



Psychopathic personality traits and cognitive dissonance: Individual differences in attitude change

Ashley A. Murray^{a,*}, James M. Wood^a, Scott O. Lilienfeld^b

^a University of Texas at El Paso, Department of Psychology, 500 W. University Ave., El Paso, TX 79902, USA

^b Emory University, Department of Psychology, Suite 270, PAIS Building, 36 Eagle Row, Atlanta, GA 30322, USA

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ABSTRACT

In a study using a classic cognitive dissonance paradigm, 164 undergraduate participants were induced to deceive a fellow student; half were directly instructed to lie whereas the other half were politely requested but not instructed to lie. Participants were assessed for psychopathic traits using the Psychopathic Personality Inventory-Revised: Short Form and the Levenson Self-Report Psychopathy Scale, and for Machiavellianism using the MACH-IV. As predicted, participants low in psychopathic traits exhibited classic cognitive dissonance effects following their lie whereas participants high in psychopathic traits did not. Results for Machiavellianism were nonsignificant. These results indicate that cognitive dissonance effects in an induced compliance paradigm are reduced or eliminated among individuals with high levels of psychopathic traits.

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1. Introduction

The personality construct of psychopathy is marked by a constellation of interpersonal, affective, behavioral, and antisocial features. These include superficial charm, callousness, dishonesty, manipulateness, egocentricity, a lack of concern for social mores, guiltlessness, poor impulse control, irresponsibility, and antisocial behavior (Cleckley, 1976; Hare, 2003; Hare & Neumann, 2006).

According to many theorists, the multidimensional characteristics of psychopathy reflect underlying differences in cognitive and emotional responses to environmental stimuli (Blair, Peschardt, Budhani, Mitchell, & Pine, 2006; Day & Wong, 1996; Gordon, Baird, & End, 2004; Kiehl, Hare, McDonald, & Brink, 1999; Kosson, Suchy, Mayer, & Libby, 2002; Newman, Patterson, & Kosson, 1987; Patrick, Cuthbert, & Lang, 1994). Studies have demonstrated that individuals with psychopathic traits tend to evidence dysfunctions in premeditation (the ability to inhibit behavior), perseveration, and the emotional processing of fear, anxiety or guilt-related stimuli (Batson, Gudjonsson, & Gray, 2010; Blair, 2006; Blair & Blair, 2009; Blair et al., 2006; Cima, Tonnaer, & Lobbestael, 2007; Cleckley, 1976; Fowles, 1980; Hare & Neumann, 2008; Lykken, 1957, 1995; Newman, Wallace, Schmitt, & Arnett, 1997). Research has shown that impaired emotional recognition and responsiveness is one of the most salient features of psychopathy (Herpertz

& Sass, 2000; Hoff, Beneventi, Galta, & Wik, 2009; Sylvers, Brennan, & Lilienfeld, 2011). In addition, individuals with psychopathic traits evidence deficits in the recognition of others' emotions, particularly sadness and fear (Blair et al., 2004; Dolan & Fullam, 2006; Hastings, Tangney, & Stuewig, 2008; Kosson et al., 2002; Montagne et al., 2005).

According to Blair (1995), the emotional response deficits associated with psychopathy result from empathy dysfunction, which accounts for the lack of guilt and adherence to social norms found in individuals with psychopathy. In other words, psychopathic individuals fail to experience or recognize the fear and sadness of others as aversive, and thus do not learn how to avoid behaving in ways that elicit these negative responses in others (Blair & Frith, 2000; Hastings et al., 2008). Nor do they feel much guilt for their actions (Cima et al., 2007; Cleckley, 1976).

Accumulating evidence suggests that psychopathy is not a monolithic construct, but rather is a confluence or configuration of multiple traits, such as emotional detachment, boldness, and disinhibition (Patrick, Fowles, & Krueger, 2009; Skeem et al., 2011). Indeed, these different traits often exhibit strikingly different correlates; for example, the traits of psychopathy relevant to boldness typically correlate negatively with anxiety measures, whereas the traits of psychopathy relevant to disinhibition typically correlate positively with anxiety measures (e.g., Lilienfeld & Andrews, 1996). As a consequence of these differential correlates, an increasing number of researchers have examined the correlates of not merely the total scores on psychopathy measures, but also their constituent factors. For the past two decades, most psychopathy measures have been divided into two broad dimensions (but see

* Corresponding author. Present address: Simon Fraser University, Psychology Department, RCB 5246, 8888 University Dr., Burnaby, BC, Canada V5A 1S6. Fax: +1 778 782 3427.

E-mail addresses: amurray@sfu.ca (A.A. Murray), jawood@utep.edu (J.M. Wood), lilien@emory.edu (S.O. Lilienfeld).

Cooke & Michie, 2001; Hare, 2003, for alternative three and four factor models, respectively). Factor 1 of these measures tends to assess the core and affective and interpersonal deficits of psychopathy, such as lack of guilt, lack of empathy, self-centeredness, and superficial charm; Factor 2 tends to assess a longstanding antisocial and impulsive lifestyle (Benning, Patrick, Hicks, Blonigen, & Krueger, 2003; Harpur, Hare, & Hakstian, 1989).

The present study addressed a hypothesis derived from Blair's (1995) theory and other descriptive and theoretical models of psychopathy emphasizing diminished empathy (e.g., Cleckley, 1976; Hare, 1993; Lykken, 1995): If individuals with psychopathic traits, especially those with pronounced Factor 1 traits, lack empathy for the negative emotions of others, they would be expected to show an absence of the classic cognitive dissonance effect under certain specified circumstances. Before explaining this hypothesis in detail, some background information regarding cognitive dissonance is in order.

Cognitive dissonance can be defined as “the tension that arises when one is simultaneously aware of two inconsistent cognitions. For example, dissonance may occur when we realize that we have, with little justification, acted contrary to our attitudes....” (Myers, 2010, p. 141; see also Festinger, 1957; Tavris & Aronson, 2007). Research in social psychology has repeatedly demonstrated attitude change in individuals due to cognitive dissonance, and it is sometimes considered a universal pattern of behavior across individuals (for reviews, see Cooper, 2007; Harmon-Jones & Mills, 1999).

The cognitive dissonance effect was systematically demonstrated in a classic experiment by Festinger and Carlsmith (1959), who used an induced compliance paradigm to elicit attitude change. After performing a lengthy and boring task (repeatedly turning pegs on a board), undergraduate participants were asked to mislead a fellow student (actually a confederate) by telling him or her that the task was enjoyable. Half of the participants received \$1 compensation for engaging in the deception; the other half received \$20. Later, all participants were asked to indicate on a questionnaire how much they had actually enjoyed the task. The central and counterintuitive finding was that, as predicted by cognitive dissonance theory, participants who received \$1 to deceive their fellow student rated the tedious peg-turning task as substantially more enjoyable than did participants who received \$20.

Festinger and Carlsmith (1959) explained their findings as due to cognitive dissonance – the tension produced in an individual by inconsistent thoughts, attitudes, perceptions, or behaviors. According to this explanation, all participants who were paid \$1 experienced tension stemming from two inconsistent cognitions. Outwardly, they said that the peg-turning task was enjoyable, but inwardly they experienced the task as boring. This inconsistency produced an unpleasant state of tension, which the students reduced by changing their attitude toward the peg-turning task and concluding that it really was enjoyable.

Participants paid \$20 experienced a similar inconsistency between their outward statements and inward attitudes. However, in this group the outward statement was also *consistent* with their having received an external motivator to make it (the \$20). For this group, the inconsistency (between statement and inner attitude) was balanced by a consistency (between statement and external motivator), so that, the participants paid \$20 experienced little resulting tension and were unmotivated to change their attitudes, as the members of the \$1 group did.

Numerous studies have replicated and extended the classic findings of Festinger and Carlsmith (1959). Furthermore, many of these studies have confirmed that the cognitive dissonance effect is weakened or eliminated when individuals perceive that their dissonant behavior occurred in response to an external motivator,

such as social pressure or the \$20 in the study just described (e.g., Hobden & Olson, 1994; Linder, Cooper, & Jones, 1967; Zanna & Cooper, 1974; see also see Harmon-Jones & Mills, 1999).

