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ORIGINAL RESEARCH

Do All Types of Compassion Increase Prosocial Lying?

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Background: Previous studies have shown that compassion increases prosocial lying. However, in the present study, we proposed that compassion toward individuals who are frustrated in striving for minimal living conditions (named here as compassion for other's survival in suffering, abbreviated as COSS) increases prosocial lying, while compassion toward individuals frustrated in seeking development conditions (named here as compassion for other's development in suffering, abbreviated as CODS) has little effect on prosocial lying.

Methods: In Studies 1 and 2, we asked participants to evaluate the same text twice before and after experimentally experiencing emotion to test the above hypotheses. In Study 3, we created a situation with a strong moral conflict between prosociality and truth-telling to investigate the potential psychological mechanisms.

Results: In Study 1, we show that COSS and CODS both increased prosocial lying. Notably, COSS effect on prosocial lying was significantly higher than CODS effect on prosocial lying. These findings were augmented by results from Study 2, which showed that individuals with low-trait compassion in COSS condition engaged in more prosocial lying than those with high trait compassion in CODS condition. In Study 3, we report that COSS increased prosocial lying significantly, while CODS did not.

Conclusion: COSS and CODS are two different types of compassion as shown in Studies 1 and 2; they have different potential psychological mechanisms on increasing prosocial lying (Study 3a and 3b). This study provides additional information on the theory of compassion, which is important in exploring compassion effects.

Keywords: compassion, compassion types, prosocial lying, illusion

Introduction

People with prior trauma experiences like earthquake victims, homeless people, child malnutrition and starvation, unemployed workers may arouse others' compassion emotion. Previous studies report increase in moral behavior in compassionate people.[1–3] In a recent study, Lupoli et al, reported that compassion increases prosocial lying.[4] However, the effect of different compassion types on moral dilemma behavior is still unknown.

Compassion is a basic social emotion elicited by the suffering or misfortunes of other individuals,[5,6] which is often associated with emotional responses of concern and desire to help.[7,8] Further, compassion can be defined as being emotionally motivated to alleviate the suffering or distress of other individuals, particularly the urge to help others through taking action.[4,5,9,10] In this study we focus on compassion which is distinct from but related to empathy and sympathy. Empathy refers to knowing the feelings of other individuals and experiencing similar feelings.[11,12] Sympathy is understanding other peoples' feelings and showing concern or pity to those individuals, particularly those

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who suffer unfairly.[13–15] Therefore, conceptually, compassion is broad compared with empathy and sympathy.

Previous studies on compassion focused mainly on trait or state compassion. Trait compassion is an important reflection of an individual's personality but is also a baseline at which state compassion is induced.[16,17] In previous studies, compassion was reported in different scale rating.[2,4,18] State compassion can be triggered by witnessing or learning about the physical or emotional pain of other individuals.[4,19-21] Previous studies report that emotions can be induced by emotional materials, such as words, stories, pictures, music, and films.[2,4,22–26] Although stories and pictures successfully induce emotions,[27,28] films are considered as one of the most effective ways for emotion induction.[29]

Previous studies have explored how compassion affects prosocial behaviors. On inducing experience compassion on study subjects, they were willing to receive painful electric shocks on behalf of other individuals.[7] When participants reported the compassion they experienced on viewing footage of injured children, participants experienced compassion to a point they were willing to help the suffering family.[30] In addition, on inducing compassion to less religious individuals they were shown to be more generous than before experiencing compassion.[2] Participants with compassion experiences volunteered to help even when the suffering people overcame the situation without help.[31] In particular, compassion played a role in promoting the welfare of other individuals who had prior trauma experiences but not the self. In previous studies, individuals who had undergone induced compassion were willing to help others at their expense.[32–34] Therefore, some psychologists presume that compassion comprises a prototypical prosocial emotion,[5,7,9] which constitute in several domains, including forgiveness,[19,35] cooperation,[3] and volunteerism.[1]

Currently, researchers are shifting from exploring purely altruistic behaviors to prosocial lying.[4] Prosocial lying also referred as white lies are lies intended to benefit others. Notably, there are subtle differences between prosocial lies and white lies. Levine and Schweitzer[20,21] defined "Prosocial lies as false statements made with the intention of misleading and benefitting a target and white lies as false statements made with the intention of misleading a target about something trivial."

Therefore, white lies emphasize on small stakes and the intention can be self-serving or prosocial; while prosocial lies are intended to benefit the target and have minimal or substantial consequences. In previous studies, white lies fall into two categories: Pareto white lies (i.e., a lie that helps both the liar and the listener) are negatively correlated with cooperation and altruism, while altruistic white lies (i.e., a lie that helps the listener at the expense of the liar) are positively correlated with cooperation and altruism.[36,37] However, some people refrain from lying not merely because of the consequences, but because they simple view lying as a bad act in itself.[37] The moral ambiguity of prosocial lying is similar to white lies. Although prosocial lies are characterized by benevolent intentions, they may have negative consequences for both the liar and the listener. For example, to avoid the negative emotional impact, a professor lied to a student by giving an overly positive feedback for her/his poor essays, thus the student may not improve their essay writing skills and the professor' teaching attitude may be regarded as lax.

Lupoli et al,[4] explored the relationship between compassion and prosocial lying. In this study, participants were asked to evaluate a poorly written essay privately. Subsequently, they were induced to experience compassion or neutral emotion; then asked to evaluate the same essay and provide feedback to the essay writer. The method applied in the study is called a two-evaluation paradigm. The difference in scores between two evaluations was reported as prosocial lying. In this study, induced compassion increased prosocial lying while increase in prosocial lying was easily predicted from trait compassion, therefore, compassion was the emotional basis of prosocial lying. The findings from this study form a basis for future investigations on the effect of compassion and the emotional basis of prosocial behaviors. This study only reported that compassion increased prosocial lying, therefore, further studies should explore the effect of different types of state compassion on prosocial lying.

In this study, we propose two categories of compassion based on their occurrence. In early evolutionary theories compassion is considered as a response to observing the severe suffering of other individuals and specific events, such as death, physical assault or abuse, old age, illness, lack of food, weakness, disfigurement, and immobility,[5] which are associated to individuals' survival. However, compassion is not always a response to other peoples' survival distress. In previous studies, when an employee failed to deliver after hard work, Chinese managers and other employees assume that the employee was not responsible for the failure and would even offer help to him/her due to the compassion they experienced.[38,39]

Early conceptual analyses and recent empirical studies report that compassion may be induced to an individual who is exposed to the pain and needs of others.[6] In other words, both the survival and development difficulties of others can inspire

individuals' compassion. Therefore, we defined compassion toward individuals who face frustration when striving to achieve minimal living conditions as "Compassion for others' survival in suffering" (abbreviated as COSS). Further, compassion toward individuals who face frustration in seeking development was defined as "Compassion for others' development in suffering" (abbreviated as CODS). Notably, COSS and CODS are not new emotions, but rather forms of compassion based on contextual moderators.

According to Maslow's hierarchy of needs,[40] we consider COSS to be related to one's survival needs and safety needs, while CODS may be related to one's higher level growth needs, such as esteem needs and self-actualization. If one's survival and safety needs are unmet, he/she may not survive, while if one's higher level growth needs are not met, their survival may not be affected but their quality of life is negatively affected.[40–42] Although the two types of suffering have adverse effects, COSS and CODS effects may be different for the victim trauma experiences. Therefore, we hypothesized that COSS may increase prosocial lying, while CODS does not influence prosocial lying. If these effects present, the two types of compassion may have different psychological mechanisms on prosocial lying. Therefore, we designed three experiments to test these hypotheses.

Study 1

The purpose of Study 1 was to test the effects of COSS and CODS on prosocial lying. In this study, we used the two-evaluation paradigm to create a situation with a weak moral conflict between prosociality and truth-telling.

Methods

Participants and Design

The study participants comprised 162 undergraduates recruited online from different universities in Guangzhou city. We obtained the written consent for each of the participants prior to the study. Four participants were excluded for correctly guessing the purpose of the experiment and doubting that they would be acting as evaluators. Two participants were excluded as the scores they provided were larger than the range of evaluation score we had set as our guideline. Therefore, a M final sample of 156 participants ranging in age between 18 and 26 was used (100 females, 56 males; age: = 20.36, *SD* = 2.029). We used the G*Power 3.1 software [Uiversität Kiel, Germany[43]] to calculate a prior sample size. The sample calculation indicated that for an effect size (η_p^2) of 0.1 with significance at the 5% level and power (1-β) of 0.8 to be attained, the sample size should be at least 90. None of the participants had participated similar experiments in the last six months.

