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Parent Attachment: Assessment, Effects of Gender Difference, and Mediation between Past Perceived Parenting and Mental Health into Adulthood

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Abstract

Background: Inventory of Parent and Peer Attachment (IPPA) has been widely used in various countries, in examining the effect of parent attachment on later mental health. However, a limited number of studies have verified its psychometric property, in particular, its three-factor structure originally proposed by Armsden & Greenberg. Purposes: This study aimed at examining whether or not the three-factor structure (Trust, Communication, Alienation) of the Japanese version of parent IPPA is valid and examining whether respondents' gender and/or their parents' gender affects their attachment security level. We further studied the hypothesis that parent attachment assessed by IPPA is influenced by past parenting, and will influence later mental health. Methods: Data from the questionnaire survey targeting Japanese college students was used for analyses. The three inventories: IPPA, Authoritarian parenting subscale from Parental Authority Questionnaire (PAQ), and Clinical Outcomes in Routine Evaluation-Outcome Measure (CORE-OM), were used in the analyses of this study. After confirming factor structures of father and mother IPPAs by confirmatory factor analyses (CFA), ANOVAs were conducted to see whether respondent and/or parent gender had effects on the attachment security level. Structural equation modelling (SEM) was conducted to demonstrate the pathways from past parenting to later mental health via parent attachment for men and women respectively. Results: Three-factor structures for both father and mother IPPAs were confirmed by removing one item from the Communication subscale. ANOVAs showed that, concerning Trust, there were no differences between male and female

respondents in evaluating their fathers and mothers, and mothers were more likely than fathers to be scored higher both by male and female respondents. Concerning Communication, mothers were more likely than fathers to be scored higher both by male and female respondents, and male respondents were more likely than female respondents to score their fathers higher, and to score their mothers lower. As for Alienation, mothers were more likely than fathers to be scored higher by male respondents, and male respondents were more likely than female respondents to give their mothers higher scores. Parent attachment assessed by IPPA was found to intermediate past parenting and later mental health among both male and female respondents. Conclusion: This study has proven the three-factor structure of the Japanese version of father and mother IPPAs. The attachment security level varied depending on the combination of parent and child gender. The parent attachment was found to have a crucial role in Japanese male and female young adults' mental health.

Keywords

Parent Attachment, Internal Working Model, Past Parenting, Later Mental Health

1. Introduction

The attachment theory proposed by Bowlby (1969) regards attachment, originally developed between an infant and primary attachment figure, as being embedded in the innate behavioral system. In it, Bowlby opposes the secondary drive theory that attachment is developed simply by feeding. Within a few months, an infant sends signals to surrounding people indiscriminately by smiling, cooing, and reaching his/her hand towards them. The primary attachment figure, usually the mother, reacts to the signal with sensitivity. As he/she grows, the infant comes to distinguish his/her mother from other people, and develops an attachment with the mother (Bowlby, 1969). Through continuous reciprocal interaction, the attachment behavioral system becomes more complicated. Simultaneously, the infant comes to show anxiety or cautiousness towards strangers. The relationship with the primary attachment figure has an effect on that with the second attachment figure, such as father, grandmother, and above all, the relationship with his/her later attachment figure, not to mention mental health into adulthood (Bowlby, 1951).

Through interaction with the attachment figure, an infant develops internal working models of himself/herself and the attachment figure, regarding how he/she reacts in critical situations or under distresses and how the attachment figure reacts to his/her needs. These two models are distinct, but they interact with each other (Bowlby, 1973). Needless to say, if an individual's working model of himself/herself is that he/she is worth being responded to by his/her at-

tachment figure, while at the same time, his/her working model of the attachment figure is available and responsive to his/her needs, his/her attachment is a secure one. If one or both of the working models are unreliable, his/her attachment can be considered as insecure.

Ainsworth, Blehar, Waters, & Wall (1978) applying the Strange Situation Procedure they developed, observed an infant's attitudes and behaviors when separated from the mother and met her again. Based on their observation, they classified attachment styles as Secure, Ambivalent, and Avoidant (the latter two being insecure).

Since Hazan & Shaver (1987) applied attachment theory to romantic love processes, there have been several scales to assess adult attachment along with a growing number of studies regarding adult attachment. In developing inventories, some researchers used the theoretical framework of Bowlby's internal working models of attachment figure and self, mentioned above. More specifically, they categorized attachment styles into four types with two axes of working models of self and attachment figure. For example, Bartholomew & Horowitz (1991) developed the Relational Questionnaire (RQ) which classifies respondents into four attachment styles: Secure (positive working models of self and attachment figure), Dismissing (positive working model of self and negative working model of attachment figure), Preoccupied (negative working model of self and positive working model of attachment figure), and Fearful (negative working models of self and attachment figure). The RQ does not specify an attachment figure, and instructs respondents to assess themselves as to which attachment type is most applicable in their general interpersonal relationships. There is one issue to be resolved regarding RQ, i.e., the main attachment figure changes depending on an individual's development stage, e.g., the mother for an infant, peers for an adolescent, and the romantic partner for a young adult. As explained previously, the relationship with a primary attachment figure influences that with subsequent attachment figures. Meanwhile, the internal working model of each subsequent attachment figure is also influenced by its unique characteristics. Thus, it is necessary to clarify who is the object of assessment as an attachment figure. Furthermore, it is desirable to assess the attachment style for each figure, that is, not only the primary, but also subsequent attachment figures.

