Associations of Experienced Parenting Style and Empathy Among Male Offenders in China

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Abstract

**Background:** Parenting style has an important influence on the development of individuals and has been associated with empathy. The present study aimed to investigate different parenting style factors in childhood and adolescence and associated cognitive and affective empathy among offenders, which may help to inform effective intervention strategies to improve empathy.

**Methods:** A total of 994 prisoners were selected for their parents being the caregivers whose caregivers were fathers and mothers, used the Parental Bonding Instrument to collect information on the parenting styles they experienced in childhood and adolescence, and used the Interpersonal Reactivity Index to evaluate their empathy. Multivariable linear regression analysis was conducted to explore associations between different parenting style factors and the empathy of offenders, and one-way multivariate analysis of variance and a t-test was used to explore the differences in cognitive and affective empathy with different degrees of parenting style factors.

**Results:** The parental care and control factors in childhood and adolescence had a significantly greater influence on the empathy of offenders than the parental encouragement factor. There were different associations between parental care and control factors and offenders’ empathy depending on whether the parenting styles were consistent or inconsistent. When the parenting styles were consistent, different degrees of parental care had a significantly influence on the cognitive and affective empathy while different degrees of parental control only had a significantly influence on the affective empathy of offenders. And when the parenting styles were inconsistent, different degrees of paternal and maternal control had an association with the cognitive and affective empathy of offenders.

**Conclusion:** Different parenting style factors experienced in childhood and adolescence had different associations with the empathy of offenders. Different degrees of parenting style factors also had different predictive effects on offenders’ cognitive and affective empathy depending on whether the paternal and maternal parenting styles were consistent or inconsistent. Moreover, the parental control factor had a particular influence on the empathy of offenders. Our findings underscore the pressing need for taking preventive monitoring measures or developing policies to improve parenting styles.

**Background**

Dysfunction in the family of origin has consistently been found to correlate with preadolescents’ antisocial behavior, and this dysfunction includes disruptions or omissions in the application of family-management practices, broken families, institutional or foster home placements, low parental care, harsh discipline, physical and psychological abuse, parents’ antisocial and criminal behavior, parents’ mental health and substance use problems, delinquent siblings, and large family size[1–4]. This dysfunction may cause elevated psychopathic traits, which may lead to antisocial or violent behaviors [5]. Parenting styles have proven to be a very important factor in the family of origin environment [6–8].

The presence of good parenting styles in the family of origin is very important in preventing juvenile delinquency [9]. At present, the main problems in the parenting style of families are the degree of supervision and discipline of parents and whether they can give enough care and encouragement to their children [7]. At the same time, many studies have shown that a positive parent-adolescent relationship protects adolescents against delinquency [10]. These studies have shown that children and adolescents who often have conflicts with their parents or who receive little parental support are at increased risk of juvenile delinquency [11, 12]. In addition, low levels of parental monitoring and high levels of harsh parental disciplining have been related to high levels of delinquent behavior in adolescents [1, 13]. The controlling factors in parenting style may have profound influences on the individual according to previous studies [14–16]. More negative parenting that involved high levels of control was found to be associated with more pessimistic views of marriage, higher levels of depression, and higher rates of prescribed medication for depression and anxiety [14, 15]. More authoritarian parenting styles (e.g., overly strict and controlling) may involve an increased risk of child maltreatment (e.g., harsh verbal and physical disciplining practices) [16]. Many studies have also shown that a poor family of origin environment influences the empathy of adults. Improper parenting of preadolescents is an important factor affecting empathy in adulthood [7, 17, 18]. Meanwhile, some studies have pointed out that parenting style may differentially influence cognitive and affective empathy, which further categorizes empathy [19–21].

Empathy, a multidimensional construct comprised of cognitive, affective, and behavioral dimensions, has been advanced as a critical predictor of prosocial behavior and effectiveness in the workplace [22]. Empathy allows individuals to share the affective states of others, predict others’ actions, and stimulate prosocial behavior. Recent evidence has suggested that there are two possible systems for empathy: a basic emotional contagion system and a more advanced cognitive perspective-taking system [23]. Recent studies have divided empathy into cognitive empathy and affective empathy based on the neural mechanisms or expression of empathy [23]. Cognitive empathy refers to the tendency to understand, or the state of understanding, others’ internal states (i.e., thoughts and affective states). Cognitive empathy is thought to develop later than affective empathy after children have acquired specific cognitive skills [24, 25]. Affective empathy, or feeling
the same affective state as another person, is thought to be the phylogenetically earliest system of empathy [25, 26]. People may show antisocial behavior and even criminal behavior when they lack empathy; thus, empathy deficits have been hypothesized to underlie impairments in social interactions exhibited by those who engage in antisocial behavior [27]. Some previous studies have described the deficits in and characteristics of empathy of offenders; within the low and reactive aggression cluster, girls scored higher on affective empathy, and there is a more consistent negative relation of delinquency with affective empathy (but not cognitive empathy) in adolescents than in adults [28, 29]. Empathy represents a potential mechanism that inhibits aggressive conduct and enhances prosocial behavior [30]. Indeed, Jolliffe and Farrington (2004) found that cognitive empathy had a stronger negative relation with delinquency than affective empathy, regardless of the type of offense or the age group studied [28]. Explanations of criminal or antisocial behavior (both violent and/or sexual) have often hypothesized that lack of empathy reduced the inhibition to cause harm to others, and empathy impairments have been related to aggressive, delinquent and antisocial behaviors [31, 32].

