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Exploring the Effects of the Naturalistic Fallacy: Evidence That Genetic Explanations Increase the Acceptability of Killing and Male Promiscuity

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The naturalistic fallacy is the erroneous belief that what is natural is morally acceptable. Two studies assessed whether people commit the naturalistic fallacy by testing whether genetic explanations for killing and male promiscuity, as compared to experiential explanations (i.e., learning/"nurture" explanations) increase acceptance of these behaviors. In Study 1, participants who read a genetic explanation for why people kill bugs viewed bug killing as more morally acceptable than participants who read an experiential explanation, although they did not reliably kill more bugs. In Study 2, men who read a genetic explanation for why men are more promiscuous than women reported decreased interest in long-term romantic commitment compared with men who read experiential explanations and women who read either explanation.

Most scientists agree that human behavior is shaped by complex interactions between genetic factors and experiential/learning factors, and while they may disagree about the relative contribution of these factors (e.g., Dar-Nimrod, 2007; Dupré, 2003; Eric, 2006; Herrnstein, 1990; Suzuki & Aronson, 2005), they generally agree that a genetic explanation for a given behavior does not morally justify that behavior. The distinction between descriptions of why people act the way they do and prescriptions for how they ought to act was articulated by Hume (1740/2007) and developed by many thinkers since (e.g., Black, 1964).

A growing body of research suggests, however, that people generally fail to appreciate the distinction between what "is" and what is morally good and bad (Eidelman, Crandall, & Pattershall, 2009; Friedrich, Kierniesky, & Cardon, 1989). Rather, they often commit the *naturalistic fallacy*, erroneously equating what is "natural" with what is good. In this paper, we report two studies that

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examine whether the naturalistic fallacy operates in the context of evolutionary explanations of human behavior; that is, whether people mistakenly assume that behaviors that are genetically predisposed are thereby more acceptable.[2] We hypothesize that genetic explanations for two morally relevant behaviors—killing and promiscuity—will lead people to view those behaviors as more acceptable than would explanations that emphasize the influence of experience and culture (i.e., experiential explanations).

The Naturalistic Fallacy in Evolutionary Explanations

Researchers have warned against committing the naturalistic fallacy in the context of evolutionary theorizing about human behavior, pointing out that genetic explanations for a behavior do not morally condone or condemn that behavior (e.g., Pinker, 1997). Nevertheless, people may assume that if a behavior has evolved over our species' history and has a genetic basis—if, in a sense, nature has prescribed it—then it is morally acceptable. There is some evidence consistent with this possibility. For example, Monterosso, Royzman, and Schwartz (2005) found that people exposed to genetic (vs. experiential) explanations for a target person's undesirable behaviors (e.g., setting fire to a building or overeating) were less punitive toward that individual.

Understanding the full reach of the naturalistic fallacy on attitudes toward morally relevant behaviors is particularly important, given the increasing emphasis on genetic factors in science and what appears to be an increasing popularity of genetic theories in academic and popular treatments of human behavior (ten Have, 2001; Lippman, 1991; Rothstein, 2005). With this goal in mind, we tested the effects of genetic versus experiential explanations on attitudes toward two morally relevant behaviors: killing living creatures and pursuing short-term sexual relations rather than long-term romantic commitments.

Study 1: Genetic Explanations for Killing

Genetic explanations for human killing behavior range from the instinct theories that date back to Freud (1930/1989) and Lorenz (1966) to more

[2]Technically, both genetic causes and learning/experiential causes are "natural," though the term *naturalistic fallacy* is commonly used in the context of nature versus nurture discussions to describe equating what is evolved or genetically determined with what is good. In this way, the naturalistic fallacy with reference to nature versus nurture explanations can be distinguished from recent work on an *existence bias*: a positive bias towards things merely because they already exist (Eidelman et al., 2009). In other words, both genetic and experiential explanations describe precedent or the existence of a behavior, but genetic explanations may nevertheless be more likely to suggest the rightness of the behavior.

recent perspectives based on findings that link aggressive or violent behaviors to specific genes and evolved processes. For example, some evolutionary theories posit that aggression and killing were genetically selected because they increased the inclusive fitness of our evolutionary ancestors (Buss, 2005; Buss & Shackelford, 1997; Nell, 2006; Wrangham & Peterson, 1997).