The Experiences in Close Relationships-Relationship Structures Questionnaire (ECR-RS (Fraley, Heffernan, Vicary, & Brumbaugh, 2011)) is a revision of the Experiences in Close Relationship-Revised (ECR-R (Fraley, Waller, & Brennan, 2000)), which was developed by revising the Experience in Close Relationship (ECR (Brennan, Clark, & Shaver, 1998)). The ECR and the ECR-R included many items which ask about the romantic partner or the spouse. It was difficult to apply the questionnaires to assess other relationships, such as parents, siblings, or peers. The ECR-RS adopts an evaluation style where respondents evaluate their attachment style with the father, the mother, the romantic partner, and a friend, respectively. It has a two-factor structure. The first factor "Avoid-

ance" corresponds to the negative working model of the attachment figure, and the second factor "Anxiety" corresponds to the negative working model of self.

The Inventory of Parent and Peer Attachment (IPPA), another well-known scale to assess attachment security, adopted the manner by which youths or adolescents evaluate their attachment to parents and peers. Pace, San Martini, & Zavattini (2011) concisely summarized how the original version of IPPA developed into its current state. According to their review, the original version of IPPA for assessing attachment to parents included 28 items and the inventory for assessing attachment to peers included 25 items (Greenberg, Siegel, & Leitch, 1984). Based on the hypothesis that the inventory for assessing attachment security consists of more than one factor, the revised version of IPPA was developed by increasing the number of items. The first revised version of IPPA had a three-factor structure (Trust, Communication, Alienation) (Armsden & Greenberg, 1987), which was succeeded by the final version (Armsden & Greenberg, 1989), i.e., the version revised twice from the original version. Unlike the first two versions, the final version of IPPA, consisting of 25 items for each parent and peers, assesses attachment to father and mother, respectively. Each subscale includes items such as, "My father respects my feelings" for Trust, "I like to get my mother's point of view on things I'm concerned about" for Communication, and "Talking over my problems with friends makes me feel ashamed or foolish" for Alienation.

The scope of both attachment figures and respondents to which the IPPA is applicable has been expanded. Some studies have proven the validity of inventory use for siblings as attachment figures (Noel, Francis, & Tilley, 2018; Parrello, Sommantico, & De Rosa, 2021). As for the expanded application of respondents, the inventory was verified to be applicable to children (Gullone & Robinson, 2005). However, the IPPA still has its strength in targeting adolescents or young adults. Specifically, according to Blos (1967), adolescents are in the *second individuation process* where they have to revise their relationships with their parents in order to become emotionally independent from them. Peers are those who help adolescents support this process by taking the roles of the adolescents' family, and sharing feelings of guilt pursuant to the emancipation of childhood dependencies. Therefore, for adolescents and probably for young adults as well, favorable attachment to both parents and peers are respectively crucial for emotional development. Thus, in this study, which targets Japanese college students, we applied this final version of IPPA, because it was developed aiming at assessing attachment of parents and peers respectively.

The IPPA, originally developed in English, has been translated into various languages (Choon, Hasbullah, Ahmad, & Ling, 2013; Gallarin & Alonso-Arbiol, 2013; Kocayörük, 2010; Munir, Malik, & Abbas, 2020; Pace et al., 2011). As mentioned above, the final version of IPPA has a three-factor structure, for which there seems to be a consensus among several cultures, although there have been only a few studies conducting confirmatory factor analyses (CFAs) (Guarnieri, Ponti, & Tani, 2010). The previously referred study conducted by Parrello et al.

(2021) verified the three-factor structure of the sibling version of IPPA. Meanwhile, there also have been studies supporting a one-factor structure (Gallarin & Alonso-Arbiol, 2013), and a two-factor structure (Munir et al., 2020). Furthermore, there is a study which demonstrated the validity of a three-factor structure with a reduction of the number of items from the final version of IPPA by conducting CFA (Kocayörük, 2010). In Japan, the IPPA, translated by Takagi (1994), has been used in a variety of studies. However, its factor structure has not been verified by CFAs. Therefore, first aim of this study is to prove with CFAs that the Japanese version of IPPA has a three-factor structure. In cases where the three-factor structure is not valid, we will explore the most desirable factor structure.

One of the key elements inherent in attachment might be the gender of the subject and that of the object of attachment. With regard to the subject's gender, Pace et al. (2011) showed that Italian male adolescents were more likely than the female adolescents to show low paternal Alienation. They argued that male adolescents have less conflict with their fathers concerning independence and autonomy than female adolescents. Gullone & Robinson (2005) mentioned that boys were more likely than girls to mark high scores on the parental IPPA, whereas they were less likely than girls to mark a low score on the peer IPPA. On the other hand, Tambelli, Laghi, Odorisio, & Notari (2012) noted that female adolescents were more likely than male adolescents to show a high parental attachment level. Safdar & Zahrah (2016) also mentioned that, compared to boys, girls tended to mark higher parental attachment scores, and lower peer attachment scores.

Concerning the object's gender, Delvecchio et al. (2020) wrote that mothers were the preferred attachment figure to fathers for both boys and girls. They also noted that there was no difference between boys and girls in both paternal and maternal attachment levels. The drawback in their statistical analysis is that they did not conduct 2 (gender of the parent) × 2 (gender of the respondent) analyses of variance (ANOVAs). This study therefore aims to clarify whether or not the final version of IPPA subscale score is different between the respondent's gender as well as between the parent's gender by conducting ANOVAs.

