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## Chapter

# Indirect Effects of Parenting Style on the Relationship between Maternal Personality and Children's Creativity

*Shuyang Lu, Keang Ieng Peggy Vong and Shing On Leung*

## Abstract

Mothers are important persons in the development of creativity in young children. The aim of this study was to examine whether and how mothers influence the creativity of their children. We investigated maternal personality and parenting style through parents' reports, while children's creativity of 88 Chinese kindergarten children (age  $M = 5.50$ ,  $SD = 0.567$ ) was rated by Torrance TCAM. There was an indirect effect of authoritarian parenting in the relation between maternal neuroticism and children's creativity in terms of originality. Neurotic mothers may tend to be more authoritarian and in turn, reduce their children's creativity. Further, parenting style related to not setting any guidelines at all (or NGA) may have indirect effects on the relation between maternal conscientiousness and openness toward children's creativity. The opposite direction between Chinese parents' preferential parenting and creativity encouragement parenting was found.

**Keywords:** creativity, maternal personality, parenting style, indirect effects, kindergarten children

## 1. Introduction

In this information age where ideas, exchanges, and the development of concepts are fast changing, creativity is needed and is considered as a key learning outcome. An individual's overall development is believed to be critically linked to their social world, especially via their family lives early on (e.g., [1]). Studies have explored maternal personalities' influence on family atmosphere provided to students (e.g., [2]), as well as family factors' influence on students' creativity [3–7]. However, no relevant studies were found to link maternal personalities, family factors, and students' creativity together. Besides, culture, groups accumulated common experiences, and influence on creativity also drew many researchers' attention [8–11]. Since Chinese society has, in recent years, paid increasing attention to the development of children's creativity, how Chinese culture react to the mother-child relationship and further influence children's creativity need more exploration. This study aims to investigate how mothers' personality traits and parenting behaviors link to children's actual creativity

performance, as it may lead to insights into mother-child relationships in terms of creativity, fostering family environments, and, in particular, mothers' parenting style adopted in Chinese societies.

## **2. Literature review**

Even though creativity studies have been oriented toward the creative process and understanding its dynamic and evolving momentum [12], children's everyday experiences with their significant others may influence their motivation, perseverance, competence, and so on, required for the fine elements in children's thinking [13]. Having said that, the casual relationship between mother's personality and children's creativity may be more complicated than one might assume. For example, it may be possible, depending on the conditions, that children's creativity has some effects on parent's personality, and there may be other factors such as socio-economic status which affect children's creativity [14, 15].

### **2.1 Maternal personality and children's creativity in Chinese societies**

Studies of the relationship between parents' personalities and children's creativity have conflicting results. On the one hand, studies showed mothers have an effect on children's creativity. Kwaśniewska and Lebuda [16] conducted 27 qualitative interviews with mothers and found that creative mothers foster a climate conducive to children's creativity. Kwaśniewska et al. [2]'s study showed that mothers who possess openness and extraversion traits more may show higher creative potential, while highly neuroticism parents may have less creative potential. And mothers with openness traits have a positive attitude to creativity, as well as are willing to provide the "climate" for creativity in a parent-child relationship. Since mothers are usually the primary caregivers who have been shown to play a key role in children's development, more studies are needed to examine the parent-child relationship in terms of mother's personality and children's, especially young children, creativity performance as it will shed light on creativity development in the early years, an issue that has drawn people's attention in recent years. On the other hand, Fu et al. [17]'s research showed that there was no indication of any significant relationship between maternal personality and preschoolers' creativity. The conflicting results may be due to the limitation of samples, or the measurements applied to measuring creative abilities.

From above, the relationship between maternal personality and children's creativity could be further discussed. Furthermore, considering the cultural factor, assessment of Chinese personality indicated that neuroticism, extraversion, agreeableness, and conscientiousness factors were jointly listed in the widely used Big Five inventory, but openness factor was not [18]. The openness factor was more identifiable in individualist cultures but was negatively correlated with collectivism [19]. Chinese society is more inclined to collectivism. However, previous studies showed that the openness factor was highly correlated to creativity [20]. Even the compatibility between cultural personality and creative personality in China was discussed (e.g., [21, 22]), the impacts of mother's personality on children's creativity require further investigations.