Although theorists have stressed that genetic explanations of killing behavior are independent of moral judgments, prior research (Friedrich et al., 1989; Eidelman et al., 2009) leads us to hypothesize that people who are exposed to genetic (as opposed to experiential) explanations for killing may erroneously infer that killing is more morally acceptable. To test this possibility, we exposed participants to either a genetic explanation for why people kill bugs that portrayed killing as innate or an experiential explanation that portrayed killing as shaped by cultural influences. We then had participants rate the moral acceptability of bug killing. We also had participants take part in a bug-killing task in which they determined the number of bugs to be killed. This allowed us to test whether the effect of the naturalistic fallacy extends beyond moral judgments of killing and actually influences killing behavior. We note this latter possibility more tentatively, however, because viewing a behavior as more morally acceptable does not necessarily mean that people will be more motivated to engage in it.

Method

Participants

A total of 27 undergraduates (12 male, 15 female) from the University of Canterbury participated in exchange for $10 shopping vouchers. The participants ranged in age from 18 to 36 years ($M = 23.7$).

Materials and Procedure

Cover Story. The experiment was conducted with 1 participant at each session. The experimenter began by telling the participant that he was researching the psychology of killing; that his work involves conducting experiments on killing in the laboratory, as well as writing for journals and textbooks; and that the study would involve taking part in two small projects. One was designed to get feedback on excerpts on the topic of killing that were being considered for inclusion in a textbook; the other on people's experiences with killing. At this stage, the participant was informed that the second study would involve a short bug-killing task in the laboratory. The participant was then asked to read and sign a consent form if he or she wished to participate in these studies.

Explanation Manipulation. In what was purportedly the first study on textbook feedback, the participants were randomly assigned to the genetic explanation condition or the experiential explanation condition (the experimenter was blind to condition). In the genetic explanation condition, participants read three paragraphs that offered an exclusively genetic explanation for why humans kill bugs. For example, a passage stated

> Bug-killing behavior evolved in us long ago, and appears to have been reinforced during our evolutionary past. Thus, it is a part of our genetic makeup because it helped our ancestors to stay safe from bugs and similar animals that could prove poisonous or harmful.

Participants in the experiential explanation condition read parallel passages that offered non-genetic explanations for bug killing. For example, they read that

> Bug-killing behavior has been present and taught in our cultures for a long time, and appears to have been reinforced by our historical situations. Thus, it is a part of our cultural makeup because it has helped our ancestors to stay safe from bugs and similar animals that could prove poisonous or harmful.

The participants were encouraged to read the information closely.

The passages in both conditions were largely identical (including their sentence structure, presentation style, and length), except for those words or phrases that specifically portrayed the relevant type of explanation. They were written to resemble currently popular genetic and experiential explanations. The passages in both conditions described killing as having a long history in human affairs (to control for simple differences in historical prevalence) and as serving practical benefits.

To support the cover story and to assess any possible between-condition differences in essay comprehension (we expected none), we asked the participants to answer two questions after reading the essay: "How clearly was this paragraph written?" which was rated on a 7-point Likert-type scale ranging from 1 (*not at all clear*) to 7 (*extremely clear*); and "How easy was this paragraph to read?" which was rated on a 7-point scale ranging from 1 (*not at all easy*) to 7 (*extremely easy*). Analyses of the mean of the three clarity items (one after each of the three paragraphs) and the mean of the three ease items support our assumption that participants would rate the passages in the genetic and experiential conditions to be equally clear and comprehensible ($ps > .80$).

