Dark, grey, or bright creativity? (Re)investigating the link between creativity and dishonesty

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Abstract

The question of whether and, if so, how creativity and unethical behavior such as dishonesty are related to each other has been addressed in multiple studies, with mixed results overall. The aim of this Registered Report is to shed further light on this issue. We first present a meta-analysis on the relation between creativity and dishonesty comprising the samples from a pre-registered multi-lab study (on a different topic), which found no relation between the constructs in question (k = 19, N = 2,154, r_p = .02). Next, we examined the relation between creativity and dishonesty in a study (N = 1,152), in which we addressed several limitations of previous research. Specifically, we examined relations between comprehensively assessed creativity and dishonesty using subjective and objective indicators for both constructs. We found mixed results concerning the relation between creativity and dishonesty. In the majority of the confirmatory statistical tests, subjective creativity was positively related, whereas objective creativity was negatively related to dishonesty in the mind game. However, in exploratory analyses, we found that neither subjective nor objective creativity was relatetd to dishonesty in the second dishonesty measure, the sender-receiver game.

Keywords: Creativity, dishonesty, unethical behavior, HEXACO

Introduction

Every society suffers from unethical behaviors such as corruption, money laundering, and tax fraud. Given the substantial costs that can arise from unethical behaviors, researchers across various fields have tried to identify situation and person factors predicting such behaviors (e.g., Gerlach, Teodorescu, & Hertwig, 2019; Heck, Thielmann, Moshagen, & Hilbig, 2018; Rosenbaum, Billinger, & Stieglitz, 2014). With regard to person factors, the construct of creativity, which 'involves the production of novel, useful products' (Mumford, 2003, p. 110), has been named repeatedly as a predictor (for a recent review, see Shen, Yuan, Yi, Liu, & Zhan, 2019).

Despite a great deal of effort to shed light on the relation between creativity and unethical behaviors, existing findings remain inconclusive: Some studies found that creativity is positively related to unethical behaviors (e.g., Gino & Ariely, 2012), other studies found that creativity is negatively related to unethical behaviors (e.g., Niepel, Mustafić, Greiff, & Roberts, 2015), other studies found that creativity and unethical behaviors are related to each other in specific contexts only (e.g., Mai, Ellis, & Welsh, 2015), and yet other studies found that there is no relation between the constructs at all (e.g., Dymit, 2015).

Herein, we provide a pilot study and a second study furthering the understanding of the relation between creativity and unethical behaviors. Specifically, we investigate the relation between creativity and dishonesty. We focus on this relation because dishonesty represents an important form of unethical behavior, and because dishonesty and dishonesty-related constructs have been the criteria of interest in the majority of the studies linking creativity to unethical behaviors (e.g., Beaussart, Andrews, & Kaufman, 2013; Gino & Ariely, 2012; Mai et al., 2015).

In the pilot study, we present meta-analytic findings on the link between creativity and dishonesty, based on the data from a multi-lab registered replication report (Verschuere et al., 2018). Following this, we link two subjective (i.e., self-report) and two objective (i.e., performance-based; Park, Chun, & Lee, 2016) creativity measures to (1) a straightforward behavioral cheating task as a clear measure of dishonesty, namely, a previously used variant of the mind game (Jiang, 2013; Schild, Heck, et al., 2019), and (2) the basic personality trait dimension of Honesty-Humility, a self-report measure of one's tendency to behave, among other things, in a dishonest way (Zettler, Thielmann, Hilbig, & Moshagen, 2020). By following recent recommendations to use a multi-method creativity assessment (Ambrose & Machek, 2015; Park et al., 2016; Plucker & Makel, 2010), this approach sheds light on the question which kind of (measured) creativity—if any—is related to dishonesty. Furthermore, we test whether creativity has any incremental validity in predicting dishonest behavior (assessed via the mind game) controlling for three consistently found personality predictors of dishonesty, namely, age, gender (Gerlach et al., 2019), and Honesty-Humility (e.g., Heck et al., 2018). In so doing, we test whether (specific types of measures of) creativity predict(s) dishonesty beyond the influence of established personality predictors.

Existing findings on the relation between Creativity and unethical behavior

Do creative people behave in a more unethical way?

The most influential line of research on the relation between creativity and unethical behavior suggests a positive relation between the constructs. Several arguments have been put forward on why creativity might be positively linked to unethical behavior. Gino and Ariely (2012), for instance, hypothesized that creative people may behave in a more dishonest way for two reasons. First, based on the positive link between creativity and divergent thinking—an

ability to generate multiple and varied solutions to problems (Cropley, 2006)—, Gino and Ariely (2012) speculated that divergent thinking enhances the generation of original ways to disobey moral rules, thus increasing dishonesty. Second, people high in creativity might have a higher level of cognitive flexibility—an ability to represent knowledge from different perspectives tailored to understand given situations (Spiro et al., 1992)—which can result in reinterpretations of unethical behaviors in a self-serving way (i.e., in the generation of unethical justifications). Thus, Gino and Ariely (2012) hypothesized creativity to increase dishonesty due to higher levels of divergent thinking and cognitive flexibility among creative individuals.

Supporting this theorizing, Gino and Ariely (2012; Studies 1, 3, and 4) found that self-reported creativity, measured by three different self-report questionnaires, correlated positively with dishonesty across four different cheating tasks. Further, in line with this theorizing, Beaussart et al. (2013) found that participants high in creativity expressed lower moral integrity in a self-report scale, and were more likely to fail a behavioral integrity test. In sum, these and other findings (e.g., Bassarak et al., 2017; Vincent & Kouchaki, 2016; Walczyk, Runco, Tripp, & Smith, 2008) suggest that creativity is positively related to unethical behavior including dishonesty.

Do creative people behave in a more ethical way?

Another line of research suggests that creativity may in fact be negatively related to unethical behavior. Mumford et al. (2010), for instance, assumed that ethical decision making and execution are processes that require complex skills such as recognizing present circumstances, anticipating consequences of one's actions, and considering perspectives of other people. Creativity, in turn, may enhance a more effective use of these skills, and therefore lead to more ethical behavior.

In line with this theorizing, Mumford et al. (2010) found that creative problem-solving processes among doctoral students were positively related to self-reported ethical decision making with regard to scientific conduct. In another study, Niepel et al. (2015) found that self- and teacher-rated creativity of students aged 10 to 14 was positively related to self- and teacher-rated ethical decision-making one year later, pointing out that creative children may in fact behave in a more ethical way. In sum, those and other findings (e.g., Bierly, Kolodinsky, & Charette, 2009; Keem, Shalley, Kim, & Jeong, 2018) point towards a negative relation between Creativity and unethical behavior.

Is Creativity related to unethical behavior in specific contexts only?

Another line of research suggests that the relation between creativity and unethical behavior must be considered in the light of moderators and mediators such as the presence or absence of situational cues activating creativity (in line with Trait-Activation Theory; Tett & Burnett, 2003), Moral Disengagement (i.e., the tendency to generate justifications that enhance committing immoral actions by decreasing resulting feelings of distress; Moore, 2015), and Moral Identity (i.e., the extent to which people value their moral self-image and perceive themselves as moral; Aquino & Reed, 2002).

With regard to situational cues, Mai et al. (2015), for instance, found a positive relation between self-reported creativity and dishonesty in three different economic games only when creativity was situationally activated via prior participation in various creative tasks. In addition, Mai et al. (2015) found that when creativity was activated, creative individuals were more dishonest because of their ability to generate more justifications of unethical behavior. Considering another interplay of variables, Zheng, Qin, Liu, and Liao (2017) found that creativity was positively related to Workplace Deviant Behavior if people were low (but not

high) in Moral Identity. Additionally, this relation could be explained by a high level of Moral Disengagement among people with high creativity and low Moral Identity. In a conceptually similar study, Keem et al. (2018) found, among other things, creativity to be negatively related to unethical behavior among individuals high (but not low) in Moral Identity.

Altogether, these and other results suggest that the relation between creativity and unethical behavior might perhaps emerge only in specific contexts and/or in combination with certain other personality characteristics. Furthermore, the direct correlations observed in those studies suggest that creative individuals may behave either more (Mai et al., 2015) or less (Keem et al., 2018) unethical, or neither more nor less unethical than non-creative ones (Zheng et al., 2017). In sum, despite providing multiple plausible mechanisms explaining the relation between creativity and unethical behavior, those results provide a very inconclusive picture of the direct relation between the two phenomena.

Linking different creativity measures to a straightforward cheating task

In the light of the inconclusive—and partly opposite—findings, we herein critically test the relation between creativity and dishonesty. Most importantly, we link theoretically and methodologically different creativity measures to straightforward dishonesty measures. Concerning the conceptualization and assessment of creativity, several suggestions have been put forward, from considering the self-concept of creativity (e.g., Kaufman et al., 2010), through creative achievements and activities (e.g., Carson, Peterson, & Higgins, 2005; Diedrich et al., 2018), to cognitive skills such as divergent and convergent thinking (e.g., Cropley, 2006). Consequently, creativity researchers have repeatedly suggested combining several creativity measures as a way of improving creativity assessment (e.g., Ambrose & Machek, 2015; Plucker & Makel, 2010). Park et al. (2016), for instance, emphasized that “the complex and

multidimensional characteristic of creativity requires a more comprehensive approach in assessing creativity" (p. 1). In support of this, Park et al. indeed found a rather small correlation between subjective and objective measures of creativity (r = .20, N = 1,500), indicating that subjective and objective measures of creativity may, to some degree, represent different aspects of (the construct of) creativity. Further, Park et al. found that subjective measures show a higher mean and a smaller variance than objective measures, potentially indicating that subjective creativity scores may to some degree also reflect illusory superiority, social desirability, and/or other characteristics that should not be taken as indicators of creativity.

The mixed findings on the link between creativity and unethical behavior thus may have arisen—at least, partly—from different way to assess creativity. Indeed, previous research has to a large degree relied on one creativity measure at a time, which does not allow for comparisons between different (subjective and objective) creativity measures and unethical behavior within a sample. Further, nearly all of the studies sketched above used a different measure of creativity.[1] So, although investigating a relation between constructs via different operationalizations is typically a good way to strengthen construct validity (Byworth, 2008), it has been emphasized that the diversity in creativity measurement approaches "has made it difficult to synthesize the results of different studies and research streams" (Batey, 2012, p. 55). Indeed, because of the variety of creativity measures used, it is difficult to compare and integrate previous—often

[1] With the exception of the Gough's Creative Personality Scale (Gough, 1979) which was used across three different studies (Gino & Ariely, 2012; Keem et al., 2018; Mai et al., 2015). The use of this scale might come with a specific limitation, however, because the scale includes characteristics such as 'honest' and 'sincere' as indicators of lower creativity and 'egoistical' as an indicator of higher creativity (Gough, 1979). Honesty- and creativity-related traits are typically grouped into different factors/dimensions in lexical studies (e.g., Lee & Ashton, 2004), though, so that one might argue that honesty- and non-selfish-related traits are no good indicators of creativity.

mixed or even opposite—findings on the relation between creativity and unethical behavior. This points at the necessity of comparing different measures of creativity with regard to their link to (one form of) unethical behavior. In the study presented herein, we thus consider two subjective and two objective creativity measures to examine which of these are related to dishonesty.

