

REEXAMINATION OF THE ASSOCIATION BETWEEN ANONYMITY AND SELF-INTERESTED UNETHICAL BEHAVIOR IN ADULTS

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The well-established notion that the frequency of self-interested unethical behavior increases among anonymous people was reexamined employing a more strict definition of anonymity, voluntary unethical behavior, and adult individuals. Anonymity was defined as nonassociability of the participant's traits with respect to unethical behavior. The participant's identity and a monetary reward were manipulated as the independent variables, while cheating behavior was observed as the dependent variable. A sample of 143 undergraduate students were randomly assigned to 1 of 4 conditions (nonidentifiable-reward, identifiable-reward, nonidentifiable-nonreward, or identifiable-nonreward condition) to flip a coin twice in the experimental assignment. Results indicated that participants behaved differently depending on anonymity status and reward status. Implications for unethical behavior among anonymous individuals are discussed.

Anonymity has several effects on human behavior. In the fields of social psychology and economics, anonymity has long been examined in connection with self-interested behavior (Kerr, 1999), antisocial behavior (Silke, 2003; Spivey & Prentice-Dunn, 1990; Zimbardo, 1969), and unethical behavior (Diener, Fraser, Beaman, & Kelem, 1976; Mathes & Guest, 1976; White, 1977). Although a certain type of prosocial behavior (e.g., donation) has been observed even in anonymous situations (Eckel & Grossman, 1996; Frey & Meier, 2004; Johannesson & Persson, 2000), it is generally believed, based on findings of social-dilemma and dictator game studies, that anonymous people tend to choose selfish strategies motivated by self-interest (De Cremer & Bakker, 2003; Fox & Guyer, 1978; Hoffman, McCabe, Shachat, & Smith, 1994; Kollock, 1998). In association with such findings, a meta-analysis of deindividuation research indicates that socially unacceptable behavior in the form of pursuit of material self-interest (e.g., stealing money) occurs more frequently among anonymous people in a group (Postmes & Spears, 1998). In addition, the ethical-decision-making literature suggests that people are more likely to behave in an unethical manner when that behavior benefits

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them in some way (Grover & Hui, 1994; Hegarty & Sims, Jr., 1978; Loe, Ferrell, & Mansfield, 2000).

Thus, it seems to be taken as a given, at present, that the frequency of occurrence of self-interested behavior generally increases among anonymous people, even when such behavior is deemed unethical. However, despite this seemingly well-established association between anonymity and self-interested unethical behavior, a couple of issues have remained untouched in past related research. First, definitions of anonymity employed in past research seem to differ from what anonymity means in real life. For instance, some researchers manipulated anonymity by having their participants disguised with a hood or mask (Diener et al., 1976; Zimbardo, 1969), while others simply kept participants unnamed and/or isolated from other participants and/or the experimenter (Spivey & Prentice-Dunn, 1990; White, 1977). It has also been suggested that just being in a group makes people feel anonymous (Kugihara, 2001; Mathes & Guest, 1976). Thus, definitions of *anonymity* in past research have often been synonymous with *concealment of identity*, although the degree of concealment (how anonymous one is) might have varied from study to study.

However, according to Wallace (1999), anonymity cannot be achieved only by concealing one's identity: "Anonymity is noncoordinatability of traits in a given respect. In other words, one has anonymity or is anonymous when others are unable to relate a given feature of the person to other characteristics" (Wallace, 1999, p. 24). Wallace also added, "Whatever the purpose(s) of any given instance of anonymity, it seems to me that anonymity always raises the issues of accountability, whatever other issues may be involved or at stake Anonymity is one method of minimizing accountability" (p. 31). In research that has examined the association between anonymity and socially unacceptable behavior, even when participants were kept unnamed or isolated from other co-workers during an experiment, the experimenter could link the observed behavior (e.g., cheating) of such unnamed or isolated participants to them in the end (e.g., by monitoring participants in a laboratory through a one-way mirror, by analyzing collected assignment sheets afterwards). Applying Wallace's definition to this instance, these unnamed or isolated participants cannot be regarded as completely anonymous.