After they had read all three passages, the participants responded to a question that assessed their comprehension of the passages: "According to the three paragraphs above, bug-killing behavior in humans is caused by . . .". The participants selected from the following choices for the genetic condition: "(a) culture and learning; (b) genes; (c) diet; (d) dreaming." In the experiential condition, the choices were as follows: "(a) genes; (b) culture and learning; (c) diet; (d) dreaming." The analyses reveal that all but one of the participants (in the genetic condition) identified the correct answer to the comprehension question.[3] This suggests that the passages in both conditions delivered their intended messages to participants.

Supplementary data from the same subject pool were also collected to examine the credibility of the two explanations. We asked 33 people to read either the set of experiential paragraphs or the set of genetic paragraphs and to rate how (a) *plausible*; (b) *believable*; and (c) *likely to be true* they found the theory about bug killing that was depicted in the paragraphs. We averaged the three responses. The experiential explanation ($M = 5.90$, $SD = 1.27$) and the genetic explanation ($M = 6.02$, $SD = 1.42$) were rated as equally credible, $F(1, 31) = 0.07$, $p > .75$.

Moral Acceptance and Killing Measures. The participants were then given a brief overview of the purported second study having to do with killing bugs. They were told that the second part of the study entailed a bug-extermination task and that they would be asked afterward about their experience. Participants were then led to another room (the "extermination area") where they saw 20 small plastic cups, each one with a living slater (also termed *woodlouse*, which is similar to a pill bug) and a purported extermination machine. The extermination machine was fabricated out of a coffee grinder with a tube attached to the outside wall (for a detailed depiction of a similar "bug grinder," see Martens, Kosloff, Greenberg, Landau, & Schmader, 2007). Despite appearances, bugs that were inserted into the tube did not actually enter the grinding chamber.

To familiarize participants initially with the extermination procedure, the experimenter instructed them to dump one bug into the grinder and then to turn the grinder on for at least 3 s. Next, participants engaged in a self-paced killing procedure, in which they put bugs into the grinder one at a time for a 20-s period. Limiting the task to 20 s was ostensibly so that everyone in the study would have an extermination experience of the same length. Specifically, they were given a digital timer and were told that when the experimenter left the extermination area, they should put bugs into the grinder, one at a time for 20 s at their own pace, and should subsequently turn on the grinder for at least 3 s.

[3]Excluding this participant's data from the analysis did not alter the pattern of results.

Following the bug-killing task, the participants were asked to complete a questionnaire that included, among filler questions designed to bolster the cover story, a question assessing the moral acceptance of bug killing: "To what extent do you feel that killing bugs and other lower animals for scientific purposes is morally justifiable?" Responses were rated on a 9-point scale ranging from 1 (*not at all*) to 9 (*completely*).

Results and Discussion

Our primary hypothesis was that participants exposed to a genetic explanation for bug killing would perceive this killing as more morally acceptable, compared to participants exposed to an experiential account. To test this, we submitted moral acceptance scores to a 2 (Explanation: genetic vs. experiential) × 2 (Gender) ANOVA. As predicted, participants in the genetic condition viewed bug killing as more morally acceptable ($M = 6.67$, $SD = 1.59$) than did participants in the experiential condition ($M = 3.83$, $SD = 2.72$), $F(1, 25) = 12.12$, $p < .01$. Although men rated killing bugs as more morally acceptable ($M = 6.58$, $SD = 2.15$) than did women ($M = 4.47$, $SD = 2.53$), $F(1, 23) = 6.81$, $p < .05$, gender did not interact with explanation condition ($p > .60$).

We also assessed whether exposure to genetic (vs. non-genetic) explanations for bug killing might actually lead participants to engage in more bug killing. The results show that the effect of the explanation type was not significant, $F(1, 25) = 0.75$, $p = .40$. However the pattern of means was in the predicted direction, paralleling the moral-acceptance means: The number of bugs killed by participants in the genetic condition ($M = 6.80$, $SD = 3.36$) was higher than in the experiential condition ($M = 5.75$, $SD = 2.83$); and the number of bugs participants "killed" correlated positively with how morally acceptable they viewed killing small bugs ($r = .53$, $p < .01$).

