

# Factorial Structure of the Parental Bonding Instrument (PBI) in Japan: A Study of Cultural, Developmental, and Gender Influences

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**Abstract** This study explored the factorial structure of the Parental Bonding Instrument (PBI) in the Japanese population. Several differences between the structure model in the current study and Parker et al.'s original model were identified. We also examined the adaptability of the inventory to children currently being raised by parents. We also developed a structural equation model that takes into account the impacts of the respondents' generation and gender and the caregivers' gender. The cultural, developmental, generational, and gender influences on the factorial structure of the PBI as well as the implications for clinical settings were discussed.

**Keywords** Confirmatory factor analysis · Parental Bonding Instrument · Japanese culture · Generation · Gender

## Abbreviations

Fgf	Fathers' perception about how they had been raised by their own fathers
Fgm	Fathers' perception about how they had been raised by their own mothers
Mgf	Mothers' perception about how they had been raised by their own fathers
Mgm	Mothers' perception about how they had been raised by their own mothers
CmaleF	Boys' perception about how they were being raised by their fathers
CmaleM	Boys' perception about how they were being raised by their mothers

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CfemaleF Girls' perception about how they were being raised by their fathers  
CfemaleM Girls' perception about how they were being raised by their mothers

## Introduction

The manner in which individuals are raised by their parents influences personality development and the potential for the onset of mental disorders in adulthood. Thus, the development of psychometrically sound measures of parenting is an important issue. In a review and analysis of the literature assessing parental attitudes and parent–child relationships, Parker et al. speculates that ‘care’ and ‘overprotection’ were the two main domains of child rearing. This study prompted the development of the Parental Bonding Instrument (PBI) [1].

The PBI elicits memory-based answers to questions about the manners in which respondents were raised during the first 16 years of life. It contains 25 items that address each parent separately producing a two-dimensional measure of perceived parental behaviours. These behaviours are plotted with “care” vs. “indifference/rejection” on one axis and “overprotection” vs. “allowance of autonomy/independence” on the other. Of the 25 total items, 12 evaluate the first dimension (care), while 13 evaluate the second (overprotection).

Since its development, the PBI has been used to assess relationships between the type of parenting received and mental disorders such as depression [2–12], borderline personality disorder [13, 14], and schizophrenia [13, 15–17]. While there is variation in the links between PBI profiles and these conditions, high “care” and low “overprotection” has been widely recognized as the optimal rearing combination, as initially predicted by Parker et al. [1].

While a large number of researchers have supported Parker’s original two-factor structure [18–20], others have proposed a three-factor structure [3, 21–23]. In these three-factor studies, PBI items that had originally been categorized in two-factor studies as the “care” subscale generally exhibited high factor loadings on the first factor. PBI items originally categorized as the “overprotection” subscale showed high factor loadings on one of the remaining two factors. The studies differed in the ways in which the PBI items were grouped to the last two factors. The factors loaded with the most “overprotection” items were variably named “the protection-personal domain” [21], “denial of psychological autonomy” [3], and “protectiveness” [22]; in some studies, this factor retained the original term (“overprotection”) [23]. The factors loaded with the most “allowance of autonomy/independence” items (the opposite of “overprotection”) were named “the protection-social domain” [21], “encouragement of behavioural freedom” [3], “authoritarianism” [22], and “restraint” [23]. When developing the PBI, Parker et al. [1] identified three factors in the responses to initial versions. The variance accounted for by the third factor was relatively small; in addition, items negatively loading on the second factor tended to loading on the third factor positively. Based on these findings and theoretical considerations, the two-factor structure was adopted as their final model. Using a confirmatory factor analysis to compare five models, those of Parker et al. [1], Cubis et al. [21], Gomez-Beneyto et al. [23], Murphy et al. [3] and Kendler et al. [22], Sato et al. [24] concluded that the Kendler [22] model (a three-factor model) was the most

acceptable for analyzing the target population of 418 Japanese adults. In this study, the authors compared the five models by applying their data of this Japanese population into each model. As only 16 items were used in the Kendler model [22], it remains unclear whether a two- or three-factor model or other models will demonstrate the best fit to the full 25-item PBI data collected for this Japanese population.

To examine the factorial structure of parenting styles, several issues should be considered. First, parenting styles differ tremendously between different cultures. In comparison to mothers in Western countries, Japanese mothers typically spend more time with their infants, holding their babies more frequently to comfort them and to alleviate their anger or frustration. After entering elementary school, Japanese children often bathe and sleep with their parents [25, 26]. Researchers must account for the many parenting styles around the world. As the PBI was originally developed to assess parental styles in Western cultures, it is necessary to investigate its factorial structure in Japanese populations.

A second difficulty in the assessment of perceived parenting is a potential difference between measurements of parents' past attitudes (i.e., as a child) and those of parents' current attitudes. Previous studies of the PBI's factorial structure were solely based on people over 16 years of age; the PBI was originally intended as a retrospective analytical tool. Although the PBI may be able to assess current parent-child interactions, it remains unclear if the factorial structure of PBI rated by children for their parents' current rearing would be the same as those rated retrospectively.

A third complicating factor is the potential influence of the gender of respondents and their parents and respondents' generation. Past investigations have not extensively considered these demographic variables. Similar parenting attitudes may be perceived differently by respondents in a manner dependent on the respondent's and parent's genders. The parents' attitudes may also be perceived differently depending on the age of the respondents and the cohort to which they belong.

In summary, the purposes of this study were:

1. To investigate the factorial structure of the PBI among Japanese adults and identify differences from the Parker et al's [1] model;
2. To evaluate the utility of the PBI with children as the respondents;
3. To assess the influence of generation and the gender of the respondents on the covariance between factors in the series of invariance testing, and
4. To produce a structural equation model taking into account the results obtained above.

## Methods

### Participants

Questionnaires were distributed to 50 elementary schools and 14 junior high schools (up to the 9th grade) of a rural Japanese prefecture. Of a total of 6,898 eligible families, 1,549 family units of parents and children who were between the 5th and

9th grades answered the questionnaire, while 42 family units of parents with children between the 1st and 4th grades responded.

## Measures

The PBI was designed as a retrospective instrument, in which respondents over 16 years of age were asked to recall their parents' rearing styles during the first 16 years of life. The PBI consists of 25 items, 12 care dimension and 13 overprotection dimension items. In this study, we used the PBI to evaluate the respondents' perception of how they were raised, either at present or in the past. Adult respondents were asked to recall their mother and father's parenting separately, while child respondents were asked to assess their mother and father's current parenting separately. A Japanese version of the PBI was developed by Kitamura and Suzuki [27], using back-translation for verification. We used two different versions of the PBI, one for children and one for parents. The instructions and wordings of the items were modified for child respondents to address current parental attitudes; the tenses of the sentences were converted from past to present. Fathers and mothers were asked to assess their own parents' attitudes towards them as a child using the original PBI.