On the one hand, participants' anonymity generally has been ensured with regard to other participants in many past studies (e.g., Mathes & Guest, 1976; Spivey & Prentice-Dunn, 1990), not with regard to the experimenter, so this manipulation of anonymity did not seem to be a big problem for researchers. On the other hand, it is likely that some of these seemingly anonymous participants distorted their genuine reactions, suspecting that their undesirable behavior in a laboratory would ultimately be disclosed to the experimenter. This could in turn result in an incomplete examination of anonymity in relation to the observed behavior. To more precisely examine the effects of anonymity on a certain human behavior in experimental research, observed behavior should not be related to a certain participant by anybody else, including the experimenter her- or himself, even when anonymity is not originally ensured with regard to the experimenter. Although anonymity can be achieved through the double-anonymous procedure, in which participants cannot be identified by their behavior during an experiment (Eckel & Grossman, 1996; Hoffman et al., 1994; Johannesson & Persson, 2000), clearly visible reactions from participants in this procedure could

still impair anonymity among them in research on socially unacceptable behavior, because the reaction comes from someone from the very limited group (participants of the study). Considering the possibility that traditional anonymity in laboratory settings, or even the double-anonymous procedure, is not able to fully replicate more precise effects of anonymity in real-life settings, nonassociability of the participant's traits with respect to the target behavior should be more strictly manipulated in anonymity research, especially pertaining to socially unacceptable behavior.

Apart from the definition of anonymity, the second issue concerns the scarcity of research in which self-interested unethical behavior is directly observed among *anonymous individuals*. One of the few such studies that do report such research was the Halloween trick-or-treat experiment conducted by Diener et al. (1976), who observed self-interested unethical behavior (stealing candy and money) among disguised participants. However, all the participants in their study were children, whose sense of morality might have differed from that of average adults. Furthermore, the primary focus of their study was on collective antisociality among a group of people through the deindividuation phenomenon, which is assumed to induce people in a group to engage in disinhibited behavior through decreased self-awareness (Zimbardo, 1969). Also, in such a group situation, several psychological phenomena besides anonymity are thought to affect the frequency of occurrence of socially unacceptable behavior among group members, such as conformity (adapting one's behavior to group behavior; Asch, 1955) and modeling (learning a certain behavior through observation of a group member's behavior; Bandura & Walters, 1963). In short, no study has put its primary focus on self-interested unethical behavior committed by adult individuals solely through anonymity, excluding other factors that potentially induce socially unacceptable behavior.

Finally and most important, the *degree* of unethical behavior has hardly been discussed in past research. More precisely, self-interested unethical behavior observed in most past research has required relatively passive involvement of the actor. For instance, Bersoff (1999) observed whether participants would keep an overpayment, which was considered unethical in his study (see also Hegarty & Sims, Jr., 1978). However, more voluntary self-interested unethical behavior, such as an active violation of existing rules for obtaining material self-interests, has rarely been examined in past psychological research. Even when reviewing other types of socially unacceptable behavior in past research, such as aggressive behavior, participants were mostly ordered by the experimenter to engage in such behavior (e.g., Meier & Hinsz, 2004; Spivey & Prentice-Dunn, 1990). In other words, the socially unacceptable behaviors of participants observed in most past research were not voluntary behaviors.

In summary, no studies have ever examined whether the frequency of self-interested unethical behavior that requires voluntary active involvement of the actor will increase among adult individuals due solely to stricter anonymity. Considering the fact that self-interested unethical behavior in real life, such as shoplifting and employee theft, is generally exhibited by anonymous adults (or young adults) through their voluntary involvement, it is worth reexamining the well-established association between anonymity and such behavior based on the above-mentioned criteria. The present study was designed to fulfill this purpose.