This correlation perhaps suggests that the change in attitude toward the morality of bug killing may have affected the number of bugs killed during the 20-s killing task, albeit not strongly enough to see an effect of explanation type on the number of bugs killed during the 20 s. Of course, it could also be that the number of bugs killed influenced people's feelings about the morality of killing bugs. This causal explanation seems somewhat less likely, however, given that the explanation manipulation influenced morality ratings, but not killing behavior.

The results of Study 1 confirm our hypothesis that exposure to genetic explanations of killing behavior, relative to experiential explanations, would increase the perceived moral acceptability of that behavior. These findings support the broader theoretical notion that in reading popular accounts of the genetic or evolutionary basis of human behavior, readers may erroneously infer that a behavior is morally acceptable insofar as it is genetically predisposed. Note, importantly, that in both explanation conditions, the textbook excerpts stated that bug killing was caused by broader forces and was practically advantageous for people under some conditions; but only when that explanation focused on genetic factors did participants perceive the behavior as more acceptable. This suggests that people may be prone to committing the naturalistic fallacy in the context of evolutionary explanations of human behavior, inferring that behaviors that are genetically predisposed are thereby morally acceptable.

Study 2: Genetic Explanations for Male Promiscuity

In Study 2, we seek to examine the effects of genetic versus experiential explanations in another domain that has attracted the attention of genetic and evolutionary researchers: gender differences in sexual promiscuity. As with killing behavior, a number of popular treatments of sex differences in mating strategies offer genetic explanations for why, compared to women, men are more sexually promiscuous and avoidant of long-term romantic commitment. For example, Buss and Schmitt (1993) have contended that, over the course of evolution, men have benefited from promiscuity (because they can maximize procreation by impregnating many women), whereas women have enjoyed less of an adaptive advantage by being promiscuous (since offspring demand significant resources). Additionally, research has focused on linking particular genes to these gender differences in promiscuity (Walum et al., 2008).

In Study 2, we test whether exposure to genetic explanations will influence attitudes toward one's own sexual practices. Specifically, we hypothesize that men, but not women, who are exposed to genetic explanations for male promiscuity will be more interested in short-term sexual encounters at the expense of long-term romantic commitments. Thus, we did not ask people directly whether they viewed promiscuity in general as good or moral, but assessed whether people would endorse their own engagement in promiscuous behavior.

As in Study 1, the participants were asked to read what were ostensibly textbook excerpts being considered for publication. Then, in an ostensibly unrelated study, they reported their attitudes toward sex and relationships.

Method

Participants

A total of 58 undergraduates (36 male, 22 female) at the University of Arizona participated in exchange for course credit. Their ages ranged from 18 to 22 years ($M = 18.9$).

Explanation Manipulation. All of the participants read a neutral, REM sleep essay (included to bolster the cover story) and were then randomly assigned to read textbook excerpts that took either a genetic or an experiential/cultural approach to explaining differences in sexual mating strategies. In the genetic explanation condition, the participants read three paragraphs describing male sexual promiscuity as having evolved over the course of human history and as being innate. For example, one paragraph stated

> Males' reproductive success is measured by the quantity of their offspring. They pursue frequent pairings with many females in order to maximize the number of their surviving offspring. In contrast, females' reproductive success lies in successfully raising each of their offspring to maturity. Females pair infrequently and only with a carefully chosen male because the cost of raising and ensuring the survival of each offspring is so high.

In the cultural explanation condition, the participants read three parallel paragraphs portraying male promiscuity as determined largely by cultural factors. For example

> Women and men are socialized to be quite different. Males are expected to have more sex and with more partners. Indeed, males can gain self-esteem by having had sex with a large number of women. In contrast, women are more admired by finding one long-term mate, and may be ridiculed if believed to be promiscuous. Thus, females are taught to pair infrequently and only with a carefully chosen male.