In order to develop a hypothesis regarding the impacts of attachment subject gender and attachment object gender among Japanese youth, a few studies targeting these youth need to be referred to. Uji (2022) examined how the gender of a child (a respondent) and a parent influenced parenting style in Japanese culture by using parental empathetic autonomy support as an index, concluding that male respondents were more likely than female respondents to evaluate their father as being more supportive in aspects of Respecting Autonomy and Involvement. On the other hand, female respondents were more likely than male respondents to evaluate their mother as being more supportive in Involvement and Unconditional Love. As for the effect of parent gender, mothers were evaluated as more supportive in Academic Assistance by both male and female respondents.

Uji, Sakamoto, Adachi, & Kitamura (2014) using the Parental Authority Questionnaire (PAQ (Buri, 1991)) as an index of parenting style, reported that male respondents were more likely than female respondents to have received Authoritarian parenting by both their father and mother. Regarding the gender of the parent, mothers were more likely to be evaluated as Authoritative by both male and female respondents.

The results obtained from these two studies concerning parent gender might mean the fact that mothers are expected to be more involved in raising their children than fathers. This leads us to hypothesize that both male and female adolescents and young adults in Japan would respond that they are more attached to their mothers than fathers. On the other hand, it can be assumed that the impacts of child gender on parental attachment is more complicated in that child gender does not have an independent impact on parental attachment, but rather its combination with the parent gender determines the intensity of attachment. In order to see this effect, 2 (gender of a parent) × 2 (gender of a child) ANOVAs are inevitable.

Other crucial factors associated with attachment are perceived parenting in the past and mental health. Indeed, previous studies on attachment can be classified into two categories based on the purposes of each study: 1) Relationship between past parenting and attachment; 2) Relationship between attachment and later mental health.

Concerning the relationship between past parenting and attachment, Raby et al. (2017), using Adult Attachment Interviews (AAIs) to assess attachment style, reported that child abuse and neglect were related to preoccupied (but not Dismissing) attachment style. Gullone & Robinson (2005) targeting Australian children and adolescents, showed a positive correlation between Care assessed by Parental Bonding Instrument (PBI) and attachment assessed by the final version of IPPA, as well as a negative correlation between Overprotection assessed by the PBI and attachment. Safdar & Zahrah (2016) applying the final version of IPPA, demonstrated that Authoritative Parenting assessed by the PAQ (Urdu version) significantly intensified both parental and peer attachment, whereas Authoritarian Parenting and Permissive Parenting significantly damaged both of these kinds of attachment.

Meanwhile, there have been a variety of studies examining the causal relationship between attachment and later mental health. Most of these studies applied the final version of IPPA for assessing attachment. Cortés-García, Viddal, Wichstrøm, & Senra (2022) showed that insecure maternal attachment tended to develop eating disorder via depression, while paternal attachment did not have significant influence. Chen et al. (2021) demonstrated that maternal insecure attachment increased Chinese adolescent anxiety level, whereas social support from teachers and peers alleviated this impact. Tambelli et al. (2012), targeting adolescents aged 11 to 19, examined whether or not parental and/or peer attachment influence either internalizing problems or externalizing problems. They concluded that parental Alienation and peer Trust both impacted interna-

lizing problems in expected directions but only parental attachment impacted externalizing problems. Choon et al. (2013) applying the final version of IPPA to Malaysian adolescents, showed negative relationships between adolescent delinquency and paternal/maternal attachment levels. Li et al. (2022) concluded that paternal attachment was found to have a significantly alleviating effect on adolescent anxiety level. Wilkinson (2004) demonstrated that adolescents' parental attachment decreased their depression level by way of self-esteem. Teng et al. (2020), targeting Chinese undergraduate students, showed that both paternal and maternal attachment levels had significant negative correlations with internet game disorder at a particular point, although the attachment levels did not predict the development of internet game disorder. Laible, Carlo, & Roesch (2004) concluded that parental attachment had direct impacts on both male and female college students' self-esteem, whereas peer attachment had indirect impacts on the female students' self-esteem. Irfan & Zulkefly (2020) wrote that among Pakistani college students, maternal and peer attachment had significant negative correlations with depression, anxiety, and automatic thought. Delvecchio et al. (2020) reported significant correlations between paternal/maternal attachment levels and self-esteem among Polish adolescents. Moyano, Vélez, Arias, & Sánchez-Fuentes (2022), analyzing the data obtained from Ecuadorian adolescents by structural equation modelling (SEM), demonstrated both direct and indirect (via impulsivity) pathways from mother Alienation, father Trust, and peers Alienation to depression, which in turn had an effect on suicide intention.

Unlike the above studies, Kefelia, Turow, Yıldırım, & Boysanc (2018) adopted ECR for assessing attachment. They mentioned that bipolar disorder patients were more likely than control group individuals to show attachment insecurity. As can be seen in these studies, regardless of the choice of inventories to assess attachment, the effects of parental and peer attachment on mental health have been proven.

There also have been lots of studies which examined the impacts of past parenting on later mental health. Among them, some studies demonstrated the mediating role of attachment between them, i.e., they have proven that past parenting had impacts on later mental health by way of attachment. For example, Jiang et al. (2022) showed mediating roles of attachment between child maltreatment and depressive symptoms, by applying ECR for assessing attachment. Ihme et al. (2022) mentioned that childhood traumatic experiences other than neglect developed attempted suicide via avoidant attachment. Sabaß et al. (2022) demonstrated that regardless of whether or not depression existed, child maltreatment increased feelings of loneliness by way of avoidant attachment. Gajos, Miller, Leban, & Cropsey (2022) demonstrated that adverse childhood experiences had increasing effects on the symptoms of depression and anxiety among female adolescents, and these effects were alleviated by protective factors including parental attachment. Thus, the third aim of this study is to examine whether or not attachment has this mediating role between past parenting and

later mental health when targeting Japanese youth, for each gender separately.