Manipulation of Anonymity and Current Research Design

Because the present study involves a complex research design, it needs to be explained in advance. All adult participants are kept anonymous to the experimenter as well as to the other participants, regardless of their assigned conditions, which means that no participant can be associated with a particular behavior by anybody else during the study. The participant's identity (e.g., name, student ID) and a monetary reward (a book coupon) are manipulated as the independent variables. The first variable is chosen to examine how one's identity affects the frequency of subsequent unethical behavior in a situation where even an identified participant can still be kept anonymous with respect to unethical behavior. The second variable is employed on the basis of findings that material self-interests increase the frequency of socially unacceptable behavior among anonymous people (Diener et al., 1976; Postmes & Spears, 1998). The dependent variable is defined as cheating behavior that anonymous individuals *voluntarily* engage in by violating existing rules without relying on experimental orders or other psychological phenomena.

As for the manipulation of the more strictly defined *anonymity*, participants in all conditions are asked to *flip a coin only twice* in a "take-home" experimental assignment outside the laboratory. Participants in two reward conditions can obtain the book coupon (the monetary reward) by getting two tails in two coin flips, whereas those in two nonreward conditions have no clear stake in this coin-flip assignment. The statistically expected chance of obtaining two tails in two coin flips is kept at 25% in all four conditions ($3/6 \times 3/6 = .25$). By employing a coin flip as a manipulation of stricter anonymity, participants in all four conditions can easily break the game's rules by forging their coin-flip results without being identified. Because the assignment is performed outside the laboratory, participants will not be monitored by the experimenter during this procedure.

Considering the statistically expected chance of getting two tails in two coin flips (25%), if there are 20 participants in each condition, the actual number of two-tail winners should be around the expected number of 5 in each condition ($20 \times .25$). This statistical assumption makes it possible to predict that approximately 5 participants in each condition will claim that they got two tails in two coin flips, regardless of their assigned conditions. If the observed chance of getting two tails in two flips statistically exceeds the expected chance of 25% in some of the four conditions, it will mean that some participants in that condition might have broken the game's rules. This take-home assignment of coin flips will allow participants to be anonymous in their cheating behavior, while enabling the experimenter to naturally observe unethical behavior requiring voluntary, active involvement by the participant. This procedure purportedly produces more strong feelings of anonymity among participants than does the double-anonymous procedure, as nobody can prove that an individual has cheated.

There are four experimental conditions in this study: the nonidentifiable–reward condition, the identifiable–reward condition, the nonidentifiable–nonreward condition, and the identifiable–nonreward condition. Hypothesis 1 predicts that the observed chance of obtaining two tails in two flipping attempts in the coin-flip assignment will statistically deviate from the expected chance of 25% in the nonidentifiable–reward condition, implying

that there should be some cheaters in this condition. Given that participants in the identifiable-reward condition are still assured nonassociability of their traits with respect to cheating behavior, despite being identified, participants in this condition are also expected to behave in the same manner as those in the nonidentifiable-reward condition. Consequently, Hypothesis 2 predicts that the observed chance will also statistically deviate from the expected chance in the identifiable-reward condition.

Method

Participants

A sample of 143 university students majoring in either engineering (81 men and 14 women) or psychology (13 men and 35 women) at a Japanese university were recruited from two general psychology classes and took part in this study. The average age of participants was 19.22 years (range = 18–42 years, $SD = 3.29$), and all of them were granted extra course credit for participation. The study involved a 2 (nonidentifiable, identifiable) \times 2 (reward, nonreward) between-participants design, and each participant was randomly assigned to one of the four experimental conditions: nonidentifiable-reward (the participant's identifiable information was not required in the experimental assignment, accompanied by the monetary reward; 10 women and 27 men), identifiable-reward (the information was required in the assignment, accompanied by the reward; 15 women and 23 men), nonidentifiable-nonreward (the information was not required in the assignment without the reward; 14 women and 20 men), and the identifiable-nonreward condition (the information was required in the assignment without the reward; 10 women and 24 men).

Materials

Individuals with low morality or self-interest-oriented attitudes more easily engage in cheating behavior for material self-interest. To ensure that the participants were all similar in both morality and attitudes towards money, a pre-experimental questionnaire session was conducted. Zimbardo (1969, 2004) has suggested that situational factors, such as anonymity, occasionally induce people to engage in socially unacceptable behavior. If this is the case, observed behaviors of equally moral participants with similar attitudes toward money would differ across the four conditions. Thus, this procedure was designed to be a manipulation check for precisely examining the dependent variable via the effects of the independent variables.