After each passage, the participants completed the same two items (each rated on a 7-point scale) used in Study 1 to assess the perceived clarity of the passage: "How clearly was this paragraph written?" and "How easy was this paragraph to read?" Supporting our assumption that participants would rate the passages in the genetic and cultural conditions to be equally clear and comprehensible, preliminary analyses reveal no differences in response to these items as a function of condition or gender (ps > .24). Including scores on these items as covariates in our primary analyses did not significantly alter the pattern of significant effects. Also, as in Study 1, the participants completed questions assessing their comprehension of the primary point of the excerpts. Analyses reveal that all participants understood the excerpts' primary message.

Again, as in Study 1, supplementary data from the same subject pool were also collected to examine the credibility of the two explanations. We asked 31 people to read either the set of experiential paragraphs or the set of genetic paragraphs and to rate how (a) *plausible*; (b) *believable*; and (c) *likely to be true* they found the theory about promiscuity that was depicted in the paragraphs. We averaged these three responses. The experiential explanation ($M = 6.31$, $SD = 1.92$) and the genetic explanation ($M = 5.67$, $SD = 1.60$) were rated as equally credible, $F(1, 29) = 1.03$, $p > .30$.

Romantic Commitment Measure. Next, in an ostensibly separate study of personality, the participants completed a questionnaire asking about personal preferences related to assorted topics (filler questions included "I enjoy attending parties and meeting new people"). There were two target questions to assess commitment in long-term romantic relationships: "I tend to be afraid of long-term commitments such as marriage," and "As long as I can have lots of sex without commitment, I will avoid getting committed to one person." Responses were rated on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Because scores on these items were correlated ($r = .46$, $p < .001$), we averaged responses to form total personal commitment-avoidance scores.

Results and Discussion

We submitted long-term commitment-avoidance scores to a 2 (Explanation: genetic vs. experiential) × 2 (Gender) ANOVA. The results reveal only the predicted two-way interaction, $F(1, 54) = 4.04$, $p = .05$ (for both main effects, $p > .15$). Pairwise comparisons (Fisher's least significant difference) and the pattern of means presented in Table 1 show that when men read about genetic bases for male promiscuity, they were significantly more averse to long-term romantic commitment, compared with men who read about

Table 1

Personal Aversion to Long-Term Romantic Commitment as a Function of Sex Difference Prime and Participant Gender

	Evolved sex differences		Cultural sex differences	
	M	*SD*	*M*	*SD*
Males	3.30_a	1.70	2.38_b	1.21
Females	2.00_b	0.85	2.58_b	1.20

Note. Means that do not share a subscript differ at the $p < .05$ level.

cultural bases for male promiscuity, $F(1, 54) = 4.00$, $p = .05$; and women who read about evolved sex differences, $F(1, 54) = 5.83$, $p < .05$. Although the pattern of means suggests a trend among women to show more favorable attitudes toward long-term romantic commitment in response to the genetic account of male promiscuity, this effect did not approach significance ($p = .32$). Fewer women than men participated in the experiment. Perhaps with more statistical power, this effect would have emerged as significant.

In sum, the results of Study 2 confirm our hypothesis that men exposed to a genetic explanation for male promiscuity will subsequently report less personal interest in long-term romantic commitments (and, correspondingly, increased interest in short-term sexual encounters). These results suggest that men inferred that because a behavior is apparently shaped by thousands of years of human evolution, it is the "right" or acceptable thing to do. As in Study 1, both the genetic and experiential explanations portrayed men as more promiscuous than women, and attributed these sex differences to systematic causes. Therefore, we are confident that the results are not a result of participants feeling a demand to respond in a way that accords with the message of the excerpts (also inconsistent with a potential demand alternative is the fact that female participants did not change their attitudes toward romantic commitment). Rather, we believe that these findings show that genetic explanations are often erroneously seen as morally licensing certain behaviors that might otherwise be seen as distasteful or destructive.