Although Festinger and Carlsmith (1959) explained their experimental findings as due to inconsistent cognitions, alternative theories have been posited to account for the phenomenon. Prominent among these is the “New Look” theory of cognitive dissonance, proposed by Cooper and Fazio (1984; see also Cooper, 1999, 2007), which argues that the attitude changes observed in cognitive dissonance experiments occur in response to aversive emotions, especially guilt, shame, regret, and sadness, that individuals experience when they believe they have harmed themselves or others. For instance, according to this theory, participants in the classic Festinger and Carlsmith study experienced an aversive emotional reaction, especially guilt, for having deceived a supposed fellow student. It was this negative emotion over harming someone else – not simply a need for cognitive consistency – that motivated participants in the \$1 condition to change their attitudes and decide that the peg-turning task was actually enjoyable. The New Look theory also posits that individuals feel less responsibility, and are unlikely to experience aversive emotions over their potentially harmful behavior, if they believe it has been externally motivated, for instance by a monetary payment or an insistent demand from an experimenter. An alternative and perhaps complementary model proposes that cognitive dissonance theory is aroused by threat to the self-concept; if one views oneself as a good and decent person, then lying to a fellow student would arouse cognitive dissonance (Thibodeau & Aronson, 1992).

Considerable research supports the New Look theory of cognitive dissonance (e.g., Cooper & Worchel, 1970; Goethals & Cooper, 1972; for a recent review see Cooper, 2007), although some studies have shown that the cognitive dissonance effect can also occur in the absence of aversive emotional consequences (Dickerson, Thibodeau, Aronson, & Miller, 1992; Harmon-Jones, Brehm, Greenberg, Simon, & Nelson, 1996; see also Harmon-Jones & Mills, 1999). The present study tests a hypothesis derived from the New Look theory, as well as from theories regarding the emotional deficits associated with psychopathic traits (Blair, 1995). Specifically, if some experimental manipulations produce the classic cognitive dissonance effect because participants experience guilt for having possibly harmed another person, and if individuals with psychopathic traits are impaired in their ability to experience guilt and empathy, then the same manipulations that produce cognitive dissonance in some individuals would not be expected to produce it in individuals with high levels of psychopathic traits. The finding that psychopathy is associated with weak attitude change following a dissonance-inducing manipulation could help in part to explain psychopathic individuals' apparent lack of response to many therapeutic interventions (e.g., Hare, 1993; but see Salekin (2002), for a more sanguine view). Given that effective psychotherapy often requires changes in deeply held attitudes toward oneself and others (Cacioppo, Claiborn, Petty, & Heesacker, 1991; Frank, 1963), individuals who experience less cognitive dissonance might be less motivated to alter their attitudes and behaviors in response to discrepant information. Indeed, psychotherapy often involves presenting clients with information that challenges their self-concepts (Cacioppo et al., 1991) and that impels them to modify these self-concepts as a consequence. If our hypothesis is correct, psychopathic individuals may be less likely to alter their views of themselves and the world around them following such information.

Only one study, an unpublished dissertation by Weir (2007), examined the relationship of cognitive dissonance to psychopathy. Participants were 150 males from a drug treatment facility with criminal histories. Psychopaths and non-psychopaths in this sample, who were identified using the Levenson Self-Report Psychopathy Scale (Levenson, Kiehl, & Fitzpatrick, 1995), did not significantly

differ on cognitive dissonance, as measured by attitude change following the writing of a counter-attitudinal essay that advocated harsher punishment for criminals. However, the essay's topic was not designed to elicit guilt in participants, so the manipulation did not address the theory underlying the present study.

A few studies in the 1960s and 1970s (Bogart, 1971; Bogart, Geis, Levy, & Zimbardo, 1970; Burgoon, Miller, & Tubbs, 1972; Epstein, 1969) examined the relationship of Machiavellianism (MACH) to cognitive dissonance. All of these studies found that individuals with high levels of MACH were resistant to cognitive dissonance effects. These findings may provide indirect support for the hypotheses of the present study, insofar as some theorists (McHoskey, Worzel, & Szyarto, 1998; Saruk, 1975) regard MACH and psychopathy as overlapping, although not identical, personality constructs. Specifically, both are characterized by callousness, ruthlessness, cynicism, manipulation of others, and a disregard for social norms and morals (Christie & Geis, 1970; Jones & Paulhus, 2009; Paulhus & Williams, 2002; Skinner, 1988). Nevertheless, they differ in that psychopathy is more often associated with superficial charm, glibness, self-centeredness, lack of guilt, and poor impulse control.

The present study was based on an experimental cognitive dissonance paradigm involving induced compliance developed by Festinger and Carlsmith (1959) and Cooper and Worchel (1970). Undergraduate participants performed a boring abacus task and then were asked to deceive a fellow student (actually a confederate) by falsely reporting that the abacus task was enjoyable. Half of participants were firmly instructed to lie (Low Choice condition), whereas the remaining participants were politely requested, but not instructed, to lie (High Choice condition). Afterwards, participants were asked to rate the degree to which they had enjoyed the abacus task themselves. Participants' psychopathic traits and Machiavellianism were measured by well validated self-report questionnaires.

Three hypotheses were tested. First, based on similar prior research (e.g., Cooper & Worchel, 1970), we predicted that participants would exhibit a classic cognitive dissonance effect: Participants in the High Choice condition should rate the abacus task as more enjoyable than did participants in the Low Choice condition.

Second, according to the New Look theory (Cooper & Fazio, 1984), any cognitive dissonance effect observed in the present study would be caused by participants' guilt or unease over having deceived another student. However, because psychopathy is associated with low guilt and empathy, we hypothesized that participants high in psychopathic traits, especially those associated with classical interpersonal and affective traits (e.g., lack of guilt, lack of empathy), would be less likely to show cognitive dissonance (and consequently, less attitude change) than participants low in psychopathy.

Third, based on prior studies from the 1970s (Bogart, 1971; Bogart et al., 1970; Burgoon et al., 1972; Epstein, 1969), and given the callousness and coldness often seen in high MACH individuals (Jones & Paulhus, 2009; Paulhus & Williams, 2002), we predicted that participants with high levels of Machiavellianism would be less likely to show cognitive dissonance than participants with low levels of Machiavellianism.

2. Method

2.1. Participants

Participants were 164 undergraduate students (103 females, 61 males) at a public university in the southwestern United States. Participants were predominately Hispanic white (85.4%), with smaller numbers of non-Hispanic white (6.7%), African American

(1.8%), and other ethnicities (6.1%). Ages ranged from 18 to 44 years ($M = 19.7$ years, $SD = 3.2$ years).

2.2. Measures

2.2.1. The Psychopathic Personality Inventory-Revised: Short Form (PPI-R: SF; Lilienfeld & Widows, 2005)

The Psychopathic Personality Inventory-Revised: Short Form (PPI-R: SF) is a 56-item version of the Psychopathic Personality Inventory (PPI-R), a well-known and validated self-report measure of psychopathy (Edens, Poythress, & Lilienfeld, 1999; Edens, Poythress, & Watkins, 2001; Lilienfeld & Andrews, 1996). The PPI-R: SF is composed of the 7 highest-loading items from each of the 8 PPI-R subscales (in a few cases, the 8th highest loading item was used *in lieu* of the 7th highest loading item when two of the items were very similar in content) and correlates strongly ($r = 0.90$) with the full PPI. The PPI-R has shown good reliability and validity as a measure of subclinical psychopathic tendencies (Edens & McDermott, 2010; Uzieblo, Verschuere, Van den Bussche, & Crombez, 2010; see also Benning, Patrick, Blonigen, Hicks, & Iacono, 2005; Benning, Patrick, Salekin, & Leistico, 2005; Benning et al., 2003; Lilienfeld & Andrews, 1996, for data on the validity of its parent measure, the PPI), and the PPI-R: SF has as well. For example, in a sample of 346 undergraduates, Visser, Ashton, and Pozzebon (2012) found that the PPI-R: SF total score correlated highly and significantly ($r = .69$) with total scores on a well validated questionnaire measure of psychopathy, the Self-Report Psychopathy Scale-III (Paulhus, Neumann, Hare, & CA: Multi-Health systems, *in press*); as predicted, it also correlated negatively with self-report measure of behavioral inhibition ($r = -.25$) and positively with a self-report measure of behavioral activation ($r = .45$; see also Marcus, Fulton, & Edens, 2012, for meta-analytic data supporting the validity of the PPI short form).