Previous studies have reported that many influencing factors are linked to the empathy of offenders [32, 33]. Gery et al. (2009) supported the view that sex offenders might have impairments in the decoding of some emotional cues conveyed by conspecifics’ faces, which could have an impact on affective empathy [32]. In addition, offenders with different levels of education would have different manifestations of cognitive empathy [33]. However, attention has not been paid to the influence of parenting style in the family of origin on offender’s empathy. Many studies have found that parenting style has a significant impact on the empathy of individuals [17, 34, 35]. Guo and Feng (2017) point out that parenting styles are critical for fostering children’s empathy and prosociality[17]. Several studies have found that exposure to different parenting styles during adolescence or young adulthood have different effects on an individual’s empathy [34, 35]. One study also examined the relationships between parenting styles, empathy and connectedness with the environment and found that indulgent and authoritative styles were stronger enablers of empathy and connectedness with nature [7]. Previous studies have discussed the influences of control factors in parenting style on empathy among offenders [36, 37]. One study found that the role of paternal control was a tendency that led to social isolation and defectiveness, and high maternal control was predictive of impaired autonomy in offenders [36]. Jackie et al. (2002) supported the view that an affectionless control style of parental bonding was highly prevalent among sex offenders, and higher levels of parental control were noted among men with borderline personality disorder [37]. Many studies also found that parental control was significantly associated with lower rates of juvenile delinquency or produced only a small to moderate effect on reducing delinquency [38, 39]. Most offenders may have a poor family of origin environment and may not have experienced good parental rearing since preadolescence [1, 2, 13]. Consequently, it is of utmost importance to explore the associations between parenting styles in the family of origin and empathy among offenders. There are several studies have been made on the association between the parenting style and empathy among the foreigners [18, 19, 21]. And many studies supported the view that there have many differences between Chinese and foreigners in some parts such as social cognition, psychological state, family environment, etc. [40, 41]. Whether the results of the foreigner study can be directly generalized to the Chinese population remains to be seen. There is a paucity of studies focusing on the association between experienced parenting styles and empathy among offenders in China. Having a better understanding of parenting style and associated risk factors among this special population can draw more attention from all circles in society, which is conducive to the prevention of more violent behavior in adulthood by improving the experienced parenting style of adolescents in the family of origin.

We hypothesized that different parenting styles in childhood and adolescence would have different predictive effects on empathy. To test this hypothesis, we administered the abovementioned scales assessing parenting styles and empathy to offenders to obtain information about their experienced parenting style and their capacity for empathy. The current study provided offenders’ demographic information and other psychological information. Based on this hypothesis, we predicted that parenting style may have associations with affective empathy and cognitive empathy among offenders [21, 23]. Cognitive empathy and affective empathy among offenders may have different associations with parenting style when paternal and maternal parenting styles were inconsistent [17, 20, 34].

Methods

Participants and Procedure

The study is based on data from offenders recruited from a prison in Jiangsu Province. In this project, Soochow University coordinates a collaboration among a prison in Jiangsu Province, the Center for Disease Control and Prevention (CDC) of Xiangcheng District in Suzhou and Soochow University. Participants were offenders who had disrupted social order or had violent behaviors. A total of 994 prisoners were selected because their fathers and mothers were the caregivers. The age of the participants ranged from 17 to 67 years (mean age = 39.93, SD = 8.76). A total of 26.1% of the offenders were the only child in their families. In the total sample, 37.9% were unmarried, 27.8% were divorced, 1.2% were widowers, and 32.9% were married. Among the participants, 13.6% did not graduate from junior high school, the majority (62.5%) reported having a junior high school diploma, 17.2% indicated having a high school diploma, and 6.5% had a college degree. All of the survey data were collected after informed consent was obtained from the participants. The records of the offenders were
provided by the prison in the Jiangsu Province database according to a data sharing agreement. The presented research was approved by Soochow University's institutional review boards for research conducted with human subjects.

All participants were recruited from a prison in Jiangsu Province after a successful negotiation and arrangement established by the Suzhou prison, CDC and Soochow University. Most of the offenders cooperated with our investigations accompanied by the prison police.