In this pre-experimental questionnaire session, 12 items from Tsujioka and Murayama's (1975) 72-item value judgment scale and 28 items from Haraoka's (1990) 82-item scale of attitudes toward money were employed to measure the participants' morality and attitudes toward money on a scale of 1 (*disagree*) to 5 (*agree*). The 12-item morality scale had a single-factor structure (Cronbach's alpha coefficient was not reported in the original study) and was designed to measure participants' levels of compliance with the law, public order, and social norms (e.g., "I would like to comply with public order in my life"). The 28-item attitudes scale consisted of two factors with Cronbach's alpha coefficients of .85 and .76, respectively. The first factor (19 items) was

designed to capture one's sense of the social value of money (e.g., "Whatever we do, the most important thing is money"), whereas the second (9 items) was designed to measure one's sense of the harmful effects of money on society (e.g., "Money is the root of all evil"). In total, 40 items were prepared for the pre-experimental questionnaire session.

Because the dependent variable was socially unacceptable behavior, it was also necessary to introduce a cover story, to prevent social desirability effects among participants concerning the dependent variable. To fulfill this purpose, participants were first asked to complete a fictitious psychological assignment that was ostensibly designed to measure their "flexibility in idea generation." The dependent variable was secretly measured in the subsequent assignment, labeled "the coin-flip fun game." By completing the fictitious psychological assignment before the actual experiment, participants would be less careful and suspicious about what was going on in the actual experiment.

The fictitious experimental materials comprised a 16-item mathematical test (e.g., "Fill in the following blanks with the appropriate numbers: $_ + _ = 10,000$ people") and a 10-item word-association test (e.g., "Write three words that can be associated with the word *English*"). The actual experimental assignment was a coin-flip game, attached to the above two fictitious psychological tests as a "special reward game" for participants in the two reward conditions, or as a simple probability game for those in the two nonreward conditions. All participants were instructed to prepare a coin (any kind of Japanese currency) and flip it twice in this coin-flip assignment.

These three assignments were stapled together with a cover sheet and two additional pages (one a debriefing page and the other the experimenter's contact address) as a take-home assignment booklet for distributing to participants. Participants were asked to complete this take-home assignment at home or at the library, as they would feel more anonymous as well as experience fewer social desirability effects in a natural setting (e.g., in their own room) than in a laboratory setting. Finally, participants in all four conditions were asked to prepare a stopwatch beforehand in order to measure the duration of time they would spend on the two fictitious flexibility assignments. The introduction of this procedure was intended to make the fictitious psychological tests more plausible to participants.

Procedure

The pre-experimental questionnaire session was secretly conducted in two general psychology classes by a female confederate, along with her own "communication-style" questionnaire survey, which was a separate study from the present study, approximately 4 weeks before the assignment booklets were actually distributed. This procedure was employed in order to allay any doubt the prospective participants might have about the relationship between the contents of the questionnaire (morality and attitudes toward money) and the fictitious purpose of the following experimental assignment (measuring flexibility in idea generation) if the same person (the actual experimenter) gave them the questionnaire and the assignment booklet at the same time. Four weeks later, the actual experimenter, who pretended to be a research assistant, told students in the same classrooms that another graduate student

(a confederate) was soon conducting a study on flexibility in idea generation and asked them for participation. The research assistant also added that participants would not need to meet the actual experimenter during the study, so their anonymity would be secured. The research assistant then randomly distributed four types of the assignment booklets to the participants who agreed to take part in the study. Participants were asked to take the booklets home but then hand them in to the research assistant within the next two scheduled classes.

On the cover sheet of the take-home assignment booklet of all the four conditions, ostensible instructions on how to complete the assignment were as follows:

Please complete the assignment in a quiet place where you can be completely alone, such as your own room or a study room in the library; once you have started filling in the assignment, please complete it without stopping. Do not leave the assignment half-done. Once you have completed the assignment, please do not correct any of your answers. Put your assignment in the envelope given and seal it with paste or cellophane tape when you are finished. Please do not consult with other participants about the contents of the assignment before you hand it in.

