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Approach motivational orientation enhances malevolent creativity

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ABSTRACT

Three studies were conducted to investigate the relationship between motivation and malevolent creativity (MC). In Study 1, participants completed motivation scales and a measure of MC in online formats. Results showed that approach motivation accurately predicted MC, whereas avoidance motivation was negatively related to MC. In Study 2, participants solved MC problems in either approach or avoidance motivation conditions. Analyses revealed higher MC in the approach than in the avoidance motivation condition. In Study 3, participants were further asked to solve MC problems in one of the following conditions: approach-success/approach-failure/avoidance-success/avoidance-failure. The beneficial effects of approach motivation over avoidance motivation were again observed. Moreover, the experience of 'no closure' (failure in doing something) enhanced individual MC performance and counteracted the negative impact of avoidance motivation on MC. These findings indicate that individual MC performance might be enhanced by approach motivation and the experience of 'no closure'.

1. Introduction

As a proverb says, 'While the priest climbs a post, the devil climbs ten'. In literature or movies, villains can always generate quite novel and striking ways to achieve their evil purposes. Such ability, which is named as malevolent creativity (MC), involves the application of novel ideas to harm others purposely, mostly for the sake of oneself (Cropley, Cropley, Kaufman, & Runco, 2010; Cropley, Kaufman, & Cropley, 2008; Harris, Reiter-Palmon, & Kaufman, 2013). MC is not a unique property exclusive to villains. It can appear everywhere in the daily life of normal individuals, such as deception, playing tricks, and so forth. The present study aimed to investigate the effects of approach and avoidance motivational orientations on MC.

1.1. Creativity and malevolent creativity

Creativity is typically defined as the ability to generate novel and useful ideas (Runco & Jaeger, 2012; Sternberg & Lubart, 1993). The earliest relevant mention of MC can be traced back to a discussion of the positive and negative purposes and social influence of creativity (Rogers, 1954; Stein, 1953). Until the 1990s, scholars attended to the negative and anti-social side of creativity (Gruber, 1993; McLaren, 1993). More recently, it has been reported that creativity is associated with antisocial behaviors or traits (Cropley et al., 2008; Cropley, Kaufman, White, & Chiera, 2014) and sometimes criminality could be a by-product of creativity (Cropley et al., 2008). It was also suggested that highly creative individuals are often perceived as having more negative traits by laypersons unconsciously (Cropley et al., 2014).

Runco (1993) suggested that creative behavior can hardly be recognized as malevolent or not without taking intentions into account. Although it is possible for creative products to raise negative consequences, not all are created with the purpose of harming others. This negative creativity (NC) refers to creativity that is harmful to others, like MC, however, unlike MC, the intention is not malevolent (James, Clark, & Cropanzano, 1999; McLaren, 1993).

The typical examples of MC involve crime and terrorism. Creativity requires people to think outside-the-box or break traditional rules, which is also a key element of unethical behavior (Gino & Wiltermuth, 2014) and lawbreaking (Cropley & Cropley, 2011). Cropley and Cropley (2011) proposed that creativity and lawbreaking involve 'deviance' (norm violation). Some individuals may go to extremes to violate laws; that is, crimes may be the products of creativity (Cropley et al., 2008), or conversely, crimes can improve creativity. For example, 'thinking-outside-the-box' could induce individuals to behave more dishonestly (Gino & Ariely, 2012), and previous dishonest behavior would also enhance subsequent creativity (Gino & Wiltermuth, 2014). Eisenman (2008) presented nine types of MC in criminals, such as taking revenge on a personal enemy by killing his or her lover, threatening victims by

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burning down their houses, and so on. Cropley and Cropley (2011) found that some criminals exhibited efficient and novel criminal behaviors. They shared similar personality traits as those who have high creativity, such as being willing to take any risk to achieve their goals, put any possible method into practice regarding the potential harm to society, and so on. Gino and Ariely (2012) also found that highly creative individuals tend to break the rule and the law. Moreover, Kapoor (2015) defined a Dark Triad of traits (i.e. Machiavellianism, narcissism, and psychopathy) that she felt may explain MC. Gill, Horgan, Hunter, and Cushenbery (2013) explored MC behaviors in terrorist organizations and revealed the influence of the factors of terrorist's MC behaviors from the dimensions of the group and the individual.

MC is embodied in the behaviors of daily life as well, such as hurting people, lying, playing tricks, betrayal, deception, and so on (Gill et al., 2013; Hao, Tang, Yang, Wang, & Runco, 2016; Harris & Reiter-Palmon, 2015; James et al., 1999; Spooner, 2008; Walczyk, Runco, Tripp, & Smith, 2008). These behaviors are malevolent since they are harmful to others (e.g. hurting people), not allowed in society (e.g. lying), troublesome and selfish (e.g. playing tricks). Also, these behaviors require creativity. For instances, 'hurting people' usually involves the application of original ideas to purposely hurt others physically or mentally (Hao et al., 2016).

Cognitive flexibility and divergent thinking are necessary to tell a lie (DePaulo, Ansfield, Kirkendol, & Boden, 2004; DePaulo & Kashy, 1998). Divergent thinking helps individuals to find more novel ways to lie, which may make the lie more believable than something that has been heard before. The flexibility that is also a part of divergent thinking may make it easier for individuals to justify their dishonest behavior (Gino & Ariely, 2012). As the use of pre-existing tricks can be ineffective, it can be quite necessary to employ novel tricks on others to be successful (Bailin, 1987). Incidentally, playing tricks always relates to humour, which involves incongruity-resolution between remote ideas (Chan, 2016). Certain kinds of humour (e.g. sarcasm) would require individuals to integrate remote ideas, which is related to creativity (Huang, Gino, & Galinsky, 2015).