The PPI-R: SF yields one overall total score and two higher-order factor subscales, Fearless Dominance (FD) and Self-Centered Impulsivity (SCI), as well as scores on eight content subscales: Machiavellian Egocentricity, Social Influence (formerly called Social Potency), Fearlessness, Coldheartedness, Rebellious Nonconformity (formerly called Impulsive Nonconformity), Blame Externalization, Carefree Nonplanfulness, and Stress Immunity. FD comprises the Social Influence, Fearlessness and Stress Immunity scales, and reflects social and physical boldness and absence of anxiety. SCI is comprised of the Machiavellian Egocentricity, Rebellious Nonconformity, Blame Externalization, and Carefree Nonplanfulness scales, and reflects an impulsive and narcissistic propensity toward rule-breaking. The Coldheartedness subscale, which reflects an absence of deep social emotions (e.g., guilt, empathy, loyalty) does not load substantially on either the FD or SCI factor and is treated separately in analyses.

2.2.2. Levenson Self-Report Psychopathy Scale (LSRP; Levenson et al., 1995)

The LSRP is a 26-item self-report questionnaire that measures behavioral and emotional features of psychopathy. It comprises two subscales, Primary Psychopathy and Secondary Psychopathy. The Primary Psychopathy subscale describes the traditional Factor 1 traits of callousness, self-centeredness, and lack of empathy; the Secondary Psychopathy subscale describes the traditional Factor 2 characteristics of poor impulse control and a propensity toward antisocial behavior. In contrast to the PPI, the LSRP tends to assess more maladaptive aspects of psychopathy, with greater emphasis on callousness and meanness (Lilienfeld & Fowler, 2006). For example, the Levenson Primary Psychopathy Scale tends to be much more highly correlated than the first PPI factor (Fearless Dominance) with self-reported indices of callousness, coldness, self-centeredness, and arrogance (Wilson, Miller, Zeichner, Lynam,

& Widiger, 2011). Levenson et al. (1995) reported good internal consistency (Cronbach's $\alpha = .82$) for the Primary subscale and marginal internal consistency (Cronbach's $\alpha = .63$) for the Secondary subscale. Lynam, Whiteside, and Jones (1999) found a moderately high ($r = .64$) correlation between the LSRP and an earlier version of the PPI-R.

2.2.3. MACH-IV Scale (Christie & Geis, 1970)

The MACH-IV is a 20-item self-report questionnaire intended to measure Machiavellianism. It is one of the most popular measures for assessing Machiavellianism and has been used in over 2000 published studies; the MACH-IV has been shown to capture Machiavellian tendencies across student and community samples (see Jones & Paulhus, 2009, for a review). Internal consistency as measured by coefficient alpha has been reported to be above .70 (Austin, Farrelly, Black, & Moore, 2007; Fehr, Samsom, & Paulhus, 1992; McHoskey et al., 1998). McHoskey et al. (1998) reported moderate-to-strong correlations of the MACH-IV with the Primary Psychopathy ($r = .65$) and Secondary Psychopathy ($r = .49$) subscales of the LSRP.

2.2.4. Post-experimental questionnaire

A post-experimental questionnaire to measure cognitive dissonance effects was adapted from a study by Cooper and Worchel (1970). To reduce reactivity, the questionnaire was presented as a general survey being conducted by the Psychology Department attempting to assess undergraduates' experiences as research participants. The questionnaire was composed of eight items asking about the experiment, including an item that assessed how enjoyable the participant perceived the abacus task to be. The item assessing the participant's self-evaluated enjoyment of the abacus task, called the Enjoyment Rating, was the primary dependent measure in the current study, and specifically stated, "The task of moving balls across the abacus in this experiment was very enjoyable." The post-experimental questionnaire was administered just prior to the self-report psychopathy and MACH measures.

2.3. Procedure

The experimental procedure was modeled on prior cognitive dissonance studies of induced compliance by Festinger and Carlsmith (1959) and Cooper and Worchel (1970). Upon arrival for the experiment, each participant was seated alone in a waiting area and, after a brief delay, was accompanied into a testing room by an experimenter. After the participant gave informed consent, the experimenter introduced the (bogus) experimental task, which required the participant to move the beads on an abacus back and forth, one at a time, for twenty minutes, while the experimenter timed the procedure with a stop watch. As in similar prior cognitive dissonance studies, the abacus task was designed to induce boredom in the participant. Approximately 15 min into the task, another student (actually a confederate) opened the door of the room to ask if the experiment was being held there. The experimenter told the confederate to remain outside in the waiting area.

After completion of the abacus task, the (genuine) experimental manipulation was administered. Participants were randomly assigned to receive either a High Choice manipulation or a Low Choice manipulation. In the High Choice condition, the experimenter (deceptively) told the participant that the true purpose of the study was to examine the effect of a positive emotional attitude on abacus task performance. The participant was told that it was necessary to create a positive attitude toward the task for the next student in the study, who was now in the waiting area. The experimenter informed the participant that usually a research assistant informed the waiting participant that the abacus task is

fun, but that the research assistant was ill and did not come into work today, so now the researcher was in a bind; the researcher then requested that the participant help create a positive attitude in the next student by telling him or her that the experiment was enjoyable in place of the missing research assistant. To maximize the participant's subjective perception of choice and heighten feelings of responsibility for deceiving the next student, the participant was told that his or her cooperation would be appreciated but was not required: "You don't have to, but if you would be willing to do this for me, all I would ask you to do is to tell the next participant who is now in the hall, that this task is fun and enjoyable. So, I'd take you into the hall, introduce you to the next person, and then give you about 1 min to begin your conversation and tell him or her that this abacus task will be fun. It's up to you of course, but do you think you could help me out by doing this for me?"

After agreeing to tell the other student that the experiment was enjoyable (100% of participants), the participant was led into the waiting area and left alone with the student confederate for two minutes. If the participant told the confederate without prompting that the abacus task was going to be enjoyable, the confederate thanked the participant in a manner designed to heighten feelings of guilt: "Great, I'm really glad to hear that this is a fun experiment because all of the other experiments I have had so far have really been boring. Thanks for telling me." If the participant did not say without prompting that the task was enjoyable, the confederate provided a prompt by asking "So how was it?" then thanked the participant in the same way already described.

The Low Choice manipulation was the same as the High Choice manipulation except in one respect: After explaining the need to create a positive attitude toward the abacus task, the experimenter *firmly instructed* (rather than requested) that the participant tell the next student that the experiment was enjoyable: "So, what you will have to do is to tell the next participant who is now in the hall, that this task is interesting and enjoyable. I'll take you into the hall, introduce you to the next participant, and then give you about 2 min to begin your conversation and tell him or her that this abacus task will be fun. Are you ready?" This variation in the manipulation was intended to reduce the participant's subjective perception of choice and diminish feelings of responsibility for deceiving the next student. The participant was then led into the waiting area and left with the student confederate. The same procedure was then followed as in the High Choice condition.

After misleading the confederate as part of the experimental manipulation, participants in both conditions were led to a separate room and administered the Post-experimental Questionnaire. To minimize demand characteristics, the participant was told (falsely) that the questionnaire was a survey that was being administered by the Psychology Department to all students who were serving as participants in research projects. The Post-experimental Questionnaire consisted of eight questions, including a question that asked the respondent to rate the following item: "The task of moving balls across the abacus in this experiment was very enjoyable." Ratings for this question were made on a 7-point scale (1 = no enjoyment of the task; 7 = high enjoyment of the task). As noted earlier, ratings for this question were the dependent variable of the study.

After completing the questionnaire, participants were administered the PPI-R: SF (Lilienfeld & Widows, 2005), the LSRP (Levenson et al., 1995), and the MACH-IV (Christie & Geis, 1970). They were then debriefed regarding the true nature of the experiment and given experimental credit for participation. As the participant was completing the questionnaires, the student confederate, seated in a different room, completed a manipulation check form that indicated if the participant had reported that the task was enjoyable and had required a prompt.