A total of 1324 offenders admitted to the counseling room were screened for inclusion. Data from participants were collected using different scales: 1324 offenders between the ages of 17 and 67 completed the scales in the counseling room with questions regarding social demographics, parenting style, trauma, empathy and other characteristics. All 1324 returned a completed scale, three of which were invalid and were thus excluded from the subsequent data analysis. Our study used only the scales assessing parenting style and empathy, and the survey was designed according to the purposes of our study. The scales are available from the authors upon request.

**Measures**

**Parenting style**

The parenting style questionnaire is a self-report scale to assess individuals’ cognition of the parenting style they experienced in childhood and adolescence (before the age of 16) [42]. Parenting style refers to the relatively stable behavior style of parents in raising and educating their children. According to attachment theory, parental care, namely, love, gentleness, closeness and low control, are necessary for children's safe attachment and normal development. Parental control, namely, intervention, obedience, overprotection and low care, contributes to children's insecure attachment mode and later psychological disorders. The questionnaire was divided into the maternal version (Parental Bonding Instrument-Mother; PBI-M) and the paternal (i.e., father) version (PBI-F) with 23 items each and assessed three factors: caring, encouraging autonomy and controlling. Using a Likert 4-point scoring form, "0" represented "does not conform very well", "1" represented "does not conform", "2" represented "match", and "3" represented "fits". The Cronbach's alpha coefficient for PBI-F and PBI-M in this study were 0.821 and 0.776.

**Empathy**

To assess empathy in a multidimensional manner, we administered the Interpersonal Reactivity Index (IRI). The IRI (Davis, 1983), is a 22-item self-report questionnaire that measures these two components of empathy [43]. To date, it is the only published measure that allows a multidimensional assessment of empathy. Empathy in the broadest sense refers to the reactions of one individual to the observed experience of another. The IRI describes four separate aspects of empathy and are assessed in relation to measures of social functioning, self-esteem, emotional functioning, and sensitivity to others. Two of these subscales, perspective taking (PT) and fantasy (FS), measure cognitive empathy (CE), while the other two subscales, empathic concern (EC) and personal distress (PD), measure affective empathy (AE). More specifically, the PT subscale measures the tendency of individuals to cognitively place themselves in the position of others, thereby adopting their psychological viewpoint, while the FS subscale provides an indication of the extent to which people can immerse themselves in and identify with the feelings and actions of fictitious characters. The EC subscale is designed to measure the capacity to experience feelings of compassion, warmth, and concern in response to other people, whereas the PD subscale evaluates subjective feelings of unease and discomfort in reaction to observing the anguish and pain endured by others [44]. The Cronbach's alpha coefficient for IRI in this study was 0.862.

**Data analyses**

First, a descriptive analysis was performed to examine the psychological state of the offenders with different ages and levels of education. Multivariable linear regression was used to identify the influence of the three different factors of parenting style on empathy. Then, the three different parenting factors were divided into three degrees: high (top 27% of the score), medium (excluding high and low scores) and low (bottom 27% of the score). To investigate whether different levels of parenting style factors impact empathy among individuals, we conducted a series of one-way multivariate analyses of variance (MANOVAs). To observe whether an individual's empathy is differentially affected when the father and mother show different levels of the same parenting style factor, the parenting performance of the father and mother for a specific parenting style factor was divided into two types: father-high, mother-low (FHML) and father-low, mother-high (FLMH). Then, a t-test was used to interrogate whether the difference between paternal and maternal parenting styles affected the individual's empathy.

**Results**

**Mental health problems and parenting style characteristics of the participants**
A total of 994 male offenders with valid data were included in the present study. We describe the psychological states, such as anxiety, trauma, aggression and so on, of the criminals with different ages and education levels in Table 1. Meanwhile, the three different factors of the paternal and maternal parenting styles and the four items representing empathy based on the parenting styles of the parents are also expressed (mean and SD) across ages and education levels in Table 1 (n = 994). Overall, there were no significant differences in parenting style factors and the four empathy items between different age groups. With improvements in education level, the degree of parental care and encouragement and the EC (F(994) = 8.05, p < .01), PT (F(994) = 6.27, p < .01) and FS (F(994) = 5.50, p < .01) empathy items showed an increasing trend, while the degree of parental control and PD (F(994) = 2.98, p < .05) showed a decreasing trend.