In this study, we randomly assigned the participants to the COSS condition, the CODS condition, or the neutral condition in a three-cell between-subjects design. The participants were required to complete a two-evaluation task (which included the COSS, CODS, and neutral manipulations) and then report the emotions they experienced, and answer some questions about social perceptions. At the end of the experiment, the experimenter gave 30 CNY to the participants as a reward, explained the purpose of the experiment to the participants and helped them to regulate their emotions. We calculated the difference in scores between the final evaluation (the second evaluation) and the initial evaluation (the first evaluation) of an application text as the dependent variable.

Stimulus Material

We used three types of stimulus materials. The first type was an application letter for joining the school debate team, and the participants were asked to evaluate the writing level of an applicant. The second type was three texts describing the applicants' experiences, with the aim of inducing different types of compassion in the participants. The third type was an emotional rating scale, which aimed to assess the emotions experienced by the participants.

Application Text

We selected five different texts with the same theme (joining the school debate team) and then recruited 28 participants to evaluate these texts (0 = worst, 100 = best). We chose a relatively poorly written text (M = 57.76, SD = 9.25, shown in the Supplemental Materials - Study 1) as the experimental material for the two-evaluation task in the subsequent experiments.

Three Types of Applicant Experiences

We constructed three types of summer experiences for the applications induce different types of compassion on the participants (shown in Supplemental Materials - Study 1). The first type of experience was used to induce COSS. In the first case, the text described a poor college student who had been working part-time jobs throughout the holidays to earn the living expenses for the next semester. Unfortunately, all of the money was lost on the way back to school. The second type of experience was used to induce CODS. In this case, the text described an ordinary college student who planned to take the IELTS exam during the summer vacation to go abroad for

further study. He/she had been studying hard throughout the holidays, and he/she was well prepared for this test. Sadly, he experienced traffic congestion on his way to the exam hall and thus missed the exam. The third type of experience could not induce compassion. In this experience, the text described an ordinary college student who went for a trip as planned. He/she travelled to Mount Tai (in Shandong province, China) and explored the natural sceneries.

We conducted a pilot experiment to select the texts and ensure the first two types of applicant experiences induced compassion at a similar intensity level. Forty-four participants took part in the pilot experiment, in which they were required to rate their emotional experiences, after reading the nine different applicant experience texts (three for each emotional experience type). We used the Latin square design to ensure impartiality in the three types of texts. The evaluation results guided us to select three experience texts (one for each emotional experience type) as the experimental materials. ANOVA results showed a significant difference in the compassion scores for the three selected texts (F (2, 41) = 13.0, p < 0.001, η_p^2 = 0.387). Further analysis showed no significant difference in compassion scores for the two induced compassion conditions (M_{COSS} = 3.02, SD_{COSS} = 0.891; M_{CODS} = 3.07, SD_{CODS} = 0.856), t (27) = −0.132, p = 0.896. However, higher compassion scores were recorded for the two induced compassion conditions compared with the neutral condition ($M_{neutral}$ = 1.71, $SD_{neutral}$ = 0.722), COSS vs. neutral: t (27) = 4.372, p < 0.001, d = 1.62, CODS vs. neutral: t (28) = 4.686, p < 0.001, d = 1.71). In addition, there were no significant differences in positive affect (F (1, 43) = 0.199, p = 0.82), negative affect (F (1, 43) = 0.393, p = 0.697) and distress (F (1, 43) = 0.413, p = 0.583) among the three conditions (Tables S2 and S3 in the Supplemental Material - Study 1).

Emotional Rating Scale

We used 23 items in this emotional rating scale. Ten items with positive affect and ten items with negative affect were obtained from the Chinese version of the Positive and Negative Affect Schedule (PANAS).[44,45] Among them, a subset of the negative affect items (distressed, upset, afraid, nervous, and scared) was used to assess personal distress.[4,30] In addition, three items ("compassionate", "sympathetic", and "moved") were used to assess compassion.[4,34] After reading an applicant's experience text, the participants reported the intensity of the emotions they experienced (1 = very slightly, 5 = extremely). All the items were randomly presented to the participants.

Procedure

In the experiment, the participants were grouped in pairs. For each pair, one participant was a real participant and was designated the evaluator in the experimental setting. The other participant was a confederate and was designated the applicant in the experimental setting.

Prior to the experiment, both participants in each pair could see each other in different rooms but could only communicate through computers. The real participant was informed that the next task was to evaluate the content and quality of an application letter for joining the school debate team. This application text was an impromptu writing sample submitted by the applicant in the other room. In addition, the real participant was informed that the evaluation was an important reference in determining to the admission eligibility of the applicant to the school debate team.

Prior to the experiment, the participant read the evaluation criteria on a screen. Further, the applicant read through the application text and instructions presented on the screen. The participant was instructed to complete a preliminary evaluation according to the evaluation criteria. After completing the evaluation, the participant was asked to make a comment for the applicant. We asked the applicant (i.e., the confederate) to write down one of his/her most impressive personal experiences during the summer vacation for reference to ensure that the participant understood the applicant well. Later, the screen randomly presented one of the three applicants' experience texts (selected during the pilot experiment) that would initiate different types of compassion. After reading the text, the participant was asked to provide an evaluation comment. However, the computer was set to hide the previous data. The participant was asked to rewrite the evaluation of the application text. Thereafter, the screen presented the applicant's application text and the evaluation criteria as it did at the beginning of the experiment. The participants completed the emotion rating scale immediately after giving the final evaluation. All the instructions and stimuli were presented on a 24-inch LED monitor using E-prime 2.0, with a resolution of 1920 × 1080 and a refresh frequency of 60 HZ.

Three types of evaluation criteria were used.[4] The first criterion focused on the text quality and the participants were asked to assign a score for the best writing from someone in his/her peer-group/students at his/her university (0 = worst, 100 = best). The second criterion focused on the attributes of the text and the participants were asked to assign a score according to the conception, focus, content, structure, and wording of the text (1 = worst, 5 =

best). The detailed items for this part were added in the supplemental material (shown in the Criteria in Supplemental Material - Study 1). The third criterion focused on the recommendation of the text and asked the participants whether they would recommend this application text to other individuals who could use it (1 = very unlikely, 7 = very likely).

Results

Manipulation Check

One-way ANOVA results showed a significant difference in the compassion scores of the emotion rating scale among the three groups (F (2, 153) = 16.364, $p < 0.001$ $\eta_p^2 = 0.176$). Further analysis showed no significant difference between COSS and CODS conditions (M_{COSS} = 3.28, SD_{COSS} = 0.998; M_{CODS} = 3.05, SD_{CODS} = 0.86), t (104) = 1.28, p = 0.203. Moreover, the participants in the two types of compassion inducing conditions reported increase in compassion compared with the neutral condition group ($M_{neutral}$ = 2.31, $SD_{neutral}$ = 0.833), COSS vs. neutral: t (102) = 5.40, $p < 0.001$, d = 1.06, CODS vs. neutral: t (100) = 4.42, $p < 0.001$, d = 0.876. The results indicated that emotional induction was successful.

The Difference Scores Showed in the Compassion and Neutral Conditions

Further, to study the effect of compassion induction, we combined the data of the two types of compassion inducement conditions and compared it with the neutral data condition. The participants in the compassion group showed significantly higher scores compared with the neutral group. (To obtain the overall difference score, we first converted the attribute score (1~5) and recommendation score (1~7) into a percentage score according to the proportion and then calculated the average of the attribute score, the recommendation score and quality score as the overall score. The overall difference score was defined as the difference between the final overall score and the initial overall score.) ($M_{compassion}$ = 6.93, $SD_{compassion}$ = 8.62 vs. $M_{neutral}$ = 2.06, $SD_{neutral}$ = 6.105), t (154) = 3.59, $p < 0.001$, $d = 0.616$. The findings showed that the participants in the compassion condition engaged in more prosocial lying than those in the neutral condition, which were consistent with a report by Lupoli et al.[4] We also compared the scores of individual evaluation criteria (quality, attributes, recommendation) between different conditions as shown in supplemental material section.

COSS, CODS and Neutral Conditions Showed Different Scores

One-way ANOVA analysis showed significant differences in the overall difference scores for the three conditions (F (2, 153) = 14.132, $p < 0.001$, $\eta_p^2 = 0.156$). The overall difference score for the COSS condition was significantly higher than the CODS condition score (M_{COSS} = 9.66, SD_{COSS} = 9.17 vs. M_{CODS} = 4.09, SD_{CODS} = 7.04), t (104) = 3.50, $p < 0.001$, d = 0.680) and the neutral condition score ($M_{neutral}$ = 1.06, $SD_{neutral}$ = 6.10), t (102) = 4.94, $p < 0.001$, $d = 0.969$). A significant difference was also observed in the overall difference score between the CODS condition and the neutral condition (t (100) = 2.56, $p = 0.023$, $d = 0.590$). The results on comparison of the three conditions are shown in Figure 1. We also compared the scores of individual evaluation criteria (quality, attributes, recommendation) between different conditions as shown in the supplemental material section. These results are presented in Table 1.