3. Results

3.1. Manipulation check

The manipulation check revealed that 152 (92.7%) of all participants (96% of the High Choice group and 89% of the Low Choice group) complied with the researcher's suggestion without prompting and told the confederate that the abacus task would be enjoyable. In the High Choice group an additional 2 (2.4%) participants told the confederate that the abacus task would be enjoyable, but only after the confederate prompted them by asking, "How was the task?" and 1 participant told the confederate that the task was boring. In the Low Choice group 4 (4.9%) participants told the confederate that the abacus task would be enjoyable, but only after being prompted, three participants never told the confederate whether the task was enjoyable, one participant told the confederate that the task was enjoyable but added that he was instructed by the researcher to say so, and one participant who told the confederate that the task was boring.

To preserve randomization, all analyses reported here included all participants ($N = 164$), including the six participants who failed to comply with the researcher's suggestion. This "intent-to-treat analysis" was adopted because it yields an unbiased estimate of the effects of assignment to each experimental condition (Shadish, Cook, & Campbell, 2002). However, supplementary analyses were also conducted that excluded the six participants who failed to comply with the researcher's suggestion. The results of these supplementary analyses, available from the authors upon request, were highly similar to the results reported here, except for one discrepancy involving the LSRP Primary Psychopathy scales, as will be described later in Section 3.

3.2. Descriptive statistics and correlations among measures of psychopathic traits and Machiavellianism

Table 1 reports descriptive statistics for the main variables in the study, including the Enjoyment Rating for the abacus task (the dependent variable) and the measures of psychopathic traits and Machiavellianism. Table 2 reports correlations among the cen-

Table 1
Descriptive statistics for the enjoyment rating and the measures of psychopathic traits and Machiavellianism ($N = 164$).

Variable	Mean (SD)	Minimum	Maximum
Enjoyment rating for abacus task	4.01 (1.69)	1	7
<i>PPI-R: SF</i>			
Total score	125.65 (16.28)	90	170
Fearless dominance factor	56.05 (9.12)	28	76
Self-centered impulsivity factor	54.36 (9.89)	35	84
Machiavellian egocentricity subscale	13.60 (3.52)	7	25
Social influence subscale	18.88 (4.00)	7	28
Fearlessness subscale	18.98 (4.48)	7	28
Coldheartedness subscale	15.23 (3.87)	8	26
Rebellious nonconformity subscale	13.99 (4.15)	7	24
Blame externalization subscale	14.16 (4.19)	7	26
Carefree nonplanfulness subscale	12.62 (3.29)	7	23
Stress immunity subscale	18.20 (4.53)	7	28
<i>LSRP</i>			
Total score	50.18 (9.03)	30	73
Primary psychopathy factor	30.62 (7.02)	16	49
Secondary psychopathy factor	19.56 (4.05)	11	31
<i>MACH-IV</i>			
Total score	52.96 (8.33)	35	76

Note: PPI-R: SF = Psychopathic Personality Inventory-Revised: Short Form. LSRP = Levenson Self-Report Psychopathy Scale.

tral measures of psychopathic traits, Machiavellianism and their correlations with abacus task enjoyment across high and low choice conditions. As can be seen, the total scores on the two psychopathy measures (PPI-R: SF and LSRP) were moderately and positively correlated, as were the respective Factor 2 scores of these measures. In contrast, consistent with previous research (Miller & Lynam, 2011), the respective Factor 1 scores of these measures were negligibly associated, probably reflecting the fact that the PPI-R: SF FD Factor reflects a considerably more adaptive set of traits (e.g., immunity to stress) than does the LSRP Primary Scale. Again, with the exception of the PPI-R: SF FD Factor, the MACH-IV scale was moderately and positively associated with the other psychopathy indices, again as found in previous studies (Paulhus & Williams, 2002).

Internal consistencies were calculated using Cronbach's alphas for each measure and are presented in Table 2. The PPI-R: SF yielded good overall internal consistency ($\alpha = .84$), as well as on each factor: Fearless Dominance ($\alpha = .81$), Self Centered Impulsivity ($\alpha = .80$). The alphas for the eight PPI-R: SF content scales ranged from .66 to .81. The total score and Primary Factor of the LSRP yielded acceptable internal consistency ($\alpha = .78$ and .79, respectively), although the Secondary Factor demonstrated only modest internal consistency ($\alpha = .58$). The MACH-IV evidenced modest overall internal consistency ($\alpha = .61$) and modest to poor subscale internal consistency, with alphas of the subscales ranging from .25 (Residual subscale) to .53 (Deceit subscale).

3.3. Hypothesis 1: replication of the classic cognitive dissonance effect

Multiple regression was used to test the first hypothesis of the study, namely, that the classic cognitive dissonance effect reported in earlier research would be replicated in the present study. The predictor variable in the regression was Choice Condition, (High Choice versus Low Choice), with the High Choice condition dummy-coded as "1" and the Low Choice condition as "0." The dependent variable in this regression and all regressions reported in the Results section was the Enjoyment Ratings (participants' self-report ratings of how much they enjoyed the abacus task).

Based on classic studies of cognitive dissonance, we predicted that participants in the High Choice condition would report higher Enjoyment Ratings than participants in the Low Choice condition. This prediction was confirmed by the regression, which revealed that Enjoyment Ratings were significantly higher in the High Choice than in the Low Choice group, $F(1, 162) = 6.66, p = .011$, standardized $\beta = .199, t(163) = 2.58, p = .011$. Mean Enjoyment Ratings were 4.34 ($SD = 1.62$) in the High Choice group compared with 3.67 ($SD = 1.71$) in the Low Choice group, $d = .402$. Thus, consistent with earlier studies, High Choice participants, who felt that they had more choice whether to mislead the confederate, reported greater enjoyment of the abacus task than did Low Choice participants.

3.4. Hypothesis 2: relationship between enjoyment ratings and psychopathic traits

The main hypothesis of the study concerned a statistical interaction: We predicted that (a) individuals with lower levels of psychopathic traits would show the classic cognitive dissonance effect (i.e., reporting more enjoyment of the abacus task in the High Choice than in the Low Choice condition), whereas (b) individuals with higher levels of psychopathic traits would not show this effect or would not show it as strongly. To test this hypothesis, two multiple regressions were conducted, each using a different psychopathy measure as a predictor and Enjoyment Ratings as the dependent variable.