In the two nonidentifiable conditions, participants were required to fill in only the blanks on the cover sheet asking for plausible experimental information, such as their sex, department, age, current academic year, and the name of the place where they completed the assignment (e.g., one's room), whereas participants in the two identifiable conditions were asked to provide their name and student ID number in addition to the above information.

On the next two pages, participants in all four conditions were instructed to complete the two fictitious flexibility tests and were timed with a stopwatch. After participants completed these two tests, those in the two reward conditions saw the coin-flip assignment on page 4 of the assignment booklet, in which they could win a 500-yen book coupon (approximately US\$4.75) as an extra reward for participation in the study if they managed to get two tails in two coin flips. In the nonreward conditions, participants were also asked to flip a coin twice in the coin-flip assignment, but they could not win anything even when they managed to get two tails in two coin flips. Participants in all the conditions were required to fill in their coin-flip results at the bottom of the page (e.g., first flip: heads, second flip: tails) and the type of the coin they used (e.g., a 100-yen coin). Only "two-tail winners" in the two reward conditions were instructed to send the research assistant a blank e-mail that had as its subject line their reward number (e.g., "01"), for claiming their rewards.

On the last page of the assignment, the experimenter expressed appreciation for the students' participation in the study and provided instructions on how to hand in the assignment booklet. The students could also write comments regarding the study on the last page of the assignment booklet, or through e-mail to the experimenter. The research assistant subsequently collected all the take-home assignment booklets in the same class time within 2 weeks of the distribution date. On this occasion, the research assistant gave the 500-yen book coupon to those in the two reward conditions who had won in the coin-flip assignment.

Ethical Considerations

Because the present study involved cheating behavior, there was the possibility that some participants, especially those in the reward conditions who might have broken the game's rules to obtain the monetary reward, would be uncomfortable in the debriefing phase. To avoid or minimize their potential discomfort as much as possible, participants were not debriefed immediately after the study. Instead, a piece of paper was attached to the take-home assignment booklet during the preparation of the study, informing each participant that a couple of deceptions were employed in the study, and that full explanations would be provided to those who wished to have them.

A similar debriefing procedure was employed in Bersoff's (1999) study, in which unethical behavior (not reporting an overpayment) was also examined. This procedure was found to be a practical compromise between two contradicting ethical considerations in this study as well as in Bersoff's study: participants' right to know detailed procedures of the study, and the experimenter's responsibility not to create unnecessary discomfort for participants. In total, 10 participants sought a debriefing of the study, and the experimenter sent them an e-mail explaining the particular deceptions and the actual purpose of the study. Even after receiving the debriefing e-mail, none of the participants actually complained about the study or reported discomfort regarding the deceptions.

Results

Manipulation Check

Before any analyses were performed, all unanswered or incomplete items were automatically deleted from the questionnaire data. A principal factor analysis was first conducted with varimax rotation on the scales of morality and attitudes toward money. Although the sample size was not large enough to provide stable factor structures, this factor analysis was performed to reconfirm the dimensionality of each scale. One item was deleted from the morality scale, as it did not significantly load on any factor found. A scree plot of eigenvalue distribution indicated 6.35, 4.45, 3.54, 2.01, 1.89..., and a three-factor solution was supported for the whole scale, including the morality and attitudes scales, although it accounted for only 31.79 of the variance. Consequently, these two scales were found to have the same factor structures as the original scales (a single-factor structure for the morality scale with a Cronbach's reliability coefficient of .79, and a two-factor structure for the attitudes scale with Cronbach's reliability coefficients of .88 and .83). To avoid any confusion on further analyses, one factor of the attitudes scale (19 items) was named "attitudes toward the social value of money," and the other factor (9 items) was labeled "attitudes toward the morality of money."