This study will apply the PAQ previously refereed to, to assess parenting perceived by Japanese youth. In order to minimize the respondents' burden, only Authoritarian subscale from the PAQ was chosen. Uji et al. (2014) already explored the impacts of three parenting styles (Authoritative, Authoritarian, Permissive) assessed by the Japanese version of PAQ on an individual's later mental health, concluding that Authoritative parenting had beneficial effects while Authoritarian parenting had detrimental effects. This study aims at examining whether or not an attachment security mediates the causal relationship between Authoritarian parenting and the child's later mental health, more specifically, verifying the hypothesis that Authoritarian parenting harms the development of secure attachment, which in turn damages the child's later mental health. The hypothesis is shown in **Figure 1**.

Figure 1 is a hypothesis path model which will be analyzed using SEM. The variables shown in rectangles are observed variables and those shown in ellipses are latent variables. If the CFA results of the final Japanese version of IPPAs reveal that the IPPAs have a factor structure other than the three-factor structure, SEM will be conducted along with the number of factors identified by the CFA. The Clinical Outcomes in Routine Evaluation-Outcome Measure (CORE-OM (Evans et al., 2000, 2002)) was developed as a standardized brief outcome measure for use in both routine clinical training and psychotherapy research. It consists of 34 items, with each item being used to assess one of four subscales: symptomatic problems, life functioning, psychological well-being, and risk to self and others. It applies the manner to assess a respondent's mental health over the past month comprehensively. The reliability and validity of the Japanese version of the CORE-OM were confirmed by Uji, Sakamoto, Adachi, & Kitamura (2012). In this study, the total score of the four subscales was used as observed variables.

For two reasons, the co-variance between Father Authoritarian and Mother Authoritarian were hypothesized. The first reason is that the concepts and approaches to child rearing are usually shared between a child's father and mother. The second one is that PAQ applies the evaluation style in which a child evaluates his/her father's and mother's parenting styles. Therefore, it is assumed that the child's cognitive characteristics equally influence how the child evaluates his/her father's and mother's parenting styles. The reason for hypothesizing the co-variance between Father IPPA and Mother IPPA is that attachment with any significant others can be affected by each individual's internal working models as explained earlier, i.e., both father and mother attachment are developed by being influenced by an individual's internal working models to some degree.

To summarize, this study aims at:

1) Examining the validity of three-factor structures of both father and mother IPPAs by CFAs;

2) Clarifying the effects of gender of both respondents (children) and their parents on attachment level;

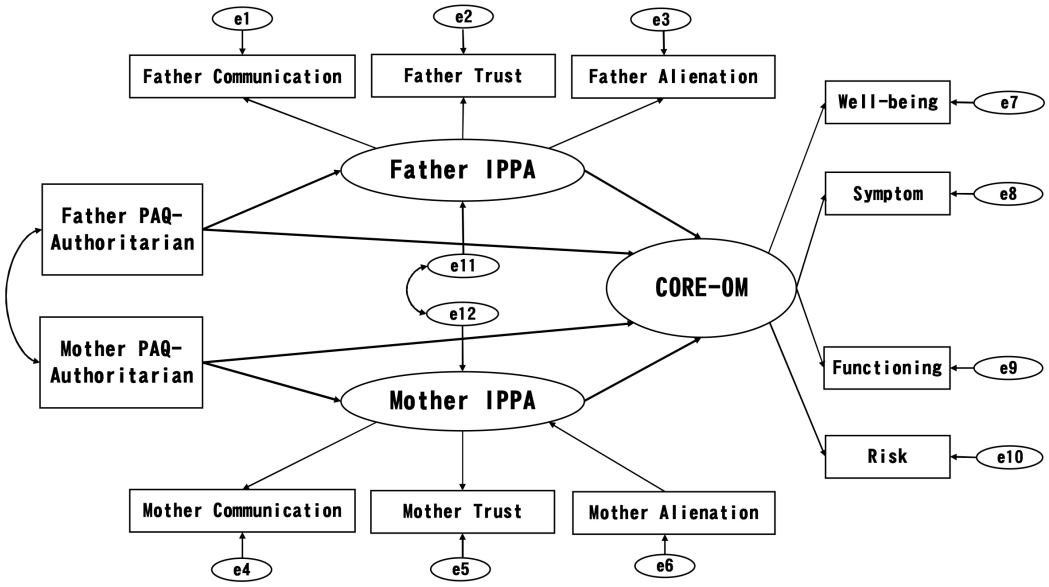

Figure 1. Hypothesis model of direct and indirect (mediated by parent attachment) effects of Authoritarian parenting on current mental health.

3) Demonstrating that both paternal and maternal attachment mediate past perceived parenting and current mental health reported by Japanese college students, for male and female respondents, respectively.

2. Methods

2.1. Procedures

Japanese college freshmen were chosen to participate in two questionnaire surveys. The first questionnaire included PAQ-Authoritarian and IPPAs, and the second included CORE-OM. The interval between the first and second questionnaires was five months. The institutional review board approved the study protocol. Anonymity and voluntary participation were guaranteed.

2.2. Participants

The number of students who agreed to participate in both the first and second questionnaires, was 792 (male: 315, female: 477) with the mean age (SD) of 19.9 (4.6). Among them, 445 answered every item in the PAQ-Authoritarian, the final Japanese version of IPPA, and the CORE-OM. The mean age (SD) was 20.0 (4.9). Missing data were analyzed, proving missing completely at random (MCAR). Therefore, we used the data obtained by the 445 students' responses.