With regard to the dishonesty assessment, we use straightforward cheating tasks, meaning that people can see and realize the opportunity to cheat (for personal profit) clearly. We deem it important to link the different creativity measures to straightforward cheating tasks to shed light on the relation between (different conceptualizations and measures of) creativity and dishonesty without any confounding aspects in the assessment of the criterion. For instance, some of the cheating measures included in previous studies on the link between creativity and dishonesty might have required creativity and/or unintentionally wrong misinterpretations or reasoning to dishonestly obtain a profit. Gino and Ariely (2012), for instance, found that creativity was positively related to dishonesty in a cheating task in which participants could obtain a profit through dishonest misinterpretation of ambiguous stimuli, which in itself might have required creativity to perform a dishonest action (or which might have been based on an unintentional misinterpretation of the stimuli). Consequently, in our study, we link creativity to variants of (1) the mind game (Jiang, 2013; Schild et al., 2019), and—exploratory—(2) the sender-receiver game (Gneezy, 2005), both of which are behavioral tasks assessing dishonesty in a straightforward way. Note that linking different creativity measures to behavioral tasks mirrors investigating so-called prediction consistency, i.e., “if two variables are indicators of the same construct, they should not only be correlated with each other, but must also predict an external criterion in the same direction and to a similar extent” (Hilbig, Moshagen, & Zettler, 2016, p.

639). More precisely, we investigate whether the construct of creativity is related to dishonesty (rather than only specific conceptualizations or measurements of it).

Linking different creativity measures to Honesty-Humility

In order to more comprehensively test whether creativity (assessed via subjective and objective measures) is indeed an important personality predictor of dishonesty, we expand our investigation by including Honesty-Humility from the HEXACO Model of Personality (Ashton & Lee, 2007). Honesty-Humility is defined as "the tendency to be fair and genuine in dealing with others, in the sense of cooperating with others even when one might exploit them without suffering retaliation" (Ashton & Lee, 2007, p. 156). A recent large-scale re-analyses of different studies linking basic personality dimensions to dishonesty found that particularly (and arguably only) Honesty-Humility is linked to dishonesty (Heck et al., 2018). Similarly, in a recently conducted larger meta-analysis involving different measures of cheating/dishonesty, Honesty-Humility showed a substantial negative relation with dishonesty ($\hat{\rho}$ = -.25, k = 25, N = 3,073; Zettler et al., 2020).

The role of Honesty-Humility in the following investigation is twofold. First, Honesty-Humility serves as a subjective indicator of dishonesty, complementing the analyses on the link between creativity and dishonesty using objective dishonesty measures (i.e., cheating tasks). Consequently, four conceptually distinguishable kinds of relation are investigated, namely, links between (1) subjective measures of creativity and cheating (i.e., objective indicators of dishonesty), (2) subjective measures of creativity and Honesty-Humility (i.e., a subjective indicator of dishonesty), (3) objective measures of creativity and cheating, and (4) objective measures of creativity and Honesty-Humility.

Incremental validity of creativity over established predictors of dishonesty

The second role of Honesty-Humility is to serve as an established predictor of dishonest behavior (Heck et al., 2018; Zettler et al., 2019) and, thus, as a control variable when investigating the link between creativity and dishonesty. Specifically, we test if there is a relation between (subjectively and objectively measured) creativity and dishonesty when controlling for Honesty-Humility. If the proposed link between creativity and dishonest behavior would disappear when controlling for Honesty-Humility, this would suggest that (1) the relation in question is present due to the shared variance between creativity and Honesty-Humility, rather the specific impact of creativity itself, and therefore that (2) creativity has a lower validity in predicting dishonest behavior than Honesty-Humility. In addition to controlling for Honesty-Humility, we control for age and gender when linking creativity to dishonesty. Controlling for age and gender is based on recent meta-analytic evidence (Gerlach et al., 2019). In this meta-analysis, every additional year lowered the probability of dishonesty by 0.28% (N = 7,917, k = 40), and 4% more men lied as compared to women (N = 17,736, k = 380). Overall, controlling for these meta-analytic established predictors of dishonesty provides a strong test whether creativity is linked to dishonesty beyond other personality characteristics.

Finally, to provide an even more conservative test of the relation in question, we do not only test whether creativity has incremental validity in predicting dishonesty over age, gender, and Honesty-Humility, but also control for other personality characteristics that have been shown to be related to creativity itself (rather than to dishonesty). This allows us to test whether the (potential) observed relations between creativity and dishonesty are due to creativity itself, or rather other personality characteristics that have overlap with creativity. Specifically, we

additionally control for intelligence (e.g., Silvia, 2015) and Openness to Experience (e.g., Jauk, Benedek, & Neubauer, 2014; Zettler et al., 2020).

The Present Investigation

To shed light on the relation between creativity and dishonesty, we first conducted a meta-analysis as a pilot study based on freely available data from a multi-lab registered replication report (Verschuere et al., 2018). In this registered replication report, creativity was measured via a classic divergent thinking measure—namely, the Unusual Uses Task (Guilford, 1967)—and dishonesty was measured via a well-known matrix task (Mazar, Amir, & Ariely, 2008). Moreover, the registered replication report also includes assessments of participants' age, gender, Honesty-Humility, Openness to Experience, and intelligence. This allowed us to conduct a meta-analysis on the relations between an objective measure of creativity (i.e., Unusual Uses Task), Honesty-Humility, and cheating in the matrix task. Furthermore, it allowed us to conduct another meta-analysis in which we test whether creativity has any incremental validity over age, gender, and Honesty-Humility in predicting cheating behavior. Finally, we present a meta-analysis, analogical to the former one, but additionally controlling for Openness to Experience and intelligence.

Following this, we link subjective and objective creativity measures to a straightforward cheating tasks as well as to Honesty-Humility, in order to investigate whether creativity—or rather: which conceptualization of creativity—is linked to (subjective and objective indices of) dishonesty. Given the mixed findings on the topic so far, we explicitly test two opposing hypotheses stating that creativity is related to dishonesty (Hypothesis 1a), and that creativity is not related to dishonesty (Hypothesis 1b). Please note that "creativity" in the hypotheses above refers to both subjective and objective measures of creativity, whereas "dishonesty" refers to

both Honesty-Humility and cheating. Hence, the conclusion that creativity is (not) related to dishonesty would be made only if both creativity measures are (not) related to both dishonesty measures. Furthermore, we test whether (subjective and objective) creativity has any incremental validity over the established predictors of dishonesty (age, gender, and Honesty-Humility) in predicting cheating in a cheating task. In this regard, we test two contrasting hypotheses, stating that creativity has incremental validity over the established predictors of dishonesty (i.e., age, gender, and Honesty-Humility; Hypothesis 2a), and that creativity has no incremental validity over the established predictors of dishonesty (Hypothesis 2b). Finally, we test whether (subjective and objective) creativity has incremental validity over the above mentioned established predictors of dishonesty and factors (typically) related to creativity (intelligence and Openness to Experience) in predicting cheating. Again, we test two opposing hypotheses stating that creativity has incremental validity over the established predictors of dishonesty and predictors related to creativity (Hypothesis 3a), and that creativity has no incremental validity over the established predictors of dishonesty and predictors related to creativity (Hypothesis 3b) in predicting cheating in a cheating task. Please note that "creativity" in Hypotheses 2a-3b refers to both subjective and objective measures of creativity, whereas "dishonesty" refers to cheating. Hence, the conclusion that creativity has (no) incremental validity over established predictors of dishonesty (Hypotheses 2a and 2b), or over established predictors of dishonesty and factors closely related to creativity (Hypotheses 3a and 3b), would be made only if both subjective and objective creativity measures exhibit (no) incremental validity over the above mentioned predictors.

Pilot Study

Methods

Procedure and Participants

For the pilot study, we used the datasets from a multi-lab registered replication report (Verschuere et al., 2018; https://osf.io/mcvt7/). The registered replication report primarily aimed to replicate a link between moral reminding and dishonesty as described in Experiment 1 in Mazar et al. (2008) but also included measures of creativity, Honesty-Humility, age, gender, Openness to Experience, intelligence, and other constructs (for details, see Verschuere et al., 2018). Overall, there were datasets from 25 different labs (N = 6,786). Following the same exclusion criteria as Verschuere et al. (2018), we excluded sessions that included less than 50 participants (to ensure adequate anonymity and privacy of the participants; Mazar et al., 2008), where the instructions were administered incorrectly, and participants who did not follow the matrix or the priming task instructions (N = 2,112). Next, we excluded participants with missing (N = 47) or incorrectly reported (N = 23) creativity scores, and participants with missing HEXACO (see below) scores (N = 231). This resulted in a total sample size of N = 2,154 in the experimental condition (in which cheating was possible without being caught), and N = 2,219 in the control condition (in which cheating was not possible without being caught). The finally included datasets were collected in 19 different labs from 13 countries in total. Please note that the results without exclusions (except for the missing and incorrect data exclusions) are reported in the Supplemental Material (Tables S1-S4).

Measures

Creativity

Creativity was measured via the Unusual Uses Task (Guilford, 1967), a task aiming to assess divergent thinking by asking participants to list multiple possible uses of a given object (e.g. Silvia, Nusbaum, & Beaty, 2017; Silvia et al., 2008). Participants were asked to list as many uses of a paperclip as possible within two minutes (specifically, they were instructed not to spend more than two minutes on the task). For each participant, a rater provided a creativity score between 1 (low Creativity) and 10 (high Creativity) on the base of four aspects of the responses: fluency (how many uses were provided), originality (how unusual provided uses are), flexibility (how broad the range of uses is), and elaboration (how developed the uses are).

Honesty-Humility

Honesty-Humility was measured via the HEXACO-60 (Ashton & Lee, 2009), a questionnaire aiming to assess the HEXACO personality dimensions (including Honesty-Humility) via ten items each. In the HEXACO-60, participants are asked to indicate on a Likert scale ranging from 1 = ‘strongly disagree’ to 5 = ‘strongly agree’ the extent to which they agree with presented statements about themselves and other people. A sample item for Honesty-Humility is “I would never accept a bribe, even if it were very large”.

Openness to Experience

Openness to Experience was also measured via the HEXACO-60 (Ashton & Lee, 2009). A sample item for Openness to Experience is “I would be quite bored by a visit to an art gallery”.

Intelligence

Intelligence was measured via 10 items aiming to assess nonverbal intelligence (materials provided by C. Chabris; Verschuere et al., 2018). Each item consisted of a 3x3 graphical pattern

with one piece missing. Participants were instructed that they should choose for each item the one piece (out of eight possible pieces presented as response options) that matches the given pattern, and that they should not spend more than 5 minutes on this task. The intelligence score is computed as the sum of the correctly solved matrices.

Dishonesty

Dishonesty was measured via a problem-solving task comprising 20 matrices showing 12 different numbers each. Participants were instructed to search for numbers that add up to 10 in each matrix, and to check the "Got it" box for each matrix once they solved it. Participants were also informed that they should not spend more than four minutes on completing the task and that two participants were be randomly chosen to receive US $10 for each matrix they solved. Importantly, half of the matrices was unsolvable. In order to give participants an opportunity to misreport the number of matrixes solved (i.e., cheat) in the experimental condition, they were asked to tear out the page that contained the matrices, and to hand in only the page that contained the number of matrices they indicated to had solved (Verschuere et al., 2018). In the control condition, participants were asked to tear out a blank page, and hence it was visible whether they actually completed the matrices. The final score was computed as the number of matrices participants reported to have solved.