### Table 1

Characteristics of mental health problems among offenders by demographic factors (n = 994)

| Age       | 30 (10.7%) | 30–39 (40.5%) | 40–49 (33.1%) | ≥ 50 (15.4%) | Primary school and below (13.6%) | Junior high school (62.5%) | High school (17.2%) | College and above (6.5%) |
|-----------|------------|---------------|---------------|-------------|---------------------------------|---------------------------|----------------------|-------------------------|
| Maternal care | 22.76(5.31) | 22.72(4.32) | 22.47(4.67) | 22.53(4.19) | 21.54(4.56) | 22.44(4.40) | 23.59(4.63) | 23.96(4.73) |
| Maternal encouragement | 10.94(4.16) | 10.67(3.84) | 10.75(4.01) | 11.12(3.49) | 9.85(4.26) | 10.83(3.80) | 11.22(3.78) | 11.33(3.86) |
| Maternal control | 6.25(2.41) | 5.82(2.42) | 5.69(2.42) | 5.60(2.50) | 5.91(2.74) | 5.86(2.33) | 5.64(2.48) | 5.25(2.57) |
| Paternal care | 19.54(4.73) | 19.60(4.28) | 19.24(4.54) | 19.45(4.26) | 18.43(4.77) | 19.31(4.25) | 20.42(4.40) | 20.41(4.53) |
| Paternal encouragement | 11.48(3.85) | 11.47(3.50) | 11.18(3.62) | 11.32(3.32) | 10.23(3.87) | 11.39(3.43) | 11.75(3.52) | 12.29(3.55) |
| Paternal control | 6.56(2.66) | 5.86(2.57) | 5.91(2.48) | 5.91(2.42) | 6.07(2.58) | 6.10(2.41) | 5.64(2.65) | 5.24(3.02) |
| Perspective taking | 8.43(4.07) | 8.20(3.90) | 7.83(3.82) | 8.11(3.65) | 7.79(4.07) | 7.82(3.65) | 8.74(4.22) | 9.59(3.92) |
| Personal distress | 5.23(3.98) | 4.97(4.05) | 5.24(3.98) | 5.03(3.51) | 5.71(3.79) | 5.18(3.99) | 4.51(3.72) | 4.50(4.10) |
| Empathic concern | 16.36(3.85) | 16.39(3.48) | 16.42(3.56) | 16.41(3.43) | 15.48(3.52) | 16.30(3.39) | 17.01(3.67) | 17.66(3.18) |
| Fantasy | 13.57(4.07) | 12.38(3.87) | 12.48(3.61) | 12.53(3.61) | 11.93(3.81) | 12.40(3.54) | 13.25(4.31) | 13.69(4.08) |

### Multivariable logistic regression analysis of empathy across parenting styles

Multiple linear regression analyses were performed to determine the associations between different parenting style factors and different items on the empathy scale. Experience with paternal and maternal caring factors was associated with an increasing trend in EC (all p for trend < 0.05), while experience with paternal control was associated with a decreasing trend in EC (p for trend < 0.05). All parenting style factors other than paternal encouragement was associated with increasing trends in PT (all p for trend < 0.05). Experience with paternal and maternal control were associated with an increasing trend in PD (all p for trend < 0.001). Experience with paternal and maternal care and maternal control were associated with an increasing trend in FS (all p for trend < 0.05) (see Table 2).
Table 2
Multivariable linear regression analysis on empathy with parenting style factors (n = 994)

| Variable | Constant term | \( B \) | Standard error | Beta | \( t \) | \( p \) |
|----------|---------------|--------|----------------|------|------|------|
| EC       |               |        |                |      |      |      |
|          | Constant term | 10.28  | 0.70           | 14.61| < .001 |
|          | Maternal care | 0.24   | 0.03           | 0.31 | 7.68 | < .001 |
|          | Maternal encouragement | -0.007 | 0.03 | -0.008 | 0.21 | 0.83 |
|          | Maternal control | -0.06 | 0.05 | -0.04 | 1.26 | 0.2 |
|          | Paternal care | 0.07   | 0.03           | 0.09 | 2   | < .05 |
|          | Paternal encouragement | 0.01 | 0.04 | 0.01 | 0.37 | 0.71 |
|          | Paternal control | -0.09 | 0.05 | -0.07 | 1.99 | < .05 |
| PT       |               |        |                |      |      |      |
|          | Constant term | -0.43  | 0.8            | 0.54 | 0.58 |
|          | Maternal care | 0.11   | 0.03           | 0.13 | 3.04 | < .01 |
|          | Maternal encouragement | 0.11 | 0.04 | 0.11 | 2.61 | < .01 |
|          | Maternal control | 0.17 | 0.05 | 0.11 | 3.09 | < .01 |
|          | Paternal care | 0.08   | 0.04           | 0.1  | 2.14 | < .05 |
|          | Paternal encouragement | 0.10 | 0.05 | 0.09 | 1.88 | 0.06 |
|          | Paternal control | 0.14 | 0.05 | 0.09 | 2.55 | < .05 |
| PD       |               |        |                |      |      |      |
|          | Constant term | 2.78   | 0.82           | 3.35 | < .001 |
|          | Maternal care | -0.04  | 0.03           | -0.04| 1.09 | 0.27 |
|          | Maternal encouragement | 0.03 | 0.04 | 0.03 | 0.86 | 0.38 |
|          | Maternal control | 0.28 | 0.05 | 0.17 | 4.8 | < .001 |
|          | Paternal care | -0.07  | 0.04           | -0.08| 1.73 | 0.08 |
| Variable                  | Constant term | $B$   | Standard error | $Beta$ | $t$  | $p$  |
|--------------------------|---------------|-------|----------------|--------|------|------|
| Paternal encouragement   |               | 0.07  | 0.05           | 0.06   | 1.27 | 0.2  |
| Paternal control         |               | 0.30  | 0.05           | 0.19   | 5.24 | <.001|
| FS                       | Constant term | 6.62  | 0.82           | 8.04   | <.0001|
| Maternal care            |               | 0.14  | 0.03           | 0.17   | 4.01 | <.001|
| Maternal encouragement   |               | -0.06 | 0.04           | -0.06  | 1.55 | 0.12 |
| Maternal control         |               | 0.20  | 0.05           | 0.13   | 3.45 | <.001|
| Paternal care            |               | 0.10  | 0.04           | 0.12   | 2.43 | <.05 |
| Paternal encouragement   |               | -0.009| 0.05           | -0.008 | 0.16 | 0.87 |
| Paternal control         |               | 0.03  | 0.05           | 0.02   | 0.56 | 0.57 |