2.3. Scales

PAQ: The PAQ was developed by Buri (1991) and translated into Japanese by Uji et al. (2014), who confirmed its reliability and validity. It has a three-factor structure (Authoritative, Authoritarian, Permissive) with each subscale consisting of ten items. As noted previously, in this study, only the Authoritarian pa-

renting subscale was included in order to reduce the respondents' burden. Each participant was instructed to choose the number of the answer that best applied to his/her father/mother, 4 being the most and 0 being the least applicable. The higher the score is, the more authoritarian the parenting is. Authoritarian parenting refers to a parenting style where parents attempt to control their children based on absolute standard without reciprocal communication.

Japanese version of IPPA: As referred earlier, the final version of IPPA, which had been revised twice from its original version, was developed by Armsden & Greenberg (1989). In this study the final version of IPPA was applied. Hereon, IPPA means the final version of IPPA, and Japanese version of IPPA means the final version of IPPA which was translated into Japanese. It applies the manner in which a respondent evaluates his/her attachment security towards his/her father, mother, and peers, respectively. In this study, we chose only father and mother IPPAs as the target of analyses.

CORE-OM (Evans et al., 2000, 2002): As explained earlier, CORE-OM was adopted to assess the participants' current mental health. It is a 34-item questionnaire, including symptomatic problems, life functioning, psychological well-being, and risk to self and others. Each participant was instructed to choose the number of the answer that best applied to him/her, 5 being the most and 1 being the least applicable. The higher score indicates more seriously impaired mental health.

2.4. Statistical Analyses

CFA was to be conducted for the Japanese version of IPPAs to evaluate whether the three-factor model proposed by Armsden & Greenberg (1987) would show either desirable or acceptable levels of fitness. If the fitness levels turned out to be either undesirable or unacceptable, other models which better fit the data would need to be explored. The Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA) would be used to evaluate compatibility. According to conventional criteria, a good fit would be indicated by CFI > .95, and RMSEA < .050, and an acceptable fit by CFI > .90, and RMSEA < .080. We also would use the Akaike Information Criterion (AIC), in which lower AIC has been judged as preferable. The best fit model would then be analyzed simultaneously between genders in order to verify the configural, metric, and scalar invariances. SPSS version 29.0 and Amos version 29.0 would be used for CFA.

Three 2 (gender of a parent) × 2 (gender of a respondent) ANOVAs would be conducted for each of Trust, Communication, and Alienation to examine the impacts of parent and child (respondent) gender on the intensity of attachment. Parent gender would be treated as the within-subject factor, and child (respondent) gender as the between-subject factor.

Furthermore, SEM would be conducted to evaluate the hypothesis model shown in **Figure 1** using the CFI, RMSEA, and AIC referred to above.

3. Results

3.1. Factor Structures of Father and Mother IPPAs

We conducted CFAs for the Japanese versions of father and mother IPPAs, each consisting of 25 items, to examine whether or not the three-factor model originally proposed by Armsden & Greenberg (1987) is compatible with our data at either favorable or acceptable levels.

Before conducting CFAs for father and mother IPPAs, we conducted CFAs for each subscale (Trust, Communication, Alienation) to confirm that every subscale has a one-factor structure. The one-factor model for every subscale was proven (**Table 1**). The only problem was that item 14 (My father/mother has his/her own problems, so I don't bother him/her with mine) included in Communication had extremely low factor loading on the factor, in both father and mother IPPAs. (Standardized factor loading was −.02 in both father and mother Communication.) When the factor loading of item 14 on Communication was hypothesized as 0, the compatibility improved in both father and mother IPPAs (**Table 1**).

Taking into account the probability of excluding item 14 from Communication, we conducted CFAs to see whether the 25-item IPPAs have a three-factor structure. The result was acceptable compatibility (**Table 2**). However, here again, the factor loading of item 14 on Communication was extremely low, where standardized factor loading was −.02 in father IPPA, and −.01 in mother IPPA. Therefore, based on this result, we hypothesized the factor loading of item 14 on Communication as 0, resulting in improvement of compatibility in both father and mother IPPAs (**Table 2**). As such, we concluded that the Japanese version of father and mother IPPAs, each consisting of 24 items, have a three-factor structure. The fitness levels of the 24-item IPPAs were as follows: CFI: .94, and RMSEA: .054 for father, and CFI: .95, and RMSEA: .053 for mother, respectively (**Table 2**). For both father and mother IPPAs, the configural, metric, and scalar invariances between genders were also confirmed by simultaneous analysis of multi-groups (**Table 2**).

Table 1. Fitness level of each IPPA subscale one-factor structure.

		Number of items	CFI	RMSEA	AIC
Father IPPA subscale	Trust	10	.97	.069	187.6
	Communication	9	.98	.049	111.4
		8 (item 14 excluded)	.98	.048	109.7
	Alienation	6	.98	.064	58.9
Mother IPPA subscale	Trust	10	.98	.057	150.0
	Communication	9	.95	.078	189.7
		8 (item 14 excluded)	.95	.075	188.1
	Alienation	6	1.00	.037	42.4

Table 2. Fitness levels of IPPA three-factor structure models.