General Discussion

In two studies, we examined the potential effects of nature versus nurture explanations on viewing the given behaviors as personally acceptable. Study 1 provided participants with either genetic or experiential explanations for why people kill bugs. People who read the genetic explanations viewed bug killing as more morally acceptable. In Study 2, men and women read either a genetic or experiential explanation for why men are more promiscuous than women. Men who read the genetic explanation reported decreased interest in long-term romantic commitment (and a concomitant increase in interest in short-term sexual encounters) compared to men who read experiential explanations and women who read either explanation.

These studies add to a small literature documenting the effects of nature and nurture explanations for behavior. For example, genetic explanations have been shown to increase stereotyping of gender differences (Brescoll & LaFrance, 2004), to legitimate gender inequality (Postmes, 2003), to alleviate responsibility attributed to other people's undesirable behaviors (Monterosso et al., 2005), and to lead to more lenient judgments of offenders (Dar-Nimrod & Heine, 2008).

The present research builds on these findings by showing that genetic explanations can also lead to the naturalistic fallacy in the context of judgments of two morally relevant behaviors: killing and promiscuity. Killing is the most severe form of aggression and, as mentioned, has been explained in both the scientific and popular literature as a function of genetics and evolution. And the topic of gender differences in promiscuity is one of the most widely discussed and taught topics from an evolutionary psychology perspective. Study 2 additionally builds on prior work by showing that exposure to genetic explanations can influence the perceived acceptability and likelihood of one's own actions.

Limitations and Future Directions

The present research helps document that, at least in some circumstances, people may infer from popular genetic accounts of morally relevant behaviors that the behaviors are more acceptable. We have not, however, examined the psychological process by which this may occur. Several possibilities exist, and examination of these processes may be fruitful avenues for further research. For example, people may generally view nature and what is natural as good (Eidelman et al., 2009), so when behaviors are theorized as genetic (i.e., as natural), people may by association simply view them more positively and as more morally acceptable than they would otherwise.

A second possible mechanism behind this naturalistic fallacy effect may have to do with viewing innate and genetic behaviors as resistant to change. Genetic explanations may be interpreted as portraying a behavior as outside of one's intentional control. Because the behavior is thus seen as externally dictated, it may be more difficult to view it as morally repugnant. For example, generally speaking, people do not view a cheetah that instinctively kills its prey as behaving unethically. Conversely, the experiential explanation implies control and malleability and, in turn, is something more easily viewed as wrong or unethical. If a destructive behavior can be changed, then behaving in such a way becomes less forgivable. This dovetails with recent work on the impact of believing that one's actions are directed by free will (Vohs & Schooler, 2008). The research has found that when people are provided an argument that free will is an illusion, they become more likely to engage in morally questionable behavior.

A third possibility is that genetic explanations influence the moral perceptions of behaviors for the reasons mentioned previously, but particularly when people are motivated to view these behaviors as moral; for example, because they can aid in the justification of these morally questionable behaviors. If this is correct, we would expect that genetic explanations for a given act will have an especially strong effect on moral attitudes among individuals who have engaged in that act. For example, perhaps in Study 1, the impact of the genetic explanation emerged in conjunction with having just engaged in an ethically questionable bug-extermination task.

In addition, if this theorizing is correct, we might expect the impact of genetic explanations to be stronger for morally questionable behaviors than for morally condoned behaviors. Indeed, there may be some support for this prediction in Study 2, in which the moral character of the behaviors explained by the genetic and experiential theories differed for men and for women. The behavior explained for men (i.e., promiscuity) is, in general, considered more morally questionable than is the behavior described for women (i.e., monogamy). The results show that the genetic explanation for male promiscuity significantly affected men's attitudes, but the genetic explanation for female monogamy did not significantly affect women's attitudes.

In addition to examining the possible psychological mechanisms involved in the effect of nature and nurture explanations on perceptions of killing and promiscuity, future research might better examine killing and promiscuity *behaviors*. In Study 1, we did examine killing behavior, and although the pattern was for the genetic explanation of killing to elicit more of the behavior, the effect was not significant. It is conceivable, however, that under different circumstances, we might see such an effect more clearly.