Means and standard deviations of all the questionnaire data were computed as shown in Table 1. Subsequently, a one-way ANOVA was performed on the questionnaire data, to examine any differences between participants in the four experimental conditions. The results of the ANOVA indicated that no significant differences were found between participants in morality, $F(3, 122) = 0.18, ns$; attitudes toward the social value of money, $F(3, 120) = 1.54, ns$; and attitudes toward the morality of money, $F(3, 121) = 0.14, ns$. From these

results it was assumed that the participants in the four conditions did not differ from one another in terms of these three criteria.

Table 1
Means and Standard Deviations for the Measures of Morality and Attitudes Toward Money

Condition	Morality		Social value of money		Morality of money	
	M	SD	M	SD	M	SD
N-R	3.64	0.47	3.44	0.65	2.96	0.72
I-R	3.57	0.47	3.22	0.63	3.10	0.74
N-NR	3.55	0.60	3.19	0.46	3.09	0.61
I-NR	3.57	0.58	3.42	0.54	3.04	0.60

Note. N-R = nonidentifiable-reward; I-R = identifiable-reward; N-NR for the nonidentifiable-nonreward; I-NR = identifiable-nonreward

Experimental Data

In total, 143 take-home assignments (37 in the nonidentifiable-reward condition, 38 in the identifiable-reward condition, 34 in the nonidentifiable-nonreward condition, and 34 in the identifiable-nonreward condition) were collected by the due date. The observed chances of getting two tails in two coin flips in the four conditions are shown in Figure 1, and a binomial test was subsequently performed on the observed chances of the four conditions. The results found that the observed chances did not statistically deviate from the expected chance of 25% in the identifiable-reward condition (8 out of 38 participants; 21%, *ns*), in the nonidentifiable-nonreward condition (12 out of 34; 35%, *ns*), and in the identifiable-nonreward condition (5 out of 34; 15%, *ns*).

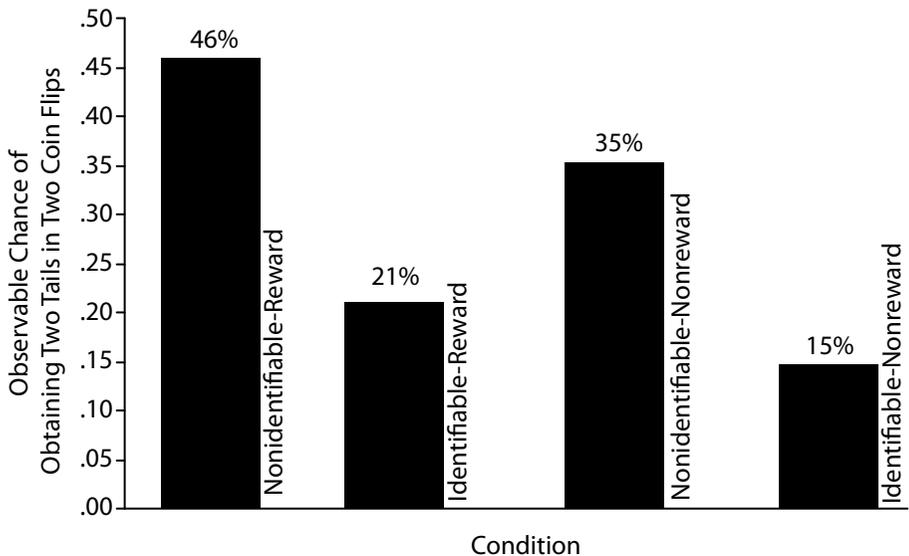


Figure 1. Results of the coin-flip game assignment in the four conditions.

In the nonidentifiable-reward condition, however, 17 out of 37 participants (46%) claimed that they got two tails in two coin flips. The

observed chance of getting two tails in two coin flips in this condition statistically deviated from the expected chance of 25% ($p < .01$), implying that some of those who allegedly won in the coin-flip game might have broken the assignment rules in order to pursue the monetary reward. The number of "rule-breakers" in this condition was supposed to be around 8, based on a simple calculation of the observed number of winners (17) deducted by the statistically expected number of winners ($37 \times .25 = 9.25$).