James et al. (1999) suggested that MC might be the outcome of the interaction of negative target, negative emotion, and concept generation (also see Clark & James, 1999). Gill et al. (2013) found that an unfair situation and a dissatisfaction with society were associated with MC. Cropley et al. (2008) proposed that competitive environment would force individuals to find more malicious and novel methods to defeat their opponents. Harris et al. (2013) found that people with low emotional intelligence performed high on measures of MC, compared to individuals with high emotional intelligence. Then, there is personality. Lee and Dow (2011) found that subjects with high physical aggression traits reported more harmful ideas on an Alternative Uses Task (AUT). Harris and Reiter-Palmon (2015) found that individuals with high implicit aggression produced more malevolent creative ideas when their premeditation levels were low. Jonason, Abboud, Tomé, Dummett, and Hazer (2017) found that dark triads were positively correlated with harmfulness of creative ideas that were produced in solving AUT problems.

1.2. Approach/avoidance motivations and malevolent creativity

Previous studies have confirmed that individual creativity is susceptible to motivation (Friedman & Förster, 2000, 2002; Mehta & Zhu, 2009). Generally, motivation can be classified as approach motivation or avoidance motivation. While the approach motivation is the one induced by positive outcomes, the avoidance motivation is induced by negative outcomes (Elliot & Church, 1997). For instance, one will look forward to seeing somebody (approach motivation) who treated him/her nicely (a positive outcome) but avoid meeting someone (avoidance motivation) who treated him/her badly (a negative outcome). Researchers reported that creative performance could be enhanced by approach motivation, but inhibited by avoidance motivation (Friedman & Förster, 2000, 2002; Mehta & Zhu, 2009). It was interpreted that individuals with approach motivation prefer to take more risks and be more flexible and highly efficient, which can contribute to creative performance (Friedman & Förster, 2002, 2005; Mehta & Zhu, 2009). On the contrary, avoidance motivation may make individuals more conservative, narrow their attention scope, and diminish flexible thinking (Friedman & Förster, 2005). Thus, creative performance was inhibited by avoidance motivation.

As a subtype of creativity, MC requires individuals to take more risks, namely, to violate certain serious social norms (i.e. laws) to produce malevolent ideas. Since individuals with approach motivation tend to be more risk-takers (Friedman & Förster, 2002, 2005; Mehta & Zhu, 2009), they may find it much easier to violate social norms and generate malevolent behaviors. However, one with avoidance motivation may have greater difficulty violating norms or generating malevolent behaviors because avoidance motivation can make individuals more conservative and more likely to avoid taking risks (Friedman & Forster, 2005). Accordingly, we hypothesize that when compared to avoidance motivation, approach motivation can lead to higher MC performance. However, in some cases, avoidance motivation may result in creative performance equivalent to that of approach motivation.

According to the Dual Pathway to Creativity Model, both persistent pathways (e.g. exploring ideas in a few categories, narrow processing style, prolonged and systematic effort) and flexible pathways (e.g. exploring ideas in broad categories, holistic processing style) provide access to creativity (Baas, Roskes, Sligte, Nijstad, & De Dreu, 2013; De Dreu, Baas, & Nijstad, 2008). De Dreu et al. (2008) indicated that while individuals with approach motivation tend to create through the flexible pathways, those with avoidance motivation tend to create through the persistent pathways. The persistent pathway, however, is relatively effortful and requires prolonged task engagement (Baas, De Dreu, & Nijstad, 2011; Eysenck, Derakshan, Santos, & Calvo, 2007; Roskes, De Dreu, & Nijstad, 2012). That is to say, only when effortful and prolonged task engagement is obtained, will the benefit of persistent pathways on creative performance eventually emerge.

An extra incentive, therefore, may be required to enhance individuals' effort to compensate for the cost of persistent pathways. In support of this, several studies have found that when creative performance can contribute to goal fulfilment, individuals with avoidance motivation perform as well as those with approach motivation. However, their performance is more effortful and exhausting (De Dreu et al., 2008; Roskes et al., 2012). Moreover, Baas et al. (2011) have also observed the effect of regulatory closure (whether a goal is fulfilled or not) on the relationship between motivation and individual creative performance. In their study, participants were randomly assigned into four conditions: approach/task accomplished (closure), approach/task unaccomplished (no-closure), avoidance/task accomplished (closure), and avoidance/task unaccomplished (no-closure). They were then asked to solve RAT (Remote Association Task) problems. Results showed that in the no-closure condition, participants' performance of creativity had no significant difference between approach and avoidance motivation. This may indicate that in the no-closure condition, where the motivation to goal fulfilment is maintained and may serve as an incentive (Förster, Liberman, & Higgins, 2005), enhanced effort and task engagement release the benefits of persistent pathways on creative performance. Consequently, individuals with avoidance motivation performed as well as those with approach motivation. In this study, we also expected to verify whether the same effect of regulatory closure on the relationship between motivation and creative performance could be observed on MC.

1.3. The present study

In the present study, we particularly aimed to address three questions by three sub-studies. For study 1, 'Does an individual motivation

trait predict MC?' For study 2, 'Does induced motivational state affect individual MC performance?' For study 3, 'Is the effect of motivation on MC performance moderated by extra incentives such as regulatory closure?' Based on the aforementioned review, three hypotheses were posited for each study: For study 1, (H1) motivation, aggression, and MC would be related to each other; for study 2, (H2) compared with avoidance motivation, approach motivation would enhance MC performance; and for study 3, (H3) in the no-closure condition, the superiority of approach motivation over avoidance motivation will be absent.

2. Study 1

Study 1 investigated the relationship between motivation and MC at the trait level using several scales to measure different traits. Previous studies reported that creativity can be enhanced by approach motivation but is inhibited by avoidance motivation (Friedman & Förster, 2000, 2002; Mehta & Zhu, 2009). Accordingly, we tested the first hypothesis (H1) in Study 1. Since previous studies have found that aggression is associated with both MC and motivation (Harmon-Jones & Peterson, 2008; Lee & Dow, 2011; Yang & Raine, 2009), we further explored the effect of aggression on the relationship between motivation and MC.