## Procedure

After obtaining approval from the ethics committee of Kumamoto University Graduate School of Medical Sciences, we asked the head of each elementary and junior school to distribute the questionnaire to students and their parents. A teacher in each class handed a set of questionnaires to each student. Students between grades 5 and 9 (10–14 years old) were asked to participate in the study. These students and children between grades 1 and 4 (6–9 years old) were also asked to hand their parents the father and mother's versions of the letter, the questionnaire, and a pre-stamped envelope. All of the questionnaires (both for students and parents) were attached to a letter explaining the purpose of this study and explicitly confirm the autonomous decision to participate. Anonymity was guaranteed. The teachers also emphasized autonomous and anonymous participation orally. All participants returned the questionnaire in the pre-stamped envelope provided. Students in grades 1–4 (6–9) were not asked to participate in the survey, because of their limited linguistic capacity.

## Statistical Analyses

Only questionnaires in which more than 23 PBI items were answered were used for analysis. An exploratory factor analysis with PROMAX rotation was performed in a series of four combinations for the parents' generation: how fathers perceived they were raised by their fathers (Fgf) and mothers (Fgm) and how mothers perceived they were raised by their fathers (Mgf) and mothers (Mgm). Next, we performed the same statistical analysis in a series of four combinations for the students' generation: how boys perceived they were being raised by their fathers (CmaleF) and mothers (CmaleM) and how girls perceived they were being raised by their fathers (CfemaleF) and mothers (CfemaleM).

The number of responses from each group were as follows: Fgf, 596 with a mean age of 44.1 (SD = 5.0; range = 33–57); Fgm, 592 with a mean age of 44.1 (SD = 4.4; range = 33–55); Mgf, 776 with a mean age of 41.5 (SD = 4.3; range = 32–55); Mgm, 797 with a mean age of 41.5 (SD = 4.4; range = 30–55); CmaleF, 569 with a mean age of 12.3 (SD = 1.5; range = 10–15); CmaleM, 612 with a mean age of 12.3 (SD = 1.5; range = 10–15); CfemaleF, 610 with a mean age of 12.2 (SD = 1.4; range = 10–15); and CfemaleM, 683 with a mean age of 12.2 (SD = 1.4; range = 10–15).

Using the data from the exploratory factor analyses above, we performed a confirmatory factor analysis using AMOS version 5.0 software, distributed by SPSS version 11.0. To examine the possible influence of the generation (Fgf vs. CmaleF, Fgm vs. CmaleM, Mgf vs. CfemaleF, Mgm vs. CfemaleM) and gender (Fgf vs. Mgf, Fgm vs. Mgm, CmaleF vs. CfemaleF, CmaleM vs. CfemaleM) of respondents on the covariance between factors, we examined the critical ratio in the series of invariance testing.

Finally, we developed a structural equation model accounting for the impacts of generation and gender of both the respondents and caregivers.

Causal coefficients were calculated as indices of the causal relationship between and within the latent and observed variables. Causal coefficients usually range from 0 to unity as an absolute value; indices approaching +1.0 indicate a stronger positive relationship, while those approaching –1.0 indicate an increasingly negative relationship [28].

We used the following measures of absolute fit, the goodness of fitness index (GFI), the adjusted goodness of fitness index (AGFI), and the root mean square error of approximation (RMSEA), to estimate the extent to which the models fit the data.

## Results

Application of the scree test [29] to all eight-factor analyses yielded three factors to be extracted (Tables 1 and 2). Despite slight differences in the factorial structures based on the scree test, PBI items with moderate (0.3 or more of the absolute value) factor loadings on the first factor were those originally belonging to Parker's "care" (positive loadings) and "indifference/rejection" (negative loadings) categories. PBI items originally belonging to the "overprotection" subscale ("overprotection" and "allowance of autonomy/independence") were scattered into the second and third factors. These data contradict Parker et al.'s theoretical claim that perceived rearing is comprised of only two elements.

We then conducted confirmatory factor analyses, setting the number of factors as three (Fig. 1). We failed to obtain satisfactory goodness-of-fit indices, particularly for the Fgf and Fgm groups (Table 3).

We therefore returned to the results of exploratory factor analyses (Tables 1 and 2). We observed that the items originally categorized as representing "care" exhibited high positive loadings (0.5 or more) on the first factor only. The majority of items originally categorized as reflecting "indifference/rejection", however, demonstrated moderately negative factor loadings (0.3 or more of the absolute value) on the first factor as well as moderately positive factor loadings (0.3 or more) on either of the other two factors on which "overprotection" items had moderately positive