### Analysis of variance of empathy across different paternal and maternal parenting styles

From the results of regression analysis, the three different parenting style factors of the father and mother had different effects on individuals' empathy. According to the scores of each parenting style factor, the three parenting style factors were divided into three groups: high, medium and low as described above to indicate the different degrees of each parenting style factor. Analysis of variance (ANOVA) was used to compare the differences in the four items of empathy with the three parenting style factors across different degrees of the father and mother.

Follow-up univariate ANOVAs for each of these variables separately revealed that there were statistically significant differences in four different empathy items among individuals exposed to different degrees of the three paternal and maternal parenting style factors. The group that experienced high parental care and encouragement had significantly higher EC, PT, and FS scores and had significantly lower PD scores than the group that experienced low levels of parental care and encouragement. The group that experienced higher parental control had significantly lower scores on EC but had significantly higher scores on PD than the group that experienced low levels of parental control. When the parental control was high, the PT score was highest, and those who experienced medium parental control had significantly lower scores on PT than those who experienced low levels of parental control. When the parental control was low, FS scores were highest, and the group that experienced high paternal control had significantly lower FS scores than the group that experienced medium paternal control; when maternal control was high, the FS scores were highest, and the group that experienced medium maternal control had significantly lower FS scores than the group that experienced low maternal control (see Tables 3 and 4).
Empathy differences under different degrees of parental care factors (n = 994)

| Group        | n    | EC  | PT  | PD  | FS  |
|--------------|------|-----|-----|-----|-----|
|              |      | Father | Mother | Father | Mother | Father | Mother | Father | Mother |
| High         | 268  | 18.09 ± 3.38 | 18.18 ± 3.16 | 9.71 ± 4.42 | 9.43 ± 4.11 | 4.60 ± 4.02 | 4.58 ± 3.90 | 13.72 ± 4.63 | 13.39 ± 4.32 |
| Medium       | 457  | 16.17 ± 3.24 | 16.44 ± 3.16 | 7.81 ± 3.16 | 7.85 ± 3.57 | 5.10 ± 3.67 | 4.75 ± 3.71 | 12.23 ± 3.28 | 12.49 ± 3.68 |
| Low          | 269  | 15.12 ± 3.33 | 14.55 ± 3.36 | 6.95 ± 3.82 | 7.15 ± 3.72 | 5.59 ± 4.25 | 6.20 ± 4.15 | 12.00 ± 3.39 | 11.87 ± 3.19 |
| F            |      | 56.18 | 85.51 | 39.4 | 26.2 | 4.26 | 15.02 | 17.85 | 11.14 |
| p            |      | < .0001 | < .0001 | < .0001 | < .05 | < .0001 | < .0001 | < .0001 | < .0001 |

