between parental tenderness and short-term mating attitudes/aptitudes. Testosterone is associated with short-term mating behavior (van Anders, Hamilton, & Watson, 2007), oxytocin is associated with parental attachment and caregiving (Rodrigues, Saslow, Garcia, John, & Keltner, 2009), and there is some evidence that testosterone and oxytocin may be mutually inhibitory (e.g., Okabe, Kitano, Nagasawa, Mogi, & Kikusui, 2013).

Finally, past research has shown that parents' emotional responses towards their infants predict parent-child bonding and children's learning outcomes (e.g., Belsky, 1984). It is therefore possible that men's attitudes toward, and aptitudes for, short-term mating might have indirect, but considerable long-term ramifications for their children's own actual developmental outcomes.

Acknowledgment

This research was supported by an Insight Grant from the Social Sciences and Humanities Research Council of Canada.

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