2.1. Participants

A total of 263 participants were recruited from different cities in China. All participants were asked to complete their questionnaires through the website platform of Sojump (www.sojump.com) on their own cell phones and computers, after which they had a chance to draw a lottery of ¥2 as compensation. A strict standard of exclusion was applied in Study 1. Fifty-five participants were excluded because of incomplete information and fake answers. Thus, the data of 208 participants (69 male; M = 25.33 years old, SD = 5.47) were analysed. The protocol of the study was approved by the University Committee on Human Research Protection (UCHRP) of East China Normal University.

2.2. Instruments

The Behavior Approach System/Behavior Avoidance System Scale was used to assess the participants' motivation traits. This Scale (Carver & White, 1994) contains 20 items and uses a 4-point Likert-type scale, from 1 to 4 ('extremely uncharacteristic of me' to 'extremely characteristic of me'). The Chinese version (Li et al., 2008) has acceptable internal consistency reliability and structural validity. The internal consistency reliability of the Behavior Approach System Scale (α = 0.77) and the Behavior Avoidance System Scale (α = 0.76) was satisfactory for this study.

The Buss-Perry Aggression Questionnaire (Buss & Perry, 1992) was used to assess the participants' aggression, since previous studies have found that aggression is associated with both MC and motivation (Harmon-Jones & Peterson, 2008; Lee & Dow, 2011; Yang & Raine, 2009). The scale contains 29 items and uses a 5-point Likert scale, from 1 to 5 ('not at all' to 'very much'). The Chinese revised Buss-Perry Aggression Questionnaire (Lv, Takami, Dong, Wong, & Wang, 2013) contains 22 items and has satisfactory internal consistency reliability (Cronbach's α = 0.89), test-retest reliability (r = 0.91), and structural validity. The internal consistency reliability of Buss-Perry Aggression Questionnaire (α = 0.89) was satisfactory for this study.

The Runco Ideational Behavior Scale (Runco & Acar, 2012) was used to assess the participants' individual creative potential. The scale focuses on ideation that may occur in daily life. The short form of the Runco Ideational Behavior Scale was adopted in this study. It contains 19 items and asks participants to choose a number from 0 to 4 which range from 'never' to 'just about every day', according to the frequency of each item in daily life. The sum of the 19 items is the creativity ideation score. The reliability of the Runco Ideational Behavior Scale in the present investigation was satisfactory (Cronbach's α = 0.86).

The MC Behavior Scale (Hao et al., 2016) was used to assess the participants' individual MC potential. It contains 13 items divided into three dimensions: hurting people, lying, and playing tricks. Respondents were asked to choose from 0 to 5 (0 = never, 1 = few times, 2 = sometimes, 3 = often, and 4 = usually) according to the frequency of each item in their own daily lives. The sum of all 13 items equals the score on the MC Behavior Scale; a higher score is indicative of greater MC potential. The internal consistency reliability of the MC Behavior Scale (α = 0.89) was satisfactory for this study.

The MC problem. The MC problem was as follows: 'Ming (a name) was walking on his way one day. Wei (a name) was running in a hurry and bumped into Ming, and Ming's computer dropped on the ground and broke. Wei criticized Ming and ran off without saying that he was sorry, which made Ming very angry'. Participants were asked to generate as many creative ideas as possible to help Ming take revenge on Wei without being discovered. During the instruction, the following requirement was emphasized repeatedly: Focus on generating creative ideas regardless of how immoral or unacceptable they may be.

2.3. Procedure

Participants first completed the Behavioral Approach System/Behavioral Avoidance System Scale, MC Behavior Scale, Runco Ideational Behavior Scale, and Buss-Perry Aggression Questionnaire. Then, they were asked to solve one MC problem without time limitations. They were encouraged to produce as many solutions as possible and type them briefly into the text-entry box. Finally, participants submitted their responses online, which were stored in a database for further analysis.

2.4. Assessment of performance on MC task

First, two raters collaborated to exclude the ideas that were not malevolent. Then, two indicators were employed to assess participants' performance in solving the MC problem. One was the fluency score, which was calculated by the number of appropriate solutions that participants generated for the MC problem (James et al., 1999). The other was the originality score, which was assigned according to the ideas' statistical infrequency (Guilford, 1967; Runco, 1991). Specifically, the ideas of all participants generated for the MC problem were first collected into a comprehensive solution pool. Then, ideas were given points based on their statistical infrequency i.e. the ideas given by < 1%, 1%–5% or > 5% participants in the sample were given scores of '2', '1', '0', respectively. Once the instruments were scored, two trained raters independently assessed the originality of the MC performance for every participant. The inter-rater agreement (Internal Consistency Coefficient, ICC = 0.86) was satisfactory. Individual ratings for each participant from these two raters were averaged into a single originality score for each participant.

2.5. Results

2.5.1. Correlations between MC task performance and scale scores

The correlations between MC performance, MC potential, creative potential, aggression, and approach/avoidance motivation are shown in Table 1. The fluency and originality of MC performance were positively correlated with the scores of MC potential and creative potential (p < .01). The MC potential had positive correlations with the creative potential, approach motivation, and aggression (p < .01). The approach motivation was positively correlated with the MC fluency (p < .05), MC potential (p < .01), creative potential (p < .01) and aggression (p < .05).

Table 1
Descriptive statistics and correlations of MC task performance, MC potential, aggression, creative potential and motivation scores in study 1.