Empathy differences under different degrees of parental control factors (n = 994)

| Group        | n    | EC  | PT  | PD  | FS  |
|--------------|------|-----|-----|-----|-----|
|              |      | Father | Mother | Father | Mother | Father | Mother | Father | Mother |
| High         | 268  | 15.27 ± 3.41 | 15.34 ± 3.47 | 8.60 ± 3.81 | 8.73 ± 4.00 | 6.79 ± 4.17 | 6.74 ± 4.13 | 12.85 ± 3.69 | 12.39 ± 3.95 |
| Medium       | 457  | 16.51 ± 3.41 | 16.52 ± 3.36 | 7.67 ± 3.57 | 7.60 ± 3.49 | 4.76 ± 3.57 | 4.89 ± 3.76 | 12.09 ± 3.39 | 12.25 ± 3.57 |
| Low          | 269  | 17.33 ± 3.37 | 17.25 ± 3.43 | 8.29 ± 4.28 | 8.27 ± 4.20 | 3.97 ± 3.77 | 3.82 ± 3.48 | 13.10 ± 4.37 | 12.74 ± 3.93 |
| F            |      | 25.02 | 21.58 | 5.43 | 7.86 | 4.26 | 41.2 | 7.14 | 3.19 |
| p            |      | < .0001 | < .0001 | 0.004 | < .001 | < .05 | < .0001 | < .001 | < .05 |

**Analysis of variance and t-test of empathy based on consistent and inconsistent parenting styles**

After examining the parenting style factors of fathers and mothers separately, we also examined whether the individual’s four empathy items were different when the degree of the father and mother parenting style factors were consistent or inconsistent. When the parenting styles were consistent, the three parenting style factors were divided into three groups based on scores: high, medium and low using the above classification criteria. The inconsistent parenting style was categorized into two types: FHML (top 27% of the score of father and top 27% of the score of mother) and FLMH (bottom 27% of the score of father and top 27% of the score of mother). The results from MANOVAs indicated that there were statistically significant differences in the four different empathy items among individuals who experienced different degrees of paternal and maternal parenting style factors when the parenting styles were consistent, and the results from the t-test revealed that there were also statistically significant differences in the four empathy items among individuals who experienced different degrees of paternal and maternal parenting style factors when the parenting styles were inconsistent.

When the paternal and maternal parenting style factors were consistent, the group that experienced high parental care had significantly higher scores on EC ($F_{(963)} = 81.44, p < .001$), PT ($F_{(963)} = 32.49, p < .001$) and FS ($F_{(963)} = 11.34, p < .001$) but had significantly lower scores on PD ($F_{(963)} = 7.95, p < .001$) than the group that experienced low parental care. The group that experienced high parental encouragement had significantly higher scores on EC ($F_{(924)} = 36.32, p < .001$) PT ($F_{(924)} = 37.11, p < .001$) and FS ($F_{(924)} = 9.57, p < .001$) than the group that experienced low parental encouragement, and there were no significant differences in PD. The group that experienced high parental control had significantly lower scores on EC ($F_{(919)} = 2.66, p < .001$) but had significantly higher scores on PD ($F_{(919)} = 43.8, p < .001$) than the group that experienced low parental control. When the paternal and maternal parenting styles were inconsistent, the group that experienced FLMH and FHML care screened out from participants was too small to make a meaningful statistical comparison, so there was no further discussion in the subsequent analysis. The group that experienced FHML encouragement had significantly lower scores on PD ($t_{(50)} = 2.39, p = .02$) than the group that experienced FLMH encouragement, and there were no significant differences in EC, PT and FS. The group that experienced FHML control had significantly lower scores on PT ($t_{(59)} = 2.52, p < .05$) and PD ($t_{(59)} = 2.01, p < .05$) than the group that experienced FLMH control, and there were no significant differences in EC and FS (see Figs. 1 and 2).
Discussion

In the present study, we found that parental care and control factors in childhood and adolescence had a significantly greater influence on the empathy of offenders than parental encouragement factor. In addition, regarding the paternal and maternal parenting styles, the predictive model of parental care factors on the empathy of the offender had similar patterns, while there were differences between the predictive patterns of paternal and maternal parental control factors on the empathy of offenders. Moreover, the present study revealed that there were different associations between parental care and control factors with offenders' empathy when the parenting styles were consistent or inconsistent, and the most interesting result was that the parental control factor had a special influence on the empathy of offenders. Although the results of a single study are far from conclusive, our study offers new avenues for exploring and understanding the associations between different parenting styles and empathy of individuals.

Our hypothesis was based on the fact that empathy had usually been divided into cognitive empathy and affective empathy in previous studies [23, 44]. Perspective taking and fantasy were used to measure cognitive empathy, and empathic concern and personal distress were used to measure affective empathy [24–26]. Based on regression analyses, the present study found that the three different parenting style factors in childhood and adolescence had different influences on the cognitive and affective empathy of offenders. On the one hand, paternal and maternal care had a significant influence on the individual's cognitive empathy, including perspective taking and fantasy, but a weaker influence on affective empathy, i.e., influenced empathic concern only. On the other hand, maternal control had a significant influence on an individual's cognitive empathy, including perspective taking and fantasy, while paternal control had a significant influence on affective empathy, including empathic concern and personal distress of offenders. Moreover, only maternal encouragement had a significant predictive influence on the perspective taking of offenders. Several previous studies have revealed that parental care and control have significant influences on empathy of individuals but less attention has been paid to parental encouragement [45, 46]. However, several studies have found that parental encouragement has no significant influence on the empathy of individuals [34, 36]. Based on the regression results, parental care and control factors had a more significant impact on an individual's empathy than the encouragement factor. Therefore, we will pay more attention to the associations between parental care and control factors with offenders' ability to empathize in the subsequent discussion.