More importantly, it may be difficult to measure children's creativity as young children's manifestations of creativity are subtle and nonverbal. Therefore, the Thinking

Creatively in Action and Movement (TCAM) measure [23], which takes around 30 minutes for each child, is used in this study. Details will be given in the Section 3. This paper aims at finding the direct and indirect effects of maternal personality on children's creativity. For indirect effects, we conjecture that parenting style may be one of the possible mediators. So, we shall look at previous studies on the relationship between parental personality and parenting style.

## 2.2 Parental personality and parenting style

Parents play an important role in children's development [24, 25]. Clark et al. [26] and van Aken et al. [27] study showed that parents' personality relates to their parenting behaviors, and in turn children's behaviors generally. Smith et al. [28] found that mothers with higher levels of agreeableness showed more warmth and support toward their children. Mothers with higher extraversion showed more maternal warmth and, thus, were more likely to support their children's autonomy, but such mothers also exercised higher power assertion over their children [28, 29]. Furthermore, mothers with high conscientiousness levels displayed support toward their children's autonomy, yet these mothers were more controlling and restrictive; but at the same time, less forcefully disciplinarian [26, 30]. Such mothers provided more rational, structured, and less forceful parenting to their children [30]. Coplan et al. [31] concluded that maternal neuroticism may lead to an overprotective parenting style, while higher agreeableness in mothers represented a low, harsh parenting style.

There are possible relationships between maternal personality and maternal parenting style. According to Baumrind [32] research on parenting authority, there were three categories: authoritarian (high in control and maturity demands, low in responsiveness and communication), authoritative (high in control, maturity demands, responsiveness, and communication), and permissive (high in communication and responsiveness, but low in control and maturity demands). In China, Xu et al. [33]'s research showed that Chinese mothers prefer authoritarian and authoritative parenting. Results showed that authoritative parenting could increase children's creativity while authoritarian parenting plays a negative role in children's creativity in high-school students [34]. The relationship between parenting style and children's creativity is worth studying, given the importance of the early years which are known to set the foundation for later development.

## 2.3 Parenting style and creativity

Maternal parenting style is one of the factors that influence children's development [35]. Feldman and Klein [36] found that mothers who give warm and sensitive feedback to their children's needs may lead to positive and effective interactions between mother and child. Also, children who accept their parents' advice may be more willing to correct misbehavior [37]. In contrast, negative interactions between parents and children, or even worse, punishment, may intensify children's misbehavior [38, 39]. Few studies have focused on the relationship between parenting and creativity, but some are described as follows.

Fan and Zhang [40] found that perceived parental involvement is positively related to a creativity-generating thinking style. Siegelman [7] found that students who perceive lower parental attention show higher creative potential than those who perceive parental love, and we will return to this with our results in the Section 5. Both studies focused on university students and not on young children. Fearon et al. [13]

investigated the inter-relationship among parents' creativity, parenting styles, and children's creativity for primary school students, and the Torrance Tests of Creative Thinking (TTCT) were used. Results showed that there were significant effects of parents' creativity and parenting styles on children's creativity. In this study, the importance of maternal personality in affecting young children's creativity, instead of children's creativity level or performance, is emphasized.

## 2.4 Research objectives

Some previous studies have shown the relationships between two variables, namely parents' personality and parenting style, or between parenting style and children's creativity for primary school students. Meanwhile, the cultural issues that were highlighted in previous studies are still contested. This study, therefore, investigates the direct and indirect effects of maternal personality on 4- to 8-year-old children's creativity under the Chinese context. For indirect effects, parenting style is treated as a mediator. And before we do that, we explore the interrelationships among maternal personality, maternal parenting style, and children's creativity.

