

Short Version of the Inventory of Parental Representations for Attachment Assessment Among Adolescents

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Abstract

Background: The Inventory of Parental Representations (IPR), a self-administered questionnaire, was developed primarily to identify styles of attachment in adolescence. However, it did not present stable psychometric properties in the various American studies carried out. The aim of this study was to adapt the IPR in French and to provide a shorter version with improved psychometric properties and a sound content.

Methods: The content validity was carried out by an expert committee and 10 adolescents. The study of the metric properties of the French version of the IPR was realized in a sample of 275 responses. In case of mediocre results in the CFA of the existing structures, the development of a new IPR structure was planned (Classical Test Theory and Rasch Modelling).

Results: Out of 62 items translated, 13 needed adaptation. The analysis of its metric properties produced mediocre results. In a group of 275 adolescent's responses, a step-by-step process was implemented. Content and psychometric property analyses generated a paternal Short-IPRF (15 items) and a maternal Short-IPRM (16 items) scale with sound content and good psychometric properties confirmed in an independent sample of 795 responses (Short-IPRF: Comparative Fit Index (CFI)=0.987, Tucker-Lewis Index (TLI)=0.982, Root Mean Square Error of Approximation (RMSEA)=0.027; Short-IPRM: CFI=0.953, TLI=0.927, RMSEA=0.068). Using Rasch modelling, the attachment was correctly measured overall especially for insecure attachment.

Conclusions: A step-by-step process involving both content analysis and psychometric property analysis led to the generation of two questionnaires, a paternal scale, the Short-IPRF, and a maternal scale, the Short-IPRM.

Background

The theory of attachment was defined by Bowlby in the 1960s [1]. The various styles of attachment were subsequently described by Ainsworth followed by Main through the Strange Situation Procedure in children aged 12 to 24 months [2–4]. Secure attachment corresponds to a balance between the attachment system and the exploratory system. A secure child feels safe and confident in accessing his/her attachment figure. There are several styles of insecure attachment: avoidant insecure attachment corresponds to hypo-activation of the attachment system, resistant-ambivalent insecure attachment corresponds to hyper-activation of the attachment system and disorganized-disoriented attachment equates to the presentation of contradictory attitudes.

In adolescents, there are links between attachment disorders and mental health disorders [5–9]. Specific psychotherapies exist to treat attachment disorders [10, 11].

Several methods have been developed to evaluate attachment at other ages: interviews or questionnaires. The interviews are derived primarily from the Adult Attachment Interview - an instrument developed for an

adult population [12]. These interviews require time and access to training. There is no Gold Standard for evaluating attachment in adolescence using self-administered questionnaires [13]. The Inventory of Parents and Peer Attachment is the questionnaire mostly used to evaluate attachment in adolescence, using sub-scores (Trust, Communication and Alienation), even though the Inventory of Parents and Peer Attachment was not initially designed to measure attachment styles [14–16].

The Inventory of Parental Representations (IPR), a self-administered questionnaire, was developed in the United States of America with the primary goal of identifying attachment styles as defined by Ainsworth. The IPR authors have devised items to define the various insecure attachments with greater accuracy. The IPR was studied in English in an adolescent cohort [17]. The various IPR studies conducted in the United States of America did not highlight stable psychometric properties [17–19].

The IPR has already been used in a French population without investigating its measurement properties [20]. A translation-back-translation process was implemented without transcultural adaptation, a step that is often deemed essential [21]. The use of an expert committee is important, particularly for content validity [22]. The lack of stability in the structure of the questionnaire suggested an element of uncertainty in terms of the content of the IPR and what it actually investigated. It was therefore relevant to re-examine the items included in the IPR and create a shorter questionnaire with a stable structure consistent with its content in an attempt to improve the psychometric properties of the scale [23].

The purpose of this work was to adapt the IPR into a French language version for adolescents between 13 and 18, and to propose a shorter version with improved psychometric properties and a clear, sound content.

Methods

The population targeted by this study was French adolescents, i.e. subjects between 13 and 18.

The Inventory of Parental Representations (IPR)

The IPR comprises two sections - one for the mother and one for the father - each one comprising the same 62 items (Appendix 1). A distinction is made between maternal and paternal representations, even if the items are similar. The answers are based on a Likert scale ranging from 1 (Strongly disagree) to 4 (Strongly agree). The different versions of the IPR are described in Appendix 2. In its original version, the IPR comprised seven dimensions, five of which specifically assessed insecure attachment [17]. The 7-dimensional structure was not found when a new exploratory factor analysis was carried out [18]. A study proposed a revised and shortened version of the IPR comprising 19 items divided into five dimensions. The author relied on a new exploratory factor analysis and interpretation of factor loadings to develop this version without any confirmatory analysis [19].

Study design

An expert committee was constituted for this study, comprising four confirmed French-speaking child psychiatrists and a medical epidemiologist specialized in questionnaire adaptation. Three of the five committee members were fluent in English. The whole expert committee analyzed original version, a reduce committee, comprising two of the four confirmed French-speaking child psychiatrists and the medical epidemiologist, developed the IPR short version.