Table 2
Correlations among the PPI-R: SF, LSRP, MACH-IV, their factors and subscales and reported task enjoyment by choice level (N = 164).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1.PPIR	.837																					
2.P1FD	.761 [†]	.806																				
3.P2SCI	.771 [†]	.240 [†]	.802																			
4.M Ego	.516 [†]	.068	.712 [†]	.662																		
5.Soc In	.471 [†]	.658 [†]	.141	.087	.753																	
6.Fear	.645 [†]	.727 [†]	.362 [†]	.104	.244 [†]	.734																
7.Cold	.443 [†]	.232 [†]	.124	.191 [†]	.071	.076	.716															
8.Rebel	.738 [†]	.478 [†]	.717 [†]	.357 [†]	.231 [†]	.522 [†]	.147	.751														
9.Blm E	.264 [†]	-.129	.629 [†]	.348 [†]	-.047	.090	-.194 [*]	.161 [*]	.762													
10.Care	.500 [†]	.210 [†]	.540 [†]	.175 [*]	.101	.203 [†]	.229 [†]	.305 [†]	.041	.671												
11.Stres	.476 [†]	.711 [†]	.000	-.044	.198 [*]	.258 [†]	.330 [†]	.240 [†]	-.306 [†]	.132	.814											
12.LSRP	.345 [†]	-.024	.509 [†]	.534 [†]	-.018	.065	.209 [†]	.241 [†]	.369 [†]	.186 [*]	-.097	.777										
13.Prime	.322 [†]	.059	.368 [†]	.473 [†]	.082	.031	.275 [†]	.171 [*]	.219 [†]	.105	.015	.902 [†]	.790									
14.Secon	.212 [†]	-.156 [*]	.498 [†]	.370 [†]	-.183 [*]	.090	-.011	.241 [†]	.443 [†]	.233 [†]	-.243 [†]	.664 [†]	.277 [†]	.580								
15.MACH	.376 [†]	.076	.478 [†]	.477 [†]	.150	.105	.182 [*]	.244 [†]	.278 [†]	.264 [†]	-.083	.510 [†]	.467 [†]	.327 [†]	.606							
16.Dece	.356 [†]	.085	.383 [†]	.380 [†]	.096	.121	.320 [†]	.190 [*]	.094	.384 [†]	-.033	.312 [†]	.295 [†]	.185 [*]	.631 [†]	.526						
17.Flat	.189 [*]	.030	.210 [†]	.192 [*]	.200 [*]	-.019	.186 [*]	.087	.062	.236 [†]	-.097	.139	.118	.104	.570 [†]	.304 [†]	.442					
18.Immor	.176 [*]	-.003	.297 [†]	.276 [†]	.022	.069	-.013	.143	.296 [†]	.040	-.093	.405 [†]	.345 [†]	.306 [†]	.589 [†]	.153	.202 [†]	.273				
19.Cyn	.152	.030	.242 [†]	.316 [†]	-.025	.092	-.052	.160 [*]	.092	.072	-.008	.449 [†]	.449 [†]	.223 [†]	.454 [†]	.169 [*]	.057	.152	.386			
20.Resid	.231 [†]	.073	.279 [†]	.266 [†]	.133	.049	.086	.146	.231 [†]	.076	-.019	.248 [†]	.226 [†]	.161 [*]	.689 [†]	.244 [†]	.213 [†]	.197 [*]	.175 [*]	.245		
21.HCO	-.374 [†]	-.134	-.398 [†]	-.422 [†]	.062	-.293 [†]	-.220 [*]	-.273 [*]	-.146	-.153	-.040	-.327 [†]	-.270 [*]	-.227 [*]	-.295 [†]	-.203	-.209	-.193	-.138	-.172	-	-
22.LCO	-.054	.098	-.076	.014	-.018	.100	-.267 [*]	-.075	-.082	-.259 [*]	.106	.023	.025	-.104	-.238 [*]	.101	-.209	.001	.033	-	-	-

Predictor abbreviations: PPIR = PPI-R: F total score, P1FD = PPIR: F Factor 1 – Fearless Dominance Factor Score, P2SCI = PPIR: F Factor 2-Self Centered Impulsivity Factor Score, M Ego = PPI-R: F Machiavellianism Egocentricity subscale, Soc In = PPI-R: F Social Influence subscale, Fear = PPI-R: F Fearlessness subscale, Cold = PPI-R: F Coldheartedness subscale, Rebel = PPI-R:SF Rebellious Nonconformity subscale, Blm E = PPI-R: F Blame Externalization Subscale, Care = PPI-R: F Carefree Nonplanfulness subscale, Stress = PPI-R: F Stress, Immunity subscale, LSRP = LSRP total score, Prime = LSRP Primary subscale, Secon = LSRP Secondary subscale, MACH = MACH-IV total score, Dece = MACH-IV Deceit subscale, Flat = MACH-IV Flattery subscale, Immor = MACH-IV Immorality subscale, Cyn = MACH-IV Cynicism subscale, Resid = MACH-IV Residual subscale score, HCO = High Choice condition reported enjoyment of task, LCO = Low Choice condition reported enjoyment of task.

[†] Correlation significant at .01 level.

^{*} Correlation significant at .05 level. Cronbach's alphas of reliability presented for each measure along the diagonal.

3.4.1. First multiple regression: PPI-R: SF total scores

The predictors in the first multiple regression were (1) Choice Condition (High Choice versus Low Choice), (2) PPI-R: SF total scores, and (3) the interactions of (1) and (2). Consistent with the recommendations of Cohen, Cohen, West, and Aiken (2003), the first two predictors were first transformed by being centered, and an interaction value was calculated for each participant by multiplying the two centered predictors. The hypothesis of interest was that the interaction term would significantly predict self-reported Enjoyment Ratings.

Results of the first multiple regression analysis are shown in the first row of numbers in Table 3. As can be seen, the model in the regression equation was statistically significant, $F(3,160) = 6.23, p < .001$, as was the main effect for High versus Low Choice condition, standardized $\beta = .196, t = 2.62, p = .010$. The main effect for PPI-R: SF total scores was not statistically significant, standardized $\beta = -.053, t = -0.52, p = .607$.

As hypothesized, the interaction of PPI-R: SF total scores and Choice condition was statistically significant in predicting Enjoyment ratings for the abacus task, standardized $\beta = -.216, t(163) = -2.11, p = .036$. Fig. 1 depicts this interaction graphically.

As can be seen Fig. 1, PPI-R: SF scores and Enjoyment Ratings were significantly related in the High Choice condition, $\beta = -.374, t(81) = -3.61, p = .001$, but not in the Low Choice condition, standardized $\beta = -.054, t(81) = -.486, p = .628$. Comparison of the two figures reveals that, as hypothesized, individuals with lower levels of psychopathy showed the classic cognitive dissonance effect, but individuals with higher levels did not.

3.4.2. Second multiple regression: LSRP total scores

The predictors in this multiple regression were (1) Choice Condition (High Choice versus Low Choice), (2) LSRP total scores, and (3) the product of (1) and (2). Again, we hypothesized that the interaction (partialled product) term would significantly predict self-reported Enjoyment Ratings.

Results of this multiple regression are shown in the second row of numbers in Table 3. The results were similar to those for the PPI-R: SF. Specifically, the model using the LSRP was statistically significant, $F(3,160) = 5.18, p = .002$, as was the main effect for High versus Low Choice condition, standardized $\beta = .207, t = 2.74, p = .007$. The main effect for LSRP total scores was not statistically significant, standardized $\beta = .022, t = 0.22, p = .827$.

Table 3
Multiple regressions: prediction of self-reported enjoyment of abacus task by main measures of psychopathy and machiavellianism. each row represents a different multiple regression. predictors for each row include (1) High versus Low Choice conditions, (2) a measure of psychopathy or machiavellianism and (3) the interactions of (1) and (2).

Measure	Simultaneous predictors																			
	Test of overall model				(1) High vs. Low Choice					(2) Psychopathy/Machiavellianism					(3) Interactions of (1) and (2)					
	F	(df)	p	ΔR^2	B	Std. error	β	t	p	B	Std. error	β	t	p	B	Std. error	β	t	p	
PPIR:SF	6.23	(3,160)	<.001	.025	.661	.252	.196	2.62	.010	-.089	.173	-.053	-0.52	.607	-.536	.254	-.216	-2.11	.036	
LSRP	5.18	(3,160)	.002	.031	.699	.255	.207	2.74	.007	.037	.171	.022	0.22	.827	-.603	.258	-.236	-2.34	.021	
MACH-IV	4.92	(3,160)	.003	.009	.703	.256	.208	2.75	.007	-.173	.178	-.102	-0.98	.331	-.314	.257	-.128	-1.22	.223	

Abbreviations: PPI-R: SF = Total score for Psychopathic Personality Inventory-Revised: Short Form.
LSRP = Total score for Levenson Self-Report Psychopathy Scale.
 ΔR^2 = Change in R^2 .
B = Unstandardized Beta Weight.
Std. error = Standard Error of Unstandardized Beta Weight.
 β = Standardized Beta Weight.