**Table 1** Factor loadings on the three axes for the adults’ generation

	Fgf			Fgm			Mgm			Mgm		
	1st	2nd	3rd									
<b>Care</b>												
1	<b>0.81</b>	0.13	0.10	<b>0.79</b>	0.10	0.04	<b>0.81</b>	0.05	0.16	<b>0.79</b>	0.06	0.18
5	<b>0.57</b>	-0.01	0.12	<b>0.53</b>	-0.01	0.22	<b>0.59</b>	0.18	0.06	<b>0.65</b>	0.15	0.06
6	<b>0.61</b>	0.05	0.27	<b>0.66</b>	0.10	0.24	<b>0.72</b>	0.15	0.09	<b>0.74</b>	0.11	0.10
11	<b>0.81</b>	0.12	0.04	<b>0.91</b>	0.16	-0.01	<b>0.83</b>	0.03	0.12	<b>0.83</b>	0.01	0.12
12	<b>0.87</b>	0.20	0.08	<b>0.92</b>	0.21	0.02	<b>0.92</b>	-0.01	0.17	<b>0.92</b>	-0.01	0.18
17	<b>0.68</b>	0.11	0.08	<b>0.71</b>	0.06	0.06	<b>0.70</b>	0.08	0.15	<b>0.58</b>	0.16	0.14
<b>Indifference</b>												
2	<b>-0.37</b>	0.02	0.19	<b>-0.30</b>	0.02	0.11	<b>-0.34</b>	0.04	-0.11	-0.29	0.08	-0.07
4	<b>-0.40</b>	<b>0.45</b>	0.07	<b>-0.45</b>	<b>0.37</b>	0.04	<b>-0.72</b>	0.06	0.16	<b>-0.54</b>	0.02	0.23
14	<b>-0.36</b>	<b>0.50</b>	0.02	-0.26	<b>0.52</b>	0.02	<b>-0.47</b>	-0.05	0.28	<b>-0.40</b>	-0.15	<b>0.30</b>
16	-0.17	<b>0.52</b>	0.00	<b>-0.35</b>	<b>0.41</b>	0.06	<b>-0.41</b>	0.03	0.29	<b>-0.49</b>	0.04	0.22
18	<b>-0.73</b>	0.17	<b>0.34</b>	<b>-0.57</b>	<b>0.33</b>	0.22	<b>-0.76</b>	0.24	0.15	<b>-0.69</b>	0.23	0.18
24	<b>-0.49</b>	<b>0.37</b>	0.18	<b>-0.47</b>	<b>0.40</b>	0.15	<b>-0.65</b>	0.15	0.19	<b>-0.64</b>	0.13	0.20
<b>Overprotection</b>												
8	-0.11	<b>0.52</b>	-0.04	-0.13	<b>0.60</b>	-0.06	-0.14	-0.12	<b>0.36</b>	-0.30	0.02	<b>0.38</b>
9	0.12	<b>0.75</b>	-0.18	0.06	<b>0.70</b>	-0.13	-0.03	-0.23	<b>0.61</b>	-0.11	-0.16	<b>0.59</b>
10	0.06	<b>0.75</b>	-0.08	-0.03	<b>0.67</b>	-0.10	-0.16	-0.14	<b>0.50</b>	-0.19	-0.12	<b>0.48</b>
13	0.15	<b>0.50</b>	0.05	0.13	<b>0.59</b>	-0.02	0.09	-0.01	<b>0.52</b>	0.11	-0.02	<b>0.59</b>
19	0.01	<b>0.56</b>	-0.05	0.08	<b>0.75</b>	-0.04	0.04	0.01	<b>0.53</b>	0.07	-0.03	<b>0.62</b>
20	0.01	<b>0.62</b>	-0.04	0.05	<b>0.75</b>	0.00	0.04	0.04	<b>0.61</b>	0.09	-0.03	<b>0.69</b>
23	<b>0.33</b>	<b>0.52</b>	0.09	0.29	<b>0.70</b>	0.08	0.26	0.14	<b>0.57</b>	0.19	0.11	<b>0.70</b>
<b>Autonomy</b>												
3	-0.05	-0.08	<b>0.74</b>	0.07	-0.05	<b>0.69</b>	0.03	<b>0.69</b>	-0.07	0.12	<b>0.73</b>	0.03
7	<b>0.33</b>	-0.18	<b>0.34</b>	<b>0.32</b>	-0.13	<b>0.33</b>	0.23	<b>0.45</b>	-0.07	0.24	<b>0.43</b>	-0.03
15	0.13	-0.15	<b>0.52</b>	0.14	-0.14	<b>0.54</b>	0.02	<b>0.58</b>	-0.05	0.07	<b>0.51</b>	-0.10
21	-0.09	-0.06	<b>0.86</b>	-0.08	-0.05	<b>0.85</b>	-0.07	<b>0.89</b>	-0.02	-0.15	<b>0.93</b>	-0.04
22	-0.15	0.02	<b>0.79</b>	-0.18	0.01	<b>0.86</b>	-0.18	<b>0.85</b>	0.07	-0.21	<b>0.88</b>	0.00
25	0.06	0.07	<b>0.54</b>	0.09	0.07	<b>0.61</b>	0.06	<b>0.52</b>	0.00	0.17	<b>0.51</b>	0.04
% of variance explained	33.1	10.7	8.5	35.7	12.2	7.4	33.4	11.0	7.1	35.6	9.7	7.1

1st: the first factor, 2nd: the second factor, 3rd: the third factor. Bold numbers: 0.3 or more of the absolute values of factor loading

factor loading. This result indicates that indifference/rejection items were not the opposite of care items. Thus, care items and indifference/rejection items should not be included in the same factor. Items originally categorized as representing “overprotection” displayed moderately positive factor loadings (0.3 or more) on only one of the remaining two factors. The items originally categorized as reflecting allowance of autonomy/independence had moderately positive factor loadings (0.3 or more) on the last factor only, with the exception of the item 7 (‘Like me to make my own decisions’) that exhibited a positive factor loading (0.3 or more) on the first factor in five of the eight subgroups (Fgf, Fgm, CmaleM, CfamelaF, and CfemaleM). Thus, we concluded that there were four aspects of parenting; these measures of parenting styles correlated with one another to some extent.

The results of the exploratory factor analysis led us to produce a four-factor model (Fig. 2), which postulates that these four factors correlated with one another. We dubbed these four latent variables “care”, “indifference”, “overprotection”, and “autonomy”. The term “factor” is used to denote the latent variable, while the term “item” refers to each PBI item. We then conducted confirmatory factor analyses

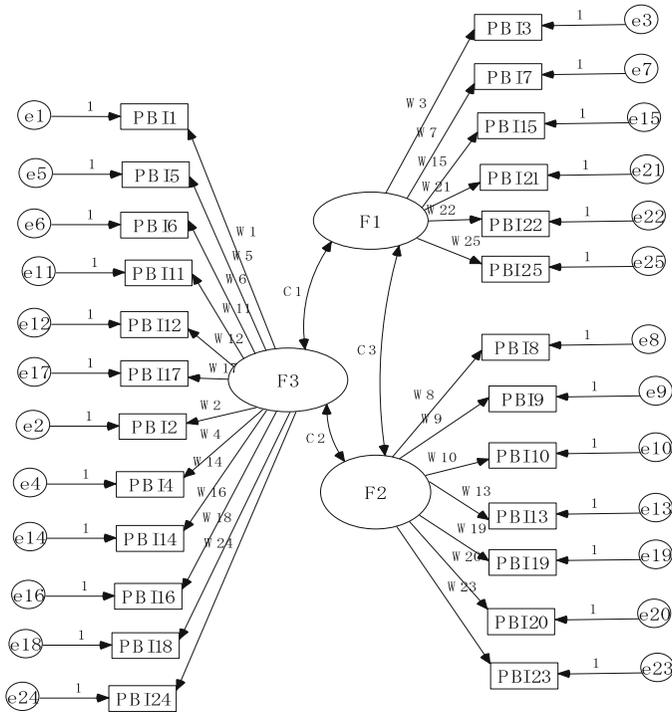
**Table 2** Factor loadings on the three axes for the children’s generation