Results

In the following, we report five meta-analyses: on the (1) correlation between creativity and dishonesty, (2) correlation between creativity and Honesty-Humility, (3) correlation between Honesty-Humility and dishonesty, (4) predicting incremental validity of creativity over age, gender, and Honesty-Humility when regressed on dishonesty, and (5) analogical to the fourth meta-analysis, but additionally controlling for intelligence and Openness to Experience.

The meta-analyses were conducted using the *meta* (Schwarzer, 2007) and *metafor* (Viechtbauer, 2010) R packages. Following Aloe (2014), we used Hedges estimator to assess heterogeneity in meta-analytical effect sizes. To estimate the effect sizes for each dataset required to conduct the meta-analyses, we computed Fisher's r-to-z transformed (partial) correlations and (for a clearer interpretation) Pearson's (partial) correlations. The results from the correlational analyses are reported using Pearson's correlations, while the results from the regression analyses are reported using Pearson's partial correlations (Aloe, 2014; Aloe & Thompson, 2013). The results for Fisher's r-to-z transformed (partial) correlations, resulting in conceptually identical findings, can be found in the Supplemental Material (Tables S5-S7).

Furthermore, in the following we used equivalence testing in order to examine whether the obtained effects are smaller than what we assumed to be the smallest effect size of interest (SESOI). Specifically, following Lakens, Scheel, and Isager (2018), we computed 90% confidence intervals around the obtained effect sizes. If the obtained 90% CIs did not exceed the SESOI, we concluded that the effect is smaller than what we consider meaningful. Please note that we set the SESOI at $r = |.10|$, which corresponds to an effect size conventionally considered as small (Faul et al., 2009). Because we did not assume the SESOI a priori, we decided to set this (very conservative) effect size of $r = |.10|$.

Cheating in the matrix task

First, we tested whether participants indeed cheated in the experimental condition. To do so, we extracted the means of the reported number of solved matrices in each study in the control ($M = 3.25$, $SD = 2.64$) and the experimental ($M = 3.44$, $SD = 2.74$) conditions, which allowed us to conduct a meta-analysis on the mean differences between conditions. The Hedges estimator ($Q = 18.21$, $df = 18$, $p = .442$) indicated that the heterogeneity across studies was insignificant,

and the I^2 statistic indicated that 5.85% of the variability was due to heterogeneity rather than chance. A random-effects meta-analysis indicated that the standardized mean difference in the number of reported matrices between the experimental and the control condition was significant (*SMD* = 0.08, 95% CI [0.02, 0.14], $p = .011$; $k = 19$). Therefore, participants reported having solved more matrices in the experimental condition as compared to the control condition.

Correlational analyses

Creativity and dishonesty

We continued with investigating the relation between creativity and dishonesty in the experimental condition. Heterogeneity across studies was significant as indicated by Hedges estimator ($Q = 30.91$, $df = 18$, $p = .030$), and the I^2 statistic indicated that 36.87% of the variability was due to heterogeneity rather than chance. A random-effects meta-analysis indicated that the overall correlation between creativity and dishonesty was insignificant ($r_p = .02$, 95% CI [-0.04, 0.07], $p = .562$; $k = 19$). We continued with conducting equivalence testing of the obtained effect size. Specifically, following Lakens et al. (2018), we calculated a 90% confidence interval of the obtained effect size and tested whether it overlaps with the smallest effect size of interest (SESOI) of $r = |.10|$. The obtained 90% CI [-0.03, 0.06] of the effect size $r_p = .02$ did not exceed the SESOI of $r = |.10|$, suggesting that the relation between creativity and dishonesty was lower than what we set as being of interest. Additionally, the correlation between creativity and dishonesty was also insignificant in the control condition ($Q = 15.16$, $df = 18$, $p = .651$, $I^2 = 0\%$; $r_p = -.01$, 95% CI [-0.05, 0.03], $p = .541$; $k = 19$). Similarly, the 90% CI [-0.05, 0.02] did not exceed the SESOI of $r = |.10|$.

Creativity and Honesty-Humility

Next, we investigated the relation between creativity and Honesty-Humility. The Hedges estimator showed that the heterogeneity across studies was significant (Q = 32.52, df = 18, p = .019), and the I^2 statistic indicated that 41.44% of the variability was due to heterogeneity rather than chance. The results of the random-effects meta-analysis indicated that the correlation between creativity and Honesty-Humility was insignificant (r_p = -.02, 95% CI [-0.05, 0.02], p = .419 k = 19). Furthermore, we conducted equivalence testing of the obtained effect size. Specifically, we computed a 90% confidence interval of the obtained correlation coefficient and tested if it overlaps with the SESOI of r = |.10|. The 90% CI [-0.05, 0.02] of the effect size r_p = -.02 did not exceed the SESOI of r = |.10|. This suggests that the relation between creativity and Honesty-Humility was smaller than what we set as being meaningful.

Honesty-Humility and cheating

Next, we investigated the relation between Honesty-Humility and cheating in the experimental condition. As indicated by the Hedges estimator, the heterogeneity across studies was insignificant (Q = 13.68, df = 18, p = 0.750), and the I^2 statistic showed that 0% of the variability was due to heterogeneity rather than chance. The random-effects meta-analysis indicated that the relation between Honesty-Humility and dishonesty was significant (r_p = -.05, 95% CI [-0.10, -0.01], p = .012, k = 19). Importantly, however, the 90% confidence interval of this relation [-0.09, -0.02] fell within the pre-established SESOI. Additionally, the correlation between Honesty-Humility and the number of reported matrices was insignificant in the control condition (Q = 29.69, df = 18, p = .041, I^2 = 35.99%; r_p = -.04, 95% CI [-0.09, 0.01], p = .133; k = 19), and the 90% CI [-0.08, 0] did not exceed the SESOI of r = |.10|.

Testing for incremental validity of creativity in predicting dishonesty

In order to test for incremental validity of creativity over age, gender, and Honesty-Humility when predicting dishonest behavior, we computed a meta-analysis for a partial correlation between creativity and dishonesty (partialling out age, gender, and Honesty-Humility). The Hedges estimator indicated that the heterogeneity across studies was significant (Q = 28.94, df = 18, p = 0.049). The I^2 statistic showed that 33.78% of the variability across studies was attributed to heterogeneity rather than chance. The random-effects meta-analysis indicated that the partial correlation between creativity and dishonesty was insignificant (r_p = .01, 95% CI [-0.04, 0.06], p = .675, k = 19), and the 90% CI [-0.03, 0.06] did not exceed the SESOI of r = |.10|. The results for age, gender, and Honesty-Humility, together with a models additionally controlling for intelligence and Openness to Experience (which resulted in conceptually identical findings), are presented in Tables 1 and 2.

Discussion

In this pilot study, we found no support for a relation between a specific creativity measure (i.e., the Unusual Uses Task; Guilford, 1967) and specific (objective/subjective) dishonesty measures (i.e., the matrix task, Mazar et al., 2008; Honesty-Humility, Ashton & Lee, 2009). Furthermore, replicating results of multiple previous studies (Heck et al., 2018; Zettler et al., 2020), we found a significant negative relation between Honesty-Humility and dishonesty. However, it should be noted that, despite its statistical significance, this relation was smaller than what we pre-specified as meaningful. Furthermore, we found no incremental validity of creativity in predicting dishonesty above already established personality predictors of dishonest behavior. Interestingly, we found a positive relation between age and dishonesty and no

significant relation between gender and dishonesty, which does not go in line with other meta-analytical findings (Gerlach et al., 2019).

Two of the major strengths of this study are the large sample size accumulated across labs and countries, and the use of two commonly used measures of creativity and dishonesty. On the other hand, the Unusual Uses Task represents an objective measure assessing only one aspect of creativity, namely, divergent thinking, whereas other objective (e.g., Remote Associates Task; Mednick, 1962) or subjective (e.g., the Inventory of Creative Activities and Achievements; Diedrich et al., 2018) creativity measures have been suggested to assess different aspects of creativity. Arguably even more importantly, the matrix task does not assess pure dishonesty because the final score not only represents the number of matrices that were dishonestly reported as solved, but also the number of matrices that were actually solved correctly. Furthermore, some participants might have unintentionally thought to have solved a specific matrix (by miscalculating, maybe due to the time pressure; Heyman, et al., 2020). This limitation might explain, for instance, the very small relation between Honesty-Humility and cheating, given that previous studies consistently found larger effects (Heck et al., 2018; Zettler et al., 2020). Another limitation is that participants were responsible for meeting the given time limits, which might have led to confounding dishonesty with other measures. For instance, it might be that intelligence is confounded with dishonesty because dishonest people might have cheated by spending more time on the intelligence task. Finally, it should be noted that the creativity ratings were provided by one rater only, which is rather rare in creativity research and might have led to a comparatively low reliability and validity of the creativity score (Benedek et al., 2013). To address those limitations and to more critically test whether creativity is linked to dishonesty, in the following study we link several creativity measures to straightforward cheating measures,

namely, a variant of the mind game (Schild et al., 2019) and a sender-receiver game (Gneezy, 2005).

Study 1

In the following study, we critically test the relation between creativity, assessed via commonly used subjective and objective measures, and dishonesty, assessed via straightforward cheating tasks and an established personality predictor of dishonesty. In so doing, we, for the first time, provide a more comprehensive assessment of creativity when assessing its relation to dishonesty. Furthermore, we test for incremental validity of comprehensively assessed creativity in predicting dishonesty over established personality predictors of dishonest behavior.

Methods

Procedure and participants

Because previous findings on the relation between creativity and dishonesty do not provide a clear guidance on what effect size of the relation in question to expect, we decided to assume a small-to-medium effect size of $r = |.15|$, based on resource limitations. Because in the following we use both Pearson's *r* and odds ratios (*OR*), we decided to convert the assumed Pearson's *r* to *OR*, following the approach outlined by Heck et al. (2018; script: https://osf.io/rebnk/). Specifically, we simulated a dataset with $N = 100{,}000$, based on two correlations of $r = .15$ and $r = -.15$, respectively, between the included variables. Then, we fitted a logistic regression model on the obtained data, which revealed that odds ratios of approximately $OR = 1.30$ and $OR = 0.75$ correspond to $r = .15$ and $r = -.15$, respectively (script available in the OSF; see above). Based on these effect sizes, we conducted the following power analyses:

- Hypothesis 1a: the required sample size to test a two-tailed Pearson's correlation with r = |.15|, α = .05, and assuming power of .90, equals N = 571 ("pwr" R package; Champely, 2018).
- Hypothesis 1b: the required sample size to test for equivalence between the obtained effect size and a SESOI of r = |.15|, with α = .05, and assuming power of .90, equals N = 477 ("TOSTER" R package; Lakens, 2017).
- Hypothesis 1a/2a/3a: the required sample size to test a modified logistic regression with one (Hypothesis 1a), five (Hypothesis 2a), or seven (Hypothesis 3a) predictor(s), one dependent variable, the effect size(s) of *OR* = 1.30/0.75, the proportion of reported matching outcomes of 30%, the probability of winning of 12.5%, α = .05, and assuming power of approximately .90, equals N = 1,100 (based on a power simulation with 1,000 iterations; Heck & Moshagen, 2018).
- Hypothesis 1b/2b/3b: the required sample size to test a modified logistic regression with one (Hypothesis 1b), five (Hypothesis 2b), or seven (Hypothesis 3a) predictor(s), one dependent variable, the SESOI of *OR* = 1.30/0.75, the proportion of reported matching outcomes of 30%, the probability of winning of 12.5%, α = .10, and assuming power of approximately .90, equals N = 1,100 (based on a power simulation with 1,000 iterations; Heck & Moshagen, 2018). Please note that α = .10 was assumed, because equivalence testing is based on one-tailed tests (Lakens, 2017).