In addition, a 2 (Initial/Final) x 2 (COSS/CODS) repeated measures ANOVA indicated that the interaction was significant (F (1, 125) = 24.3, $p < 0.001$, $\eta_p^2 = 0.163$). Further, there was a significant effect of time (Initial/Final) (F (1, 125) = 49.2, $p < 0.001$, $\eta_p^2 = 0.282$). Participants gave higher scores on the second assessment of texts ($M_{Initial}$ = 59.8, $SD_{Initial}$ = 13.6) than on the first text assessment (M_{Final} = 65.6, SD_{Final} = 15.8), t (126) = 6.48, $p < 0.001$, d = 0.575. Further, a significant effect from the compassion induced condition was observed (F (1125) = 7.80, $p = 0.006$, $\eta_p^2 = 0.059$) implying that participants' rating scores in the COSS condition (M_{COSS} = 66.1, SD_{COSS} = 12.5) were significantly higher compared with the score for the CODS condition (M_{CODS} = 59.4, SD_{CODS} = 14.5), t (125) = 2.79, $p = 0.006$, $d = 0.496$.

In summary, COSS and CODS evaluated in Study 1 increased prosocial lying. COSS showed a greater difference score, implying that it had a higher effect on prosocial lying compared to CODS. However, we only explored the effect of state compassion and not individual trait compassion. According to a study by Lupoli et al,[4] individuals with high trait compassion engaged in more prosocial lying than those with low-trait compassion. Therefore, we presumed high trait compassion in the COSS condition would have higher effect on prosocial lying compared to low-trait compassion in the CODS condition. Furthermore, we presumed that if participants with low-trait compassion in the COSS condition exhibited a greater difference score than high trait compassion participants in the CODS condition (that is, if the two different types of state compassion reversed the effect of trait

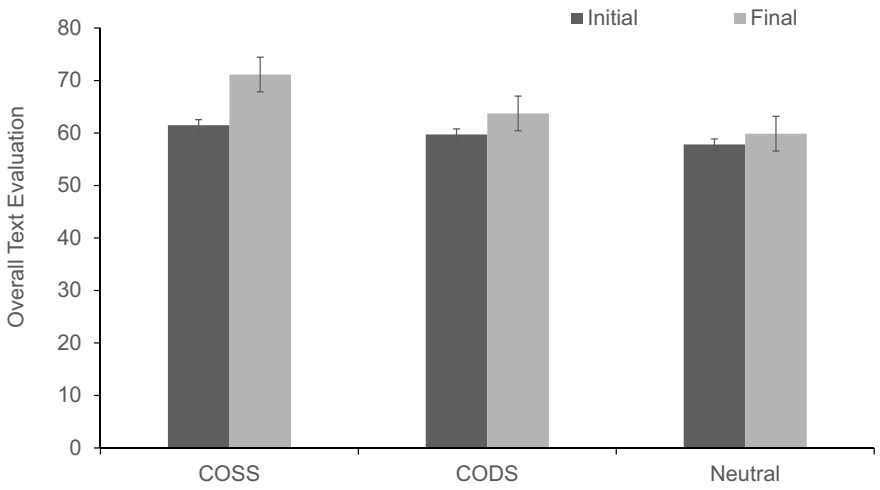

Figure 1 The overall text evaluations of three conditions in Study 1. The overall evaluation was scored on a 0 to 100 scale. Error bars indicate standard errors. "Initial" indicates the participants' first evaluation score. "Final" indicates the participants' second evaluation score. "Neutral" indicates neutral emotion.
Abbreviations: COSS, compassion for other's survival in suffering; CODS, compassion for other's development in suffering.

compassion to positively predict increased prosocial lying), we would have more evidence to conclude that COSS and CODS were two different types of compassion. To test these hypotheses, we designed study 2.

Study 2

Methods

Participants

We recruited 137 undergraduate participants online from different universities in Guangzhou city. Among them, six participants were excluded for reporting a suspicion that they were not real evaluators in the experiments. Thus, the final sample included 131 participants ranging between 18 and 27 years old (74 females, 57 males; age: $M = 20.23$, $SD = 2.685$). Further, we estimated the target sample size needed for 0.95 power (1-β) to investigate the medium-sized effect found in Study 1 ($\eta_p^2 = 0.156$). The analysis indicated that a sample of at least 100 participants would be required in Study 2. Thus, the sample size in this study meets the requirements.

Notably, none of the participants had participated in Study 1. We obtained the written informed consent from each of the participants.

Stimulus Material

In this study, we used the two scale Chinese versions to measure trait compassion. One scale was the Empathic Concern subscale of the Interpersonal Reactivity Index (IRI-EC).[46] Zhang et al,[47] tested the reliability and validity

Table 1 Description of the Results in Three Conditions

		Quality		Attributes		Recommendation		Overall	
		M (SD)	F-value	M (SD)	F-value	M (SD)	F-value	M (SD)	F-value
Initial	COSS	73.48 (10.65)	2.287	3.02 (0.58)	0.934	3.62 (1.43)	1.093	61.49 (11.76)	1.274
	CODS	69.31 (8.69)		2.90 (0.59)		3.45 (1.29)		59.42 (10.86)	
	Neutral	70.16 (12.30)		2.86 (0.69)		3.24 (1.22)		58.82 (12.67)	
Final	COSS	79.35 (9.74)	10.16***	3.53 (0.57)	10.64***	4.50 (1.17)	7.214***	71.14 (10.78)	12.19***
	CODS	71.88 (10.69)		3.09 (0.66)		3.97 (1.24)		63.51 (11.53)	
	Neutral	70.88 (11.24)		2.98 (0.71)		3.55 (1.43)		59.88 (13.41)	
Difference	COSS	5.87 (7.08)	8.773***	0.504 (0.48)	12.96***	0.88 (1.03)	5.04**	9.66 (9.17)	14.13***
	CODS	2.58 (6.17)		0.188 (0.42)		0.53 (0.93)		4.09 (7.04)	
	Neutral	0.72 (5.73)		0.11 (0.35)		0.31 (0.79)		1.06 (6.10)	

Notes: The values are means (standard deviations). The overall evaluation is scored on a 0 to 100 scale; the quality score is scored on a 0 to 100 scale; the attributes score is scored on a 1 to 5 scale; the recommendation score is scored on a 1 to 7 scale. "Initial" indicates the participants' first evaluation score. "Final" indicates the participants' second evaluation score. "Difference" indicates the difference score that the final score minus the initial score. "Neutral" indicates neutral emotion. $^{**}p < 0.01$. $^{***}p < 0.001$.
Abbreviations: M, mean; SD, standard deviation; COSS, compassion for other's survival in suffering; CODS, compassion for other's development in suffering.

of the Chinese version of the IRI-EC and reported an internal consistency coefficient of 0.532 and the retest reliability of 0.625. In the 7-item IRI-EC, the participants reported their agreement or disagreement on a scale of 1 to 5 (1 = strongly disagree, 5 = strongly agree). The second scale was the compassion subscale of the Dispositional Positive Emotion Scales (DPES).[48] In the 5-item Compassion DPES, the participants rated their agreement or disagreement on a scale of 1–5 (1 = disagree strongly, 7 = agree strongly).

Design and Procedure

We first asked the participants to complete the IRI-EC and DPES tests. For each participant, we converted the raw scores of the IRI-EC (1 ~5) and the DPES (1 ~ 7) into percentage scores according to the proportion. Further, we calculated the mean scores of the two scales and presented it as the trait compassion score. In addition, we estimated the means of the trait compassion scores for all the participants (M = 71.82) We defined a high trait compassion as trait compassion score higher than the mean and a low-trait compassion as a trait compassion score lower than the mean and repeated the procedure in Study 1. Participants with high- and low-trait compassion were randomly assigned to the COSS manipulation or the CODS manipulation. Thirty-seven participants were assigned to the "high trait + COSS" group, thirty-one participants to the "high trait + CODS" group, thirty participants to the "low trait + COSS" group, and thirty-three participants to the "low trait + CODS" group.