## 3. Method

### 3.1 Participants

Five provincial-level kindergartens in Zhuhai city of Guangdong province, China, participated in this study, with a total sample of 127 children. Ethical consent was obtained from both parents and teachers, as the children were very young. Each child participated in a 30-minute Thinking Creatively in Action and Movement (TCAM) [23] test to assess creativity. Their mothers filled out the Chinese Big Five Personality Inventory (CBF-PI) and Parental Authority Questionnaire (PAQ), with a total of 70 items. Excluding 98 (77%) children participated and 88 (70%) records were valid. The mean and SD of children's age were 5.50 and 0.567 years, respectively, with 47.7% girls and 52.3% boys. Missing values were imputed by using the linear interpolation method in SPSS.

### 3.2 Instruments

#### 3.2.1 *Thinking creatively in action and movement (TCAM)*

The TCAM test was used to measure children's creativity. As the subjects were Chinese, we used the revised Chinese version by Chang [41], which was fully validated. The TCAM consists of four activities with the first, third, and fourth activities scoring both children's fluency and originality in creativity, while the second activity scores imagination. Fluency measures cumulatively in how many ways do children react. Originality measures the uniqueness of responses based on a large cardinal number of participants tested in the Taiwan Chinese version. And, imagination measures how many unique scenes children could act out.

The details of the four activities are as follows. Activity one (How many ways?) asks children to use diverse ways to get from one place to another. Activity two (Can you move like a tree/rabbit/fish/snake?) asks children to pretend to be something or to play a prescribed role (driving a car at high speed and pushing an elephant away



Measure	Test		Retest		
	Mean ± SD	$\alpha$	Mean ± SD	A	ICC
Fluency	25.82 ± 19.26	0.70	24.43 ± 18.67	0.68	0.98
Originality	25.12 ± 19.41	0.55	24.52 ± 19.05	0.58	0.99
Imagination	15.46 ± 3.52		15.99 ± 3.89		0.93

**Table 1.**  
 Mean, SD, and Cronbach's  $\alpha$  for the three constructs in creativity in test and retest and ICC.

from desired things). Activity three (What other ways?) asks children to use diverse ways to put a number of paper cups into a box. The last activity (What might it be?) requires children to think about playing with and using paper cups. Testing one child takes around 30 minutes. Each activity was restricted to 10 minutes with a total time of under 30 minutes.

All activities were conducted in the kindergartens' activity rooms, which provided enough space for children to move around freely. A five-minute warm-up exercise was used so that the children feel relaxed and trust the experimenter. We complied strictly with the TCAM (Taiwan version) test manual.

TCAM-Taiwan version has already been validated by Chang [41] in Chinese writing. We obtained consent from parents for the digital recording of participants' movements in the testing areas. The dataset was scored again 2 weeks later by the same trained research assistant. The test-retest reliabilities of the first to fourth activities and the overall scores were, respectively, 0.72, 0.76, 0.70 and 0.60, and 0.75.

Following Zachopoulou et al. [42], the reliabilities were assessed via means, SD and reliability of internal consistency Cronbach's  $\alpha$  in test and retest, and the Intraclass correlation (ICC). These results are reported in **Table 1**.

In **Table 1**, the means, SD, and reliability of internal consistency  $\alpha$ 's are all very similar between test and retest. The means for fluency, originality, and imagination are, respectively, 25.82, 25.12, and 15.46 with the corresponding SD being 19.5, 19.5, and 3.4. These values are comparable with Zachopoulou et al. [42]. The temporal stability of TCAM was examined using the intraclass correlation (ICC) between test and retest, which were at least 0.93. The test was reliable.

### 3.2.2 Chinese big five personality inventory (CBF-PI)

Maternal personality was measured by Wang et al. [43] the Chinese Big Five Personality Inventory (CBF-PI) brief version, with the original version created by McCrae and Costa [44]. It uses a 6-point Likert scale, ranging from 1 (=extremely disagree) to 6 (=extremely agree), and has five dimensions: openness, conscientiousness, extraversion, agreeableness, and neuroticism (OCEAN), with eight items for each. CBF-PI has been validated and has internal consistency reliabilities ranging from 0.764 (Agreeableness) to 0.814 (Neuroticism). The test-retest reliabilities range from 0.672 (Agreeableness) to 0.811 (Openness) [43]. Here, the reliabilities of internal consistency for OCEAN and the overall scales are, respectively, 0.799, 0.784, 0.716, 0.705, 0.778, and 0.790.