Based on the above power calculations, we concluded that the sample size needed for the required analyses equals N = 1,100. In order to account for a potential dropout from the first to the fourth wave (see below), we decided to oversample by 30%, which results in the final sample size of N = 1,430 participants. Finally, 1,430 participants completed the first measurement

occasion, 1,212 completed the first two measurement occasions, 1,152 participants completed the first three measurement occasions, and 1,125 participants completed the four measurement occasions of the study. In the following, the analyses that do not include the data collected at the fourth measurement occasion are based on 1,152 participants (742 females, 402 males, and 7 participants who indicated the response option "other"; aged from 18 to 76, M_{age} = 34.70 years), whereas the analyses that include data collected at the fourth measurement occasion are based on 1,125 participants (724 females, 394 males, and 7 participants who indicated the response option "other"; aged from 18 to 76, M_{age} = 34.89 years).

We conducted the study via the online panel provider Prolific Academic (www.prolific.ac; Palan & Schitter, 2018) using the online survey software formr (www.formr.org; Arslan, Walther, & Tata, 2019). All participants were UK residents. To reduce potential carry-over effects and to minimize the time participants need to complete multiple measures in a row, the study consisted of four measurement occasions. At the first measurement occasion, participants completed two subjective creativity measures (the Inventory of Creative Activities and Achievements, Diedrich et al. 2018; the Revised Creativity Domain Questionnaire, Kaufman et al., 2010) and a personality questionnaire (HEXACO-60; Ashton & Lee, 2009) in random order. At the second measurement occasion, to which participants were invited one week after the first measurement occasion, they completed two objective creativity measures (the Unusual Uses Tasks, e.g., Silvia, 2011; the Remote Associations Tasks, Mednick, 1962), and an intelligence measure (ICAR-16, Condon & Revelle, 2014) in random order. At the third measurement occasion, to which participants were invited one week after the second measurement occasion, participants took part in the first cheating task—the mind game (Jiang, 2013; Schild et al., 2019). At the fourth measurement occasion, one week after the third,

participants took part in the second cheating task—the sender-receiver game (Gneezy, 2005). The detailed description of the data collection together with the exact dates of the data collection is available in the "laboratory log" in the OSF (see above).

The exact study procedure is available at https://wave1-c.formr.org (measurement occasion 1), https://wave2-c.formr.org/ (measurement occasion 2), https://wave3-c.formr.org (measurement occasion 3), and https://wave4-c.formr.org (measurement occasion 4), and all study materials and analyses scripts, are available in the OSF (see above).

Measures

Creativity

We used two subjective—namely, the Inventory of Creative Activities and Achievements (ICAA, Diedrich et al. 2018) and the Revised Creativity Domain Questionnaire (Kaufman et al., 2010)—and two objective—namely, the Unusual Uses Task (e.g., Silvia et al., 2008) and the Remote Associates Task (Mednick, 1962)—creativity measures, all of which have been repeatedly found to be reliable and valid measures of their respective constructs (e.g., Benedek, Mühlmann, Jauk, & Neubauer, 2013; Diedrich et al., 2018; Kaufman et al., 2010; Mednick, 1962; Silvia, Wigert, Reiter-Palmon, & Kaufman, 2012; Silvia et al., 2008). This selection of measures allows to test five aspects of creativity that are most commonly addressed in the literature: everyday creativity and professional creativity (Diedrich et al. 2018); self-concept of creativity (Kaufman et al., 2010); as well as divergent (e.g., Silvia et al., 2008) and convergent (Mednick, 1962) thinking. The order of the items within each subjective creativity measure and the order of the tasks within each objective creativity measure were randomized.

We included one attention check item in each the ICAA, the CDQ-R, and the HEXACO-60 (i.e., three in total, specifically, 'This is an attention check. Please choose 1'; 'This is an

attention check. Please choose 4'; 'This is an attention check. Please choose 5'). Participants who failed at least one of the attention check items were excluded from further participation in the study. We also included two control questions before the two objective creativity assessments. Specifically, "Which of the following is the aim of the task? 1) To generate creative uses of objects, 2) To generate common uses of objects, 3) To generate random associations with objects" before the Unusual Uses Tasks, and "Which of the following is the aim of the task? 1) To generate a word connected to all the presented words, 2) To generate a word not connected to all the presented words, 3) To generate a random word" before the Remote Associates Task. If participants failed one of these control questions, they got a reminder to re-read the instructions carefully again, and then were asked to answer the control question again. If participants failed at least one of these control question twice, they were excluded from further participation in the study

Inventory of Creative Achievements and Activities

The Inventory of Creative Achievements and Activities (ICAA) is a subjective tool aimed at assessing creative activities (48 items) and achievements (80 items) in eight different domains (literature, music, arts and crafts, creative cooking, sports, visual arts, performing arts, and science and engineering). Creative activities are assessed by asking participants to determine on a five-point scale (ranging from 1 = "Never" to 5 = "More than 10 times") how often they engaged in six different creative activities related to the particular domain in the past 10 years. Creative achievements are measured by asking participants to indicate all levels of achievement that they have obtained within each creative domain (10 answers per domain; e.g., 0 = "I have never been engaged in this domain", 10 = "I have already sold some of my work in this domain"). If participants selected the option indicating that they have never been engaged in a

given domain (regarding creative achievements), they were not be able to select among the remaining items in a given domain. Regarding creative activities, the domain-specific scores were obtained by averaging across the six items within each domain, and the domain-general scores are calculated by summing up the obtained averages across the eight domains. Regarding creative achievements, the domain-specific scores were obtained by summing up all the marked levels of achievement within each domain, whereas the domain-general scores were calculated by summing up all the marked levels across the eight domains.

Revised Creativity Domain Questionnaire

The Revised Creativity Domain Questionnaire (CDQ-R) is a subjective 21-item tool aimed at assessing the self-concept of Creativity, i.e., peoples' beliefs about their creative skills across various domains (Kaufman et al., 2010). Participants are asked to rate on a six-point scale ranging from 1 = 'Not at all creative' to 6 = 'Extremely creative' their creativity in several domains (e.g., acting, algebra/geometry, chemistry) as compared to other people with a similar background than themselves. The questionnaire includes four domains: drama (e.g., singing, acting), arts (e.g., painting, design), math/science (e.g., chemistry, computers), and interaction (e.g., selling, teaching). The domain scores were calculated by averaging items belonging to each domain, and the overall score is created by averaging the domain scores. The scale has shown good psychometric properties (Silvia et al., 2012).

Unusual Uses Task

The Unusual Uses Task, in which participants are asked to generate unusual uses of various objects, is a common indicator of divergent thinking (e.g., Benedek et al., 2013; Silvia et al., 2008). In this task, participants were asked to generate as many original uses as possible for

(1) a bus ticket, (2) a bag of potting soil, and (3) a remote control[2] within two minutes per each object (Benedek et al., 2013). Participants were instructed that the goal is to come up with creative ideas, which 'strike people as clever, unusual, interesting, uncommon, humorous, innovative, or different' (Silvia et al., 2017, p. 218). After becoming familiar with the instructions, participants were be asked to answer a control question (see above).

After completing all tasks, participants were asked to select the three uses of each object that they consider the most creative (Benedek et al., 2013). The order of the presented ideas within each task and the order of the tasks were randomized. The ideas chosen by the participants were then judged on how creative they are by three independent raters blind to the hypotheses of the study (Silvia, 2011; Silvia et al., 2008, 2017). Before participants' responses were rated by theses judges, two members of the research team had deleted non-understandable and nonsensical responses (the dataset was divided between the raters). In addition, the two members of the research team removed repetitive responses as well as separated responses from participants who provided multiple responses as one.

The responses were rated on a 5-point scale (1 = not at all creative, 5 = very creative) by the three raters (Silvia et al., 2017). Lower scores were assigned to responses that are actual uses of given objects and are common in the dataset. Higher scores were assigned to responses that are 'quirky, clever, elaborate, and, for lack of a better word, creative' (Silvia et al., 2017, p. 218). After the raters judged the first 20 responses, we computed the ICCs and discussed the areas of disagreement. Because the obtained value (ICC = 0.69) reached the pre-set threshold of .50, we

[2] We used these three objects, because—as of 05/12/2019—one cannot find creative answers for this on the internet directly.

then began the main ratings. The raters were instructed to rate for four hours per day, and to take breaks at least every 45 minutes. Finally, responses from the raters were averaged.

Remote Associates Test

The Remote Associates Test (Mednick, 1962) is an objective measure of convergent thinking focusing on the ability to form associative elements into new combinations. Specifically, participants are presented with three cue words related to each other and they are asked to generate a fourth word that is connected to all presented words (e.g., sleeping/bean/trash, answer: bag). For each set, there is one predefined correct answer. Following Lee and Therriault (2013), participants were first be presented with four practice sets of words (15 seconds per each set), each of which includes three cue words, followed by a screen where participants were asked to generate the response. During the practice trials, participants were presented with the correct response after each set. The main procedure consisted of 30 sets of words chosen from Olteţeanu, Schultheis, and Dyer (2018), the difficulty of which increased as the task progressed. For each correct answer, a score of 1 was given, and the total score consists of a sum of all the correct responses.

Dishonesty

We included two cheating paradigms to test for the generalizability of our findings. At the same time, however, including multiple cheating tasks in a row in one study might decrease the validity of the cheating estimates because participants who behave honest in one task might feel entitled to cheat in another task. Indeed, such behavior would allow participants to maintain a positive moral self-concept while still benefitting (to some extent) from dishonest behavior (in one task). As a consequence, the obtained variance might be affected by several aspects (rather than one's straightforward tendency to cheat). Please note that this argumentation is in line with

many research findings suggesting that people normally do not cheat to the full extent as a way to decrease psychological costs associated with lying (e.g., Gerlach et al., 2019; Shalvi, Gino, Barkan, & Ayal, 2015). To minimize the impact of the first cheating task on the second cheating task, we included the mind game and the sender-receiver game at two separate measurement occasions (the beginning of which was separated by a week-long break).

The mind game

At the third measurement occasion, participants took part in a version of the mind game cheating paradigm (Jiang, 2013; Schild et al., 2019). Specifically, participants were asked to write down a number between one and eight on a piece of paper. Following that, a random number from that range was displayed on the screen, and participants were asked whether the displayed number matches the number they wrote down before. The chance that both numbers would match equals 12.5%. If the numbers matched, participants obtained a bonus incentive of £0.4 in addition to the basic fee of £0.42 that they obtained independently of the reported number. Hence, participants had a chance to dishonestly obtain the additional bonus by reporting that the numbers match, even if they did not match. Importantly, dishonesty in the mind game is a very straightforward way to assess dishonesty (indeed, the meta-analysis by Gerlach et al., 2019, indicated generally large similarities between the dice-roll paradigm and the coin-flip task, two conceptually similar straightforward cheating measures). Therefore, one can expect that a potential relation between creativity and dishonesty in the mind game can be attributed to creative people being in fact more dishonest rather than to any creativity-related requirements (or any other confounding factors) of the cheating task.