Results

A Significant Difference in the Overall Difference Score Was Observed in the Four Groups

The results showed a significant difference in the overall difference scores of the four groups ($M_{\text{high + COSS}}$ = 10.37, $SD_{\text{high + COSS}}$ = 10.64 vs. $M_{\text{low + COSS}}$ = 7.862, $SD_{\text{low + COSS}}$ = 8.90 vs. $M_{\text{high + CODS}}$ = 2.21, $SD_{\text{high + CODS}}$ = 7.13 vs. $M_{\text{low + CODS}}$ = 1.85, $SD_{\text{low + CODS}}$ = 7.37), $F(3, 121)$ = 7.69, $p < 0.001$, η_p^2 = 0.16). The results for the overall difference scores for the four groups are presented in Figure 2. In addition, the participants in the "high trait + COSS" group showed the greatest difference score while the participants in the "low trait + CODS" group showed the smallest difference score. To test our main hypothesis, we performed a two-sample t-test between the "low trait + COSS" and "high trait + CODS" groups. Consistent with our hypothesis, the overall difference score for the "low trait + COSS" group was significantly higher compared with the overall difference score for the "high trait + CODS" group (t (55) = 2.66, p = 0.01, d = 0.705). Further, we compared the scores for individual evaluation criteria (quality, attributes, recommendation) between different conditions as shown in the supplemental materials section.

The Four Groups Showed Significant Differences in Trait Compassion Scores

One-way ANOVA analysis showed a significant difference in the trait compassion scores of the four groups (F (3, 127) = 67.93, $p < 0.001$, η_p^2 = 0.627). However, the "high trait + COSS" group trait compassion score showed no significant difference with the "high trait + CODS" group trait compassion score (M_{COSS} = 80.4, SD_{COSS} = 6.69 vs. M_{CODS} = 78.7, SD_{CODS} = 5.59), t (54) = 0.098, p = 0.278. Further, the "low trait + COSS" group score showed no significant difference with the "low trait + CODS" group score (M_{COSS} = 61.9, SD_{COSS} = 7.52 vs. M_{CODS} = 64.1, SD_{CODS} = 6.25, t (60) = −1.23, p = 0.222). In contrast, the scores for the "high trait + COSS" group were significantly higher compared to the "low trait + COSS" group scores (t (64) = 10.37, $p < 0.001$, d = 2.63) while the score for the "high trait + CODS" group was significantly higher compared with the "low trait + CODS" group score (t (61) = 6.20, $p < 0.001$, d = 1.58). These results indicated that the classification of the four groups was in line with the requirements.

The Difference Scores Showed in Two Compassion-Inducing Conditions

Further to test the results of Study 1, we combined the "high trait + COSS" and "low trait + COSS" groups into one group termed as the COSS group and the "high trait + CODS" and "low trait + CODS" groups into one group of termed as CODS group. The obtained results were consistent with the results of Study 1 (shown in Supplemental Results in Supplemental Material - Study 2).

In Study 1 and 2, COSS and CODS showed different increases in difference scores in the two-evaluation task, which suggested that the two types of compassion may be different. However, the reason why these two types of compassion were associated with different increases in prosocial lying remained unclear. To explore the association of COSS

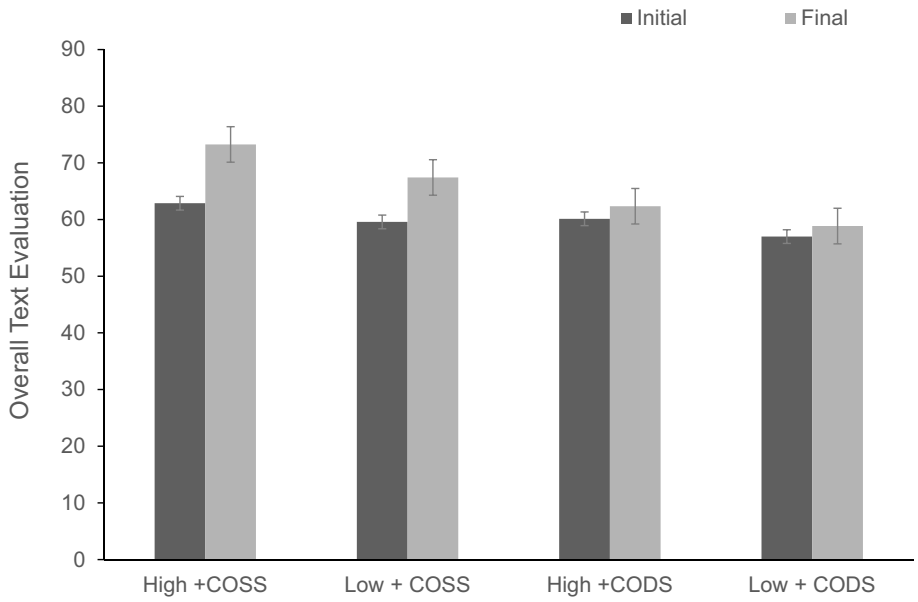

Figure 2 The results of the four groups on overall evaluations in Study 2. The overall evaluation was scored on a 0 to 100 scale. Error bars indicate standard errors. "Initial" indicates the participants' first evaluation score. "Final" indicates the participants' second evaluation score. "high + COSS" indicates that the participants with high trait compassion were assigned to COSS group. "low + COSS" indicates that the participants with low-trait compassion were assigned to COSS group. "high + CODS" indicates that the participants with high trait compassion were assigned to CODS group. "low + CODS" indicates that the participants with low-trait compassion were assigned to CODS group.

Abbreviations: COSS, compassion for other's survival in suffering; CODS, compassion for other's development in suffering.

and CODS compassion types and prosocial lying, we employed an ambiguous-dice paradigm in Study 3. Study 3 included two parts: 3a and 3b. In Study 3a, we created a situation with a strong moral conflict between prosociality and truth-telling to examine the differences in reporting target dice between two compassion-inducement conditions and a neutral condition. In Study 3b, we created a situation without conflict to examine the differences in the basic reporting of dice among the three groups. We combined Study 3a and 3b to explore the differences in the psychological mechanisms underlying the two types of compassion that affect prosocial lying.

Study 3a

Methods

Participants and Design

In this study, we recruited 121 undergraduates, ranging in between 18 and 26 years old from universities in Guangzhou city (77 females, 44 males; age: M = 20.65, SD = 2.04). All of these participants had normal or corrected-to-normal vision. We randomly assigned them to the COSS condition (n = 40), the CODS condition (n = 42) or the neutral condition (n = 39) in a three-cell between-subjects design. We chose this sample size as it would give us high power to detect a small-to-medium effect size. In a previous study, Pittarello et al[49] set power (1-β) to 0.95 and η^2 to 0.57 (for information on their pilot experiment) and reported that a sample size of 13 participants per between-subjects cell would provide enough power to detect a medium to large behavioral effect.

Procedure

Prior to the experiment, to obscure the real purpose of this study, we informed the participants that they would be participating in a study regarding "how personality and visual stimuli influence memory".[4] The participants were instructed to complete the Big Five Personality Inventory (BFI). The BFI has 20 items (1 = strongly disagree, 5 = strongly agree), which was extracted from the Chinese version of the BFI.[50] The detailed items are shown in Supplemental Material - Study 3. Subsequently, the participants watched one of the three videos. The three videos were adapted from the three applicants' experiences in Study 1 and 2 to induce different types of compassion in Study 3. Forty undergraduates participated in the evaluation of the three videos. In this procedure, participants reported experiencing a similar intensity of compassion in the COSS and CODS conditions, and they all reported feeling more compassion than the participants in the neutral condition (the detailed results are shown in Table S13 in the Supplemental Material – Study 3).

Further, the participants were informed that they would win prizes for the characters in the video and that the type of prizes would be related to their response in the subsequent tasks. In general, the larger the reported outcome, the better the prize. At the end of the experiment, we instructed the participants to select five trials they had performed randomly. We then calculated the average dice points reported by the participants in the five trials. We requested the participants to exchange the corresponding prize according to the average value for the character (the rules of exchange are displayed in Table S14 in the Supplemental Material – Study 3).