### 3.2.3 Parental authority questionnaire (PAQ)

Parenting styles were measured by the Parental Authority Questionnaire (PAQ) [45], with the Chinese translated version validated by Deng [46]. It uses a 5-point

Likert scale, ranging from 1 (=extremely disagree) to 5 (=extremely agree), with 30 items, three dimensions (authoritative, authoritarian, and permissive), and 10 items in each dimension. The reliabilities of internal consistency for authoritarian, authoritative, and permissive dimensions are, respectively, 0.72, 0.77, and 0.76 in Reitman et al. [45]’s original study; 0.78, 0.70, and 0.68 in Deng [46]; and 0.73, 0.71, and 0.62 in the present study.

### 3.3 Special single items

Single items have the advantages of having good content validity and decreasing subjects’ confusion [47], and only content validity is the real validity and others can be considered as a validation process [48]. In addition to the three domains of parenting, we used one special item in each of the three domains in parenting styles as they have some special properties, as follows. Traditional Chinese parent-child interaction emphasizes parents’ “training” of children [49], which implies high maternal involvement for promoting children’s success. The first item was “it is for my children’s own good to require them to do what I think is right, even if they don’t agree” in the authoritarian domain. This was the only item in the domain that emphasized doing something entirely *for the sake of children’s good*. All others emphasized ordering without mentioning children’s good. We name it FCG (for children’s good), hereafter. The second item was “I always encourage discussion when my children feel family rules and restrictions are unfair” in the authoritative domain. This was the only item in the domain that *encourages, by words*, parent-children interactions. Others do encourage interactions but not by words and are less explicit. We shall name it EBW (encourage by words). The third item was “I usually don’t set firm guidelines for my children’s behavior” in the permissive domain. This was the only item in the domain where parents set *no guidelines at all*. We name it NGA (no guidelines at all). According to Chao [49]’s discussion on Chinese parenting, FCG, EIW, and NGA items represent descending order for “training.” We shall see later that NGA has more indirect effects on children’s creativity.

### 3.4 Mediation methods

The traditional approach to handle mediation analysis was proposed by Baron and Kenny [50]. It requires statistically significant conditions for: independent and dependent variables; independent variables and moderators; and mediators to predict dependent variables when controlling for independent variables. But it has been found that this procedure assumes no measurement error for mediators, which is impractical [51]. More importantly, an indirect effect can exist even though there is no direct effect [52, 53]. In our case, it may be possible that there is an indirect link between maternal personality and children’s creativity without a direct link between the two variables. We will return to this in the Section 5. Hence, we used a more recent approach that uses the PROCESS (version 2.16.3) [54] procedure in SPSS with bootstrapping. Bootstrapping takes random samples with replacement of the original data. It has the advantage of not assuming normality and is particularly useful in small samples such as this case. If the “zero” point is not included in the confident interval as outputted, the indirect effect is said to be statistically significant [55]. Technically, if we denote X, Y, and M as independent variable, dependent variable, and mediator. The indirect effects are denoted by  $c$ , which equals  $a*b$ , where  $a$  is regressing M on X, and  $b$  is regressing Y on M controlling for X.

## 4. Results

### 4.1 Demographic result and direct effect

To examine the direct relationship between maternal personality and children's creativity, we looked at the correlations between five personality characteristics and three creativity constructs. These correlations are reported in the upper part of **Table 2**.

**Table 2** shows no significant correlations among the 15 combinations. Effect sizes were small, medium, and large if the magnitude of correlations is around 0.10, 0.30, and 0.50, respectively [56]. **Table 2** shows all correlations were below 0.10, except the correlation between conscientiousness and imagination (0.184), and between neuroticism and fluency (−0.115). There was no direct effect of maternal personality on creativity of children.