	M	SD	2	3	4	5	6	7
MC fluency	2.26	1.83	0.88**	0.33**	0.20**	0.14*	−0.08	0.09
MC originality	2.76	2.94		0.29**	0.22**	0.13	−0.11	0.00
MC potential	31.10	9.69			0.44**	0.27**	−0.02	0.44**
Creative potential	55.78	14.26				0.31**	0.01	0.18*
Approach motivation	40.90	4.90					0.31**	0.16*
Avoidance motivation	15.54	2.72						0.24**
Aggression	75.90	17.25						
		25						

*p < 0.05; **p < 0.01; ***p < 0.001

2.5.2. Regressions of aggression, creative potential, motivation on MC potential and MC task performance

A multiple regression analysis was conducted to investigate the effects of aggression, creative potential, approach motivation, avoidance motivation on MC potential. A hierarchical approach was used to evaluate: (1) whether these four variables were uniquely associated with the MC potential, and (2) whether there were any interaction effects of these four variables on the MC potential. In the first model, the MC potential was regressed on the aggression, creative potential, approach motivation, avoidance motivation (F (4, 203) = 29.31, p < .001). The results revealed that the avoidance motivation (β = −0.18, p < .01) was a significant negative predictor of MC potential, while the aggression (β = 0.40, p < .001), creative potential (β = 0.32, p < .001), approach motivation (β = 0.16, p < .05) were significant positive predictors. In a subsequent model (F (9, 198) = 14.46, p < .001), the multiplicative terms between two of these four variables were added to determine if the associations between one variable and MC potential were dependent on another variable. All interaction terms were added at the same time. It was found that there was an interaction effect of approach motivation × aggression on MC potential (β = −0.15, p < .05) (see Table 2).

2.5.3. Interaction effect between approach motivation and aggression on MC potential

The variables of approach motivation, aggression, and MC potential were standardized prior to the analyses in order to aid in the interpretation of the interaction effects. Significant interactions were probed at high (+SD) and low (−SD) levels of the moderator in order to evaluate the interaction effect, according to standard procedures (Aiken & West, 1991). As shown in Fig. 1, at a high level of approach motivation, the MC potential was associated with increases in the aggression (β = 0.44, p < .01); comparably, at a low level of approach motivation, the MC potential exhibited a sharper slope of increase with the aggression (β = 0.56, p < .001).

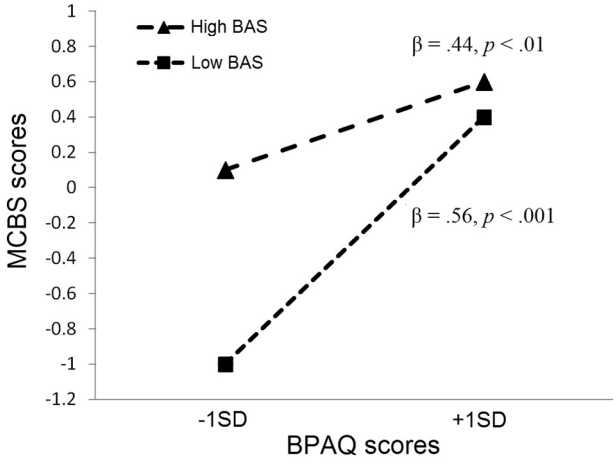

Fig. 1. Association between scores on the Buss-Perry Aggression Questionnaire and Malevolent Creativity Behavior Scale at low and high levels of approach motivation. Note: The BPAQ refers to the Buss-Perry Aggression Questionnaire. The MCBS refers to the Malevolent Creativity Behavior Scale.

2.6. Interim discussion

In this study, the results indicated a negative correlation between avoidance motivation and MC, and a positive correlation between approach motivation and MC. Moreover, the results revealed a moderating effect of approach motivation on the relationship between aggression and MC. That is, when the level of approach motivation was higher, aggression was less closely related to MC.

Table 2
Regression analyses of approach motivation, avoidance motivation, aggression, creative potential on the MC potential and MC fluency.

	MC potential				MC fluency			
	First order effects model (R^2_{adj} = 0.35)		Second order effects model (R^2_{adj} = 0.37)		First order effects model (R^2_{adj} = 0.05)		Second order effects model (R^2_{adj} = 0.05)	
	β	SE	β	SE	β	SE	β	SE
AP_m	0.16**	0.12	0.14*	0.12	0.13	0.03	0.14	0.03
AV_m	−0.17**	0.22	−0.18**	0.21	−0.13	0.05	−0.13	0.05
Aggre	0.40***	0.03	0.42***	0.03	0.15*	0.01	0.15*	0.01
Cre_p	0.32***	0.04	0.32***	0.04	0.08	0.01	0.06	0.01
AP_m × Cre_p	–	–	0.04	0.01	–	–	−0.08	0.002
AP_m × Aggre	–	–	−0.15*	0.01	–	–	0.09	0.002
AV_m × Cre_p	–	–	−0.05	0.02	–	–	−0.08	0.003
AV_m × Aggre	–	–	−0.04	0.01	–	–	0.02	0.003
Cre_p × Aggre	–	–	0.05	0.00	–	–	0.07	0.00

Note: AP_m indicates the approach motivation; AV_m indicates the avoidance motivation; Aggre indicates the aggression; Cre_p indicates the creative potential.
*p < 0.05; **p < 0.01; ***p < 0.001

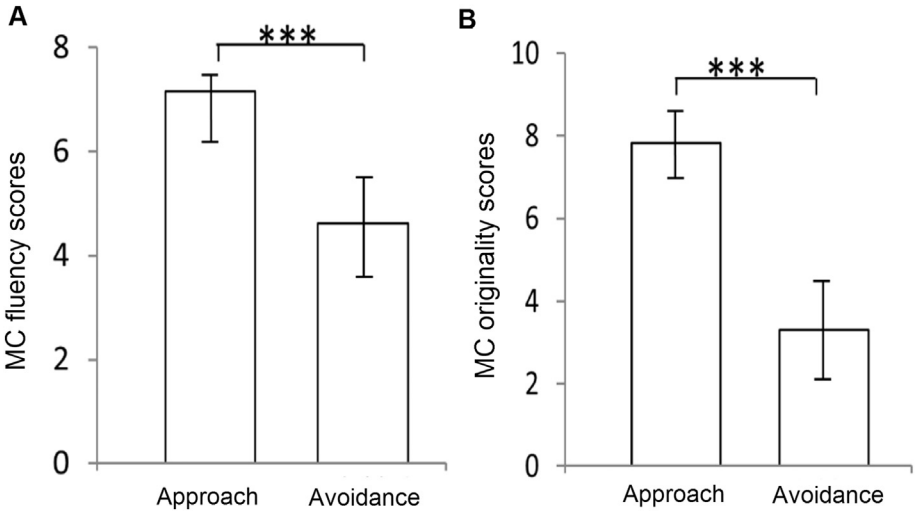

Fig. 2. MC fluency and originality scores in the approach and avoidance introduction conditions. Error bars indicate standard errors of the mean. $^{***}p < .001$.