After indicating that they understood the exchange rules, the participants conducted the ambiguous-dice task. In each trial, a black fixation cross "X" (1000 ms) was displayed at one of eight possible locations on the screen. The eight locations were on the left or right midpoint of the middle four dice. Then, the "X" disappeared, and the screen presented six dice. The distribution of relations of the six dice in each trial is shown in Figure 3. After 1000 ms, the six dice disappeared. The participants were asked to type the outcome of the target die that was the closest to the fixation cross "X".[49] One die referred to as the "adjacent die" was the second closest to the fixation cross "X". The participants first conducted some practice trials and stopped the practice when 85% correct rate was attained. After the practice trials, they began the experiment that included 164 trials. Among them, eighty-four trials were experimental trials in which the target die had a smaller value than the adjacent dice. Sixty-seven trials were filler trials in which the target die had a larger value than the adjacent dice. In addition, thirteen trials were filler trials in which the target die was equal in value to the adjacent dice. After completing this task, the participants were instructed to answer three single-choice questions on the details of the video contents to test their memory and complete the emotional rating scale. At the end of the experiment, the participants exchanged the prize according to the rules. Finally, the experimenter gave 30 CNY to the participants as a reward and explained the aim of the study to them. The whole experimental procedure is shown in Figure 4. All instructions and stimuli were presented on a 24-inch LED monitor using PsychoPy 1.90, with a resolution of 1920 × 1080 and a refresh frequency of 60 HZ. Each participant was seated in a private cubicle 60 cm from the screen.

Results

Manipulation Check

One-way ANOVA analysis showed a significant difference in the compassion score of the emotional rating scale among the three groups (F (2, 118) = 24.927, $p < 0.001$, $\eta_p^2 = 0.297$). Further analysis showed no significant difference in the two types of compassion inducement conditions ($M_{COSS} = 3.23$, $SD_{COSS} = 0.894$ vs. $M_{CODS} = 3.18$, $SD_{CODS} = 0.94$), t (80) = 0.249, $p = 0.804$). Moreover, participants in the two types of compassion inducement conditions reported increased compassion compared with the participants in the neutral condition ($M_{neutral} = 2.02$, $SD_{neutral} = 0.737$), COSS vs. neutral: t (73) = 6.59, $p < 0.001$, $d = 1.48$, CODS vs. neutral: t (79) = 6.144, $p < 0.001$, $d = 1.37$). These results, therefore, indicated that emotion induction was successful.

Reported Outcome of the Ambiguous Dice Task

One-way ANOVA analysis showed a significant difference in reporting the error rate of the target dice among the three groups (F (2, 118) = 4.30, $p = 0.016$, $\eta_p^2 = 0.068$). Participants in the COSS condition reported a higher error rate compared with those in the CODS condition ($M_{COSS} = 0.218$, $SD_{COSS} = 0.181$ vs. $M_{CODS} = 0.123$, $SD_{CODS} = 0.110$),

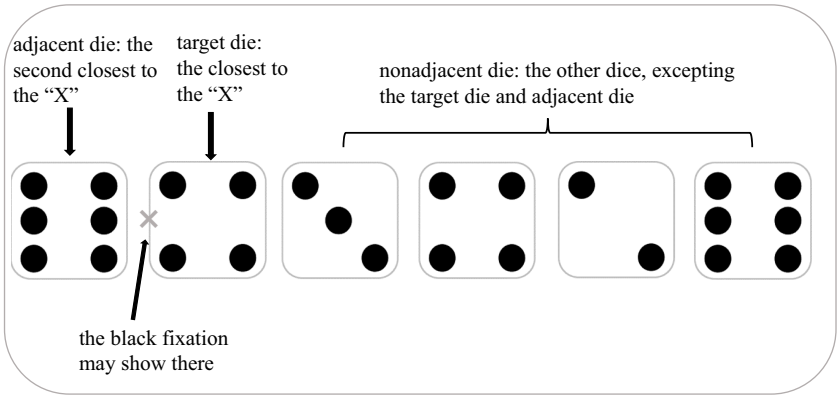

Figure 3 Illustion of therelevance of the adjacent vs nonadjacent die in each trial.

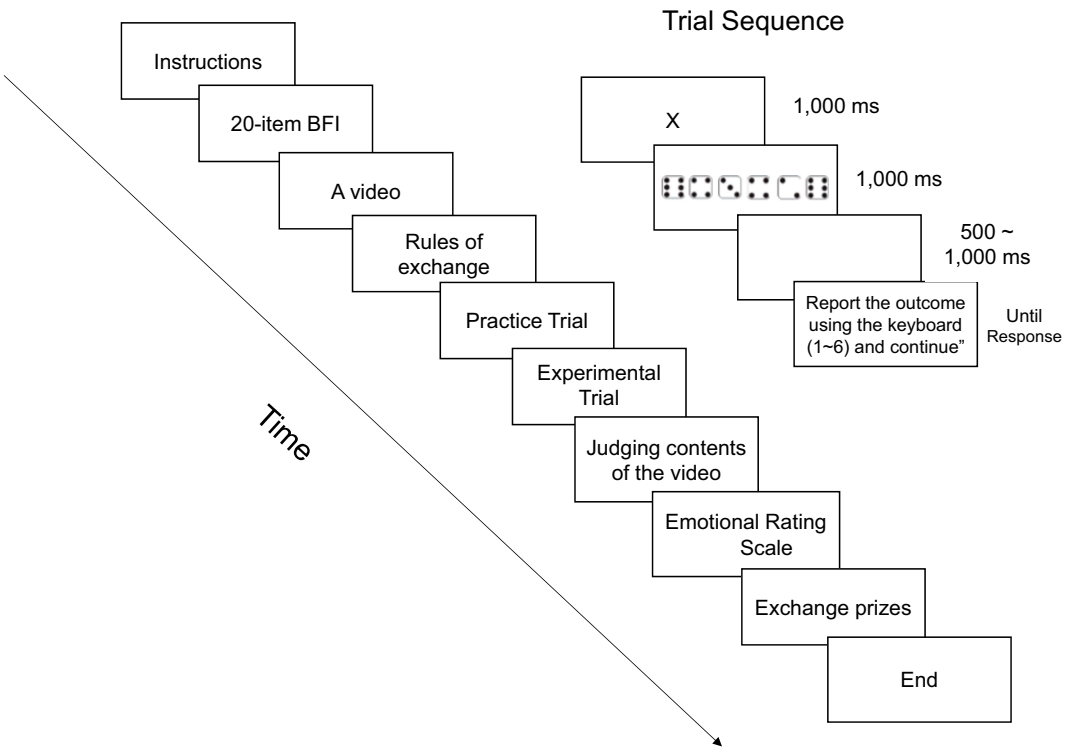

Figure 4 Illustration of the experimental procedure in Study 3a. The entire procedure was conducted according to the instructions. The participants first completed the 20-item BFI and subsequently watched one of the three video pieces. After learning the exchange rules, the participants completed some practice trials, and the experiment did not begin until the rate of correct responses reached 85%. After completing 164 trials in the experiment, the participants answered three single-choice questions regarding the details of the video content to test their memory; subsequently, they completed the emotion rating scale. Finally, the participants exchanged the prize.

t (80) = 2.87, p = 0.005, d = 0.633) and the neutral condition ($M_{neutral}$ = 0.129, $SD_{neutral}$ = 0.186), t (77) = 2.14, p = 0.035, d = 0.482). Notably, the error rate between the CODS condition and the neutral condition showed no significant difference.

Further analysis indicated that the participants' reported error rates for the target dice could be grouped into two cases. In the first case, the participants reported outcomes that were larger than the value of the target die (referred to as "misreporting a larger die"). In the second case, the participants reported outcomes that were smaller than the value of the target die (referred to as "misreporting a smaller die"). Analysis showed no significant difference in misreporting a smaller die among the three groups. However, there was a significant difference in misreporting a larger die among the three groups (F (2, 118) = 8.59, p < 0.001, η_p^2 = 0.127). In addition, the participants in the COSS condition misreported larger dice much more frequently than the participants in the CODS condition (M_{COSS}= 0.193, SD_{COSS} = 0.18; M_{CODS} = 0.095, SD_{CODS} = 0.108), t (80) = 2.98, p = 0.004, d = 0.658) and the neutral condition ($M_{neutral}$ = 0.075, $SD_{neutral}$ = 0.106), t (77) = 3.53, p < 0.001, d = 0.795). There was no significant difference in the misreporting of larger dice between the CODS condition and the neutral condition.