Next, we investigated the indirect effects of maternal personality on children's creativity through parenting style. First, we looked at the effects of maternal personality on parenting style for three domains and three single items. The results were reported in the lower part of **Table 2** for the economy of space. From **Table 2**, conscientious and openness personalities showed statistically significant correlations with an authoritative parenting style ( $r(88) = 0.375, p < 0.01$  and  $r(88) = 0.421, p < 0.01$ , respectively). A significant result was found between neuroticism and an authoritarian parenting style ( $r(88) = 0.376, p < 0.01$ ), and this in turn correlated significantly with creativity. For the three single items, a conscientious personality showed statistically significant correlations with NGA ( $r(88) = 0.393, p < 0.01$ , respectively). Neuroticism and agreeableness showed significant correlation with FCG ( $r(88) = 0.360, p < 0.01$ ;  $r(88) = -0.282, p < 0.01$ ). Openness significantly correlated with item EIW ( $r(88) = 0.348, p < 0.01$ , respectively). These single items were correlated with creativity as we shall see.

In terms of effect sizes, all those nonsignificant correlations were of small effect sizes. All those statistically significant correlations ranged from 0.249 to 0.421 and were of "medium" effect sizes. Next, we looked at how the three parenting styles and the three single items of parenting were correlated with the three creativity constructs, and the results are shown in **Table 3**.

	Neuroticism	Conscientiousness	Agreeableness	Openness	Extraversion
Fluency	−0.115	0.026	−0.068	−0.083	−0.084
Originality	−0.055	0.023	−0.073	−0.024	−0.044
Imagination	−0.066	0.184	0.064	−0.075	−0.079
Authoritarian	0.376**	−0.008	0.077	0.035	0.029
Authoritative	−0.205	0.375**	0.217	0.421**	0.054
Permissive	0.117	0.116	−0.095	0.190	0.158
FCG	0.360**	−0.144	−0.282**	−0.099	−0.145
EIW	−0.136	0.167	0.056	0.348**	0.111
NGA	−0.187	0.393**	0.187	0.249*	0.193

Note: Blank, "\*" and "\*\*" represent nonsignificant and significant at 0.05 and 0.01 levels, respectively.

**Table 2.**  
 Correlations between five personalities, three creativities, and three parenting styles.



	Authoritarian	Authoritative	Permissive	FCG	EIW	NGA
Fluency	-0.279*	0.033	0.065	-0.074	-0.077	0.242*
Originality	-0.278*	-0.082	0.058	-0.071	-0.126	0.220*
Imagination	-0.134	-0.168	-0.245	-0.228*	-0.259*	0.259*

Note: Blank, “\*” and “\*\*\*” represent nonsignificant and significant at 0.05 and 0.01 levels, respectively.

**Table 3.**  
Correlations between three parenting styles and three creativities.

Out of the total 9 (=3 × 3) combinations of domain level, only the authoritarian parenting style showed a significant relationship with fluency and originality ( $r(88) = -0.279, p < 0.05$ ;  $r(88) = -0.278, p < 0.05$ ). And the correlation between permissive parenting style and imagination was marginal ( $r(88) = -0.245, p = 0.069$ ). In terms of effect sizes, these three correlations were of small to medium effect, with the rest being small. For the three single items of parenting, item NGA showed a significant relationship with all the creativity constructs (fluency, originality, and imagination) ( $r(88) = 0.242, p < 0.05$ ;  $r(88) = 0.220, p < 0.05$ ;  $r(88) = 0.259, p < 0.05$ ). Item FCG was significantly correlated with imagination ( $r(88) = -0.228, p < 0.05$ ). Item EIW was significantly correlated with imagination ( $r(88) = -0.259, p < 0.05$ ). The effect sizes of all these significant correlations were medium.

Combining the results in the previous steps, at the domain level, we found significant correlations between authoritative and authoritarian parenting and maternal personality, but only authoritarian parenting has significant correlations with two creativity constructs. Even when considering effect sizes, the results did not change, i.e., the only two possible indirect paths between maternal personality and children’s creativity are from neuroticism to an authoritarian parenting style, and then from an authoritarian parenting style to fluency and originality.