3. Study 2

While Study 1 focused on traits, Study 2 extended this line of work and further explored how the induced motivational orientation affected MC. In previous studies, different instructions were used to induce approach motivation or avoidance motivation. Studies found that approach motivation encourages individual to take risks while avoidance motivation has the opposite effect (Friedman & Förster, 2002, 2005; Mehta & Zhu, 2009). Therefore, H2 was tested in study 2.

3.1. Participants

Sixty-five healthy college students (60 females; $M = 22.6$ years old, $SD = 2.54$) with normal or corrected-to-normal vision were recruited in this study. None of them participated in Study 1. Participants were randomly assigned to the approach and avoidance conditions, in which there were 33 and 32 participants, respectively. Participants gave written informed consents prior to the experiment and received ¥20 after the experiment for their participation. The protocol of the study was approved by the University Committee on Human Research Protection (UCHRP) of East China Normal University.

3.2. Instruments

The Buss-Perry Aggression Questionnaire, Runco Ideational Behavior Scale, and MC Behavior Scale were also used in Study 2. These questionnaires had satisfactory internal consistency reliability for this study, $\alpha = 0.80$, $\alpha = 0.88$, and $\alpha = 0.89$, respectively. The Self-Assessment Manikin (Bradley & Lang, 1994) was used to assess participants' emotional states at the assessment moment, in which the participant selected one of nine ratings (valence: 1 = very pleasant, 9 = very unpleasant; arousal: 1 = very exciting, 9 = not exciting at all) illustrated by five cartoon figures and the points between any two figures. The MC problem used in this study was the same as in Study 1. Two trained raters assessed MC performance following the same scoring procedure as in Study 1. The inter-rater agreement (ICC = 0.88) was satisfactory.

3.3. Experimental procedure

Participants first completed the Buss-Perry Aggression Questionnaire, Runco Ideational Behavior Scale, and MC Behavior Scale. Then, they were induced to approach or avoidance motivations by reading different instructions (see details in the Manipulation of Motivational Orientation). Immediately before and after the session of motivation induction, participants completed the Self-Assessment Manikin twice to check whether reading different motivation-appropriate instructions induced different emotions. In the next 15 min, participants were required to solve the MC problem. They were encouraged to produce as many creative solutions as possible and write them down briefly.

3.4. Manipulation of motivational orientation

To manipulate motivational orientation, participants received instructions framed in approach or avoidance terms. For the approach group, participants were instructed that 'you will receive ¥10 as compensation, which will double to ¥20 if the number of your solutions is more than the average level'. While for the avoidance group, participants were instructed that 'you will receive ¥20 as compensation, which will discount to ¥10 if the number of your solutions is less than the average level'. Similar framing manipulations are commonly used in work on approach-avoidance motivation in general (Förster, Higgins, & Idson, 1998; Sherman, Mann, & Updegraff, 2006) and on creative performance in particular (Friedman, 2009; Roskes et al., 2012).

3.5. Results

3.5.1. MC task performance in two motivational orientations

A MANOVA with the motivational orientation (MOTIVATION: approach vs. avoidance) as the between-subjects factor was conducted on MC fluency and MC originality, *Box's* $M = 78.45$, $p < .001$. There were main effects for MOTIVATION on MC fluency and originality, $F(2, 62) = 31.59$, $p < .001$, $\eta_p^2 = 0.51$. Specifically, MOTIVATION had a significant main effect for MC fluency, $F(1, 63) = 37.18$, $p < .001$, $\eta_p^2 = 0.37$. The approach motivational orientation group generated more MC ideas ($M = 7.15$, $SD = 2.21$) than did the avoidance group ($M = 4.62$, $SD = 0.79$). Likewise, MOTIVATION also had a significant main effect for MC originality, $F(1, 63) = 64.17$, $p < .001$, $\eta_p^2 = 0.51$. The approach group produced ideas with greater originality ($M = 7.82$, $SD = 3.14$) than did the avoidance group ($M = 3.31$, $SD = 0.54$) (see Fig. 2).

3.5.2. Aggression, creative potential, MC potential in two conditions

Three separate ANOVAs with MOTIVATION (approach vs. avoidance) as the between-subjects factor were performed on the aggression, creative potential, and MC potential, respectively. There was no significant main effect for MOTIVATION on the aggression ($p = .32$), creative potential ($p = .55$), or MC potential ($p = .58$). These results indicated that there was no difference in aggression, creative potential,

Table 3
Levels of valence and arousal of emotional states in pre- and post-instruction epochs under the approach and avoidance introduction conditions ($M \pm SD$) in study 2.

Emotion	Approach introduction		Avoidance introduction	
	Pre	Post	Pre	Post
Valence	6.39 ± 1.17	5.18 ± 1.91	6.56 ± 1.56	5.62 ± 1.45
Arousal	4.82 ± 1.51	5.42 ± 1.73	5.28 ± 1.67	5.75 ± 1.74

MC potential between these two groups.

After the aggression, creative potential, MC potential entered into the MANCOVA model as covariates, there was still a significant main effect for MOTIVATION on MC fluency and originality, F (2, 59) = 29.73, $p < .001$, $\eta_p^2 = 0.50$.

3.5.3. Emotion change and its effects on MC task performance

Levels of valence and arousal of emotional states in pre- and post-instruction epochs in the approach and avoidance conditions are shown in Table 3. A repeated measures ANOVA with EPOCH (pre- vs. post-instruction) as a within-subject factor, and MOTIVATION (approach vs. avoidance) as a between-subjects factor, was conducted on the valence levels. The results showed that there was a significant main effect of EPOCH, $F(1, 63) = 21.17$, $p < .001$, $\eta_p^2 = 0.25$, but there was neither a main effect for MOTIVATION nor an interaction effect of EPOCH and MOTIVATION. A second repeated measures ANOVA revealed that EPOCH had a significant main effect on the arousal levels, F (1, 63) = 4.38, $p < .05$, $\eta_p^2 = 0.07$, but MOTIVATION did not. Interaction effects of EPOCH and MOTIVATION were also not statistically significant.