Furthermore, participants' reported rates of misreporting larger dice comprised two cases. In the first case, the participants misreported the adjacent larger die (i.e., when the adjacent die had a larger value than the target die, the participants reported the outcome of the adjacent die). In the second case, the participants misreported a non-adjacent larger die (i.e., the participants reported that the outcome was larger than the value of the target die, but it was not the value of the adjacent die). Statistical analysis showed a significant difference in misreporting of adjacent larger dice among the three groups (F (2, 118) = 7.89, p < 0.001, η_p^2 = 0.118). The participants misreported the adjacent larger dice more often in the COSS condition than in the CODS condition (M_{COSS} = 0.329, SD_{COSS} = 0.305 vs. M_{CODS} = 0.168, SD_{CODS} = 0.204), t (80) = 2.82, p = 0.006, d = 0.624) and the neutral condition ($M_{neutral}$ = 0.126, $SD_{neutral}$ = 0.197), t (77) = 3.49, p < 0.001, d = 0.786). Moreover, the participants misreported adjacent larger dice slightly more often in the CODS condition than in the neutral condition (t (79) = 0.922, p = 0.359); however, the difference was not statistically significant. Furthermore, there was a significant difference in the misreporting of non-adjacent larger dice (F (2, 118) = 3.48, p = 0.034, η_p^2 = 0.056). In this case, the participants in the COSS condition misreported non-

adjacent larger dice at a higher rate than those in the CODS condition (M_{COSS} = 0.025, SD_{COSS} = 0.046 vs. M_{CODS} = 0.009, SD_{CODS} = 0.016), t (80) = 1.99, p = 0.050, d = 0.439 and in the neutral condition ($M_{neutral}$ =0.010, $SD_{neutral}$ = 0.012), t (77) = 1.90, p = 0.062, d = 0.427. There was no significant difference between the misreporting error rate in the CODS condition and the neutral condition, t (79) = −0.18, p = 0.857. The error rates are displayed in Figure 5.

To ensure that the participants falsely reported larger dice to benefit other individuals rather than for other reasons, we designed Study 3b.

Study 3b

Methods

Participants, Design, and Procedure

In this study, 120 undergraduates, ranging in age between 18 and 25, from universities in Guangzhou city were recruited online (80 females, 40 males; age: M = 20.5, SD = 2.21). All the participants had normal or corrected-to-normal vision. We randomly assigned them to either the COSS condition (n = 40), the CODS condition (n = 40), or the neutral condition (n = 40) in a three-cell between-subjects design. In Study 3b, the procedure in Study 3a was used but participants were not rewarded in this study. In this case, regardless of the adjacent dice being larger than the target dice or not, participants had the same perceptual temptation to pick target dice. Thus, we presumed that the participants in the COSS condition would no longer report the adjacent larger dice more times than those in the CODS condition. If the outcome matched this assumption, we could exclude the confounding effect that the participants in COSS condition tended to misreport the larger dice. The power is 0.8 to detect the confound in Pittarello' study.[49]

Results

Manipulation Check

One-way ANOVA analysis showed a significant difference in increased compassion scores among the three groups (F (2, 117) = 28.6, p < 0.001, η_p^2 = 0.328). Further analysis showed no significant differences in compassion score for the two types of compassion inducement conditions (M_{COSS} = 3.20, SD_{COSS} = 0.640 vs. M_{CODS} = 2.98, SD_{CODS} = 0.890), t (78) = 1.25, p = 0.215). Moreover, the participants in the two types of compassion inducement conditions showed higher compassion scores than those in the neutral condition ($M_{neutral}$ = 1.97, $SD_{neutral}$ = 0.787), COSS vs. neutral: t (78) = 7.69, p < 0.001, d = 1.72, CODS vs. neutral: t (78) = 5.41, p < 0.001, d = 1.21. Therefore, these results imply that emotional inducement was successful.

Reported Outcome of the Ambiguous-Dice Task

One-way ANOVA analysis showed no significant difference in error rate for reporting the target dice among the three groups. A further analysis showed no significant difference in misreporting smaller dice or misreporting larger dice among the three groups. These results are presented in Table 2. The results indicated that initiating emotion without reward did not increase the chances of reporting larger dice or smaller dice.

Furthermore, we analyzed the reported dice of participants in the three groups. The result of the paired-sample t-tests showed that there were no significant differences for the error rate for reporting target dice in each group when the adjacent dice had a larger value than the target dice or when the adjacent dice had a smaller value than the target dice. In addition, the results of one-way ANOVA analysis indicated that regardless of the value on the adjacent dice, their confound effects on the target dice had no significant differences in the three emotion inducement groups. The results are displayed in Table 3.

In addition, in order to further test the reliability of the results, Bayesian analyses were also performed in the study 3b. The Bayes factor values (BF_{01}) of these tests were 2.44–4.81 (Tables 2 and 3). Bayes factor of 3 to 10 are interpreted as "strong" support for the null hypothesis.[51] The results in the study 3b strongly favored the null hypothesis, such that the observed data were more likely under the null hypothesis rather than the alternative hypothesis.

The results in Study 3a and 3b indicated that although misreporting the target dice could produce prosocial effects, the participants in the COSS condition misreported larger dice significantly more than those in the CODS condition. On the other hand, when misreporting the target dice had no effect on prosocial lying, there was no significant difference in misreporting the target dice between the COSS condition and CODS condition. Therefore, we concluded that the participants lied not only because they experienced compassion emotion, but more importantly because they were in a moral conflict between prosociality and truth-telling.

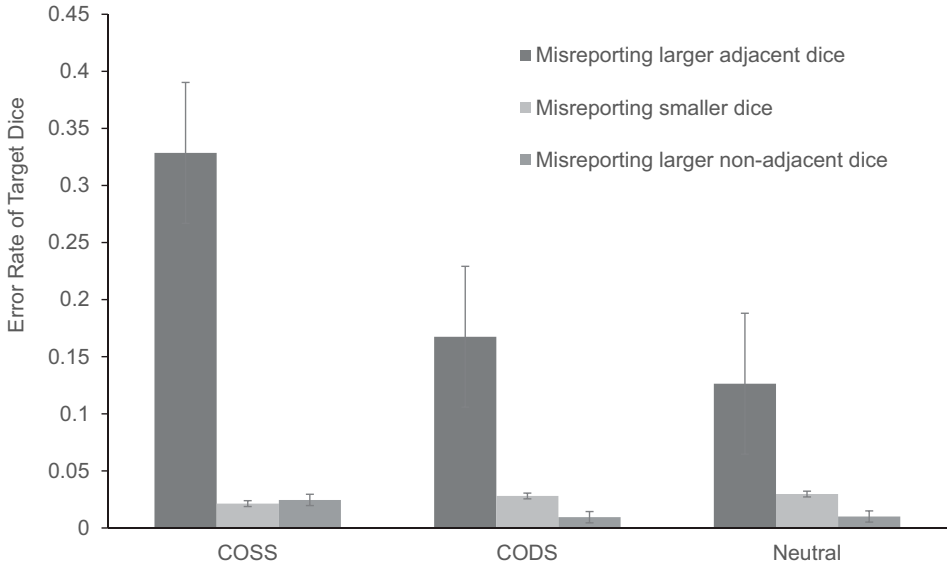

Figure 5 The overall error rates for reporting target dice in three groups. The overall error rate was divided into two cases: the misreporting of larger dice and the misreporting of smaller dice. The rate of misreporting larger dice was divided into two cases: the rates of misreporting adjacent larger dice and the rate of misreporting non-adjacent larger dice. Error bars indicate standard errors. "Neutral" indicates neutral emotion.
Abbreviations: COSS, compassion for other's survival in suffering; CODS, compassion for other's development in suffering.

Discussion

Based on previous studies, we first classified compassion into COSS and CODS based on its occurrence, and then explored the effect of COSS and CODS on prosocial lying.

To investigate whether COSS and CODS were two different types of compassion, we employed a two-evaluation paradigm before and after emotional inducement in Study 1 and 2 to create a situation with a weak moral conflict between prosociality and truth-telling. In Study 1, we found that both COSS and CODS increased prosocial lying, while neutral emotions had no effect on prosocial lying. The results imply that compared to neutral emotions, compassion emotion may prompt the participants to make the decision to lie, when they evaluated the application text again. As shown in the previous studies, emotion, an important part of decision-making, may prompt individuals to make biased choices.[52,53] In the experiment, the participants chose to lie to prevent applicants' emotional harm. Dishonesty is always optimal in the short run, but honesty may be optimal in repeated social interactions.[54,55] When participants were in states of compassion emotion, they were more likely to promote their intuitive reaction (System 1) to benefit the applicant.[56] Therefore, COSS and CODS increase prosocial lying than neutral emotion.

In addition, the participants in the COSS condition engaged in prosocial lying significantly more often than those in the CODS condition, which suggested that COSS could stimulate a stronger rescue motivation than CODS. This is consistent with the theory of the Hierarchy of Needs.[57] Human beings have common needs that motivate their behavior to satisfy needs, according to hierarchical levels. COSS and CODS had differences on affecting prosocial lying, which imply participants in the two conditions may be stimulated different motivational strengths. The results obtained in study 2 provided stronger evidence, which showed that COSS and CODS may be different types of compassion.