A possibility that warrants future attention is that giving participants longer than 20 s to complete the extermination task might have made it more likely to observe an effect of the explanation-type manipulation. It might also be likely to emerge if there were an additional motivation to engage in the morally questionable behavior. The way the bug-killing paradigm was framed in Study 1, there was no encouragement or incentive to kill more, as opposed to fewer, bugs during the 20-s free-time period.

In our studies, we found that participants responded differently to genetic and cultural explanations for a given behavior. However, there may be situations in which people assume that cultural differences reflect underlying genetic differences, perhaps because of perceived differences in the genetic constitution of different ethnic groups. In these situations, we might expect to see the naturalistic fallacy influencing people's judgments of behaviors, even when they are presented as culturally determined. Future research might examine the factors of the situation and the person that influence whether people interpret cultural explanations to signal underlying genetic differences.

Future work might also examine the relative contributions of experiential and genetic explanations to perceiving given behaviors as acceptable. We did not include pure control conditions that would allow us to examine whether genetic explanations were increasing moral acceptability from baseline or whether experiential explanations were decreasing acceptability from baseline. However, we collected two sets of supplemental data. We asked a sample of people taken from the Study 1 subject pool—without reading about either the experiential or genetic theories—to respond to the bug-killing dependent measure. We asked another sample of males taken from the Study 2 subject pool to respond to the promiscuity dependent measure. The mean for the morality of killing dependent measure ($M = 5.55$) fell in between the means observed in the experiential condition ($M = 3.83$) and the genetic condition ($M = 6.67$), albeit closer to the genetic condition. The mean for the promiscuity dependent measure ($M = 2.75$) also fell in between the means observed among males in the experiential condition ($M = 2.38$) and the genetic condition ($M = 3.30$). Thus, it seems that the cultural explanations shade participants toward viewing the behaviors as less morally acceptable and the genetic explanations shade participants toward viewing them as more morally acceptable. Thus, the effects of learning about experiential and genetic explanations appear most clearly when they are pitted against each other.

Implications

Given this evidence, along with other accruing data (e.g., Brescoll & LaFrance, 2004; Dar-Nimrod & Heine, 2008), perhaps the most important implication is for the teaching and disseminating of genetic and evolutionary theories. The present study supports the criticism and research evidence that genetic/evolutionary explanations may affect people's moral attitudes (e.g., Nelson, 1975). Perhaps a solution to prevent the general public from committing the naturalistic fallacy would be to caution people against drawing moral conclusions from genetic or evolutionary accounts of human behavior. However, a study by Friedrich (2005) found that even when participants were warned that making moral inferences from an empirical research is unjustified, it did not fully prevent them from deriving such unwarranted inferences from fictitious empirical research. Perhaps a socially responsible approach would be to emphasize the contribution or role of experiential factors when discussing genetic explanations and theories: to make clear the role of "nurture" when presenting theorizing or evidence for the role of "nature" in human behavior.

Additionally, increased public understanding of the integrative roles that both nature and nurture play in our behavior may help protect against the potential for manipulation by institutions. It is conceivable that genetic explanations for killing and gender differences may be exploited. Nations may often seek and manipulate scientific theories and ideas, as well as employ professionals in legitimizing or justifying these actions (Alvarez, 2001). For example, aggressive nations or military organizations could seek to promote genetic explanations for human aggression and killing in order to obtain public acceptance for state-sponsored violence (Nelson, 1975). If killing members of particular groups or nations is understood solely as a function of evolved and innate tendencies, then the perpetration of this violence may be perceived as more legitimate and less morally reprehensible. In a similar fashion, organizations and institutions that maintain sexist practices might promote genetic and evolutionary explanations for these gender roles in an effort to preserve inequalities. Thus, scientists and professionals may want to be mindful of the social implications of their theories for human behaviors.

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