Content Validity. Good content validity is an essential property of a measurement scale, as it is an evaluation of the degree to which the content of the scale is relevant with respect to the construct it wants to measure [24]. One of the components of the content validity is the face validity, which is how people perceive and comprehend the items.

The expert committee reviewed the French translation of each of the 62 items (box 1, Fig. 1). If any doubt was raised about the face validity of an item, it was discussed with adolescents (box 2, Fig. 1), and then considered by the expert committee. An English-speaking psychiatrist was contacted if the exact meaning of some items was unclear.

Ten adolescent volunteers were individually interviewed on the face validity of the questionnaire. The written consent of parents was obtained. All 62 items were discussed and specific questions raised by the expert committee were put to them. A qualitative analysis of the responses was carried out. If at least two of the ten adolescents interviewed mentioned a problem of comprehension for an item, it was discussed again by the expert committee (box 3, Fig. 1).

Based on these analyses and the attachment theory, the expert committee proposed a French cross-cultural adaptation of the IPR, used for the remainder of the study (box 4, Fig. 1).

Study of the metric properties of the French version of the IPR. Two independent groups were constituted: one for exploratory approach, further named development group, constituted from voluntary adolescents from schools and colleges; one for confirmatory approach further named validation group, constituted from school enrolled adolescents and adopted adolescents.

All adolescents responded to the 62 items of the IPR. Socio-demographic data were collected from parents. Consent was deemed to have been given when the adolescent and his/her parents completed all of the questionnaires distributed.

All questionnaires in the study were addressed to the parents and not to the adolescent. Consent was obtained by the parents if they responded to the questionnaires. The same was true for the adolescents. The inclusion of adolescents was only effective if all the questionnaires intended for the parents were returned. Indeed, the study was completely anonymous and it had been agreed with the ethics committee had requested that the people carrying out the study not have access to any data that could allow identification of the participants, in relation to the adoption data. The ethics committee validated this method of collecting consent.

Each group had to have a minimum number of four subjects by item, i.e. $62 \times 4 = 248$ responses for each parent to perform the analyses according to the recommendations of the COSMIN group [24].

As the items did not have the same valence, positive or negative, the scores of certain items were inverted so that all of the items followed the same direction in the analyses.

Based on the classical test theory, confirmatory factor analyses (CFA) were carried out in the development group on the structures proposed by the developers to explore construct validity (Appendix 1). Several fit indices were used to judge the CFA fit: *Comparative Fit Index* (CFI), Tucker-Lewis Index (TLI) and *Root Mean Square Error of Approximation* (RMSEA). A CFA was considered to have a reasonable fit with the model if CFI and TLI values were > 0.90 and if RMSEA was < 0.08 ; the fit with the model was deemed good if CFI and TLI ranged from 0.97 to 1.00 and if RMSEA was ≤ 0.05 [25, 26].

Compiling a short version of the IPR. In case of mediocre results in the CFA of the existing structures, the development of a new, stable, content-based, IPR structure was planned according to the following steps in the development group. It was considered that the same structure might not be appropriate for the mother and the father.

Step 1

New dimensions were identified from qualitative work carried out by the reduced committee. The 62 items were grouped into new dimensions consistent with the theory.

Items or group of items deemed to be irrelevant for measuring attachment were removed and items which posed significant problems in terms of comprehension were also removed.

Step 2

The floor and ceiling effects of responses to the items were taken into consideration in order to select discriminating items. If at least 80% of the sample size had the maximum or minimum response level for an item, it was discussed by the reduced committee and removed if it was not essential for measuring attachment styles.

Step 3

Psychometric properties were analyzed using the development group data based on the structure proposed on step 1.

In order to preserve the structure proposed on step 1, CFA were used iteratively in an exploratory approach. Between each CFA, the model was changed according to the modification indices of the model, which reflect the potential improvement of the model in the event of a change in the structure of the questionnaire, and according to the consistency of the new structure with the content.

The aim was to establish a structure with good fit indices and factor loadings > 0.4. If the presence of an item or a group of items was unnecessary in terms of content, it was removed. If some items did not fit into a dimension or did not present properties acceptable in CFA but were important for assessing attachment in qualitative terms, the reduced committee could decide to retain them.

A single-parameter Rasch analysis was carried out. As the items were polytomous, a Rating Scale Model was used for the analysis [27]. Item response theory was used to check that latent trait was well covered by the items, particularly insecure attachment, and that the sequence of item response modalities was respected. Model fit was evaluated via the infit and outfit mean square (MNSQ). Significant MNSQ values smaller than 0.6 or larger than 1.4 were considered to misfit the model [28, 29].

The Person Separation Reliability index, which assesses internal consistency by measuring the discrimination capacity of the different response levels, was considered good if ≥ 0.80 [30].

If the Rasch analyses yielded unsatisfactory results, the dimension was discussed and modified again by the reduced committee. This process involved going back and forth between several CFA and Rasch analyses combined with an ongoing discussion focusing on content. The Short-IPR obtained at the end of this process was used in the remainder of the study.