The sender-receiver game

At the fourth measurement occasion, participants took part in a version of the sender-receiver game (Gneezy, 2005). The sender-receiver game includes two participants: the sender and the receiver. First, the sender learns about two payoff options that determine their own and the receivers' payoffs. The two options differ in how beneficial they are for the participants: Option A results in £0.1 for the sender and £0.5 for the receiver, whereas Option B results in £0.5 for the sender and £0.1 for the receiver. After learning about the payoff options, the sender is asked to choose between two messages that they can send to the receiver. Specifically, the sender can choose between an honest message "Option A will earn you more money than Option B" and a dishonest message "Option B will earn you more money than Option A". In other words, the sender has a chance to choose the dishonest message in order to maximize their payoff. Because it is clear which behavior of the sender is dishonest behavior—that is, sending the dishonest message—this task is a straightforward measure of dishonesty.

In this study, all participants were assigned to the role of the sender. Following that the study, we conducted a smaller study in which we recruited 50 receivers to randomly match them with 50 randomly chosen senders. The receivers were informed about the senders' decision, which determined the payoffs for both players (Biziou-van-Pol et al., 2015). Please note that in the standard sender-receiver game (Gneezy, 2005), the receiver is asked whether they believe the message that they received from the sender. Only if they choose to believe it, the payoffs are determined by the sender's message. In our study, however, the receiver has no active choice and the payoffs are determined only by the sender's message. We used this variant of the game (as also used by, e.g., Biziou-van-Pol et al., 2015) to avoid the possibility of sophisticated deception

(i.e., senders telling the truth in expectation that the receiver will not believe them, and hence choose the option that benefits the senders; Sutter, 2009), which might in itself require creativity.

Intelligence

We used a 16-item version of the ICAR (International Cognitive Ability Resource project; http://www.icar-project.com) test. The test consists of eight items in which participants are asked to identify the next position in the sequence of letters or numbers among six choices, and eight items in which participants are asked to select a figure that fits a figure matrix the best among six choices (Condon & Revelle, 2014). The final score was calculated as a sum of all the correct responses.

Analysis plan

Confirmatory analyses

In the following, subjective creativity was calculated by averaging the z-scored means of each of the subjective creativity scales, namely, (1) creative activities, (2) creative achievements (in the ICAA), (3) drama, (4) math/science, (5) arts, and (6) interaction (in the CDQ-R). Objective creativity was calculated by averaging the Unusual Uses Tasks and the RAT scores, indicated by the z-scored mean of the average of the ratings from each rater (in the Unusual Uses Tasks), and by the z-scored mean of the number of correctly solved convergent thinking tasks (in the RAT). Subjective dishonesty was calculated as a z-scored mean of the Honesty-Humility items in the HEXACO-60. Objective dishonesty was a dichotomous variable indicating if participants reported the target number or not in the Mind Game. Openness to Experience was calculated as a z-scored mean of the Openness to Experience items in the HEXACO-60. Intelligence was calculated as a z-scored mean of the number of all the correct responses in the ICAR-16.

Hypothesis 1a was tested using two Pearson's correlations between the (1) subjective and (2) objective indicators of creativity and Honesty-Humility, and two modified logistic regressions with the (1) subjective and (2) objective creativity as predictors and reports in the mind game as the dependent variable. The modified logistic regression approach accounts for measurement noise that arises from the fact that the dependent variable (outcomes reported in the Mind Game) reflects the number of both dishonestly and honestly reported matching outcomes (for details, see Heck & Moshagen, 2018). Specifically, it allows to control for the fact that 12.5% of the participants are expected to win, and, thus, to report honestly that their chosen and the shown number match. Hence, the cheating rate that we obtain from said analysis describes the proportion of dishonest individuals adjusted for the proportion individuals who reported the target number honestly. We implemented the modified logistic regression using the RRlog function from the R package RRreg (Heck & Moshagen, 2018), which allows for predicting a dichotomous variable (in this case, whether participants reported a matching outcome or not) from continuous and categorical predictors. Hypothesis 1b was tested using models identical to the models described above with the only difference being that instead of testing if the effects occurred, we tested whether we can reject the presence of the smallest effect sizes of interest (SESOIs; Lakens et al., 2018).

Because the tests related to Hypotheses 2a and 3a include outcomes in the mind game as the dependent variables, we used modified logistic regression to test these hypotheses. Specifically, Hypothesis 2a was tested using a modified logistic regression with subjective creativity, objective creativity, age, gender, and Honesty-Humility as predictors and the reported outcome in the mind game as the dependent variable. Analogically, Hypothesis 3a was tested using a modified logistic regression with subjective creativity, objective creativity, age, gender,

Honesty-Humility, Openness to Experience, and intelligence as predictors and the reported outcome in the mind game as the dependent variable We planned to conclude that creativity had incremental validity in predicting dishonesty over already established predictors of dishonesty (Hypothesis 2a), and additionally over traits (typically) closely related to creativity (Hypothesis 3a) if both subjective and objective indices of creativity were significant at $\alpha = 5\%$ level as indicated by two-tailed likelihood-ratio tests. Hypotheses 2b and 3b were tested with models identical to models used to test Hypothesis 2a and 3a with the only difference being that we test for equivalence between the obtained effect sizes and the assumed smallest effect sizes of interest.

Exploratory analyses

We conducted all of the confirmatory analyses, but distinguishing between each creativity measure, i.e., with five different indicators of creativity: (1) creative activities, (2) creative achievements, (3) creative self-concept, (4) divergent thinking, and (5) convergent thinking. In addition, we conducted all of the confirmatory and exploratory analyses with cheating in the sender-receiver game as a dependent variable. In this case, the planned randomized response logistic regressions were exchanged for regular logistic regressions, because we know which participants cheated in the sender-receiver game (as opposed to the mind game). Hence, the obtained cheating rate refers to the proportion of senders who sent a dishonest message to the receiver. Finally, we fitted Structural Equation Models analogical to all the planned confirmatory analyses, but with latent factors instead of z-scores (for details, see Supplemental Material, pp. 2-4)

Other statistical considerations

We excluded all participants who failed attention checks interspersed among the questionnaires or who failed to understand the rules of the objective creativity measures. We did not exclude any outliers from the acquired data. All analyses that included covariates are reported both with and without them.

Results

Reliability analysis

All measures included in the analyses below exhibited acceptable reliability: CDQ-r (overall: α = .83; arts: α = .77; drama: α = .75; interaction: α = .71; math: α = .81), ICAA (creative achievements: α = .73: creative activities: α = .74), Unusual Uses Task (quality: α = .71; quantity: α = .86), RAT (α = .79), Honesty-Humility (α = .74), Openness to Experience (α = .75), ICAR-16 (α = .75). Furthermore, the inter-rater reliability in the Unusual Uses Tasks was moderate for the "bus ticket" and the "bag of potting soil" tasks (bus ticket: ICC(2,3) = 0.61; 95% CI [0.54; 0.67]; bag of potting soil: ICC(2,3) = 0.59; 95% CI [0.51; 0.65]) and poor for the "remote control" task (ICC(2,3) = 0.50; 95% CI [0.43; 0.55]).

Subjective and objective creativity measures

In the following, we use subjective and objective indices of creativity, comprising of three different scales measuring subjective creativity (creative self-concept, creative activities, and creative achievement), and two different scales measuring objective creativity (quality of divergent thinking, and convergent thinking), respectively. It should be noted that, surprisingly, the relation between subjective and objective creativity was negative (r = -.08; 95% CI = [-.13; - .02]; p = .009). As can be seen in Table 3, it is mostly convergent thinking that exhibits the negative relation to subjective creativity, whereas divergent thinking has either insignificant or positive relation to subjective creativity. Furthermore, it should be noted that, unlike the

subjective and objective creativity measures, the proportion of overreporting dishonest individuals in the mind game (d = .26; SE = 0.02; the outcome we use in the confirmatory analyses) was strongly positively related to the proportion of dishonest individuals in the sender-receiver game (d = .62; the outcome we use in the exploratory analyses). Specifically, the odds of dishonesty in the sender-receiver game were 112% higher for participants who lied, than for participants who did not lie in the mind game (OR = 2.12; 95% CI = [1.45; 3.12]; p < .001). Furthermore, the cheating rates that we obtained in both tasks (d = .26 in the mind game, and d = .62 in the sender-receiver game) were similar to typically obtained cheating rates in said tasks (e.g. Gerlach, et al., 2019), and we have not obtained neither floor nor ceiling effects.

Confirmatory analyses

We found a significant negative correlation between subjective creativity and Honesty-Humility (r = -.12; 95% CI = [-.18; -.06]; 90% CI = [-.17; -.07]; p < .001). Hence, participants high in subjective creativity achieved lower scores in Honesty-Humility. Next, we found no significant correlation between objective creativity and Honesty-Humility (r = .04; 95% CI = [-.02; .09]; 90% CI = [-.01; .08]; p = .218; see Table 4). Because the 90% confidence interval of the obtained estimate (r = .04) lies entirely within the SESOI of r = |.15| we conclude that the relation between objective creativity and Honesty-Humility did not occur.

Next, we fitted a modified logistic regression model predicting the proportion of overreporting dishonest individuals in the mind game from subjective creativity. We found that subjective creativity was positively related to dishonesty (OR = 1.34; 95% CI = [1.05; 1.71]; 90% CI = [1.09; 1.64]; p = .020). In other words, the proportion of overreporting dishonest individuals was higher among participants high in subjective creativity than among participants low in subjective creativity. Furthermore, we fitted an analogical model including objective,

instead of subjective, creativity, as a predictor, which revealed that objective creativity was negatively related to dishonesty (*OR* = 0.67; 95% CI = [0.55; 0.82]; 90% CI = [0.57; 0.79]; $p < .001$). Hence, the proportion of overreporting dishonest individuals was lower among participants high in objective creativity than among participants low in objective creativity.

In order to test for robustness of the findings outlined above, we fitted a modified logistic regression model predicting the proportion of overreporting dishonest individuals from subjective and objective creativity, controlling for established predictors of dishonesty (gender, age, and Honesty-Humility; out of which only age and Honesty-Humility were significantly related to dishonesty in the mind game in our sample; *OR* = 0.97; 95% CI = [0.95; 0.98]; 90% CI = [0.96; 0.98]; $p < .001$ and *OR* = 0.64; 95% CI = [0.50; 0.82]; 90% CI = [0.52; 0.79]; $p < .001$, respectively). We found that in this model the positive relation between subjective creativity and dishonesty became insignificant (*OR* = 1.17; 95% CI = [0.90; 1.53]; 90% CI = [0.94; 1.46]; $p = .237$). However, despite the lack of significance of this relation, the 90% equivalence bound (90% CI = [0.90; 1.53]) did not fall entirely within the assumed SESOI (i.e., between *OR* = 0.75 and *OR* = 1.30). Therefore, we conclude that more data is needed to establish if this relation indeed did not occur. Furthermore, we found that the negative relation between objective creativity and dishonesty remained significant when controlling for the established predictors of dishonesty (*OR* = 0.69; 95% CI = [0.57; 0.85]; 90% CI = [0.58; 0.82]; $p = .001$).