	CmaleF			CmaleM			CfemaleF			CfemaleM		
	1st	2nd	3rd									
<b>Care</b>												
1	<b>0.64</b>	0.04	0.15	<b>0.64</b>	-0.01	0.10	<b>0.75</b>	0.03	0.12	<b>0.78</b>	0.18	0.07
5	<b>0.60</b>	0.09	0.05	<b>0.57</b>	-0.01	0.05	<b>0.61</b>	-0.09	-0.03	<b>0.60</b>	0.04	0.00
6	<b>0.67</b>	0.03	0.12	<b>0.65</b>	0.09	0.12	<b>0.71</b>	0.06	0.08	<b>0.70</b>	0.09	0.14
11	<b>0.66</b>	0.06	0.02	<b>0.65</b>	0.07	0.02	<b>0.69</b>	-0.03	0.10	<b>0.76</b>	0.01	-0.09
12	<b>0.75</b>	0.13	-0.03	<b>0.78</b>	0.16	0.00	<b>0.74</b>	-0.05	0.17	<b>0.78</b>	0.17	0.00
17	<b>0.65</b>	0.11	-0.01	<b>0.64</b>	0.13	-0.07	<b>0.65</b>	0.04	0.05	<b>0.63</b>	0.00	-0.03
<b>Indifference</b>												
2	-0.14	.13	0.13	-0.10	0.03	0.06	-0.28	0.08	0.06	-0.11	0.06	0.03
4	-0.28	<b>0.46</b>	0.07	-0.28	<b>0.34</b>	-0.07	<b>-0.47</b>	0.03	0.26	<b>-0.30</b>	<b>0.36</b>	-0.04
14	-0.18	<b>0.45</b>	0.07	-0.21	<b>0.35</b>	0.01	-0.29	-0.11	<b>0.30</b>	-0.21	<b>0.34</b>	-0.13
16	-0.15	<b>0.34</b>	-0.05	-0.20	<b>0.40</b>	0.04	-0.26	-0.06	<b>0.32</b>	<b>-0.31</b>	<b>0.34</b>	0.10
18	<b>-0.45</b>	0.19	0.17	<b>-0.32</b>	0.19	0.08	<b>-0.54</b>	0.09	-0.03	<b>-0.35</b>	0.28	0.12
24	<b>-0.45</b>	0.21	0.13	<b>-0.39</b>	0.26	0.15	<b>-0.47</b>	0.08	0.21	<b>-0.46</b>	0.22	0.12
<b>Overprotection</b>												
8	-0.06	<b>0.38</b>	-0.03	-0.16	<b>0.38</b>	0.09	-0.15	-0.04	<b>0.31</b>	0.04	<b>0.41</b>	-0.09
9	0.04	<b>0.56</b>	-0.07	0.09	<b>0.59</b>	-0.13	0.05	-0.12	<b>0.40</b>	0.06	<b>0.54</b>	-0.13
10	-0.02	<b>0.62</b>	-0.01	-0.11	<b>0.54</b>	0.02	-0.11	-0.02	<b>0.56</b>	-0.16	<b>0.49</b>	-0.03
13	0.12	<b>0.31</b>	-0.03	0.08	<b>0.43</b>	0.01	0.02	0.03	<b>0.40</b>	0.03	<b>0.46</b>	0.23
19	0.17	<b>0.51</b>	0.02	0.10	<b>0.44</b>	-0.07	0.11	0.09	<b>0.51</b>	0.11	<b>0.47</b>	0.04
20	0.02	<b>0.35</b>	-0.10	0.05	<b>0.45</b>	-0.01	0.07	0.02	<b>0.48</b>	0.03	<b>0.49</b>	-0.19
23	0.21	<b>0.35</b>	-0.06	0.23	<b>0.45</b>	0.02	0.19	0.13	<b>0.37</b>	0.12	<b>0.42</b>	0.10
<b>Autonomy</b>												
3	0.04	-0.04	<b>0.57</b>	0.11	-0.04	<b>0.57</b>	0.07	<b>0.56</b>	0.04	0.06	0.01	<b>0.67</b>
7	0.28	-0.13	0.26	<b>0.30</b>	-0.12	0.16	<b>0.31</b>	0.21	-0.08	<b>0.35</b>	-0.03	0.20
15	0.18	0.07	0.28	0.22	-0.02	0.26	0.24	0.26	0.07	0.20	-0.05	0.22
21	-0.01	-0.04	<b>0.75</b>	-0.02	-0.01	<b>0.81</b>	-0.05	<b>0.80</b>	-0.05	-0.06	-0.04	<b>0.78</b>
22	-0.08	-0.06	<b>0.55</b>	-0.13	0.04	<b>0.78</b>	-0.20	<b>0.63</b>	0.05	-0.11	0.06	<b>0.67</b>
25	-0.02	0.00	<b>0.34</b>	0.05	-0.01	<b>0.36</b>	-0.02	<b>0.40</b>	0.03	0.11	-0.05	<b>0.37</b>
% of variance explained	20.9	9.3	6.8	21.2	9.3	7.1	22.3	8.7	7.0	23.5	8.9	7.0

1st: the first factor, 2nd: the second factor, 3rd: the third factor. Bold numbers: 0.3 or more of the absolute values of factor loading

(Table 4). In all of the subgroups, the goodness-of-fit indices improved in comparison to the three-factor model; each covariance between the four factors was significant. The covariance between the “care” and “indifference” factors (C1) was significant with a negative value ( $p < 0.001$ ). The covariance between the “overprotection” and “autonomy” factors (C2) was also significant with a negative value ( $p < 0.001$ ). The covariances between the “care” and “autonomy” factors (C3) and the “overprotection” and “indifference” factors (C4) were both significant with positive values ( $p < 0.001$ ) (Table 4). This result indicates that the “care” and “autonomy” factors and the “indifference” and “overprotection” factors are close to each other.

Series of invariance testing were preformed across the respondents’ generations and genders. We assumed the constraint that the causal coefficient (W1–W25) of each factor (Care, Indifference, Overprotection, Autonomy) to each item (PBI 1–25) to be the same across the corresponding groups. The results of the series of invariance testing demonstrated excellent fits, as shown in Table 5 (across different respondent generations) and Table 6 (across different respondent genders). This