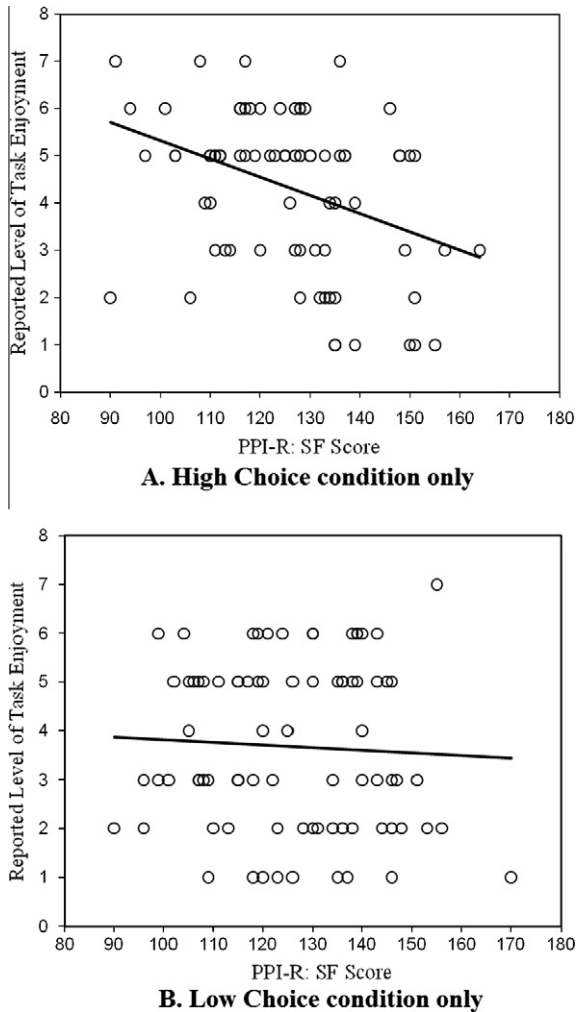


Fig. 1. Interaction between reported level of task enjoyment and total PPI-R:SF score in the (A) High Choice condition (standardized $\beta = -.374$, $p = .001$) and (B) Low Choice condition (standardized $\beta = -.054$, $p = .628$).

As hypothesized, the interaction of LSRP total scores and Choice condition was statistically significant in predicting Enjoyment Ratings for the abacus task, standardized $\beta = -.236$, $t(163) = -2.34$, $p = .021$. The analyses, depicted in Fig. 2, indicated that LSRP scores and Enjoyment Ratings were significantly related in the High Choice condition, standardized $\beta = -.327$, $t(81) = -3.09$, $p = .003$, but not in the Low Choice condition, standardized $\beta = .023$, $t(81) = .208$, $p = .836$. Thus, the findings for the LSRP, like those for the PPI-R: SF, supported the hypothesis that individuals with lower levels of psychopathy would show the classic cognitive dissonance effect, but that individuals with higher levels would not¹.

3.4.3. Follow-up analyses

Exploratory multiple regressions were performed using the scores of the PPI-R: SF and LSRP factors and subscales as predictors

¹ In addition, hierarchical regressions were conducted comparing the PPI-R: SF to the LSRP to identify differences in the two measures' incremental validity for attitude shift above and beyond one another. Results demonstrated that the Results demonstrated that the inclusion of the interaction between LSRP total scores with self-reported enjoyment of the abacus task significantly increased predictive power, $\Delta R^2 = .023$, $\Delta F(1, 158) = 4.18$, $p = .043$. When this hierarchical regression was reversed, and we assessed whether PPI-R: SF total scores significantly predicted task enjoyment above and beyond LSRP total scores, results indicated that the PPI-R: SF did not significantly increase predictive power above and beyond LSRP total scores, $\Delta R^2 = .012$, $\Delta F(1, 158) = 2.21$, $p = .139$.

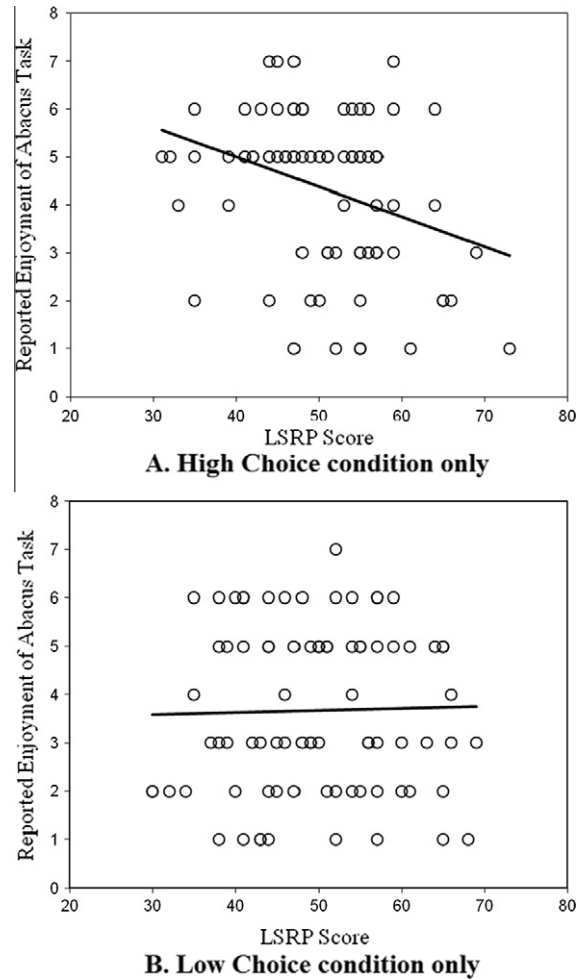


Fig. 2. Interaction between reported level of task enjoyment and total LSRP score in the (A) High Choice condition (standardized $\beta = -.327$, $p = .003$) and (B) Low Choice condition (standardized $\beta = .023$, $p = .836$).

to better understand the central findings of the study². Results of analyses using the factors of the PPI-R: SF and LSRP are shown in Table 4. As can be seen, the PPI-R: SF Self-Centered Impulsivity factor exhibited a significant interaction with Choice condition. Neither of the two LSRP Factor Scales exhibited a significant interaction. However, when the data were re-analyzed excluding the 6 participants who failed to comply with the researcher's suggestions, the interaction for the LSRP Primary Psychopathy scale became statistically significant, standardized $\beta = -.216$, $t(157) = -2.02$, $p = .045$.

Regression analyses using the eight PPI-R: SF lower-order subscales demonstrated three significant subscale interactions with Choice Condition (overall model equations $p < .05$): Machiavellian Egocentricity, standardized $\beta = -.295$, $t(157) = -2.81$, $p = .006$, Fearlessness, standardized $\beta = -.274$, $t(157) = -2.47$, $p = .015$, and Rebellious Nonconformity, standardized $\beta = -.243$, $t(157) = -2.30$, $p = .023$. The remaining PPI-R: SF subscales did not yield a significant interaction with Choice condition. The results of these

² Post-hoc exploratory moderator regressions were conducted using gender as a moderator of the interaction between level of psychopathic traits and choice condition. Of the regressions conducted using the PPI-R: SF, the Self-Centered Impulsivity factor yielded a significant moderation with gender: males demonstrated larger effects than females ($\Delta R^2 = .038$). The same pattern held for the LSRP total score ($\Delta R^2 = .054$) and both the Primary ($\Delta R^2 = .034$) and Secondary Factor scales ($\Delta R^2 = .051$). Nevertheless, given that these gender effects were not predicted, we are reluctant to interpret them without independent replication in other samples.

Table 4
Multiple regressions: prediction of self-reported enjoyment of abacus task by PPI-R: SF and LSRP factors. Each row represents a different multiple regression. predictors for each row include (1) High versus Low Choice conditions, (2) a factor of the PPI-R: SF or LSRP and (3) the interactions of (1) and (2).

Subscale	Simultaneous Predictors																		
	Test of overall model				(1) High vs. Low Choice				(2) Factor				(3) Interactions of (1) and (2)						
	F	(df)	p	ΔR^2	B	Std. error	β	t	p	B	Std. error	β	t	p	B	Std. error	β	t	p
<i>PPI-R: SF factors</i>																			
FDOM	2.96	(3,160)	.034	.013	.670	.260	.198	2.58	.011	.175	.194	.104	0.91	.366	-.382	.262	-.167	-1.46	.146
SCIMP	6.90	(3,160)	<.001	.027	.657	.251	.195	2.62	.010	-.123	.168	-.073	-0.73	.466	-.561	.254	-.220	-2.21	.028
<i>LSRP factors</i>																			
PRIMARY	4.20	(3,160)	.007	.021	.691	.257	.205	2.69	.008	.041	.176	.024	0.23	.815	-.495	.259	-.199	-1.92	.057
SECONDARY	3.59	(3,160)	.015	.012	.682	.258	.202	2.64	.009	.018	.187	.101	0.09	.926	-.377	.259	-.161	-1.45	.148

Abbreviations:

PPI-R: SF = Psychopathic Personality Inventory-Revised: Short Form.

LSRP = Levenson Self-Report Psychopathy Scale.