To further test for robustness of our findings, we fitted a logistic regression model predicting the proportion of overreporting dishonest individuals from subjective and objective creativity, controlling for established predictors of dishonesty (gender, age, and Honesty-Humility), and factors closely related to creativity (intelligence and Openness to Experience; which were both positively related to creativity in our sample; see Table S8 in the Supplemental

Material). We found that in this model subjective creativity was significantly positively related to dishonesty (*OR* = 1.36; 95% CI = [1; 1.84]; 90% CI = [1.05; 1.75]; *p* = .048), whereas objective creativity was significantly negatively related to dishonesty (*OR* = 0.75; 95% CI = [0.61; 0.94]; 90% CI = [0.63; 0.90]; *p* = .011). Table 5 presents the complete results of the models described above.

In summary, the relation between creativity and dishonesty based on the confirmatory models is unclear. However, it should be noted that in three out of four confirmatory models, subjective creativity was positively related to dishonesty. Specifically, this relation emerged in models testing for direct relations between subjective creativity and (1) Honesty-Humility, and (2) cheating in the mind game, as well as (3) incremental validity of subjective creativity in predicting cheating in the mind game over established predictors of dishonesty and factors closely related to creativity. Furthermore, in three out of four confirmatory models, objective creativity was negatively related to dishonesty. Specifically, this was the case in models testing for (1) direct relation between objective creativity and cheating in the mind game, as well as (2) incremental validity of objective creativity in predicting cheating in the mind game over established predictors of dishonesty, and (3) incremental validity of objective creativity in predicting cheating in the mind game over established predictors of dishonesty, as well as factors closely related to creativity.

Exploratory analyses

Creativity and cheating in the sender-receiver game

We found that there was no relation between neither subjective creativity (*OR* = 1.02; 95% CI = [0.85; 1.22]; 90% CI = [0.87; 1.19]; *p* = .840), nor objective creativity (*OR* = 0.89; 95% CI = [0.76; 1.04]; 90% CI = [0.78; 1.02]; *p* = .155) and cheating in the sender-receiver

game. Furthermore, the relations remained insignificant when we controlled for established predictors of dishonesty (age, gender, and Honesty-Humility; *OR* = 0.92; 95% CI = [0.76; 1.11]; 90% CI = [0.79; 1.08]; *p* = .393 for subjective creativity and *OR* = 0.92; 95% CI = [0.78; 1.08]; 90% CI = [0.80; 1.05]; *p* = .301 for objective creativity) and when we additionally controlled for factors closely related to creativity (Openness to Experience and intelligence; *OR* = 1.01; 95% CI = [0.82; 1.25]; 90% CI = [0.85; 1.21]; *p* = .904 for subjective creativity and *OR* = 0.97; 95% CI = [0.81; 1.14]; 90% CI = [0.84; 1.11]; *p* = .684 for objective creativity). Because the 90% confidence intervals of all the estimates described above fall within our pre-established equivalence bound (*OR* = 0.75 and *OR* = 1.30), we conclude that the relations between subjective/objective creativity and cheating in the sender-receiver game did not occur. The remaining results from the models described above are available in Table 6.

Individual indicators of creativity and Honesty-Humility and cheating in the mind game

In order to gain a better understanding of the obtained findings, we fitted each one of the confirmatory models distinguishing between each creativity measure (subjective measures: creative self-concept, creative activities, and creative achievements, objective measures: quantity of divergent thinking, quality of divergent thinking, and convergent thinking). Below, we present a short summary of the significant findings, whereas the complete results are available in Tables 7 and 8. First, we looked at the correlations between each of the creativity measures and Honesty-Humility. We found that each of the subjective creativity measures was negatively related to Honesty-Humility (creative self-concept: *r* = -.09; 95% CI = [-.15; -.04]; 90% CI = [-.14; -.05]; *p* = .001; creative activities: *r* = -.14; 95% CI = [-.20; -.08]; 90% CI = [-.19; -.09]; *p* < .001; creative achievements: *r* = -.10; 95% CI = [-.16; -.04]; 90% CI = [-.15; -.05]; *p* = .001). In terms of objective creativity measures, quantity of divergent thinking was negatively related (*r*

= -.12; 95% CI = [-.17; -.06]; 90% CI = [-.16; -.07]; $p < .001$), and convergent thinking was positively related ($r = .07$; 95% CI = [.02; .13]; 90% CI = [.03; .12]; $p = .011$) to Honesty-Humility. See Table 7 for an overview.

Next, we fitted six modified logistic regression models, each one including one creativity measure as a predictor, and the proportion of overreporting dishonest individuals in the mind game as a dependent variable. We found that two out of three subjective creativity measures were positively related to dishonesty (creative self-concept: $OR = 1.20$; 95% CI = [1.01; 1.41]; 90% CI = [1.04; 1.38]; $p = .034$, and creative activities: $OR = 1.27$; 95% CI = [1.09; 1.49]; 90% CI = [1.12; 1.45]; $p = .003$), and two out of three objective creativity measures were negatively related to dishonesty (quality of divergent thinking: $OR = 0.77$; 95% CI = [0.67; 0.83]; 90% CI = [0.68; 0.87]; $p < .001$, and convergent thinking: $OR = 0.82$; 95% CI = [0.70; 0.96]; 90% CI = [0.71; 0.93]; $p = .012$).

To test for robustness of our findings, we fitted two additional modified logistic regression models with the following predictors: (1) the six creativity measures described above and the established predictors of dishonesty (age, gender, and Honesty-Humility), and (2) with the predictors listed in (1) and the factors closely related to creativity (intelligence and Openness to Experience). Both models included the proportion of overreporting dishonest individuals in the mind game as a dependent variable. In both models, we found that quality of divergent thinking significantly negatively predicted dishonesty ($OR = 0.78$; 95% CI = [0.66; 0.91]; 90% CI = [0.68; 0.89]; $p = .002$ in the first model, and $OR = 0.80$; 95% CI = [0.68; 0.94]; 90% CI = [0.70; 0.92]; $p = .009$ in the second model). In addition, in the second model only, we found that creative activities significantly positively predicted dishonesty ($OR = 1.32$; 95% CI = [1.03; 1.69]; 90% CI = [1.08; 1.62]; $p = .026$). For an overview, see Table 8.

Individual indicators of creativity and cheating in the sender-receiver game

Analogically to the results presented above, we fitted six logistic regression models, each one including one creativity measure as a predictor, and cheating in the sender-receiver game as a dependent variable. We found that only quantity of divergent thinking was significantly positively related to cheating in the sender-receiver game (*OR* = 1.15; 95% CI = [1.01; 1.30]; 90% CI = [1.03; 1.27]; *p* = .030), whereas all the remaining creativity measures were not significantly related.

Furthermore, to test for the robustness of these findings, we fitted two additional logistic regression models, each one including the six creativity measures described above and (1) the established predictors of dishonesty (age, gender, and Honesty-Humility), and (2) the predictors listed in (1) and the factors closely related to creativity (intelligence and Openness to Experience). In both models, we found that the quantity of divergent thinking was the only creativity measure that significantly predicted dishonesty. Specifically, people with higher quantities of divergent thinking engaged in more dishonesty than people with lower quantities of divergent thinking ((1) *OR* = 1.18; 95% CI = [1.03; 1.35]; 90% CI = [1.05; 1.32]; *p* = .018; (2) *OR* = 1.17; 95% CI = [1.03; 1.35]; 90% CI = [1.05; 1.32]; *p* = .021). The complete results from the analyses described above are available in Table 9. Finally, correlations between all included variables are available in the Supplemental Material (Table S8)

Discussion

The relation between creativity and dishonesty in Study 1 is unclear. We found that subjective creativity exhibited a negative direct relation to Honesty-Humility and a positive relation to cheating. On the other hand, objective creativity was not significantly related to Honesty-Humility and it was positively related to cheating. Furthermore, the incremental validity

in predicting dishonesty over established predictors of dishonesty was unclear for subjective creativity and significant for objective creativity. On the other hand, the incremental validity of in predicting dishonesty over established predictors of dishonesty and factors closely related to creativity was significant for both subjective and objective creativity. Finally, none of these findings generalized to cheating in the sender-receiver game. The possible explanations of these mixed findings are discussed in the "General discussion" section, and the summary of the findings is available in Table 10.

General discussion

The relation between creativity and dishonesty, although being investigated in several studies thus far, has remained unclear. The aim of this Registered Report was to shed some light on this relation, addressing two major limitations of previous studies, namely, (1) the lack of a comprehensive assessment of creativity, and (2) the use of not straightforward cheating tasks. The observed findings in this Registered Report do also not provide a more conclusive picture of the relation between creativity and dishonesty, however. Specifically, in the pilot study, we found no support for a relation between one creativity measure (i.e., the Unusual Uses Task, which measures divergent thinking; e.g., Guilford, 1967) and two dishonesty measures (the matrix task; e.g., Mazar et al., 2008; Honesty-Humility, Ashton & Lee, 2007). To establish whether this finding generalizes to other creativity and dishonesty measures, we conducted a study in which we included two indices of creativity—namely, (1) subjective creativity (in terms of creative self-concept, creative activities, and achievements) and (2) objective creativity (in terms of divergent and convergent thinking)—, and two indices of dishonesty—namely, (1) subjective dishonesty (Honesty-Humility), and (2) objective dishonesty (via two games, namely, the mind

game and the sender-receiver game). Despite this comprehensive assessment of the constructs in question, we did not obtain a conclusive picture of the direct relation between creativity and dishonesty. Specifically, although subjective creativity was negatively related to Honesty-Humility and positively related to cheating in the mind game, objective creativity was unrelated to Honesty-Humility and negatively related to cheating in the mind game. It should be noted that we conducted supplemental Structural Equation Modelling analyses where the results were slightly different—we found no significant relation between subjective creativity and cheating in the mind game, and a negative relation between objective creativity and cheating in the sender-receiver game (for details, see pp. 1-9 in the Supplemental Material).

To provide a more conservative test of the relation in question, we also tested the incremental validity of creativity in predicting dishonesty over established predictors of dishonesty as well as over factors closely related to creativity. We found that subjective creativity had incremental validity in predicting dishonesty over established predictors of dishonesty when factors closely related to creativity (i.e., Openness to Experience and intelligence) were controlled for. However, when factors closely related to creativity were not controlled for, the incremental validity in question was unclear (i.e., the result was statistically non-significant but it was not equivalent to the smallest effect size of interest and hence we could not conclude that it did not occur). Therefore, the incremental validity in question occurred only with regard to the variance of subjective creativity which was not shared with Openness to Experience and/or intelligence. On the other hand, objective creativity exhibited incremental validity when both (1) only established predictors of dishonesty and (2) established predictors of dishonesty as well as factors related to creativity were controlled for.

In summary, the relation between subjective creativity and dishonesty was, in most cases, positive (in three out of four confirmatory statistical tests), whereas the relation between objective creativity and dishonesty was, in most cases, negative (in three out of four confirmatory statistical tests). One possible explanation of these mixed findings could be attributed to the lack of a positive relation between the subjective and the objective indicators of creativity. Specifically, it seems as if the two indicators of creativity have captured two different constructs (r = -.08), and hence resulted in different relations to Honesty-Humility/cheating.