To further investigate whether emotional states might confound the effect of motivations on MC fluency and originality, pre- and post-introduction valence and arousal levels were entered into the MANCOVA model as covariates. The results revealed that these four variables did not diminish the main effect of MOTIVATION on MC fluency and originality, F (2, 58) = 29.73, $p < .001$, $\eta_p^2 = 0.51$.

3.6. Interim discussion

The results revealed that individuals in an approach motivation experimental condition showed greater MC originality and MC fluency than individuals in the avoidance motivation experimental condition, even after controlling for the effect of emotion, aggression, daily creative level, and trait level of MC. Such findings indicated that approach motivation promotes MC when compared to avoidance motivation.

4. Study 3

In Study 3, regulatory focus was introduced to explore the relationship between MC and motivation further. Participants were asked to solve MC problems in one of the following conditions: approach-success (approach-closure, successfully attained a positive outcome), approach-failure (approach-no-closure, unsuccessful in attaining a positive outcome), avoidance-success (avoidance-closure, successfully avoided a negative outcome) and avoidance-failure (avoidance-no-closure, unsuccessful in avoiding a negative outcome). Previous studies reported that, in the no-closure condition, there was no significant difference in creative performance between individuals with approach and avoidance motivation (Baas et al., 2011). Thus, H3 was tested in Study 3.

4.1. Participants

One hundred and eleven healthy college students (97 females; M = 22.9 years old, SD = 2.50) with normal or corrected-to-normal vision took part in this study. None of them participated in Study 1 or Study 2. They were randomly assigned to the approach-success, approach-failure, avoidance-success, and avoidance-failure conditions, in which there were 28, 27, 28, and 28 participants, respectively. Participants gave written informed consents prior to the experiment and received ¥20 after the experiment. The protocol of the study was approved by the University Committee on Human Research Protection (UCHRP) of East China Normal University.

4.2. Instruments

The Buss-Perry Aggression Questionnaire, Runco Ideational Behavior Scale, and MC Behavior Scale were also adopted in Study 3. These questionnaires had satisfactory internal consistency reliability in this study, α = 0.86, 0.86, 0.89, respectively. We developed the 'cigarette problem' to measure the participants' performance of MC. This problem was as follow: 'Ming and Dong (two names) are freshmen in college. They share one room of the students' dormitory. Dong has a habit of cigarette smoking, and always smokes in the room. Ming has tried his best to negotiate with Dong and asked him to smoke outside. However, Dong ignores Ming's suggestions completely. Please generate as many creative ideas as possible to help Ming take revenge on Dong without being noticed. During the instruction, the following requirement was emphasized repeatedly: Focus on generating creative ideas regardless of how immoral or unacceptable they may be. Two trained raters assessed participants' MC performance following the scoring procedure as in Study 1. The inter-rater agreement (ICC = 0.87) was satisfactory.

4.3. Experimental procedure

Similar to Study 2, participants first completed The Buss-Perry Aggression Questionnaire, Runco Ideational Behavior Scale, and MC Behavior Scale. They then completed an autobiographical memory task to induce approach or avoidance motivation (see details below). Before and upon completion of the autobiographical memory task, participants completed the The Self-Assessment Manikin twice to test whether recalling the past also induces emotions that may influence subsequent MC performance. In the next 15 min, participants were required to solve the MC problem. They were encouraged to produce as many solutions as possible and write them down briefly.

4.4. Manipulation of motivational orientation and regulatory closure

Participants were asked to complete an autobiographical memory task, which was used to manipulate motivational orientation and regulatory closure (Baas et al., 2011). In this task, participants were asked to write a short essay about a situation that happened to them. In the approach condition, they wrote about a situation in which they successfully attained a positive outcome (closure) or were unsuccessful in attaining a positive outcome (no closure). In the avoidance condition, they wrote about a situation in which they successfully avoided a negative outcome (closure) or were unsuccessful in avoiding a negative outcome (no closure). Participants were asked explicitly to write their essay in 5 min, and in such a way that another person could imagine the being in that situation.

4.5. Results

4.5.1. Effects of motivational orientation and regulatory closure on MC task performance

A MANOVA with the motivational orientation (MOTIVATION: approach vs. avoidance) and the regulatory closure (CLOSURE: success vs. failure) with between-subjects factors were conducted on MC fluency and MC originality, *Box's M* = 93.59, $p < .001$. MOTIVATION had

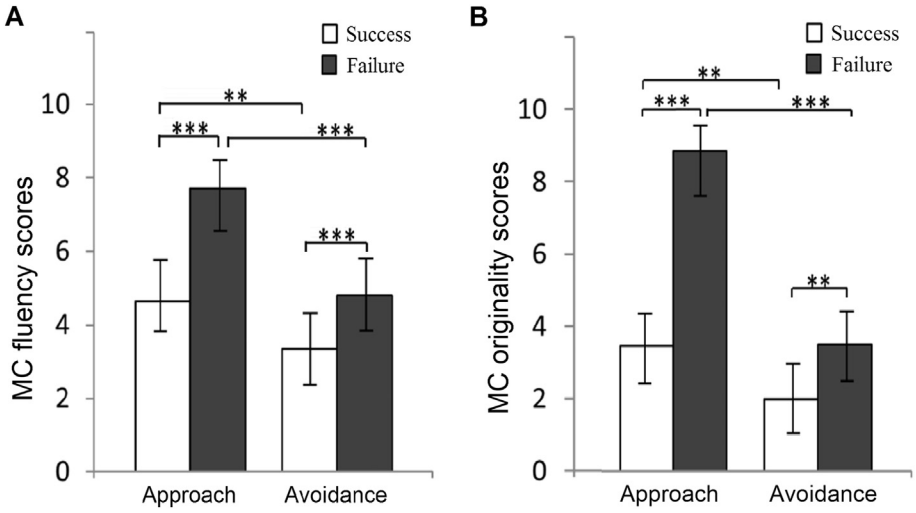

Fig. 3. MC fluency and originality scores in the approach-success, approach-failure, avoidance-success and avoidance-failure conditions. Error bars indicate standard errors of the mean. $^{***}p < .001$.

significant main effects for MC fluency and originality, F (2, 106) = 49.96, $p < .001$, $\eta_p^2 = 0.49$, as did CLOSURE, F (2, 106) = 52.39, $p < .001$, $\eta_p^2 = 0.50$.