Additional analyses were performed to reveal any potential differences in the behaviors observed in the four conditions. A *t* test was performed on the questionnaire data between participants in the nonidentifiable-reward condition who won the monetary reward (17 participants) and those who did not (20 participants), as there were supposed to be some cheaters among the reward winners in this condition. The results showed no significant differences between the two groups in morality ($M = 3.69$, $SD = 0.54$, for two-tail winners; $M = 3.60$, $SD = 0.42$, for nonwinners), $t(33) = 0.55$, *ns*; the social value of money ($M = 3.56$, $SD = 0.55$, for winners; $M = 3.34$, $SD = 0.72$, for nonwinners), $t(32) = 0.99$, *ns*; and the morality of money ($M = 2.99$, $SD = 0.77$, for winners; $M = 2.93$, $SD = 0.69$, for nonwinners), $t(32) = 0.22$, *ns*. Thus, it was assumed that the reward winners in this condition, including those who might have broken the assignment rules for the reward, did not differ from the nonwinners in the same condition in terms of the measured morality and attitudes toward money. Finally, participants were divided by academic major (see Table 2) and sex (see Table 3), and a binomial test was conducted on the observed chances across the eight subgroups in each case, despite the fact that the sample sizes were not large enough to obtain reliable statistical results. It was found that only the observed chances of engineering students (22 men and 3 women) and male students (22 engineers and 5 psychologists) in the nonidentifiable-reward condition deviated from the statistically expected chance (14 out of 25 engineers won, 56%, $p < .001$; 15 out of 27 male students won, 56%, $p < .001$), while the observed chances of their counterparts did not (3 out of 12 psychologists won, 25%, *ns*; 2 out of 10 female students won, 20%, *ns*).

Table 2
Coin-Flip Results Across the Four Conditions, Sorted by Academic Major

Major	N-R		I-R		N-NR		I-NR	
	Two tails	<i>n</i>						
Engineering	14 (56%*)	25	5 (19%)	27	9 (41%)	22	4 (19%)	21
Psychology	3 (25%)	12	3 (27%)	11	3 (25%)	12	1 (8%)	13

Note. The observed chance of each group is in parentheses.

* $p < .001$

Table 3
Coin-Flip Results Across the Four Conditions, Sorted by Sex

Sex	N-R		I-R		N-NR		I-NR	
	Two tails	<i>n</i>						
Male	15 (56%*)	27	4 (17%)	23	7 (35%)	20	4 (17%)	24
Female	2 (20%)	10	4 (27%)	15	5 (36%)	14	1 (10%)	10

Note. The observed chance of each group is in parentheses.

* $p < .001$

Discussion

The main focus of the study was whether or not the frequency of self-interested behavior that required voluntary active involvement of the actor would increase among adult individuals solely through the more strictly defined anonymity. The use of coin flips and take-home assignments was chosen in order to reproduce more complete feelings of anonymity among participants with respect to unethical behavior, as well as to naturally observe unethical behavior requiring voluntary active involvement of the participant. This research design made it impossible to measure exactly how many of the participants, or which ones, actually engaged in cheating behavior. However, the statistical results indicated that the observed chance of winning two tails in two coin flips in the nonidentifiable-reward condition (46%) deviated from the expected chance frequency (25%), supporting Hypothesis 1. This in turn implied that some participants in this condition (approximately eight) voluntarily violated the game's rules for the reward. On the other hand, despite being as anonymous as those in the nonidentifiable-reward condition with respect to cheating behavior, the observed chance did not deviate from the expected chance among participants in the identifiable-reward condition (21%), rejecting Hypothesis 2.