In this regard, as noted by Park et al., 2016, high scores in subjective creativity might partially reflect illusory superiority, that is, a belief that one is better than others. Such a belief is also characteristic for people high in traits positively related to dishonesty such as Honesty-Humility (Ashton & Lee, 2007) or the Dark Core of Personality (Moshagen et al., 2018). Therefore, illusory superiority might have played a role in the positive relation (as indicated by three out of four of the conducted tests) between subjective creativity and dishonesty. With regard to objective creativity, it should be noted that the objective creativity scores are based on participants' performance across multiple, arguably time-consuming and challenging, creativity tasks. Therefore, high scores in objective creativity could partially reflect participants' motivation to complete the study correctly and/or on a high level. Such motivation might, in turn, have led to avoiding dishonesty when participating in the study. In line with this potential explanation, Schild, Lilleholt et al. (2019) recently found that participants with high Prolific approval rates—i.e., the rate of successfully completed tasks on Prolific.ac—were less likely to cheat in a cheating task than participants with low Prolific approval rates. Consequently, participants with high scores in objective creativity might have been more motivated to complete the study correctly, which might have also led them to engage in less cheating during the study

(as indicated by three out of four of the conducted tests). Future research might further examine whether the relation between creativity and dishonesty indeed depends on the administered measures such that subjective creativity is rather positively related to dishonesty, whereas objective creativity is rather negatively related to dishonesty. In doing so, possible confounding factors such as illusory superiority and motivation should be taken into account.

Interestingly, both subjective and objective creativity were unrelated to cheating in the sender-receiver game, independently of whether the established predictors of dishonesty and/or the factors closely related to creativity were controlled for or not. Thus, the findings concerning the relations between creativity and dishonesty described above did not generalize from the mind game to the sender-receiver game. It should be noted that this was the case despite the fact that cheating in the sender-receiver game was strongly positively related to the proportion of overreporting dishonest individuals in the mind game, and hence the two cheating paradigms are likely capturing (very) similar constructs. In summary, the relation between creativity and dishonesty remains unclear.

In our study, we provide valuable insights regarding the possible shape of the relation between comprehensively assessed creativity and dishonesty. Both the Pilot Study and our newly conducted study are well-powered and use well-established methods for measuring creativity and dishonesty. In addition, the Pilot Study was conducted across multiple labs in different countries, providing a wider generalizability of the obtained findings. Furthermore, Study 1 includes multiple measures of creativity, following recent calls for multi-method creativity assessment (Ambrose & Machek, 2015; Park et al., 2016; Plucker & Makel, 2010). However, despite this comprehensive and multi-dimensional assessment of creativity, we found that subjective and objective measures of this construct not only did not correlate positively, but rather were

negatively related to each other. This points out towards the necessity of improvements within the field of creativity measurement. Finally, Study 1 provides two different cheating tasks, which allowed to test for the generalizability of the obtained findings across the two tasks in question.

It should be noted, however, that our study comes with several limitations. First of all, one of the basic assumptions behind Study 1 is that studying the relation between creativity and dishonesty should be done using cheating tasks that do not require (much) creativity to cheat. However, it might be that most everyday contexts where cheating is possible require some level of creativity (e.g., in order to exploit ambiguous situations for personal profits). Future research might examine whether the relation in question depends on the amount of creativity required by a cheating task (e.g., by using several cheating tasks with different levels of creativity needed to cheat). Second, Study 1 was conducted on a sample from a crowdworking platform (namely, Prolific Academic). Given the wide popularity of this platform among researchers, it is possible that some participants have already had a chance to take part in (some of) the creativity and cheating tasks included in Study 1, which might have had an impact on the obtained findings. Third, previous research has typically found that subjective and objective creativity measures are positively related to each other (e.g., Batey & Furnham, 2006; Carson et al., 2005; Silvia et al., 2012), with small to medium-sized effects. Herein, however, we found a small negative relation between the two creativity indices. This finding might be due to the individual differences in the motivation to complete the study thoroughly—participants who have been motivated to complete the objective creativity tasks as well as possible might have also been motivated to fill in the subjective creativity scales as correctly (in this case, truthfully) as possible. As a result, the participants who did well in objective creativity tasks might have been more realistic in their self-reported creativity, rather than follow the common tendency to overestimate one's creative

achievement (see Park et al., 2016). Finally, the inter-rater reliability (ICC) of one (out of three) of the divergent thinking tasks was poor, which indicates that the findings should be interpreted with caution. Please note, however, that ICCs of approximately .50 are quite common in the field of divergent thinking measurement (e.g., Benedek et al., 2013).

In this Registered Report, we have provided a comprehensive assessment of creativity and dishonesty, aiming to clarify the relation between these two constructs. Although the findings are not entirely conclusive, they provide hints that subjective creativity might be positively related to dishonesty whereas objective creativity might be negatively related to dishonesty. Future studies could examine whether this is indeed the case, what are the mechanisms of these relations, and in what contexts they occur.

Datasets, scripts, and results can be found on the Open Science Framework (https://osf.io/7zxnw/?view_only=6b5c483b23d64e4b9c1c74b5e5007d2e), and the approved protocol was preregistered at https://osf.io/qfjk2.

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Table 1

Meta-analytic regression models predicting dishonesty – experimental condition

	Hedges *Q*	I^2	*Partial r*	*P-value*	95% CI	90% CI
Model 1						
Honesty-Humility	11.11	0	-0.05	**.034**	[-0.09; -0.00]	[-0.08; -0.01]
Creativity	28.94	33.78	0.01	.675	[-0.04; 0.06]	[-0.03; 0.06]
Age	10.92	0	0.06	**.005**	[0.02; 0.10]	[0.03; 0.10]
Gender	33.81	43.41	0.05	.116	[-0.01; 0.10]	[0.00; 0.09]
Model 2						
Honesty-Humility	11.7	0	-0.05	**.014**	[-0.10; -0.01]	[-0.09; -0.02]
Creativity	28.63	34.32	0.01	.657	[-0.04; 0.07]	[-0.03; 0.06]
Age	10.37	0	0.07	**.003**	[0.02; 0.11]	[0.03; 0.10]
Gender	30.72	36.32	0.04	.157	[-0.01; 0.09]	[-0.01; 0.08]
Openness	13.95	0	-0.01	.719	[-0.05; 0.04]	[-0.04; 0.03]
Intelligence	22.91	18.70	0.09	**<.001**	[0.05; 0.14]	[0.05; 0.13]

Note. Model 1 includes Honesty-Humility, creativity, age, and gender (male = 1, female = 0). Model 2 includes Honesty-Humility, creativity, age, gender (male = 1, female = 0), Openness to Experience, and intelligence. "Partial *r*" refers to Pearson's partial correlation. *N* = 4,373, made available via Verschuere et al. (2018). *P* values in bold <.05.

Table 2

Meta-analytic regression models predicting dishonesty – control condition

	Hedges *Q*	I^2	*Partial r*	*P-value*	95% CI	90% CI
Model 1						
Honesty-Humility	28.03	34.75	-0.03	.288	[-0.08; 0.02]	[-0.07; 0.02]
Creativity	15.22	0	-0.02	.421	[-0.06; 0.02]	[-0.05; 0.02]
Age	29.18	39.36	0.01	.797	[-0.05; 0.06]	[-0.04; 0.05]
Gender	27.36	27.77	0.08	**.003**	[0.03; 0.12]	[0.03; 0.12]
Model 2						
Honesty-Humility	23.93	23.80	-0.03	.230	[-0.08; 0.02]	[-0.07; 0.01]
Creativity	15.17	0	-0.02	.400	[-0.06; 0.02]	[-0.05; 0.02]
Age	29.12	38.60	0.01	.692	[-0.04; 0.07]	[-0.03; 0.06]
Gender	31.55	37.50	0.07	**.006**	[0.02; 0.13]	[0.03; 0.12]
Openness	25.88	22.01	-0.02	.355	[-0.07; 0.03]	[-0.06; 0.02]
Intelligence	31.39	42.33	0.12	**<.001**	[0.07; 0.18]	[0.08; 0.17]

Note. Model 1 includes Honesty-Humility, creativity, age, and gender (male = 1, female = 0). Model 2 includes Honesty-Humility, creativity, age, gender (male = 1, female = 0), Openness to Experience, and intelligence. "Partial *r*" refers to Pearson's partial correlation. *N* = 4,373, made available via Verschuere et al. (2018). *P* values in bold <.05

Table 3

Pearson's correlations between individual creativity measures.

Variable	*M*	*SD*	1	2	3	4	5
1. ICAA-act	14.30	3.75					
2. ICAA-ach	41.62	38.05	.66** [.62, .69]				
3. CDQ-r	3.15	0.72	.52** [.48, .56]	.36** [.31, .41]			
4. DT-qual	2.79	0.49	-.01 [-.06, .05]	.08** [.03, .14]	-.05 [-.11, .00]		
5. DT-quan	13.49	6.80	.17** [.11, .22]	.17** [.11, .22]	.13** [.07, .19]	.26** [.21, .32]	
6. RAT	11.78	4.82	-.11** [-.17, -.05]	.00 [-.06, .06]	-.14** [-.20, -.08]	.23** [.17, .28]	.14** [.08, .19]

Note. CDQ-r = Creativity Domain Questionnaire revised; ICAA-ach = the Inventory of Creative Activities and Achievements (achievements scale); ICAA-act = the Inventory of Creative Activities and Achievements (activities scale); DT-quantity = quantity of divergent thinking; DT-quality = quality of divergent thinking; RAT = Remote Associates Test (convergent thinking). *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. * indicates $p < .05$. ** indicates $p < .01$.

Table 4

Pearson's correlations between creativity and Honesty-Humility

Predictor	Pearson's *r*	95% CI	90% CI	P-value
Subjective creativity	-0.12	[-0.18; -0.06]	[-0.17; -0.07]	**<.001**
Objective creativity	0.04	[-0.02; 0.09]	[-0.01; 0.08]	.218

Note. 95% CI = 95% confidence interval. 90% CI = 90% confidence interval. Values in bold indicate $p < .05$.

Table 5

Relations between subjective/objective creativity and dishonesty in the mind game.

Model	Predictor	Odds Ratio	95% CI	90% CI	P-value
Model 1	Subjective creativity	1.34	[1.05; 1.71]	[1.09; 1.64]	**.020**
Model 2	Objective creativity	0.67	[0.55; 0.82]	[0.57; 0.79]	**<.001**
Model 3	Subjective creativity	1.17	[0.90; 1.53]	[0.94; 1.46]	.237
	Objective creativity	0.69	[0.57; 0.85]	[0.58; 0.82]	**.001**
	Age	0.74	[0.60; 0.90]	[0.62; 0.87]	**.001**
	Gender	1.09	[0.76; 1.55]	[0.81; 1.47]	.644
	Honesty-Humility	0.77	[0.65; 0.92]	[0.67; 0.9]	**.004**
Model 4	Subjective creativity	1.36	[1; 1.84]	[1.05; 1.75]	**.048**
	Objective creativity	0.75	[0.61; 0.94]	[0.63; 0.90]	**.011**
	Age	0.75	[0.61; 0.92]	[0.63; 0.89]	**.003**
	Gender	1.03	[0.72; 1.48]	[0.76; 1.39]	.870
	Honesty-Humility	0.79	[0.66; 0.95]	[0.68; 0.92]	**.010**
	Openness to Experience	0.85	[0.70; 1.03]	[0.72; 1]	.100
	Intelligence	0.84	[0.70; 1]	[0.72; 0.98]	.053

Note. Models 1-4 refer to modified logistic regression models with the proportion of overreporting dishonest individuals in the mind game as the dependent variable. All predictors included in the models are listed above. 95% CI = 95% confidence interval. 90% CI = 90% confidence interval. Values in bold indicate $p < .05$.