In Study 3a, we employed an ambiguous-dice paradigm to create a situation with a strong moral conflict

Table 2 Erroneous Reporting Rate for Target Dice in Three Initiating Emotion Groups

	COSS (n = 40)	CODS (n = 40)	Neutral (n = 40)	F-value	*P*	BF_{01}
Misreport larger	0.057 (0.063)	0.055 (0.060)	0.047 (0.038)	0.384	0.682	4.38
Misreport smaller	0.047 (0.043)	0.040 (0.032)	0.032 (0.031)	1.86	0.160	2.88
Overall error rate	0.106 (0.103)	0.091 (0.084)	0.080 (0.062)	0.962	0.385	2.44

Notes: The values are mean (standard deviations); BF_{01}, H_0 versus H_1 Bayesian factor. The overall error rate was divided into two cases: the misreporting of larger dice and the misreporting of smaller dice. "Neutral" indicates neutral emotion.
Abbreviations: COSS, compassion for other's survival in suffering; CODS, compassion for other's development in suffering.

Table 3 The Rate of Misreporting Adjacent Dice in Three Initiating Emotion Groups

	COSS (n = 40)	CODS (n = 40)	Neutral (n = 40)	F-value	*p*	BF_{01}
Adjacent > Target	0.091 (0.010)	0.087 (0.114)	0.078 (0.069)	0.195	0.823	4.81
Adjacent < Target	0.089 (0.084)	0.073 (0.064)	0.065 (0.066)	1.17	0.313	3.57

Notes: The values are mean (standard deviations); BF_{01}, H_0 versus H_1 Bayesian factor. The rate of misreporting adjacent dice was divided into two cases: the adjacent dice were larger target dice and the adjacent dice were smaller target dice. "Neutral" indicates neutral emotion.

Abbreviations: COSS, compassion for other's survival in suffering; CODS, compassion for other's development in suffering.

between prosociality and truth-telling. We obtained two meaningful findings. The first finding was that the rate of "misreporting larger dice" in the COSS condition was significantly higher than the rate in the CODS condition and the neutral condition, while the difference of the rate between the CODS condition and neutral condition was not significant. These results indicated that in the case of a strong moral conflict between prosociality and truth-telling, participants in the COSS condition were still willing to abandon morality and display compassion and engage in prosocial lying; while participants in the CODS condition did not show prosocial lying.

Secondly, the rate of misreporting non-adjacent larger dice in the COSS condition was higher than that in the CODS condition and the neutral condition, while there was no significant difference between the rate in the CODS condition and the neutral condition. Similarly, the rate of misreporting adjacent larger dice in the COSS condition was higher than that in the CODS condition and the neutral condition. Although the difference was not statistically significant, the rate of misreporting adjacent larger dice in the CODS condition was slightly greater than that in the neutral condition. These results indicated that misreporting larger dice may occur for two reasons. First, the participants produced illusions as a result of being driven by compassion feelings. It is possible for participants to regard the target dice they saw as the ones with the larger values because of the ambiguous setting. This kind of misreporting was implicit and unconscious and was more likely to occur in cases of "misreporting adjacent larger dice". Second, the participants might have lied consciously. The participants have realized that the target die they saw was not the larger die, but they voluntarily gave up morality to some extent and consciously told lies to report the larger-value dice. This kind of misreporting was likely to occur in cases of "misreporting adjacent larger dice" and "misreporting non-adjacent larger dice".

These speculations about conscious and unconscious prosocial lying can be explained by dual process theories in social interaction. Dual process theories involve a set of frameworks unified by the basic idea that people's choices result from the interplay between two cognitive systems, System 1 that is fast and intuitive, and System 2 that is slow and deliberative.[56,58] In this study, unconscious lying is intuitive, while conscious lying is deliberative. Based on this, we thought both COSS and CODS can promote System 1 to misreport adjacent larger dice, but COSS also promotes System 2 to misreport non-adjacent larger dice. That is to say, COSS increasing prosocial lying has two causes: the unconscious illusion driven by compassion and the conscious lying driven by compassion. While CODS mainly affected System 1 to increase unconscious prosocial lying.

However, one limitation of our studies is that although the effects may have been persuasive, all the participants were undergraduates who had similar ages and incomes. Future studies should include other age groups and income level of participants to make the results more representative and reliable. Second, in study 3b, null hypothesis analysis was used, which may have limitations. We performed Bayesian analyses to test the reliability of the results. The Bayes factor of these tests were 2.44–4.81 and supported the null hypothesis. In future studies, a more rigorous standard will be adopted and a larger sample size will be selected to verify the results. In addition, we only speculated that potential psychological mechanisms of COSS and CODS may be different on prosocial lying at the behavioral level. Therefore, we recommend future research to employ electroencephalograph (EEG) and functional magnetic resonance imaging (fMRI) technology to explore the nature of and differences between the two types of compassion from the perspective of neural mechanisms. Further additional studies should explore the underlying reasons behind the two types of compassion producing differences in conscious and unconscious lying.

In conclusion, this study demonstrates that COSS and CODS are different types of compassion. In situations with a weak moral conflict between prosociality and truth-telling, COSS and CODS increase prosocial lying. In cases where people experience a strong moral conflict between prosociality and truth-telling, only COSS increases prosocial lying. In addition, we show that COSS increases prosocial lying, partly due to two aspects: the unconscious illusion driven by compassion and the conscious lying driven by compassion. On the

other hand, participants in the CODS condition may be driven by compassion feelings to generate the unconscious illusion. This study presents pioneering work in the compassion domain, which has important implications for further research on compassion and its effects.

Ethical Approval

The study procedures were in accordance with ethical standards. All participants were informed of the research process and provided written informed consent in accordance with the Declaration of Helsinki. Study 1, 2 and 3 were approved by the Human Research Ethics Committee for the Non-Clinical Faculty of School of Psychology at South China Normal University. The study approval number was 2018/287.

Acknowledgments

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Disclosure

The authors declare that they have no competing financial interests.