To further examine the associations between parental care and control factors in childhood and adolescence with the empathy of offenders, we divided parental care and control into three groups, namely, high, medium and low, to compare the differences in the four empathy items with the three different degrees of parenting style factors. In addition, the ANOVA showed that there were significant differences in cognitive and affective empathy with different degrees of paternal and maternal care factors. High levels of parental care had a positive predictive effect on cognitive empathy (i.e., perspective taking and fantasy) compared with low levels of parental care. There was also a significant influence on affective empathy, which was characterized by higher empathic concern and lower personal distress. Reti et al. (2002) and Britton et al. (2005) suggested that parental care may be positively associated with perspective taking and empathic concern, and the results of this study are consistent with this conclusion [46, 47]. One study found that paternal care influenced affective empathy and maternal care related to cognitive empathy in men, while none of the parental care variables were related to cognitive empathy in women [45]. This study revealed that both paternal and maternal care influenced affective and cognitive empathy among male offenders. It may be that most offenders have experienced a poor family of origin environment in childhood and adolescence, and these individual's empathy is more sensitive to parental care [7, 17, 18]. There were also significant differences in cognitive and affective empathy associated with different degrees of paternal and maternal control factors. Parental control had a significant influence on affective empathy with a negative predictive effect on empathic concern and a positive predictive effect on personal distress. As with many previous studies, parental control during adolescence has been proven to have a negative predictive effect on an individual's empathic concern; in addition, one study revealed that parental control had no significant association with the empathic concern of individuals, although perceived parental control had a significant predictive effect on individual's empathic concern [48]. The ANOVA results showed that higher and lower parental control had a positive influence on cognitive empathy and that medium parental control had a negative predictive effect on cognitive empathy. Asano et al. (2016) revealed that parental control and perceived parental control during early adolescence directly increased perspective taking [48]. McElroy and Rodriguez (2008) provided support that parental control in childhood had a significantly negative association with perspective taking [49]. Our study revealed that the degree of parental control is very important and that either high or low levels of parental control may promote the development of offenders' cognitive empathy; high levels of parental control may have a greater promoting effect.

The growth of most individuals in the family of origin environment is influenced by both fathers and mothers, while previous studies have paid little attention to the influences on the empathy of individuals when the paternal and maternal parenting styles are consistent or inconsistent in the family of origin [17, 20, 34]. The present study also divided paternal and maternal care and control factors into three degrees, i.e., high, medium and low, to observe whether there were significant differences in the empathy of offenders when the paternal and maternal parenting styles were consistent or inconsistent. When the paternal and maternal parenting styles were consistent, parental care
had a positive predictive effect on cognitive empathy. There were also significant differences in affective empathy, which manifested as higher empathic concern and lower fantasy. The theory is consistent with the pattern of influence of paternal and maternal care on offenders’ empathy revealed earlier in this study. Paternal and maternal care factors, separately or together, had an influence on offenders’ cognitive and affective empathy, and there were the same predictive trends for both types of empathy. As in some previous studies, parental care refers to a warm parenting style and has been revealed to have a positive effect on the empathy of individuals [29, 50]. Parlar et al. (2014) provided support that higher levels of paternal care on the PBI were predictive of higher scores on the perspective taking subscale of the IRI [50]. The indulgent parenting style, which mainly involves parental care, has been proven to have a significant predictive effect on higher empathy, but the study did not reveal specific influences on cognitive and affective empathy [29]. Parental control had a significant influence on affective empathy but had no significant influence on cognitive empathy of the offenders. Empathic concern and personal distress showed opposite trends with different degrees of parental control, and this pattern was consistent with the trends associated with paternal and maternal control. When the paternal and maternal parenting styles were inconsistent, perspective taking and personal distress were significantly different based on the different levels of paternal and maternal control. This means that parental control had a significant predictive effect on the cognitive and affective empathy of the offenders with a larger effect on cognitive empathy. Furthermore, the results revealed that paternal and maternal control had different influencing patterns on offenders’ empathy when the parenting style was consistent or inconsistent. Parental control usually refers to strictness or authoritarian parenting style and has been found to be associated with the empathy of individuals [36, 37]. However, few studies have paid attention to the influences on cognitive and affective empathy; meanwhile, these studies have not discussed the effects on empathy when the degree of paternal and maternal control was consistent or inconsistent. It should be noted that the parenting style consists of paternal and maternal rearing styles, and previous studies have supported the notion that fathers and mothers may have different rearing attitudes regarding the development of individuals [3, 11, 20]. It should also be noted that the family of origin environment for particular populations (e.g., a group of offenders) is generally dysfunctional, and family members including the father and mother may have had some bad habits and perhaps a history of antisocial behavior or criminal history [5]. This may lead to different parenting attitudes and styles of parents regarding individuals during periods of growth (e.g., childhood and adolescence). The paternal and maternal care and control factors may have differential influences on empathy of offenders in these developmental periods, and the effects of inconsistent or consistent patterns of paternal and maternal parenting styles on offenders’ empathy are different.