Table 6

Relations between subjective/objective creativity and dishonesty in the sender-receiver game.

Model	Predictor	Odds Ratio	95% CI	90% CI	P-value
Model 1	Subjective creativity	1.02	[0.85; 1.22]	[0.87; 1.19]	.840
Model 2	Objective creativity	0.89	[0.76; 1.04]	[0.78; 1.02]	.155
Model 3	Subjective creativity	0.92	[0.76; 1.11]	[0.79; 1.08]	.393
	Objective creativity	0.92	[0.78; 1.08]	[0.80; 1.05]	.301
	Age	0.85	[0.75; 0.97]	[0.77; 0.95]	**.012**
	Gender	0.97	[0.75; 1.24]	[0.78; 1.19]	.783
	Honesty-Humility	0.76	[0.67; 0.87]	[0.68; 0.85]	**<.001**
Model 4	Subjective creativity	1.01	[0.82; 1.25]	[0.85; 1.21]	.904
	Objective creativity	0.97	[0.81; 1.14]	[0.84; 1.11]	.684
	Age	0.86	[0.76; 0.97]	[0.77; 0.95]	**.017**
	Gender	0.98	[0.76; 1.27]	[0.79; 1.22]	.889
	Honesty-Humility	0.77	[0.68; 0.88]	[0.69; 0.86]	**<.001**
	Openness to Experience	0.87	[0.76; 1]	[0.78; 0.98]	.059
	Intelligence	0.96	[0.84; 1.09]	[0.86; 1.07]	.547

Note. Models 1-4 refer to logistic regression models with the proportion of dishonest individuals in the sender-receiver as the dependent variable. All predictors included in the models are listed above. 95% CI = 95% confidence interval. 90% CI = 90% confidence interval. Values in bold indicate $p < .05$

Table 7

Pearson's correlations between individual creativity measures and Honesty-Humility.

Predictor	Pearson's *r*	95% CI	90% CI	P-value
CDQ-r	-0.09	[-0.15; -0.04]	[-0.14; -0.05]	**.001**
ICAA-ach	-0.10	[-0.16; -0.04]	[-0.15; -0.05]	**.001**
ICAA-act	-0.14	[-0.20; -0.08]	[-0.19; -0.09]	**<.001**
DT-quantity	-0.12	[-0.17; -0.06]	[-0.16; -0.07]	**<.001**
DT-quality	-0.02	[-0.08; 0.04]	[-0.07; 0.03]	.544
RAT	0.07	[0.02; 0.13]	[0.03; 0.12]	**.011**

Note. CDQ-r = Creativity Domain Questionnaire revised; ICAA-ach = the Inventory of Creative Activities and Achievements (achievements scale); ICAA-act = the Inventory of Creative Activities and Achievements (activities scale); DT-quantity = quantity of divergent thinking; DT-quality = quality of divergent thinking; RAT = Remote Associates Test. 95% CI = 95% confidence interval. 90% CI = 90% confidence interval. Values in bold indicate $p < .05$.

Table 8

Relations between individual creativity measures and dishonesty in the mind game.

Model	Predictor	Odds Ratio	95% CI	90% CI	P-value
Model 1	CDQ-r	1.20	[1.01; 1.41]	[1.04; 1.38]	**.034**
Model 2	ICAA-ach	1.07	[0.91; 1.25]	[0.94; 1.22]	.410
Model 3	ICAA-act	1.27	[1.09; 1.49]	[1.12; 1.45]	**.003**
Model 4	DT-quantity	0.89	[0.75; 1.06]	[0.77; 1.03]	.188
Model 5	DT-quality	0.77	[0.67; 0.89]	[0.68; 0.87]	**<.001**
Model 6	RAT	0.82	[0.70; 0.96]	[0.71; 0.93]	.**012**
Model 7	CDQ-r	1.09	[0.89; 1.34]	[0.92; 1.30]	.395
	ICAA-ach	1.26	[1; 1.61]	[1.04; 1.55]	.055
	ICAA-act	0.83	[0.66; 1.04]	[0.68; 1]	.089
	DT-quantity	0.89	[0.74; 1.07]	[0.76; 1.04]	.216
	DT-quality	0.78	[0.66; 0.91]	[0.68; 0.89]	**.002**
	RAT	0.99	[0.83; 1.17]	[0.85; 1.14]	.867
	Age	0.69	[0.56; 0.86]	[0.58; 0.83]	**<.001**
	Gender	1.08	[0.75; 1.55]	[0.79; 1.46]	.695
	Honesty-Humility	0.76	[0.63; 0.91]	[0.65; 0.88]	**.002**
Model 8	CDQ-r	1.14	[0.92; 1.41]	[0.95; 1.36]	.227
	ICAA-ach	1.32	[1.03; 1.69]	[1.08; 1.62]	**.026**

Model	Predictor	Odds Ratio	95% CI	90% CI	P-value
	ICAA-act	0.88	[0.70; 1.10]	[0.72; 1.06]	.260
	DT-quantity	0.87	[0.72; 1.05]	[0.74; 1.02]	.129
	DT-quality	0.80	[0.68; 0.94]	[0.70; 0.92]	**.009**
	RAT	1.05	[0.88; 1.26]	[0.90; 1.23]	.579
	Age	0.71	[0.57; 0.88]	[0.59; 0.85]	**.001**
	Gender	1.02	[0.71; 1.47]	[0.75; 1.39]	.924
	Honesty-Humility	0.78	[0.65; 0.94]	[0.67; 0.91]	**.007**
	Openness to Experience	0.84	[0.68; 1.03]	[0.70; 0.99]	.086
	Intelligence	0.82	[0.68; 0.99]	[0.70; 0.96]	**.035**

Note. Models 1-8 refer to modified logistic regression models with the proportion of overreporting dishonest individuals in the mind game as the dependent variable. All predictors included in each model are listed above. CDQ-r = Creativity Domain Questionnaire revised; ICAA-ach = the Inventory of Creative Activities and Achievements (achievements scale); ICAA-act = the Inventory of Creative Activities and Achievements (activities scale); DT-quantity = quantity of divergent thinking; DT-quality = quality of divergent thinking; RAT = Remote Associates Test. 95% CI = 95% confidence interval. 90% CI = 90% confidence interval. Values in bold indicate $p < .05$.

Table 9

Relations between individual creativity measures and dishonesty in the sender-receiver game.

Model	Predictor	Odds Ratio	95% CI	90% CI	P-value
Model 1	CDQ-r	1.02	[0.90; 1.15]	[0.92; 1.13]	.757
Model 2	ICAA-ach	1.05	[0.93; 1.18]	[0.95; 1.16]	.460
Model 3	ICAA-act	0.99	[0.88; 1.11]	[0.89; 1.09]	.813
Model 4	DT-quantity	1.15	[1.01; 1.30]	[1.03; 1.27]	**.030**
Model 5	DT-quality	0.92	[0.81; 1.04]	[0.83; 1.02]	.186
Model 6	RAT	0.95	[0.84; 1.07]	[0.85; 1.05]	.367
Model 7	CDQ-r	0.97	[0.84; 1.12]	[0.86; 1.10]	.694
	ICAA-ach	1.02	[0.85; 1.23]	[0.88; 1.19]	.802
	ICAA-act	0.90	[0.76; 1.06]	[0.78; 1.03]	.210
	DT-quantity	1.18	[1.03; 1.35]	[1.05; 1.32]	**.018**
	DT-quality	0.88	[0.76; 1]	[0.78; 0.98]	.052
	RAT	1.01	[0.88; 1.15]	[0.9; 1.13]	.892
	Age	0.83	[0.73; 0.95]	[0.74; 0.93]	**.006**
	Gender	0.99	[0.76; 1.29]	[0.8; 1.24]	.964
	Honesty-Humility	0.77	[0.68; 0.88]	[0.69; 0.86]	**<.001**
Model 8	CDQ-r	1.01	[0.87; 1.18]	[0.89; 1.15]	.890
	ICAA-ach	1.05	[0.87; 1.27]	[0.9; 1.23]	.597

Model	Predictor	Odds Ratio	95% CI	90% CI	P-value
	ICAA-act	0.92	[0.78; 1.09]	[0.8; 1.06]	.346
	DT-quantity	1.17	[1.03; 1.35]	[1.05; 1.32]	**.021**
	DT-quality	0.89	[0.78; 1.02]	[0.79; 1]	.095
	RAT	1.04	[0.90; 1.19]	[0.92; 1.17]	.598
	Age	0.84	[0.74; 0.96]	[0.75; 0.94]	**.011**
	Gender	0.98	[0.75; 1.28]	[0.78; 1.22]	.884
	Honesty-Humility	0.78	[0.69; 0.89]	[0.70; 0.88]	**<.001**
	Openness to Experience	0.86	[0.74; 1]	[0.76; 0.97]	**.046**
	Intelligence	0.98	[0.85; 1.11]	[0.87; 1.09]	.719

Note. Models 1-8 refer to logistic regression models with the proportion of dishonest individuals in the sender-receiver as the dependent variable. All predictors included in each model are listed above. CDQ-r = Creativity Domain Questionnaire revised; ICAA-ach = the Inventory of Creative Activities and Achievements (achievements scale); ICAA-act = the Inventory of Creative Activities and Achievements (activities scale); DT-quantity = quantity of divergent thinking; DT-quality = quality of divergent thinking; RAT = Remote Associates Test. 95% CI = 95% confidence interval. 90% CI = 90% confidence interval. Values in bold indicate $p < .05$.

Table 10

Study 1: Hypotheses and results.

Hypotheses	Results
Hypothesis 1: a. Creativity is related to dishonesty b. Creativity is not related to dishonesty	Both Hypotheses 1a and 1b are rejected based on mixed findings: - Subjective creativity is negatively related to Honesty-Humility - Subjective creativity is positively related to dishonesty - Objective creativity is unrelated to Honesty-Humility - Objective creativity is negatively related to dishonesty
Hypothesis 2: a. Creativity has incremental validity in predicting dishonesty over established predictors of dishonesty b. Creativity has no incremental validity in predicting dishonesty over established predictors of dishonesty	Both Hypotheses 2a and 2b are rejected based on mixed findings: - The incremental validity of subjective creativity over established predictors of dishonesty is inconclusive - Objective creativity has incremental validity over established predictors of dishonesty
Hypothesis 3: a. Creativity has incremental validity in predicting dishonesty over established predictors of dishonesty and predictors related to creativity b. Creativity has no incremental validity in predicting dishonesty over established predictors of dishonesty and predictors related to creativity	Hypothesis 3a is confirmed, Hypothesis 3b is rejected: - Subjective creativity has incremental validity over established predictors of dishonesty and predictors related to creativity - Objective creativity has incremental validity over established predictors of dishonesty and predictors related to creativity