	CFI	RMSEA	AIC
Fitness levels of father IPPA three-factor structure models			
Three-factor model (25 items)	.94	.054	935.3
Three-factor model (24 items)	.94	.054	933.6
Configural, metric, and measurement invariances of the 24-item three-factor model: male respondents 289 female respondents 460			
Configural	.93	.045	1517.9
Metric	.93	.044	1506.8
Scalar	.92	.044	1532.8
Fitness levels of mother IPPA three-factor structure models			
Three-factor model (25 items)	.95	.053	940.0
Three-factor model (24 items)	.95	.053	938.0
Configural, metric, and measurement invariances of the 24-item three-factor model: male respondents: 308, female respondents 483			
Configural	.94	.042	1454.6
Metric	.94	.041	1449.7
Scalar	.94	.043	1506.6

3.2. Internal Consistency and Correlations between Corresponding Father and Mother IPPA Subscale Scores

Every item finally selected in our three-factor model is shown in **Table 3**. Not only correlations between each item score and its subscale score (**Table 3**) but also Cronbach's alpha (**Table 4**) indicated favorable internal consistency. All correlations between corresponding father and mother subscale scores were statistically significant (**Table 4**).

3.3. Relationship of Attachment Stability to Past Parenting and Current Mental Health

The relationships of each IPPA subscale score to PAQ-Authoritarian score and to CORE-OM are shown in **Table 5**. Both father and mother IPPA-Trust and IPPA-Communication had negative correlations with PAQ-Authoritarian and CORE-OM scores. On the other hand, both father and mother IPPA-Alienation had positive correlations with PAQ-Authoritarian and CORE-OM scores.

3.4. Effect of Combination of Child (Respondent) and Parent Gender on IPPA Subscale Score

The results of 2 (gender of a parent) × 2 (gender of a respondent) ANOVAs are shown in **Table 6**. As for Trust, interaction effects were not significant. There were no differences between male and female respondents in evaluating their

Table 3. Correlation between each item and total subscale scores.

	Items	Correlation between each item and total subscale scores (father/mother)
	Trust	
01	My father/mother respects my feelings.	.78**/.80**
02	I feel my father/mother does a good job as my mother.	.71**/.66**
03R	I wish I had a different father/mother.	.66**/.68**
04	My father/mother accepts me as I am.	.76**/.80**
09R	My father/mother expects too much from me.	.32**/.44**
12	When we discuss things, my father/mother cares about my point of view.	.64**/.67**
13	My father/mother trusts my judgment.	.79**/.79**
20	My father/mother understands me.	.83**/.84**
21	When I am angry about something, my father/mother tries to be understanding.	.69**/.75**
22	I trust my father/mother.	.82**/.81**
	Communication	
05	I like to get my father's/mother's point of view on things I'm concerned about.	.51**/.55**
06R	I feel it's no use letting my feelings show around my father/mother.	.59**/.59**
07	My father/mother can tell when I'm upset about something.	.79**/.72**
15	My father/mother helps me understand myself better.	.76**/.72**
16	I tell my father/mother about my problems and troubles.	.77**/.78**
19	My father/mother helps me talk about my difficulties.	.80**/.83**
24	I can count on my father/mother when I need to get something off my chest.	.78**/.78**
25	If my father/mother knows something is bothering me, she asks me about it.	.77**/.81**
	Alienation	
08	Talking over my problems with my father/mother makes me feel ashamed or foolish.	.58**/.60**
10	I get upset easily around my father/mother.	.80**/.80**
11	I get upset a lot more than my father/mother knows about.	.81**/.81**
17	I feel angry with my father/mother.	.67**/.66**
18	I don't get much attention from my father/mother.	.56**/.60**
23	My father/mother doesn't understand what I'm going through these days.	.53**/.56**

Notes: "Item number" refers to that in the original version developed by Armsden & Greenberg (1987). "R" stands for reverse, as in IPPA 03R, IPPA 06R, and IPPA 09R. ** $p < .01$.

Table 4. Cronbach's coefficient alpha and correlations between corresponding father and mother IPPA subscale scores.

IPPA subscale	Cronbach's coefficient alpha (father/mother)	Correlation between corresponding father and mother IPPA subscale scores
Trust	.88/.89	.37**
Communication	.87/.87	.22**
Alienation	.74/.76	.46**

** $p < .01$.

Table 5. Correlations of IPPA subscale scores with PAQ-Authoritarian score and CORE-OM.

IPPA subscale	Father Authoritarian-PAQ	CORE-OM
Trust (father)	−.45**	−.33**
Communication (father)	−.25**	−.28**
Alienation (father)	.49**	.32**
	Mother Authoritarian-PAQ	CORE-OM
Trust (mother)	−.44**	−.32**
Communication (mother)	−.29**	−.20**
Alienation (mother)	.50**	.31**

Table 6. ANOVAs regarding child (respondent) and parent gender on IPPA subscale score.

IPPA subscale	respondent gender	N	mean (SD)	parent gender effect (F value)	respondent gender effect (F value)	Interaction effect (F value)
Trust (father)	Male	270	27.1 (7.9)	75.29***	.41	3.17
	female	441	26.8 (8.3)			
	total	711	26.9 (8.1)			
Trust (mother)	male	270	29.4 (7.3)			
	female	441	30.4 (7.6)			
	total	711	30.0 (7.5)			
Communication (item 14 excluded) (father)	male	270	16.1 (6.6)	Simple main effect within male respondent: 65.38***	Simple main effect within father: 10.28**	34.11***
	female	441	14.4 (6.9)			
	total	711	15.1 (6.9)			
Communication (item14 excluded) (mother)	male	270	19.7 (6.3)	Simple main effect within female respondent: 392.49***	Simple main effect within mother: 9.70**	
	female	441	21.4 (7.0)			
	total	711	20.8 (6.8)			
Alienation (father)	male	270	8.6 (4.4)	Simple main effect within male respondent: 6.27*	Simple main effect within father: .26	9.44**
	female	441	8.7 (4.8)			
	total	711	8.7 (4.6)			
Alienation (mother)	male	270	9.4 (4.8)	Simple main effect within female respondent: 3.19	Simple main effect within mother: 6.71*	
	female	441	8.4 (5.1)			
	total	711	8.8 (5.0)			