Strengths and limitations

The present study is one of the few studies exploring the associations between different degrees of parenting style factors experienced in childhood and adolescence and cognitive and affective empathy among offenders. Our finding that different paternal and maternal style factors had different predictive effects on the empathy of offenders is interesting, and the results revealed that parental care and control had a more significant influence on an individual’s empathy than parental encouragement. Previous studies have focused more attention on the influences of overall parenting style on individuals and did not examine the influence of the three parenting style factors [6–8]. The most important finding was that different degrees of paternal and maternal care and control factors had different associations with the cognitive and affective empathy of offenders. Based on whether the paternal and maternal parenting styles were consistent or inconsistent, parental control also had different predictive effects on the cognitive and affective empathy of offenders.

However, our study also has some limitations. First, the study sample in the present study was limited to male offenders, and it is unclear whether or how gender may impact empathy. Some studies have supported the view that women are more empathic than men, and our future research should also recruit subjects of different genders [51, 52]. Furthermore, information on the parenting style experienced by the offenders mainly came from the questionnaire regarding the recall of parental rearing before the age of 16. There may have been recall bias, and the information collected in the present study may not be sufficient to fully characterize the experienced parental rearing patterns. A longitudinal study is needed to establish the impact of different paternal and maternal rearing styles on the development of empathy. Finally, this association needs to be further studied in other populations, such as students at different stages. These associations were investigated in a specific population of prison inmates because the participants in the study were more likely to have deficits in empathy and to have experienced poor parental rearing styles in the family of origin; the associations between different degrees of parental style factors with cognitive and affective empathy may differ from those in the general population[1, 53].

Conclusions

In conclusion, the current study shows that there were different associations between different parenting style factors in childhood and adolescence with cognitive and affective empathy. The results revealed that different degrees of parenting style factors had different predictive effects on offenders’ cognitive and affective empathy dependent on the paternal and maternal parenting styles being consistent or inconsistent. In addition, parental control had particular influences on the cognitive and affective empathy of offenders, which suggests
the pressing need for more attention being focused on the control factors in parental rearing. These findings may provide preliminary empirical evidence to improve and enhance the capacity for cognitive and affective empathy from the perspective of improving parental rearing styles. These associations need to be confirmed and replicated in other populations, and well-designed longitudinal cohort studies should continue to investigate the longitudinal effects of parenting style factors on the development of empathy in the general population.

**Abbreviations**

CDC: Center for Disease Control and Prevention; IRI: Interpersonal Reactivity Index; PBI: Parental Bonding Instrument; PBI-M: Parental Bonding Instrument-Mother; PBI-F: Parental Bonding Instrument-Father; PT: perspective taking; EC: empathic concern; PD: personal distress; FS: fantasy; CE: cognitive empathy; AE: affective empathy; FHML: father high mother low; FLMH: father low mother high.

**Declarations**

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**Authors’ contributions**

TZ proposed the main research idea; TZ and BD made the research design; HH and XW conducted the investigation; SW, HH and YC ran the statistics; SW, BD and TZ made the discussion and wrote the manuscript.

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**Availability of data and materials**

The datasets used during the current study are available from the corresponding author on reasonable request.

**Ethics approval and consent to participate**

This study was reviewed and approved by the ethics committee of the Health Development Research Center of Soochow University in Suzhou, Jiangsu, China. Participants were informed of the purposes and procedures before the study commenced. In accordance with Declaration of Helsinki, we obtained written informed consent from all students and one of their parents or legal guardians.

**Consent for publication**

Not applicable.

**Competing interests**

The authors declare that they have no competing interests.

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**Figures**
Figure 1

Empathy differences under different degrees of paternal and maternal control factors when the paternal and maternal parenting style are inconsistent (n=59). FHML: father-high, mother-low, FLMH: father-low, mother-high. * p < .05, ** p < .01, *** p < .001

Figure 2

Empathy differences under different degrees of parental care and control factors when the paternal and maternal parenting style are consistent (n(care)=963, n(control)=919). * p < .05, ** p < .01, *** p < .001