Specifically, MOTIVATION had a significant main effect for MC fluency, F (1, 107) = 61.81, $p < .001$, $\eta_p^2 = 0.37$. Overall, participants generated more MC ideas in the approach ($M = 6.15$, $SD = 2.31$) than in the avoidance ($M = 4.09$, $SD = 1.21$) motivational orientation. CLOSURE also had a significant main effect for MC fluency, F (1, 107) = 72.85, $p < .001$, $\eta_p^2 = 0.41$. Participants produced fewer MC ideas in the success condition ($M = 4$, $SD = 1.01$) than in the failure condition ($M = 6.24$, $SD = 2.32$) (see Fig. 3A).

Likewise, there was a significant main effect for MOTIVATION on MC originality, F (1, 107) = 99.26, $p < .001$, $\eta_p^2 = 0.48$. Participants generated the MC ideas with greater originality in the approach ($M = 6.11$, $SD = 3.61$) than in the avoidance ($M = 2.75$, $SD = 1.16$) motivational orientation. CLOSURE had a significant main effect on MC originality, F (1, 107) = 101.35, $p < .001$, $\eta_p^2 = 0.49$. The MC originality was greater in the failure condition ($M = 6.13$, $SD = 3.69$) than in the success condition ($M = 2.73$, $SD = 0.82$) (see Fig. 3B).

4.5.2. Scores of aggression, creative potential, MC potential in four conditions

Three separate ANOVAs with CONDITION (i.e. approach-success, approach-failure, avoidance-success, and avoidance-failure) as the between-subjects factor were performed on the scores of aggression, creative potential, MC potential, respectively. There was no main effect of CONDITION on the scores of aggression ($p = .62$), creative potential ($p = .67$), or MC potential ($p = .13$). These results indicated that the aggression, creative potential, MC potential scores showed no difference among these four conditions.

After the aggression, creative potential, MC potential were entered into the MANCOVA model as covariates, there was still significant main effects for MOTIVATION (F (2, 103) = 47.14, $p < .001$, $\eta_p^2 = 0.48$) and CLOSURE (F (2, 103) = 48.58, $p < .001$, $\eta_p^2 = 0.49$) on MC fluency and originality. These results indicated that the effects of motivational orientation and regulatory closure on MC task performance were not confounded by individuals' levels of aggression, creative potential, MC potential.

4.5.3. Emotion change and its effects on MC task performance

Levels of valence and arousal of emotional states in the four conditions are shown in Table 4. A repeated measures ANOVA with EPOCH (pre- vs. post-manipulation) as a within-subject factor, and MOTIVATION (approach vs. avoidance) and CLOSURE (success vs. failure) as between-subjects factors, was conducted on the valence levels. The results showed that there was a significant main effect for EPOCH, F (1, 106) = 11.54, $p < .01$, $\eta_p^2 = 0.1$. Overall, after participants completed the autobiographical memory tasks, their valence levels became lower. MOTIVATION and CLOSURE had no main effect on the valence levels; there was no interaction between EPOCH, MOTIVATION, and CLOSURE on the valence levels. Another repeated measures ANOVA revealed that there were no main effects for EPOCH, MOTIVATION, and CLOSURE on the arousal levels. The interaction between these three factors was not statistically significant.

The pre- and post-manipulation valence and arousal levels were next entered into the MANCOVA model as covariates. The results revealed that these emotional variables did not diminish the main effect for MOTIVATION (F (2, 101) = 46.81, $p < .001$, $\eta_p^2 = 0.48$) and CLOSURE (F (2, 101) = 53.42, $p < .001$, $\eta_p^2 = 0.51$) on MC fluency and originality. These results indicated that emotional states did not confound the effects of motivational orientation and regulatory closure on MC task performance.

4.6. Interim discussion

The results of Study 3 indicated that individuals in the no closure condition (failure) showed a higher level of MC performance than those in the closure condition (success). This may indicate that the experience of no closure, which served as an incentive, can enhance individuals' MC performance. Moreover, there was no significant difference in MC performance between avoidance-failure and approach-success conditions. This may indicate that the negative effect of avoidance motivation on MC performance can be counteracted by the experience of no closure. These results may partially support the idea that the Dual Pathway to Creativity Model is also suitable to account for MC performance.

5. General discussion

Three studies investigated the relationship between motivation and MC performance. In Study 1, we observed a positive correlation between approach motivation trait and MC as well as a negative correlation between avoidance motivation trait and MC. Study 2 showed that individuals in the approach motivation condition showed a higher level of MC performance than those in the avoidance motivation condition. In Study 3, the superiority of approach motivation over avoidance motivation was replicated. Results also showed that participants in the no-closure condition tended to show better MC performance than those

Table 4
Levels of valence and arousal of emotional states in pre- and post-manipulation epochs under four experimental conditions ($M \pm SD$) in study 3.

Emotion	Approach-success		Approach-failure		Avoidance-success		Avoidance-failure	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Valence	6.18 ± 1.39	5.54 ± 1.67	6.11 ± 1.63	5.56 ± 1.34	6.33 ± 1.62	6.04 ± 1.61	6.29 ± 1.41	5.71 ± 1.36
Arousal	4.64 ± 1.55	5.04 ± 1.75	4.89 ± 1.85	4.78 ± 1.87	4.93 ± 1.52	5.67 ± 1.88	5.25 ± 1.96	5.36 ± 1.79

in the closure condition.