fathers and mothers. Only parent gender had significant effects on both male and female respondents, i.e., mothers were equally more likely than fathers to be scored higher. Likewise, mothers were more likely than fathers to be scored higher for Communication among both male and female respondents. Unlike Trust, interaction effects were significant in Communication. As for father Communication, male respondents were more likely than female respondents to score higher. On the other hand, female respondents were more likely than male respondents to score higher in mother Communication. Alienation also showed interaction effects. Mothers were more likely than fathers to be scored higher by male respondents, and male respondents were more likely than female respondents to score higher in mother Alienation.

3.5. Pathway from Direct and Indirect Authoritarian Parenting to CORE-OM

The results of the hypothesis path model described in Figure 1 are shown in Figure 2 for male respondents, and Figure 3 for female respondents. Among male respondents, both direct and indirect pathways (via each parent IPPA) from each parent PAQ-Authoritarian to CORE-OM were identified, with acceptable compatibility level (CFI = .96, RMSEA = .080). Two indirect pathways were, one from father Authoritarian parenting to CORE-OM by way of Father IPPA, and the other from mother Authoritarian parenting to CORE-OM by way of Mother IPPA (Figure 2). Father/Mother Authoritarian parenting decreased the father/mother attachment security, which had a role of decreasing mental health problems represented by CORE-OM, i.e., the more authoritarian the father/mother parenting, the worse the male respondent mental health level.

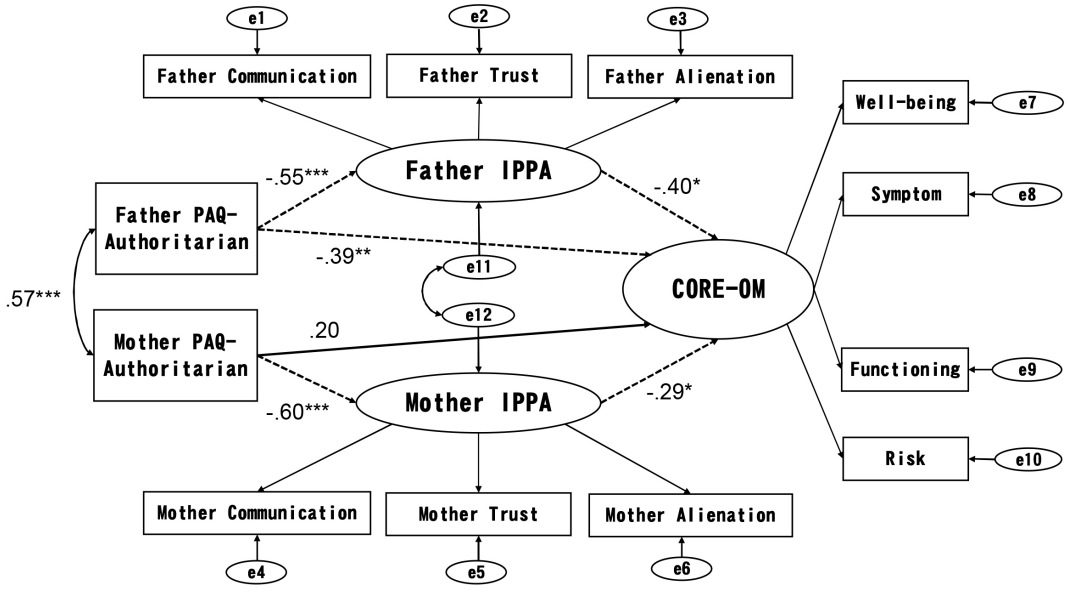

Figure 2. SEM result of male respondents. (Numerical values of co-variances and causal coefficients are standardized. Solid lines indicate positive values of causal coefficients, dashed lines indicate negative values of causal coefficients.) *$p < .05$, ** $p < .01$, *** $p < .001$.