**Fig. 1** Confirmatory factor analysis of the three-factor model

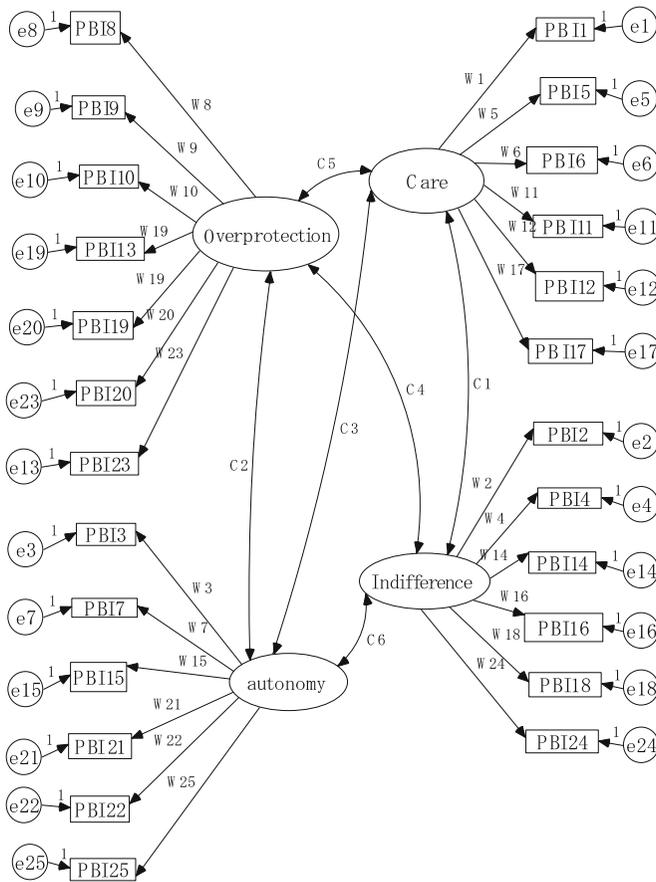
**Table 3** The absolute fit of the data to the three-factor structure model described in Fig. 1

	GFI	AGFI	RMSEA	$\chi^2$ (df)
Fgf	0.795	0.755	0.092	1644.55 (272)
Fgm	0.779	0.736	0.093	1673.73 (272)
Mgf	0.845	0.815	0.079	1601.38 (272)
Mgm	0.861	0.834	0.072	1404.20 (272)
CmaleF	0.894	0.873	0.057	772.66 (272)
CmaleM	0.886	0.863	0.062	916.67 (272)
CfemaleF	0.898	0.878	0.056	798.94 (272)
CfemaleM	0.887	0.866	0.063	1002.50 (272)

result suggested that the four-factor structure was consistent across the different respondent generation subgroups and different respondent gender subgroups.

### The Influence of the Respondents' Generation and Gender on the Factorial Structure of the PBI

To examine the influence of the generation (Fgf vs. Cmale F, Fgm vs. Cmale M, Mgf vs. CfemaleF, Mgm vs. CfemaleM) and gender (Fgf vs. Mgf, Fgm vs. Mgm, CmaleF vs. CfemaleF, CmaleM vs. CfemaleM) of respondents on the covariance between factors (C1–C6 in Fig. 2) in invariance testing, critical ratios were obtained (Tables 5 and 6).



**Fig. 2** Confirmatory factor analysis of the four-factor model

A critical ratio of 1.96 or greater indicates a significant difference (<0.05) in the parameters between each subgroup pair.

Each covariance between factors was different across the respondents' generational groups, with the exception of the covariance between the "care" and "autonomy" factors (C3) across Fgf vs. CmaleF (Table 5). In contrast, almost all of the covariances between the factors were not different across respondents' gender groups (Table 6). The covariances exhibiting differences between the corresponding groups were that between the "care" and "indifference" factors (C1) and that between the "overprotection" and "indifference" factor (C4) in the comparison of Fgf and Mgf. The covariances between the "care" and "indifference" factors (C1) and the "indifference" and "autonomy" factors (C6) were also different in the comparison of Fgm and Mgm. In the comparison of Fgf and Mgf, addition of the new constraint that the covariances C2 and C5 were the same between the two groups gave the best improvement of fitness for the model. In the comparison of Fgm and Mgm, a model in which we added the constraint that the covariances C3 and C4 were the same across the two groups exhibited the best improvement of fitness. In the

**Table 4** The absolute fit of the data to the four-factor structure model described in Fig. 2

	GFI	AGFI	RMSEA	$\chi^2$ (df)	C1	C2	C3	C4	C5	C6
Fgf	0.854	0.823	0.076	96.71 (269)	-0.74	-0.59	0.59	0.76	-0.36	-0.49
Fgm	0.858	0.829	0.072	1097.27 (269)	-0.70	-0.50	0.68	0.76	-0.33	-0.54
Mgf	0.870	0.842	0.073	1365.95 (269)	-0.88	-0.61	0.59	0.58	-0.34	-0.56
Mgm	0.891	0.869	0.063	1111.27 (269)	-0.86	-0.60	0.64	0.75	-0.47	-0.62
CmaleF	0.931	0.917	0.042	534.92 (269)	-0.68	-0.31	0.62	0.79	-0.26	-0.36
CmaleM	0.914	0.896	0.052	707.51 (269)	-0.71	-0.26	0.54	0.81	-0.30	-0.35
CfemaleF	0.915	0.897	0.050	686.33 (269)	-0.82	-0.41	0.49	0.64	-0.29	-0.52
CfemaleM	0.917	0.900	0.051	753.47 (269)	-0.74	-0.35	0.57	0.78	-0.33	-0.43

C1 correlation coefficient between the “care” and “indifference” factors

C2 correlation coefficient between the “indifference” and “overprotection” factors

C3 correlation coefficient between the “care” and “autonomy” factors

C4 correlation coefficient between the “indifference” and “overprotection” factors

C5 correlation coefficient between the “care” and “overprotection” factors

C6 correlation coefficient between the “indifference” and “autonomy” factors

**Table 5** Invariance across the generations of respondents

	GFI	AGFI	$\chi^2$ (df)	RMSEA	Critical ratio (absolute value)					
					C1	C2	C3	C4	C5	C6
Fgf vs. CmaleF	0.887	0.869	1775.22 (560)	0.043	2.15*	4.69*	0.98	2.28*	2.25*	3.17*
Fgm vs. CmaleM	0.881	0.862	1885.54 (560)	0.044	2.31*	4.48*	2.47*	3.85*	2.16*	3.68*
Mgf vs. CfemaleF	0.885	0.867	2130.36 (560)	0.045	4.51*	4.58*	4.32*	2.26*	2.32*	3.68*
Mgm vs. CfemaleM	0.900	0.884	1930.11 (560)	0.041	5.11*	5.98*	3.60*	4.35*	4.24*	5.52*

\**p* < 0.05

C1 covariance between the “care” and “indifference” factors

C2 covariance between the “indifference” and “overprotection” factors

C3 covariance between the “care” and “autonomy” factors

C4 covariance between the “indifference” and “overprotection” factors

C5 covariance between the “care” and “overprotection” factors

C6 covariance between the “indifference” and “autonomy” factors

comparison between CmaleF and CfemaleF, the model constraining the covariances C1, C2, and C5 were the same between the two groups demonstrated the best improvement of fitness. In the comparison between CmaleM and CfemaleM, the model with the constraint that all of the covariances (C1–C6) were the same between the two groups showed the best improvement of fitness.