References

1. Omoto AM, Malsch AM, Barraza JA. Compassionate acts: motivations for and correlates of volunteerism among older adults. In: Fehr B, Sprecher S, Underwood LG, editors.*The Science of Compassionate Love: Theory, Research, and Applications*. Malden: Wiley-Blackwell; 2009:257–282.
2. Saslow LR, Willer R, Feinberg M, et al. My brother's keeper? *Soc Psychol Personal Sci*. 2012;4(1):31–38. doi:10.1177/1948550612444137
3. Singer T, Steinbeis N. Differential roles of fairness- and compassion-based motivations for cooperation, defection, and punishment. *Ann N Y Acad Sci*. 2009;1167:41–50. doi:10.1111/j.1749-6632.2009.04733.x
4. Lupoli MJ, Jampol L, Oveis C. Lying because we care: compassion increases prosocial lying. *J Exp Psychol Gen*. 2017;146(7):1026–1042. doi:10.1037/xge0000315
5. Nussbaum MC. Compassion: the basic social emotion. *Soc Philos Policy*. 1996;13(1):27–58. doi:10.1017/S0265052500001515
6. Goetz JL, Keltner D, Simon-Thomas E. Compassion: an evolutionary analysis and empirical review. *Psychol Bull*. 2010;136(3):351–374. doi:10.1037/a0018807
7. Batson CD. *The Altruism Question: Toward a Social-Psychological Answer*. Lawrence Erlbaum Associates; 1991.
8. Eisenberg N. *Empathy-Related Emotional Responses, Altruism, and Their Socialization*. Oxford University Press; 2012:330–332.
9. Haidt J. The moral emotions. In: Davidson RJ, Scherer KR, editors. *Handbook of Affective Sciences*. Oxford: Oxford University Press; 2003:852–870.
10. Lazarus RS. Cognition and motivation in emotion. *Am Psychol*. 1991;46(4):352–367. doi:10.1037/0003-066X.46.4.352
11. Cohen D, Strayer J. Empathy in conduct-disordered and comparison youth. *Dev Psychol*. 1996;32(6):988–998. doi:10.1037/0012-1649.32.6.988
12. Eisenberg N. Emotion, regulation, and moral development. *Annu Rev Psychol*. 2000;51(51):665–697. doi:10.1146/annurev.psych.51.1.665
13. Post SG, Underwood LG, Schloss JP, Hurlbut WB. Altruism and altruistic love: science, philosophy, and religion in dialogue. *Choice*. 2002;5:836.
14. Vaish A, Carpenter M, Tomasello M. Sympathy through affective perspective taking and its relation to prosocial behavior in toddlers. *Dev Psychol*. 2009;45(2):534–543. doi:10.1037/a0014322
15. Wispé L. The distinction between sympathy and empathy: to call forth a concept, a word is needed. *J Pers Soc Psychol*. 1986;50(2):314–321. doi:10.1037/0022-3514.50.2.314
16. Hou X, Allen TA, Wei D, et al. Trait compassion is associated with the neural substrate of empathy. *Cognitive, Affective, & Behavioral Neuroscience*. 2017;17(5):1018–1027. doi:10.3758/s13415-017-0529-5
17. Loewy EH. Compassion, reason, and moral judgment. *Camb Q Healthc Ethics*. 1995;4(4):466–475. doi:10.1017/S0963180100006290
18. Wang Y, Wen Z, Fu Y, Zheng L. Psychometric properties of a Chinese version of the measure of empathy and sympathy. *Pers Individ Dif*. 2017;119:168–174. doi:10.1016/j.paid.2017.07.019
19. Condon P, DeSteno D. Compassion for one reduces punishment for another. *J Exp Soc Psychol*. 2011;47(3):698–701. doi:10.1016/j.jesp.2010.11.016
20. Stellar J, Feinberg M, Keltner D. When the selfish suffer: evidence for selective prosocial emotional and physiological responses to suffering egoists. *Evol Hum Behav*. 2014;35(2):140–147. doi:10.1016/j.evolhumbehav.2013.12.001
21. Stellar JE, Cohen A, Oveis C, Keltner D. Affective and physiological responses to the suffering of others: compassion and vagal activity. *J Exp Soc Psychol*. 2015;108(4):572–585.
22. Baumgartner T, Esslen M, Jancke L. From emotion perception to emotion experience: emotions evoked by pictures and classical music. *Int J Psychophysiol*. 2006;60(1):34–43. doi:10.1016/j.ijpsycho.2005.04.007
23. Dolan RJ. Emotion, cognition, and behavior. *Science*. 2002;298(5596):1191–1194. doi:10.1126/science.1076358
24. Fang L, Zhu Z, Bai X. The duration of happiness and sadness induced by emotional film editing. *Stud Psychol Behav*. 2009;7(1):32–38.
25. Mcmakin DL, Santiago CD, Shirk SR. The time course of positive and negative emotion in dysphoria. *J Posit Psychol*. 2009;4(2):182–192. doi:10.1080/17439760802650600
26. Zheng X. The priming effect of 3 emotion models by photo. *Acta Psychol Sin*. 2003;35(3):352–357.
27. Lang PJ, Bradley MM, Cuthbert BN. *International Affective Picture System (IAPS): Technical Manual and Affective Ratings*. Gainesville, FL: National Institute of Mental Health Center for the Study of Emotion and Attention; 1997.
28. Zhou P, Chen Q. The development in the research on the emotion stimulation material. *Psychol Sci*. 2008;31(2):424–426.
29. Pu Z, Liu CH, Yu GL. An overview of mood-induction methods. *Adv Psychol Sci*. 2012;20(1):45–55.
30. Eisenberg N, Fabes RA, Miller PA. Relation of sympathy and personal distress to prosocial behavior: a multimethod study. *J Pers Soc Psychol*. 1989;57(1):55–66. doi:10.1037/0022-3514.57.1.55
31. Batson CD, Duncan BD, Ackerman P, Buckley T, Birch K. Is empathic emotion a source of altruistic motivation? *J Pers Soc Psychol*. 1981;40(2):290–302. doi:10.1037/0022-3514.40.2.290
32. Eisenberg N, Miller PA. The relation of empathy to prosocial and related behaviors. *Psychol Bull*. 1987;101(1):91–119. doi:10.1037/0033-2909.101.1.91
33. Horberg EJ, Oveis C, Keltner D. Emotions as moral amplifiers: an appraisal tendency approach to the influences of distinct emotions upon moral judgment. *Emot Rev*. 2011;3(3):1–8. doi:10.1177/1754073911402384
34. Oveis C, Horberg EJ, Keltner D. Compassion, pride, and social intuitions of self-other similarity. *J Pers Soc Psychol*. 2010;98(4):618–630. doi:10.1037/a0017628

35. Rudolph U, Roesch S, Greitemeyer T, Weiner B. A meta-analytic review of help giving and aggression from an attributional perspective: contributions to a general theory of motivation. *Cogn Emot*. 2004;18(6):815–848. doi:10.1080/02699930341000248
36. Biziou-Van-Pol L, Haenen J, Novaro A, Liberman AO, Capraro V. Does telling white lies signal pro-social preferences? *Judgm Decis Mak*. 2015;10(6):538–548.
37. Erat S, Gneezy U. White lies. *Manage Sci*. 2012;58(4):723–733. doi:10.1287/mnsc.1110.1449
38. Zhang A, Reyna C, Qian Z, Yu G. Interpersonal attributions of responsibility in the Chinese workplace: a test of western models in a collectivistic context 1. *J Appl Soc Psychol*. 2010;38(9):2361–2377. doi:10.1111/j.1559-1816.2008.00395.x
39. Zhang A, Xia F, Li C. The antecedents of help giving in Chinese culture: attribution, judgment of responsibility, expectation change and the reaction of affect. *Soc Behav Pers*. 2007;35(1):135–142. doi:10.2224/sbp.2007.35.1.135
40. Maslow AH. A theory of human motivation. *Psychol Rev*. 1943;50(4):370–396. doi:10.1037/h0054346
41. Koltko-Rivera ME. Rediscovering the later version of Maslow's hierarchy of needs: self-transcendence and opportunities for theory, research, and unification. *Rev Gen Psychol*. 2006;10(4):302–317. doi:10.1037/1089-2680.10.4.302
42. McLeod S. Maslow's hierarchy of needs. *Simply Psychol*. 2007;1:1–8.
43. Faul F, Erdfelder E, Lang AG, Buchner A. G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behav Res Methods*. 2007;39(2):175–191. doi:10.3758/BF03193146
44. Watson D, Clark LA, Tellegen A. Development and validation of brief measures of positive and negative affect: the PANAS scales. *J Exp Soc Psychol*. 1988;54(6):1063–1070.
45. Lin Q. Revision of the positive affect and negative affect scale. *Chin J Appl Psychol*. 2008;14(3):249–254.
46. Davis MH. Measuring individual differences in empathy: evidence for a multidimensional approach. *J Pers Soc Psychol*. 1983;44(1):113–126. doi:10.1037/0022-3514.44.1.113
47. Zhang F, Dong Y, Wang K. Reliability and validity of the Chinese version of the interpersonal reactivity index -C. *Chin J Clin Psychol*. 2010;18(2):155–157.
48. John OP, Keltner D, John OP. Positive emotion dispositions differentially associated with big five personality and attachment style. *J Posit Psychol*. 2006;1(2):61–71. doi:10.1080/17439760500510833
49. Pittarello A, Leib M, Gordon-Hecker T, Shalvi S. Justifications shape ethical blind spots. *Psychol Sci*. 2015;26(6):794–804. doi:10.1177/0956797615571018
50. Luo J, Zhou Y, Chen W, Pan Y, Zhao S. A reliability generalization of the big-five factor personality tests in China. *Psychol Dev Educ*. 2016;32(1):121–128.
51. Jarosz AF, Wiley J. What are the odds? A practical guide to computing and reporting bayes factors. *J Prob Solving*. 2014;7:1. doi:10.7771/1932-6246.1167
52. Bechara A. Emotion, decision making and the orbitofrontal cortex. *Cereb Cortex*. 2000;10(3):295–307. doi:10.1093/cercor/10.3.295
53. Slovic P, Peters E, Finucane ML, MacGregor DG. Affect, risk, and decision making. *Health Psychol*. 2005;24(4S):35–40. doi:10.1037/0278-6133.24.4.S35
54. Capraro V. Does the truth come naturally? Time pressure increases honesty in one-shot deception games. *Econ Lett*. 2017;158:54–57. doi:10.1016/j.econlet.2017.06.015
55. Capraro V, Schulz J, Rand DG. Time pressure and honesty in a deception game. *Social Sci Electron Publishing*. 2019;79:93–99.
56. Capraro V. The dual-process approach to human sociality: a review. *Ssrn Electron J*. 2019. doi:10.2139/ssrn.3409146
57. Anderson A. Maslow's hierarchy of needs. *Educ Psychol Interactivevaldosta Ga Valdosta State Univ*. 2014;67(2):172–178.
58. Evans JSBT, Stanovich KE. Dual-process theories of higher cognition: advancing the debate. *Perspect Psychol Sci*. 2013;8(3):223–241. doi:10.1177/1745691612460685