FDOM = Fearless Dominance. SCIMP = Self-Centered Impulsivity.

PRIMARY = Primary Psychopathy. SECONDARY = Secondary Psychopathy.

ΔR^2 = Change in R^2 .

B = Unstandardized Beta Weight.

Std. error = Standard Error of Unstandardized Beta Weight.

β = Standardized Beta Weight.

subscale analyses are not shown in Table 4 but are available upon request from the primary author.

3.5. Hypothesis 3: relationship between enjoyment ratings and Machiavellianism

Based on prior research, we hypothesized that the interaction observed for psychopathy scores would also be observed for Machiavellianism scores. This hypothesis was also tested using multiple regression. The regression predictors were (1) Choice Condition (High Choice versus Low Choice), (2) MACH-IV scores, and (3) the interaction of (1) and (2). Again it was hypothesized that the interaction term would significantly predict self-reported Enjoyment Ratings.

Results of this multiple regression are shown in Table 3. As can be seen, the overall regression model was statistically significant, $F(3,160) = 4.92$, $p = .003$, as was the main effect for High versus Low Choice condition, standardized $\beta = .208$, $t = 2.75$, $p = .007$. The main effect for MACH-IV scores was not statistically significant, standardized $\beta = -.102$, $t = -0.98$, $p = .331$.

Contrary to prediction, the interaction of MACH-IV total scores and Choice condition was not statistically significant in predicting Enjoyment ratings, standardized $\beta = -.128$, $t(163) = -1.22$, $p = .223$. Post hoc analyses, similar to those depicted in Fig. 1, indicated that MACH-IV scores and Self-Reported Enjoyment were significantly related in the High Choice condition, standardized $\beta = -.295$, $t(81) = -2.76$, $p = .007$, but not in the Low Choice condition, standardized $\beta = -.104$, $t(81) = -.932$, $p = .354$. As can be seen, although one of the standardized β 's ($-.295$) was statistically significant and the other was not ($-.104$), the difference between the two coefficients was not statistically significant, resulting in a non-significant interaction term in the multiple regression.

4. Discussion

Three findings of the present study are notable. First, the classic cognitive dissonance effect reported by prior researchers was replicated. That is, consistent with earlier findings, participants in the High Choice condition reported enjoying the abacus task significantly more than did participants in the Low Choice condition. Second, as predicted, a significant interaction was found between Choice Condition and level of psychopathy as measured by total scores on the PPI-R: SF and the LSRP. Specifically, the classic cognitive dissonance effect was found among participants with lower

levels of psychopathic traits, but not among participants with higher levels. Third, contrary to prediction, no significant interaction was found between Choice Condition and level of Machiavellianism as measured by the MACH-IV. Each of these three findings is discussed in detail in the following sections.

4.1. Psychopathy and cognitive dissonance

The central hypothesis of the study was that individuals with low levels of psychopathic traits would experience cognitive dissonance after engaging in deception, whereas individuals with higher levels of psychopathic traits would not. This hypothesis was confirmed using two quite different measures of psychopathic traits. Participants with higher total scores on the PPI-R: SF and LSRP reported significantly less enjoyment of the abacus task than did participants with lower scores. Put another way, the interaction between Choice condition and psychopathy scores was significant in predicting self-reported abacus task enjoyment. True to our prediction, as can be seen in Figs. 1 and 2, participants with low levels of psychopathy experienced cognitive dissonance only when in the High Choice condition, and not in the Low Choice condition.

The observed interaction of psychopathic traits with Choice condition can potentially be explained by the New Look theory of cognitive dissonance (Cooper, 2007; Cooper & Fazio, 1984) in concert with theories concerning empathy dysfunction in individuals with psychopathic traits. The New Look theory holds that cognitive dissonance effects often reflect an attempt by individuals to reduce or eliminate their painful emotions. For instance, from the perspective of New Look theory, participants in the present study who were in the High Choice condition experienced a painful negative emotion after they voluntarily and falsely convinced a fellow participant that the abacus task was enjoyable. To reduce the negative emotion, these participants convinced themselves that the abacus was actually enjoyable, meaning that they hadn't really lied to their fellow participant at all. This interpretation is broadly consistent with our findings that participants with high scores on LSRP Factor 1 traits and PPI Machiavellian Egocentricity, both of which partly assess callousness and a lack of guilt, were especially unlikely to exhibit attitude change following the dissonance manipulation. Nevertheless, one finding from the present study that does not square entirely with this hypothesis is our negative result for the PPI Coldheartedness subscale, which also partly assesses an absence of guilt and empathy (in addition to other social emotions). Further work, especially incorporating more explicit

measures of empathy and guilt, may help to resolve this apparent discrepancy.

This partial explanation from New Look theory is supplemented by theories concerning the relationship of psychopathy to lack of empathy. According to these theories, psychopathy is associated with empathy dysfunction, which involves a failure to experience the pain of others as aversive and a lack of guilt for causing such pain (Ali, Amorim, & Chamorro-Premuzic, 2009; Blair, 1995; Blair & Frith, 2000; Cima et al., 2007; Cleckley, 1976; Hare, 2003; Hastings et al., 2008). In the present study, it could be argued, high-psychopathy participants in the High Choice condition experienced little or no guilt after lying to their fellow participant. Thus, they had no pressing need to diffuse or eliminate painful feelings afterwards by convincing themselves that the abacus task was actually enjoyable. Such an explanation of the findings in terms of empathy dysfunction is consistent with much prior theory and research indicating that a callous lack of guilt constitutes a central characteristic of psychopathy (Cima et al., 2007; Cleckley, 1976; Hart & Hare, 1997; Hare, 2003; Lykken, 1995; McHoskey et al., 1998; Walsh & Wu, 2008), although as noted earlier, it may not be entirely consistent with our negative finding for the PPI Coldheartedness subscale.

Cognitive dissonance was originally theorized to be a widespread and perhaps even universal cognitive process that mediates negative emotion (Festinger, 1957). However, the results of the current study suggest that at least some aspects of cognitive dissonance may depend on individual difference variables. Cognitive dissonance, when it involves feelings of guilt, may not occur, or may occur only in attenuated form, among individuals who are low in guilt, empathy, or both. Much of the current research conducted on the differences between psychopaths and non-psychopaths has focused on psychopaths' deficient emotional reactions in the areas of fear, guilt and anxiety responses (Batson et al., 2010; Blair, 2006; Blair & Blair, 2009; Blair et al., 2006; Cima et al., 2007; Cleckley, 1976; Fowles, 1980; Hare & Neumann, 2008; Lykken, 1957). The current study extends this line of research by identifying differences in the cognitive processing of guilt-inducing stimuli that are related to psychopathic traits. Thus, the present study adds to the understanding of the ways that individuals with psychopathic traits process and respond to emotional information.

Post hoc exploratory analyses shed partial light on whether the absence of cognitive dissonance we observed is selective to certain features of psychopathy. As can be seen in Table 4, of the two higher-order factor scales of the PPI-R: SF, only Self-Centered Impulsivity displayed a significant interaction with choice condition in predicting abacus task enjoyment. This factor correlates with the behavioral and antisocial traits of psychopathy (Benning et al., 2003). Further, two of the three PPI-R: SF subscales that yielded significant interactions with choice condition in predicting level of abacus task enjoyment, namely Machiavellian Egocentricity and Rebellious Nonconformity, load on the Self Centered Impulsivity factor. Machiavellian Egocentricity at least partly assesses ruthlessness, callousness, and lack of guilt (Lilienfeld & Andrews, 1996), potentially supporting the New Look explanation. As previously described, the New Look Theory posits that cognitive dissonance arises in response to negative feelings of guilt, shame, or discomfort around the perception of deceiving or harming another individual, and that it is the aversive emotions over harming another person that motivates attitude change (Cooper & Fazio, 1984). Therefore, our results make some sense in the fact that elevations on the subscales that assess elements of self-centeredness, guiltlessness, and a propensity to act with little regard for others related to a lack of attitude shift.