Results of Study 1 showed that while approach motivation and aggression were positively correlated with MC potential, the avoidance motivation was negatively correlated with MC potential. These results supported the first hypothesis, that motivation, aggression, and MC are related to each other. The approach motivation significantly moderated the relationship between the aggression and MC potential (see Fig. 1). Individuals with a lower level of approach motivation showed a stronger correlation between aggression and MC than those with a higher level of approach motivation. This may suggest that when the approach motivation is low, aggression will be more vital to the generation of malevolent ideas. Moreover, with respect to the relationship between motivation and MC performance, we observed a significant positive correlation between approach motivation and fluency of solutions to the MC problem. This is consistent with previous findings that the approach motivation can enhance creativity (Friedman & Förster, 2002, 2005; Mehta & Zhu, 2009). Individuals with approach motivation are more risk-tolerant (Friedman & Förster, 2002, 2005; Mehta & Zhu, 2009), which may make it easier to break pro-social norms and produce more malevolent ideas.

Results of Studies 2 and 3 revealed that individuals in the approach motivation condition showed higher MC fluency and originality than those in the avoidance motivation condition (see Figs. 2 and 3A and B). These results were consistent with previous findings (Friedman & Förster, 2000, 2002; Mehta & Zhu, 2009). It has been suggested that approach motivation may encourage individuals to take risks while avoidance motivation may make individuals risk-averse (Friedman & Förster, 2002). While producing malevolent ideas, individuals are likely to break some social norms such as 'Do not hurt others'. Meanwhile, they bear the potential for unfavourable outcomes that result from the violation of social norms. Accordingly, we proposed that individuals in the approach motivation condition were more interested in taking risks and more likely to break social norms, which might have contributed to their MC performance. On the contrary, in the avoidance motivation condition, individuals were more conservative (Friedman & Förster, 2005) and reluctant to take risks and violate social norms, which might have inhibited their MC performance. Therefore, MC fluency and originality in the approach condition were higher when compared to those in the avoidance motivation condition.

Notably, the results of Study 3 found that individuals in the no-closure (failure) condition performed better on the MC task (including fluency and originality) than those in the closure (success) condition (see Fig. 3A and B). Perhaps the activation of unfulfilled goals (no-closure condition) serves as an extra incentive to enhance an individual's MC. When regulatory no-closure is induced, individuals might work harder and try to generate more originally malevolent ideas. This was partly supported by previous findings (Baas et al., 2011; Roskes et al., 2012).

Results further showed that individuals under the avoidance-no-closure condition showed a higher level of MC performance than those in the avoidance-closure condition (see Fig. 3A and B). No significant difference was observed for MC performance between individuals under the approach-closure and avoidance-no-closure conditions. Based on the Dual Pathway to Creativity Model, creativity can be enhanced through both a flexible pathway and a persistent pathway (De Dreu et al., 2008; Roskes et al., 2012). While approach motivation might be associated with the flexible pathway, avoidance motivation might be associated with the persistent pathway (Roskes et al., 2012). However, the benefit of persistent pathways on creativity is going to emerge only when more effort is paid (Roskes et al., 2012) and more cognitive resources are consumed (compared with the flexible pathway; Tooby & Cosmides, 1990; Roskes et al., 2012). Hence, for convenience, individuals are usually reluctant to engage in the persistent pathway. Only when an extra incentive (regulatory no-closure) appears will it be likely that individuals try to exert efforts on the persistent pathway and that the benefit of the persistent pathway emerges. This fits with several previous studies on creativity (Baas et al., 2011; Förster et al., 2005). In the current study, results suggested that the appearance of an extra incentive can also contribute to individual MC performance. Individuals in the avoidance-no-closure condition tended to give more effort to generate MC ideas through the persistent pathway compared to those in the avoidance-closure condition when the extra incentive (no-closure) appeared.

In addition, previous studies found no significant difference in creative performance between the approach-closure group and the approach-no-closure group. Perhaps the approach motivation was enough to maximize individual creativity. It could be difficult for an extra incentive (no-closure) to enhance the creative performance of individuals with approach motivation further. However, in this study, we observed that individuals in the approach-no-closure condition performed better on MC task than those in the approach-closure condition. MC requires individuals to be both creative and malevolent in their thinking. When individuals try to produce creative malevolent ideas, they are not only required to be creative but also must resist the inherent tendency of obeying the social rules. Therefore, more cognitive resources may be required by MC tasks when compared with regular creative tasks (e.g. open-ended situation problems). Consequently, the appearance of an extra incentive (no-closure) can further enhance the MC performance of individuals with approach motivation. Admittedly we did not directly compare the MC task to a regular creativity task in the current study. Further research is necessary.

Several limitations should be noted in the study. Primarily, the autobiographical memory task is a reliable method that was widely used to induce different motivational states in previous studies (e.g. Baas et al., 2011; De Dreu et al., 2008). We also manipulated motivation and regulatory focus through the autobiographical memory task; however, neither of the previous studies nor the present study directly checks its effects on inducing corresponding motivational orientation. Valid methods to evaluate the motivation manipulation are required in future studies. Furthermore, failing to mention creativity in the MC Behavior Scale might lead to items that are predominantly relevant and effective, but not novel or creative. However, since statements with the same meaning as creativity were used in the items of the MC Behavior Scale and the MC Behavior Scale has been shown to be effective to assess MC potential (Hao et al., 2016), we considered it appropriate to use the MC Behavior Scale to assess individual MC potential in the current study.

In summary, the study indicated that the approach motivation promotes individual MC performance when compared to the avoidance motivation and the experience of 'no closure' (failure in doing something) counteracts the negative impact of avoidance motivation on individual MC performance. Theoretically, these findings enrich our

understanding of the relationship between different types of motivation and individual MC performance, and thus contribute to the theoretical framework of MC. Since MC is a subtype of creativity, these findings also contribute to the theoretical framework of creativity indirectly. Practically, these findings may suggest that reducing individual level of approach motivation or providing the experience of success is a useful approach to decrease the MC performance of antisocial individuals.

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