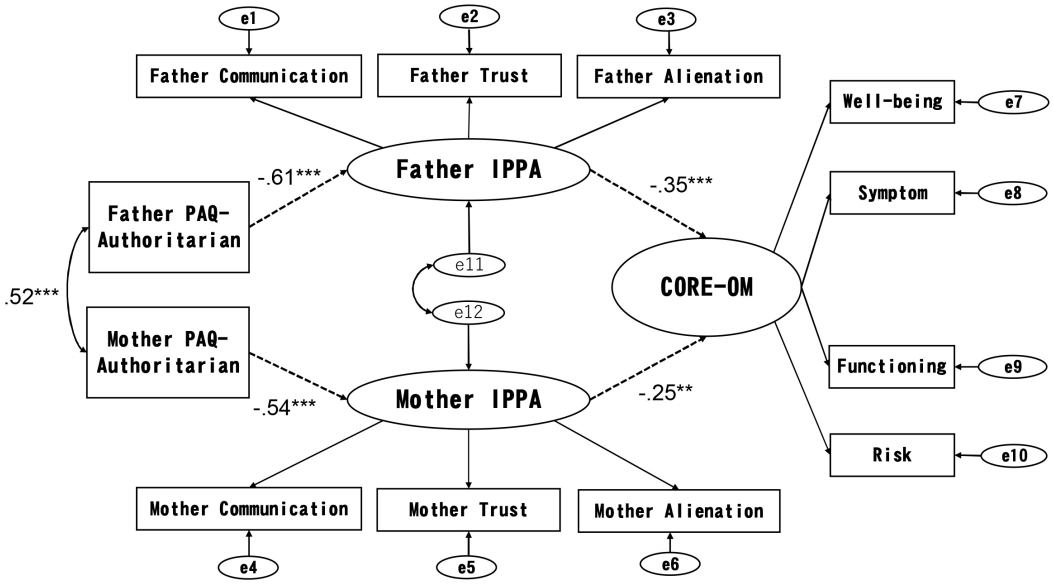

Figure 3. SEM result of female respondents. (Numerical values of co-variances and causal coefficients are standardized. Solid lines indicate positive values of causal coefficients, dashed lines indicate negative values of causal coefficients.) ** $p < .01$, *** $p < .001$.

On the other hand, among female respondents, the model, which hypothesized direct pathways from both parent PAQ-Authoritarian to CORE-OM to be 0, showed the best compatibility level (CFI = .98 RMSEA = .054) (**Figure 3**). That is to say, only the indirect pathways from each parent PAQ-Authoritarian to CORE-OM (via each parent IPPA) were existent. As seen among male respondents, Father/Mother Authoritarian parenting decreased the father/mother attachment security, which had a role of decreasing mental health problems represented by CORE-OM, i.e., the more authoritarian the father/mother parenting, the worse the female respondent mental health level was. Thus, among both male and female respondents, both Father and Mother IPPAs were found to mediate the relationship between Father and Mother Authoritarian parenting, and CORE-OM.

4. Discussion

We would like to discuss the above results with a focus on the factor structures of IPPAs, the effects of both subject (child) and object (parent) gender on an attachment security level, and the mediating roles of parental attachment between past parenting and current mental health, in order.

First, CFAs for the Japanese version of father and mother IPPAs showed acceptable fitness levels for the three-factor structure, when deleting only one item from Communication. The deleted item was a reversely scored item: "My father/mother has his/her own problems, so I don't bother him/her with mine." This item contains a nuance of not only insufficient communication, but also that of the respondents' consideration towards their father/mother. The respondents of the current study were late adolescents or young adults, who were as-

sumed to have already reconstructed their relationships with parents: i.e., being able to see their parents as they are and to recognize the parents' limitations. It is probable that they had already established equal and reciprocal relationships with the parents (Blos, 1967). If the participants had been children or early adolescents who still idealized their parents, this item sentence would have been perceived in different ways, more specifically, when their needs for idealized parents were unmet, they would interpret the content of this item sentence as psychological defense in order to alleviate their psychological pain. That is to say, for children before mid-adolescence, it would not have been necessary to delete this item because the item would have functioned as one of the reverse items of Communication. Despite the exclusion of one item from the original IPPA, it is noteworthy that the Japanese version of parent IPPA consists of the three factors originally proposed by Armsden & Greenberg (1987).

Secondly, the impacts of parent-child gender combination on attachment stability should be argued. In accordance with the hypothesis, mothers were more likely than fathers to be scored higher on Trust and Communication by both male and female respondents, probably due to social expectations on mothers for spending more time and more effort in child-rearing than fathers. Also of particular importance was that regarding Communication, male respondents were more likely than female respondents to give high scores to their fathers, and conversely female respondents were more likely than male respondents to give high scores to their mothers. Regarding Alienation, mothers were more likely than fathers to be scored higher by male respondents. Also, male respondents were more likely than female respondents to give high scores to their mothers on Alienation. These results indicate that female respondents were stably attached to their mothers. On the other hand, male respondent attachment to their mother was relatively complicated, i.e., they seemed to be attached to their mother in terms of Trust and Communication, but in terms of Alienation, they were actually more securely attached to their father. This insecurity attachment to their mother in Alienation was assumed to be compensated by low father Alienation. This might mean that father attachment has a more important role for male youth than female youth, when considering their ambivalent relationship towards their mother.

Thirdly, indirect pathways from the past father/mother authoritarian parenting style to current mental health via father/mother attachment were verified among both male and female respondents. In particular, among female respondents, only the indirect pathways were evident. This meant that past parenting per se was not the paramount key factor, but parent attachment based on the internal working models developed by the parenting is a crucial factor in determining female respondent mental health.

Finally, the limitations of this study should be mentioned. First, the evaluation of parenting which an individual received in the past and/or attachment security level are usually affected by current mental health and interpersonal relationships with surrounding people, i.e., the recall bias problem. It should also be

noted that perceived parenting is influenced by an individual personality, including attachment style. These issues suggest that causalities in the hypothesis drawn in Figure 1 are not necessarily one-way, but bidirectional. Nevertheless, the participants of this study were average college students, not a clinical population. Although it cannot be negated that among the students were some who visited a psychiatrist, most of them had adapted to society, which meant that they were not severely mentally ill. So their evaluation of parent attachment as well as past parenting were not deviated. In keeping with this assumption, it is valuable to have found that both male and female respondents' parenting they received contributed to their father and mother attachment security level, which in turn influenced their current mental health.

5. Conclusion

This study confirmed that the Japanese version of parent IPPA has a three-factor structure. In addition, the combination of parent- and child-gender was also found to be important in determining father and mother attachment assessed by the IPPA. Parent attachment was found to play a crucial role of mediating between past parenting and current mental health both among male and female respondents, in other words, parent attachment security was damaged by father/mother Authoritarian parenting, leading to impaired mental health.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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