These findings indicated that the covariances between factors are not necessarily identical across two groups of different genders or generations. This discrepancy was more profound in the comparison of two different generation groups (Table 5).

### Structural Equation Model of the PBI which Take into Account the Influence of the Respondents’ Generation and Gender of Both Respondents and Caregivers

As the analyses indicated that the factorial structure of the PBI was a function of the respondents’ generation and gender, we developed a structural equation model

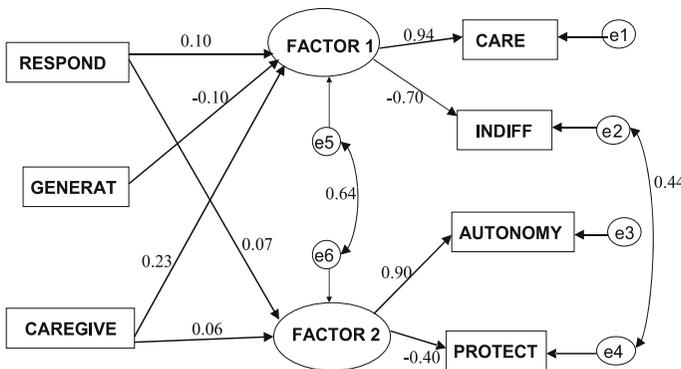
**Table 6** Invariance testing across the gender of the respondents

	GFI	AGFI	$\chi^2$ (df)	RMSEA	Critical ratio					
					C1	C2	C3	C4	C5	C6
Fgf vs. Mgf	0.861	0.838	2607.94 (560)	0.052	3.32*	0.12	1.43	2.08*	0.18	1.95
Fgm vs. Mgm	0.874	0.854	2260.40 (560)	0.047	3.07*	1.67	0.93	0.43	1.83	2.32*
CmaleF vs. CfemaleF	0.992	0.909	1241.52 (560)	0.032	1.21	1.02	1.95	1.77	0.12	1.71
CmaleM vs. CfemaleM	0.915	0.901	1486.12 (560)	0.036	0.67	0.68	0.07	0.43	0.22	0.77

\**p* < 0.05

- C1 covariance between the “care” and “indifference” factors
- C2 covariance between the “indifference” and “overprotection” factors
- C3 covariance between the “care” and “autonomy” factors
- C4 covariance between the “indifference” and “overprotection” factors
- C5 covariance between the “care” and “overprotection” factors
- C6 covariance between the “indifference” and “autonomy” factors

taking into account the generation and gender of the respondent and the gender of the caregiver (Fig. 3). The items in each of the four categories were summed separately, as neither the “care” and “indifference/rejection” items nor the “overprotection” and “allowance of autonomy/independence” items could be explained by a single factor (Fig. 2). The confirmatory factor analyses, however, showed that there were significant covariance of a negative value between the “care” and “indifference” factors and the “overprotection” and “autonomy” factors. Thus, we developed a model postulating two latent variables, one (Factor 1) that explained the total score of “care” and “indifference/rejection” items and a second (Factor 2) that explained the total score of “overprotection” and “allowance of autonomy/independence” items (Fig. 3). The “gender of the respondent,” the “gender of the caregiver,” and the “generation of the respondent” were the three observed

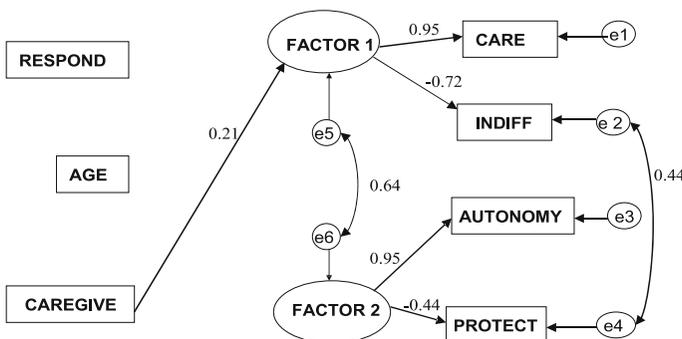


**Fig. 3** Structural equation model of the PBI with an explanation of the respondents’ generation and the gender of the respondents and caregivers. For the gender of the respondents (RESPOND) and caregivers (CAREGIVE), male was set as 0, while female was set as 1. Similarly, for the generation of respondents (GENERAT), the children’s generation was set as 0, and the adults’ generation was fixed as 1. CARE: total score of care items, INDIFF: total score of indifference/rejection items AUTONOMY: total score of allowance of autonomy and independence items PROTECT: total score of overprotection items e1–e6: variables of error for each of the observed and latent variables

variables added to the model. We assumed a correlation between the error variables of “indifference/rejection” (e2) and “overprotection” (e4), which gave a strong positive correlation (covariance = 0.44). We also assumed a correlation between the error variables of Factor 1 (e5) and Factor 2 (e6), which also gave a strong positive correlation (covariance = 0.64). This model demonstrated excellent goodness-of-fit, with a GFI = 0.994, AGFI = 0.982, chi-squared (df) = 88.14 (10), and RMSEA = 0.045.

The main purpose of this model was to explain the impact of the respondents’ generation and gender and the caregivers’ gender on Factors 1 and 2. The respondents’ gender affected the way in which they perceive their parents’ behaviours and attitudes. Female respondents were more likely than males to perceive parenting behaviours towards Factor 1 (causal coefficient = 0.10) and Factor 2 (causal coefficient = 0.07). In addition, the respondents’ generation also affected their perceptions of their parents’ behaviours and attitudes. The adult generation was less aware of their parents’ attitudes towards Factor 1 (causal coefficient = -0.10) than the student generation. The respondents’ generation, however, did not have a direct impact on the perception towards Factor 2. The gender of the caregiver also affected the way in which respondents perceived their parents’ behaviours and attitudes. Female parenting attitudes were perceived towards Factor 1 (causal coefficient = 0.23) and Factor 2 (causal coefficient = 0.06) to a greater extent than were male parenting attitudes.