For the three single items of parenting, we followed the above procedures and found nine indirect paths toward creativity. The following nine combinations have the sequence: independent variable, mediator, and dependent variable.

1. Openness, EIW, Imagination
2. Neuroticism, FCG, Imagination
3. Agreeableness, FCG, Imagination
4. Conscientiousness, NGA, Fluency
5. Conscientiousness, NGA, Originality
6. Conscientiousness, NGA, Imagination
7. Openness, NGA, Fluency
8. Openness, NGA, Originality
9. Openness, NGA, Imagination

There were total of 11 combinations, the regression models were shown in Appendix 1. Next, we investigated these indirect effects.

## 4.2 Indirect effects

We used the PROCESS procedure in SPSS to investigate if any indirect effects existed for the possible paths found. The results are presented in **Table 4**.

From **Table 4**, at the domain level, the confident interval (CI) of the indirect effects from neuroticism to fluency via authoritarian parenting is (−0.6427, 0.0331) with point zero included, indicating an insignificant result. For the indirect effects from neuroticism to originality via authoritarian parenting, the CI is (−0.505, −0.0134) with point zero excluded, indicating statistically significant results. Hence, there are no indirect effects of neuroticism on fluency via authoritarian parenting. But there are indirect effects of neuroticism on originality via authoritarian parenting.

X	M	Y	Coefficient			CI of indirect effects
			a	b	c	
Neuroticism	Authoritarian	Fluency	0.247	−0.855	−0.211	(−0.6427, 0.0331)
Neuroticism	Authoritarian	Originality	0.263	−0.704	−0.185	(−0.505, −0.0134)
Openness	EIW	Imagination	0.038	−1.596	−0.060	(−0.1355, −0.0115)
Neuroticism	FCG	Imagination	0.067	−0.684	−0.046	(−0.1166, −0.0053)
Agreeableness	FCG	Imagination	−0.064	−0.759	0.049	(0.0071, 0.1387)
Conscientiousness	NGA	Fluency	0.056	7.029	0.390	(0.1065, 0.8552)
Conscientiousness	NGA	Originality	0.056	6.351	0.352	(0.0776, 0.8097)
Conscientiousness	NGA	Imagination	0.054	0.992	0.053	(0.0086, 0.1177)
Openness	NGA	Fluency	0.031	6.162	0.194	(0.0398, 0.4709)
Openness	NGA	Originality	0.031	5.728	0.180	(0.0303, 0.5185)
Openness	NGA	Imagination	0.030	1.284	0.038	(0.0046, 0.1008)

*Note: X, M, and Y stand for independent variable, mediator, and dependent variable, respectively. Coefficient a, b, and c stand for the path from X to M, M to Y, and indirect effects from X to Y via M. CI of indirect effects are confident intervals of coefficient c.*

**Table 4.**  
*Indirect effects of five maternal personalities, three parenting styles, and three creativities.*

The sign of the effects of neuroticism on an authoritarian parenting style was positive, indicating that more neuroticism will lead to more authoritarian parenting. But the sign of the effects of authoritarian parenting style on originality was negative, indicating that more authoritarian parenting will lead to lower originality. So, the combined indirect effect of neuroticism on originality was negative, indicating that mothers with more neurotic characteristics will indirectly lead to lowering originality in creativity in children.

For the nine possible paths from maternal personalities to creativity via three single items of parenting, results are shown in the lower part of **Table 4**. First, all CIs have point zero excluded and hence, all indirect effects are significant. Secondly, the signs of EIW and FCG on imagination were both negative, indicating that more parenting in EIW will lead to less imagination, and hence the indirect paths were negative from openness to imagination via EIW, and from neuroticism to imagination via FCG. However, since the sign from agreeableness to FCG was also negative, the overall indirect effect of agreeableness on imagination via FCG was negative, indicating more maternal agreeableness may indirectly lead to more imagination if the parenting style is FCG.