Although the support for Hypothesis 1 was neither surprising nor new, at least the present study found that adult individuals tended to engage in unethical behavior for obtaining a material self-interest through the more strictly defined anonymity, even when such behavior required voluntary active involvement. In addition, unlike socially unacceptable behaviors examined in past research (e.g., Meier & Hinsz, 2004; Spivey & Prentice-Dunn, 1990), unethical behavior observed in the present study was not induced through experimental orders or other psychological phenomena, such as conformity and modeling. The results of the pre-experimental questionnaire also indicated that morality and attitudes toward money were not significantly different among the participants. As suggested by Zimbardo (1969, 2004), this finding implies that equally moral people with similar attitudes toward money can end up behaving differently, depending on the situations they are in. However, the rejection of Hypothesis 2 cast a little doubt on such a conclusion. Participants in the identifiable-reward condition were as anonymous as those in the nonidentifiable-reward condition with respect to their cheating behavior, from the viewpoints of the experimenter and other participants. Nonetheless, none of them had cheated to obtain the reward. As the only difference between the two conditions was the manipulation of the participants' identity, it was very possible that one's identity might have a preventive effect on self-interested unethical behavior among anonymous adult individuals.

One possible explanation regarding the rejection of Hypothesis 2 comes from objective self-awareness (OSA) theory (Duval & Wicklund, 1972). OSA theory claims that when attention is paid inwards, people become objectively self-aware, and in such a state they will try to change their behavior to meet their own behavioral standards or vice versa. Past research employed a mirror for making participants objectively self-aware, and such a manipulation prevented them from engaging in unethical behavior in some studies (Diener & Wallbon, 1976; Scheier, Fenigstein, & Buss, 1974), although the same manipulation produced the opposite effects in other research (Carver,

1974). Based on OSA theory, it is possible to assume that the participants in the identifiable-reward condition became more objectively self-aware than those in the nonidentifiable-reward condition by providing their identifiable information. As a result, they might have adapted potentially unethical behavior to their ethical standards, refraining from engaging in such behavior. Unfortunately, the present study provides no clue regarding this possibility, but given that self-awareness does play some role in unethical decision-making among anonymous individuals, equipment (such as a mirror) may work in the same manner as did the manipulation of participants' identity in the present study.

Limitations of the Present Study

Although the present study confirmed that the frequency of self-interested unethical behavior will increase among anonymous individuals, this finding could be construed differently by the results of additional analyses. When divided by sex and major, only the observed chances of engineering students and male students in the nonidentifiable-reward condition deviated from the expected chance. Because in this study most of the engineering students were men (81 out of 95) and most of the psychology students were women (35 out of 48), it was not appropriate to conclude that engineers were more likely to behave in an antisocial manner than psychologists. Considering that antisocial behavior is more common in men than in women (Moffitt, Caspi, Rutter, & Silva, 2001), it was more plausible that the behavioral difference between engineers and psychologists in the nonidentifiable-reward condition might have simply been due to sex differences in self-interested unethical behavior. However, before reaching such a conclusion, sex differences in the dependent variable should be examined more strictly with appropriate sample sizes in the future.

Also, the majority of the participants in the nonidentifiable-reward condition did not behave in an unethical manner for material self-interest, even when completely anonymous with respect to cheating behavior. Seventeen participants won the reward in the coin-flip assignment, statistically about 9 of whom might have truly won. In other words, only 8 of 37 participants in the nonidentifiable-reward condition engaged in cheating behavior to obtain the reward. The perceived degree of anonymity and the attractiveness of the reward might have had some effects on cheating behavior among the nonwinners in this condition. That is, the nonwinners might not have felt as anonymous as the winners during the study, or they might simply have found the reward not attractive enough. A post hoc questionnaire that measured the participants' subjective feelings of anonymity during the study (e.g., "Did you feel that nobody would figure out what you were doing on the assignment?"), and the use of various amounts of the reward (e.g., US\$2, US\$10), may constitute additional explanations for this behavioral difference between them.

Finally, as already noted, the present study could not report the exact frequency of occurrence of the self-interested unethical behavior, as it examined the dependent variable through probability in order to keep participants anonymous as well as to reduce social desirability effects regarding unethical behavior. A research design is warranted that enables the experimenter to measure the exact frequency of occurrence of unethical behavior while keeping participants anonymous with regard to such behavior.

Future research should take these limitations into account in order to more precisely explain self-interested unethical behavior among anonymous individuals.

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