This model demonstrated that the respondent’s generation influenced Factor 1 significantly. Respondent age may be a major determinant; with increasing age, the perception of parenting change. To verify this postulate, we replaced “respondent’s generation” with “respondent’s age” in the former model. This change was adopted separately for the adults’ (Fig. 4) and children’s (Fig. 5) generations, as the children, but not the adults, are still in the process of development; therefore, these generations should not be combined. The adults’ generation model (Fig. 4) demonstrated excellent goodness-of-fit, with GFI = 0.999, AGFI = 0.996,  $\chi^2$  (df) = 5.41 (3), and RMSEA = 0.018. The children’s generation model (Fig. 5) also exhibited excellent goodness-of-fit: GFI = 0.996, AGFI = 0.988,  $\chi^2$  (df) = 18.20 (9) and RMSEA = 0.027. These results demonstrated that, in the children’s generation, the observed “age” variable significantly affected the perception of parenting, while it did not in



**Fig. 4** Structural equation model of the PBI with an explanation of the respondents’ age and the gender of respondents and caregivers in the adults’ generation. The values and abbreviations are as described in Fig. 3

the adults’ population. In addition, the older the students were, the less their perceptions tended towards Factor 1 (causal coefficient = -0.11) and the more towards Factor 2 (causal coefficient = 0.11).

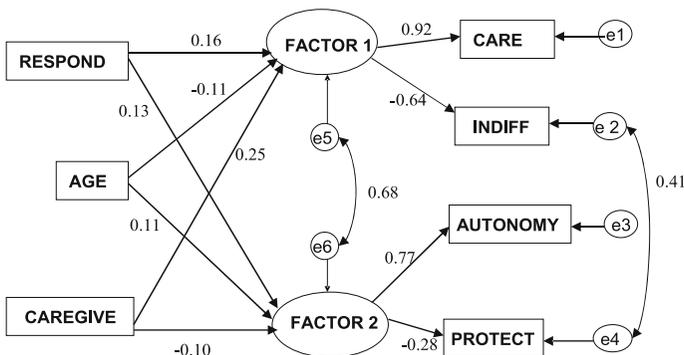
The respondents’ gender also significantly affected the perception of parenting behaviours by the children’s generation (Fig. 5). Girls were more likely to perceive parenting behaviours towards Factor 1 (causal coefficient = 0.16) and Factor 2 (causal coefficient = 0.13) than were boys. The gender of caregivers also affected the perception of parenting behaviours. The behaviours of mothers were more likely to be perceived towards Factor 1 (causal coefficient = 0.25), while fathers’ behaviours were more likely to be perceived towards Factor 2 (causal coefficient = -0.10).

The respondents’ gender did not affect the perception of parenting behaviours in the adults’ generation (Fig. 4). Only the caregiver gender influenced the perception of parenting style in the adults’ generation. The behaviours of female caregivers were more likely to be perceived towards Factor 1 (causal coefficient = 0.21) (Fig. 4), as was observed in children’s generation.

**Discussion**

While the factorial structure of the PBI has been controversial, our results support a four-factor structure. Invariance testing of the four-factor model across different respondents’ generational and gender groups demonstrated that this model was consistent across corresponding subgroups. These four factors were not independent, but correlated with each other.

Our exploratory factor analyses yielded three factors. Our factor analyses setting the number of factors as three (Fig. 1), however, did not exhibit excellent fitness (Table 3). As noted in the Introduction, while developing the PBI, Parker et al. [1] discovered three factors in the responses to initial versions of the PBI. These authors, however, adopted a two-factor structure as their final model, because they observed that items weighing negatively on the second factor tended to weigh positively on the third factor as well. In this study, however, items exhibiting factor loadings on the second factor did not have significant factor loadings on the third



**Fig. 5** Structural equation model of the PBI with an explanation of the respondents’ age and the gender of respondents and caregivers in the children’s generation. The values and abbreviations are as described in Fig. 3

factor; items that had factor loadings on the third factor did not have significant factor loadings on the second factor. In addition, “care” and “indifferent/rejection” items did not appear to be in opposition, as the majority of “indifference/rejection” items demonstrated moderately positive factor loadings on the factor upon which “overprotection” items also had moderately positive factor loadings. In addition, “indifference/rejection” items also had moderately negative factor loadings on the first factor upon which care items had large positive factor loadings. Thus, we determined the number of factors to be four. Using confirmatory factor analyses, we were able to obtain good fitness of the four-factor model for both the adults’ and children’s generations. Thus, we concluded that the PBI is also adaptable to those who are currently being raised. In general, the greater the number of factors, the better the fitness of the model. We believe, however, that a discussion of the Japanese parenting and psychological organization underlying the four-factor model merits attention.

In nearly all of the factor analysis studies of the PBI, “care” items have large positive factor loadings on the first factor almost exclusively. In our study, the factor loadings of these items did not vary with the generation of the respondent or the gender of the respondent or caregiver. These parenting behaviours are thought to be primarily intrinsically determined, which makes these behaviours less influenced by cultural and social environment. They represent caring, warm, and loving parenting.

According to confirmatory analyses (Fig. 2, Table 4), the inverse relationship between the “care” and “indifference” factors was significant with a negative value. The “indifference” factor had a significant positive covariance with the “overprotection” factor both in the children’s and adults’ generations. Thus, parental behaviours represented by the “indifference” factor were perceived as both indifference or coldness and intrusiveness or aggression. This could be interpreted by a Japanese persons’ dependence on others, “*amae*” [30]. If their parents do not meet their needs, Japanese individuals feel that their dependence was rejected, implying a persecutory feeling [30]. This phenomenon may be more common among children, as children have a more profound dependence on others than adults. The stronger the dependence, the greater the feeling of persecution when they are rejected by others. The Japanese still retain this psychological organization even after becoming adults. This may also influence other interpersonal relationships, such as the relationship with their spouse or a psychotherapeutic relationship, particularly the psychodynamics of those relationships.

We observed another interesting finding for the “allowance of autonomy/independence” items. Confirmatory factor analyses demonstrated a significant inverse relationship between the “autonomy” and “overprotection” factors in both the adults’ and children’s generations (Fig. 2, Table 4). Additionally, the “autonomy” factor was close to the “care” factor in all of the groups. In Japanese culture, certain parenting behaviours, such as letting the child do what he/she wants, and respecting his/her decisions, are highly nuanced; the child’s wishes are guessed by his/her parents and satisfied without a need for verbalization. This non-verbal interaction does not, however, mean that children are differentiated as independent individuals and are sent out alone into society by their parents. An appropriate adjective for these aspects of parenting behaviours might be “considerate” or “benevolent”. This may be the reason underlying the close relationship between the “care” and “autonomy” factors. In comparison to those in Western countries, Japanese mothers usually spend more time with their infants, holding and comforting their babies more

frequently. Being able to consider others' feelings, not necessarily fostering independence and assertiveness, is thought to be a virtue in the Japanese culture. Japanese individuals also expect others to be considerate to them, which is also a fundamental aspect of the Japanese psychological organization, "*amae*" [30]. As Sato et al. [24] did not develop their own model, they failed to identify these phenomena, which are unique to the interpersonal relationships of Japanese people. In this study, our four-structure model which no other studies proposed previously exhibits an excellent fit to the acquired data.