Thirdly, it is the results from the single item NGA (not setting guidelines at all) that are most significant and interesting. All signs for  $a$ ,  $b$ , and  $c$  coefficients were positive. The  $b$  coefficients, indicating the effects of NGA on creativity, were especially high for fluency and imagination. And NGA affects all three creativity constructs. If the maternal personalities are either of conscientiousness or openness, and in addition, if the parenting style is NGA, children's creativity will be improved in all aspects. We will return to this in the Section 5.

## 5. Discussion

### 5.1 Maternal personality's influence on children's creativity via parenting style

This study investigated the effects of maternal personality on children's creativity. Since the subjects were 4- to 8-year-old children, the best way to measure their creativity seems to be assessing actions and movements by TCAM. TCAM is time consuming and what we used here. TCAM measures creativity in terms of fluency, originality, and imagination. Finally, we investigated both direct and indirect effects via parenting.

We did not find any direct effects of maternal personality toward children's creativity, but indirect effects of maternal parenting toward the relationship between their personality and children's creativity. Consistent with Fu et al. [17]'s early study, the relationship between mother's personality and children's creativity is not statistically significant. However, when adding parenting style, a mother's personality does influence children's creativity. The insignificant result may be caused by the distance from mother's self-report personality and their actual personality received by young children. It is not easy to obtain young age children's perceived maternal personality. This is one of our limitations. Another reason may be because another maternal characteristic, which is unknown, contributes more to children's creativity than maternal personality does.

We found a statistically significant indirect effect of neuroticism maternal personality on originality via authoritarian parenting. For the relationship between maternal neuroticism and authoritarian parenting, it is in-line with Coplan et al. [31]

who concluded that maternal neuroticism leads to an overprotective parenting style. For the relationship between authoritarian parenting and creativity, our result is in-line with Fearon et al. [13] who showed that authoritarian parenting has negative effects on students' creativity with a sample of Jamaican primary school students. Authoritarian parenting is a constraining parenting style and that may explain the negative effects on children's creativity. In layman's terms, sensitive (neurotic) mothers will probably be more restrictive (authoritarian) of children's behavior, thus possibly reducing children's motivation to try new things, and hence stifling creativity.

This study added three single items in each parenting domain to give additional insight. The single item EIW under the authoritative domain is the only item that explicitly expresses mothers' views on family rules. Results showed that EIW was negatively related to imagination and positively related to maternal openness. So, if mothers with open personalities choose to explain clearly those family rules and restrictions, this may have a negative effect on the imagination. This may be because if parents give clear family rules, it will leave limited room for children's activities. A similar result is found in Kwak et al. [57]'s study, the more maternal attention, the less the child's exploration.

The single item FCG under the authoritarian domain is the only item that emphasizes doing things for the children's good. Although authoritarian and FCG correlated with different creativity constructs, the signs were both negative. Both the whole domain and the single item tend to reduce children's creativity of some sort. Hence, the indirect effects of maternal neuroticism on creativity via FCG may follow a similar path via authoritarian parenting. Our results also showed that maternal agreeableness may lead to lower FCG. Or, more agreeable mothers may tend to exert fewer rules even if it is for the children's good, and then, in turn, this may lead to more positive effects on imagination. These uncovered results were not provided by the authoritarian domain.

The single item NGA, not setting any guidelines at all, under the permissive domain is most interesting. Both maternal conscientiousness and openness were positively related to NGA, but the whole domain of permissive parenting was not related to any of the maternal personalities. Besides, NGA was positively related to all three creativity constructs, but permissive parenting was not related to any of the creativity constructs. Finally, the *b* paths, effects of NGA on fluency and originality, were especially high. This was explained in Kwak et al. [57], whereby mothers who are more conscientious and open to experience may impose fewer restrictions, giving their children more freedom. And this, in turn, will lead to more exploration and higher creativity. This is consistent with Siegelman [7]'s finding that students who perceive lower parent's attention show higher creative potential than those who perceive parental love. To conclude, mothers with conscientious or open personalities may employ the parenting style of NGA, which in turn may lead to higher creativity. This has direct practical implications for nurturing children's creativity.