At the same time, our findings offer only partial support for this explanation given that other PPI-R: SF subscales, especially

Coldheartedness, more explicitly assess an absence of guilt-proneness and related negative affects. The negative findings for the Coldheartedness subscale may reflect a Type II error; alternatively, our attitude change findings for psychopathy might reflect an alternative dissonance reduction mechanism than that proposed here. For example, perhaps individuals with high SCI scores view themselves as dishonest and deceptive, so that lying to another person may not pose a significant threat to their self-concept (see Thibodeau & Aronson, 1992). It is also possible that the dissonance manipulation elicited emotions other than guilt, such as resentment or sadness, which may help to explain the negative findings for Coldheartedness. Finally, our negative results for the PPI-R: SF FD higher-order factors suggest that anxiety and fear (both of which are central components of FD) may not be the crucial emotions underpinning the dissonance effects observed in our investigation. Nevertheless, these exploratory analyses must be interpreted with caution given our relatively small sample size and modest internal consistencies of the PPI-R: SF subscales.

4.2. Implications for social psychology's understanding of the cognitive dissonance effect

Although this discussion has focused primarily on the implications of the present findings for the understanding of psychopathy, the findings also bear implications for social psychology and its understanding of the cognitive dissonance effect. As Fig. 1 shows, the higher persons scored on subclinical psychopathy, the less likely they were to react to the high choice condition by reporting high abacus task enjoyment. This finding suggests that (a) guilt-induced cognitive dissonance may be relatively weak among the subgroup of normal individuals with relatively high levels of psychopathic traits, but (b) the effect may actually be stronger than typically reported among individuals with relatively low levels of such traits. Therefore these results could indicate that cognitive dissonance is not a universal phenomenon as sometimes assumed, but rather may be dependent on individual differences, especially personality traits. This is a potentially interesting topic that social psychological researchers have pursued sporadically in the past (e.g., see Shaffer & Hendrick, 1974, and Stalder & Baron, 1998, for findings on the relation between dogmatism and attributional complexity, respectively, and dissonance reduction), and may wish to pursue in the future in more depth, especially with respect to features of psychopathy and related personality disorders (e.g., narcissistic personality disorder, antisocial personality disorder). Our findings suggest that social psychology researchers may wish to consider including measures of psychopathy in investigations of cognitive dissonance, as their attitude change findings may not hold for highly psychopathic participants. Moreover, they raise the possibility that at least some negative findings in the cognitive dissonance literature may be attributable to the inclusion of participants with high levels of psychopathy.

4.3. Machiavellianism and cognitive dissonance

An important hypothesis of this study was that people with low levels of Machiavellianism as measured by the MACH-IV would experience cognitive dissonance regarding engaging in deception, whereas individuals with higher levels of Machiavellianism would not. This hypothesis was derived from longstanding theory and the findings from several studies carried out approximately forty years ago (Bogart, 1971; Bogart et al., 1970; Epstein, 1969). Surprisingly, however, the findings from these studies were not replicated in the present study: no significant interaction was found between MACH-IV scores and Choice condition in predicting enjoyment of the abacus task.

Despite this negative finding, there are four reasons why this hypothesis should probably not be abandoned. First, as already noted, three earlier studies on Machiavellianism and cognitive dissonance have yielded positive findings. Thus, the present negative findings must be interpreted conservatively in light of the larger body of research that supports the hypothesis. Second, the findings of the present study regarding MACH-IV were actually somewhat mixed. As reported in the Results, a significant negative correlation was found between MACH-IV scores and self-rated enjoyment of the abacus task in the High Choice condition but not the Low Choice condition. These post hoc results indicate the regression results within each experimental condition were consistent with our hypothesis, but the predicted interaction between conditions was not statistically significant because the difference between the corresponding betas was not large enough. Third, it is important to note that the MACH-IV internal consistencies were relatively low, which reduced our ability to detect significant effects. As already noted, three studies in the 1970s found an association between high Machiavellianism, as measured by the MACH-IV, and a decreased tendency to experience attitude change following a dissonance induction (Bogart, 1971; Bogart et al., 1970; Burgoon et al., 1972). However, none of these studies reported on the internal reliability of the MACH-IV. Thus, it is unclear whether the reliability of the MACH-IV in the present study was lower than in those earlier studies, and whether diminished reliability might account for our failure to replicate these studies' findings. However, the internal reliability of the MACH-IV in the present study ($\alpha = .61$) was somewhat lower than would have been expected based on most past studies. For instance, Christie and Geis (1970) reported the split-half reliability of the scale as .79, and Paulhus and Williams (2002) reported a coefficient alpha of .74. Therefore, the somewhat low internal consistency of the Mach scale in the present study may partially explain why the interaction for this scale did not reach significance. Fourth, we obtained positive findings for the PPI-R: SF Machiavellian Egocentricity subscale, a measure that is conceptually and empirically related fairly closely to MACH-IV (Lilienfeld & Widows, 2005). Thus, despite the present negative findings, we are tentatively inclined to posit that individuals high in Machiavellianism are less likely than other individuals to show guilt-induced cognitive dissonance effects, although if they do, the effect may be weaker than that for psychopathy.

4.4. Limitations of the study and future directions

Three limitations of the present study should be noted. First, the present study relied solely on self-report instruments to measure psychopathy. The construct validity of the PPI-R: SF and LSRP as measures of psychopathy have been supported in a number of studies (Levenson et al., 1995; Marcus et al., 2012; Visser et al., 2012). Nevertheless, the inclusion of the Psychopathy Checklist: Screening Version (PCL: SV; Hart, Cox, & Hare, 1995), which is based on a semi-structured interview and file review, and has been shown to effectively identify psychopathy in non-clinical and non-institutionalized populations, would have been desirable. Future researchers should attempt to replicate and extend the present results using instruments that do not rely solely on self-report. In addition, because the results of a recent meta-analysis (Miller & Lynam, 2011) suggest that the validity of the short form of the PPI may be somewhat lower than that of the long (full) form, it is possible that some of our negative findings for PPI subscales would not generalize to research using the full PPI-R. Future studies would benefit from using the full version of the PPI-R in addition to increasing the sample size of participants.

A second limitation of the current study concerns its reliance on undergraduates. Future research is needed to determine whether the results obtained in this group will generalize to populations

with higher levels of psychopathy, such as violent offenders or repeat-offender juvenile delinquents. It should be noted, however, that a stronger guilt-inducing stimulus may be required if similar cognitive dissonance studies are carried out in forensic or correctional populations. In forensic or correctional populations, in which low psychopathy is less common, substantially fewer participants would be expected to show the cognitive dissonance effect, given our current results. For this reason, replication studies in forensic populations may need to either oversample low-psychopathy offenders, or perhaps better, use a more potent manipulation to induce guilt in participants.

A third limitation may have been that the self-report measures of psychopathy and the cognitive dissonance task in this experiment were not counterbalanced. It is unclear if participation in the guilt-inducing cognitive dissonance task just prior to completing self-report psychopathy measures may have had an effect on participant responses. Given this uncertainty, future studies should consider counterbalancing the assessment of psychopathy with the cognitive dissonance task.

Finally, the topic of psychopathy and cognitive dissonance is important because it can shed light on the roles of empathy, guilt, and attitude change in psychopathic individuals. Some researchers from a social psychological perspective have argued that cognitive dissonance reduction plays an important role in some forms of psychotherapeutic change (e.g., Axsom & Cooper, 1985; Cooper & Axsom, 1982). For example, when confronted with tangible evidence in couples therapy that he has repeatedly hurt his wife's feelings without good reason, a self-centered and overbearing husband may be forced to re-evaluate his self-concept, and come to recognize that he is not as flawless a person as he once believed. Such knowledge, in turn, may help him to become kinder in his marital and other interpersonal interactions. In contrast, to the extent that psychopathic individuals experience less cognitive dissonance than other individuals, they may exhibit relatively little attitude change in psychotherapy in response to conflicting information – especially to information that evokes a sense of guilt (e.g., learning that one has inadvertently damaged the feelings of loved ones). Psychopathic individuals have long been regarded as unresponsive to psychotherapy (Hare, 1993), although this widespread view has recently been challenged (Salekin, 2002; Skeem, Monahan, & Mulvey, 2002). Regardless of the outcome of the debate regarding the treatment amenability of psychopathic individuals, the literature on cognitive dissonance may hold important implications for the question of why many psychopathic individuals display little attitude change in treatment.

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