### The Structural Equation Model Takes into Account the Generation of the Respondents and the Gender of the Respondents and Caregivers

Our study also analyzed the structural equation modelling of the PBI as a function of the generation and age of the respondents and the gender of both the respondents and the caregivers. In this model, we summed the "care" and "indifference/rejection" items and the "overprotection" and "allowance of autonomy/independence" items separately, based on the result of the confirmatory factor analyses. Based on Parker's theory and the findings of the confirmatory factor analyses, we postulated two factors: one which explained the total scores of the "care" and "indifference/rejection" items and a second that explained the total scores of the "overprotection" and "allowance of autonomy/independence" items (Fig. 3).

In this proposed model, Factor 1 is close to the "care" factor in the confirmatory factor analyses (Fig. 2), as evidenced by its high causal coefficients on the total score of "care" items (0.94). Factor 2 is close to the "autonomy" factor in the confirmatory factor analyses (Fig. 2), as indicated by its high causal coefficients on the total score of the "allowance of autonomy and independence" items (0.90). As described above, "Factor 1" is the perception of an intrinsic ubiquitous parenting style that is less likely to be influenced by culture. In contrast, "Factor 2" is a perceived parenting style that is highly influenced by Japanese culture. Both of these factors are required for optimal parenting. Our results (Figs. 3–5) demonstrate that individuals' perceptions of parenting are culturally influenced; they continue to harbour the intrinsic perceived parenting image, although this perception is significantly influenced by their generation, gender, and age.

Our study detailed the influence of the respondents' generation and children's ages on their assessment of perceived rearing. The children's generation was more likely to perceive towards Factor 1 (Fig. 3). As "care" is intrinsically determined, children are more likely to perceive this concept than adults who are more influenced by accumulating environmental experiences. The higher sensitivity of children to "Factor 1" is consistent with the findings of the structural equation model, which accounted for the ages of respondents in the children's generation (Fig. 5). Older children were less likely to perceive towards "Factor 1". The older the respondents become, the less they perceived parenting behaviours towards 'care'. Instead, the older children were more sensitive to "Factor 2". As "Factor 2" is closely related to "consideration", the sensitivity of older children to "Factor 2" is likely due to an increased influence by Japanese culture than younger children.

As the respondents' age did not influence the perception of parenting behaviours in the adults' generation (Fig. 4), the manner in which individuals perceive parenting behaviours may become constant after reaching at certain age. Only the gender of the caregiver influenced the perception of parenting attitudes among the adults'

generation. Female caregivers were more likely to be perceived as caring than male caregivers. This result may be interpreted as a manifestation of the common image that the mother is more caring than the father.

As to the model of the children's generation (Fig. 5), the respondents' gender had a significant impact on the perception towards parenting. Girls were more likely to perceive parenting behaviour as more caring and considerate. For girls, caring and consideration may be of greater value than for boys. Female caregivers were more likely to be perceived towards Factor 1, while male caregivers were more likely to be perceived towards Factor 2 (Fig. 5). One possible interpretation of these results is that, as a mother's care is essential during the early phase of parenting, an intrinsic caring attitude is likely strongly associated with the mother. In Japan, as children grow, the father's involvement in parenting increases. Children also begin to interact increasingly with society, leading to a gradual increase in the influence of culture. The image of the father may be connected to the developmental stage at which children gradually acquire socially acceptable interpersonal relationships outside of their immediate family.

Having established a good-fit model, we also proposed a scoring of the PBI for Japanese populations. We separately calculated the total scores of items "care," "indifference/rejection," "overprotection," and "allowance of autonomy/independence." We also demonstrated that it is important to consider the effects of generation, the gender of the respondents and caregivers, and the ages of the respondents.

### Implication for the Clinical Setting

The parenting style represented in the factorial structure of the PBI demonstrated in this study is unique to the Japanese culture. This perception of parenting style reflects Japanese people's psychological organization and interpersonal relationships. Therapeutic relationships are also influenced by these culture-specific interpersonal relationships. Patients will expect from therapists what they have expected from parents. When patients' needs are not met, they may feel persecuted and perceive aggression from the therapist, prompting them to become aggressive as a defence. If patients express feelings of persecution or behave self-destructively, therapists should consider what is happening in the therapeutic relationship. In Japan, patients value a therapist' warm care and benevolent consideration more than their own right to make decision as an independent individual.

### Limitations

We identified the impact of the respondents' generation on the perception of parenting and interpreted this from the perspective of developmental stage. This explanation is not necessarily universal; alternative explanations may exist. The experience of having and rearing a child may affect the perception of parenting, following a re-experiencing of the parent-child relationship. Such an influence may be an opportunity to modify the meaning of past memories, as the responding parents' generation now better understands their parents' motivations. It may be important to compare the factorial structures of adults with or without children.

Alternatively, changes in social conditions over time may have influenced the perception of parenting behaviours.

In addition, we did not collect data from children in senior high school. If we assess the factorial structure of people aged 16 or over, we might be able to further clarify the developmental effects on the factorial structure of the PBI. We presume that after the age of 15 years, an individual's perceptions grow closer to the general perceptions of adults.

Third, the response rate of the participants was only slightly greater than 20%. This low rate should be taken into account before reaching any conclusions. As unknown factors may have biased the results, confirming studies are required.

## Summary

This study supported a four-factor model of the factor structure of PBI items in a Japanese population. Confirmatory factor analysis revealed that there was a significant positive covariance between the “care” and “autonomy” factors as well as between the “indifference” and “overprotection” factors. These findings may reflect the fact that the concept of individual independence and autonomy is not very deeply rooted in Japanese culture. In addition, parenting behaviours perceived as allowance of autonomy/independence by Western people may be perceived as consideration or benevolent care by the Japanese. Rejection or indifferent behaviour may be perceived of as aggression by the Japanese, rather than as cold. The Japanese psychological organization, ‘*amae*’, underlies these perceptions of parenting behaviours.

This study confirmed the adaptability of the PBI to those who are currently being raised. We also developed a structural equation model accounting for the generation of the respondents and the gender of both the respondents and caregivers. This model demonstrated that these added variables contributed significantly to the perception of parenting, resulting in an excellent goodness-of-fit. In addition, this study demonstrates that similar parenting behaviours may be perceived of differently in a manner dependent on the respondents' developmental stage and the gender of the respondents and caregivers.

These results have implications for clinical settings, particularly in psychotherapy using psychodynamic theory in Japan.

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