Further, FCG, EIW, and NGA items represent descending order for "training" under the Chinese context. The study's result shows that FCG and EIW have a negative effect on children's creativity, while NGA has a positive effect. On one hand, even "training" has a positive meaning in Chinese culture, it has a negative effect on children's creativity. On the other hand, NGA contradicted with traditional Chinese parents' preference on educational ideology, but it plays a positive role in children's creativity. Chinese parents' parenting preference on "training" may have negative influence on children's creativity. The contradiction between Chinese parents' preference of parenting and creativity encouragement parenting deserves research effort in the future.



## 5.2 Limitations and further research

As indicated above, the casual relationship between mother's personality and children's creativity is complicated. TCAM, an instrument widely used to tap young children's creativity, does not include "elaboration" in children's creativity, so elaboration is neither measured nor discussed in this study. There may be other possible factors affecting children's creativity, e.g., their socio-economic background and maternal education. Besides, in future research, the sample size needs to be larger for multiple regression. Further studies can explore other potential factors influencing young children's creativity. And our mediation methods used here may be fairly exploratory, especially the use of single items. In particular, the single item NGA (no guidelines at all) correlated with all three creativity dimensions. Future research can develop a scale with more items and correlate with creativity. This study employed a correlational design and hence an experimental design can be considered in the future.

## A. Appendix

### A.1. Appendix 1. Regression models of 11 parent's personality (X), maternal parenting style (M), and children's creativity (Y) combinations

	Fluency			Originality			Imagination		
	B	SE(B)	Beta	B	SE(B)	Beta	B	SE(B)	Beta
Neuroticism	-0.422	0.397	-0.145	-0.105	0.408	-0.036			
Authoritarian	-0.855	0.536	-0.218	-1.012	0.551	-0.253			
<i>p</i>	0.076			0.131					
<i>R</i> <sup>2</sup>	0.089			0.071					
Adjusted <i>R</i> <sup>2</sup>	0.056			0.037					
Neuroticism							0.01	0.067	0.018
FCG							-0.684	0.366	-0.227
<i>p</i>							0.154		
<i>R</i> <sup>2</sup>							0.049		
Adjusted <i>R</i> <sup>2</sup>							0.023		
Openness	-0.438	0.338	-0.148	-0.254	0.354	-0.082	-0.079	0.061	-0.146
NGA	6.162	2.815	0.25	5.728	2.95	0.224	1.284	0.51	0.284
<i>p</i>	0.075			0.155			0.038		
<i>R</i> <sup>2</sup>	0.065			0.047			0.081		
Adjusted <i>R</i> <sup>2</sup>	0.041			0.022			0.057		
Openness							0.02	0.064	0.037
EIW							-1.596	0.638	-0.295
<i>p</i>							0.04		
<i>R</i> <sup>2</sup>							0.08		
Adjusted <i>R</i> <sup>2</sup>							0.056		
Conscientiousness	-0.297	0.435	-0.082	-0.269	0.435	-0.075	0.062	0.075	0.099

	Fluency			Originality			Imagination		
	B	SE(B)	Beta	B	SE(B)	Beta	B	SE(B)	Beta
NGA	7.028	3.085	0.273	6.351	3.084	0.248	0.992	0.531	0.221
<i>p</i>	0.079			0.124			0.049		
<i>R</i> <sup>2</sup>	0.064			0.053			0.076		
Adjusted <i>R</i> <sup>2</sup>	0.039			0.028			0.052		
Agreeableness							-0.004	0.08	-0.006
FCG							-0.759	0.354	-0.246
<i>p</i>							0.091		
<i>R</i> <sup>2</sup>							0.059		
Adjusted <i>R</i> <sup>2</sup>							0.035		


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### Author details

Shuyang Lu\*, Keang Ieng Peggy Vong and Shing On Leung  
 Faculty of Education, University of Macau, Macau, China

\*Address all correspondence to: [shuyanglu2017@163.com](mailto:shuyanglu2017@163.com)

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