Confirmatory analyses of the Short-IPR. The confirmatory analyses were performed on the validation group data. Based on the Short-IPR structure, a CFA and Rasch analysis were carried out using the same criteria.

This study was approved by the relevant ethics committees. All of the analyses were carried out using R software version 3.5.1.

Results

Content Validity

The expert committee reviewed the 62 items of the IPR. They discussed the translation of 30 items and decided to specifically interview adolescents about 9 items.

The average age of the 10 adolescents interviewed on the content validity was 15.1 years, 4 were boys. None found the questionnaire disturbing or embarrassing. Three of them indicated that they would only answer this questionnaire to health professionals because some questions were intimate.

All 62 items were reviewed again by the expert committee and a new adaptation of the IPR was proposed. Some items had to deviate further from the original English version in order to use a vocabulary that was more common, less complex and more adapted to adolescents. Item 35 "*Is competitive with me*" originally translated as "*Est en rivalité avec moi*" was finally adapted into: "*Entre en compétition avec moi*" / "Competes with me". Two adolescents did not understand "*rivalité*" (rivalry).

It was preferable to move away from literal translation in order to keep the meaning of the expressions used in English. Item 54 "*Seems to be dependent and helpless*" originally translated as "*Semble être dépendant et sans défense*" was finally adapted into: "*J'ai l'impression que mon [parent] a besoin d'aide et qu'il/elle est sans défense*" / "*I feel that my [parent] needs help and that he/she is helpless*".

In total, 13 items have been modified compared to the first French translation (Appendix 1).

Study of metric properties of the French version of the IPR

535 adolescents responded to the questionnaires, for a total of 1070 responses; the responses concerning the mother and father were analyzed independently.

The average age of the included adolescents was 14.3 years; 73.2% were females. 76.6% of parents were married (Table 1).

Table 1
Socio-Demographic Characteristics of Development Group and Validation Group.

Socio demographic characteristics	Total		Development Group		Validation Group	
	N = 1070		N = 275 (25,7%)		N = 795 (74,3%)	
	N(%) / Mean(SD)		N(%) / Mean(SD)		N(%) / Mean(SD)	
Mean age (year)	14.3	(1.50)	14,3	(1.49)	14,3	(1.58)
Parent						
Father	518	(50.0)	144	(52.4)	374	(49.1)
Mother	518	(50.0)	131	(47.6)	387	(50.9)
Gender						
Male	278	(26.8)	96	(34.9)	182	(23.9)
Female	758	(73.2)	179	(65.1)	579	(76.1)
Family statut						
In pairs	814	(81.4)	159	(61.9)	655	(88.)
Separated / divorced	138	(13.8)	75	(29.2)	63	(8.4)
Widow(er)	18	(1.8)	5	(1.9)	13	(1.7)
Single	30	(3.0)	18	(7.0)	12	(1.7)
NA	36		18		18	
Legend :						
Socio-Demographic Characteristics of Development Group and Validation Group used for the Study of the Psychometrics Properties of the Inventory of Parental Representations.						

The development group included 275 responses (144 for the father and 131 for the mother) and the validation group included 795 responses (374 for the father and 387 for the mother). CFA results for the different versions of the original IPR conducted in the development group were not good. On the paternal and maternal sections of the seven dimensions of the IPR, CFA results were mediocre in the development group (paternal: CFI = 0.634, TLI = 0.618, RMSEA = 0.081; maternal: CFI = 0.539, TLI = 0.520, RMSEA = 0.090). For the revised 5-dimension version, the fit indices were reasonable only for the RMSEA; CFI and TLI were mediocre too (paternal: CFI = 0.846, TLI = 0.814, RMSEA = 0.075; maternal: CFI = 0.848, TLI = 0.817, RMSEA = 0.077). Given the mediocre properties, a new short version of IPR was constructed based on the content, with improved psychometric properties.

Compiling a new version of the IPR

Step 1. New dimensions were proposed by the reduced committee. Some items were removed from the scale due to ambiguities or comprehension problems raised in the content analysis. This applies to item 58: "*isn't a strong person*", which defines the parent and not the relationship between adolescent and his/her parent. A dimension named *Concern* was initially proposed, which comprised items 2, 30, and 45. This dimension was completely removed because the items in this dimension measured the parent's personality and his/her fragility more than parental attachment relationship. The *Reliability* dimension was designed to measure the availability of the attachment figure and was therefore preferred. For some items, it was difficult to define the anticipated response according to attachment style, primarily because the central responses reflected secure attachment. These items, such as item 45: "*I worry about him dying*", were removed.

Six dimensions were retained in the Short-IPR version: Reliability, Autonomy, Respect, Intrusion, Aggression and Availability.

Step 2. Four items presented a floor/ceiling effect. E.g. item 13: "*likes to see me fail*" had a floor effect; 239 out of the 251 adolescents answered 1 in response to this item. The difficulty with this item appeared to be major, but it was not required to evaluate the different attachment styles and was therefore removed.

Step 3. The IPR properties remained mediocre when the responses given for both parents were analyzed simultaneously. Two versions of the IPR were therefore proposed, one for the father (Short-IPRF) and one for the mother (Short-IPRM), presented in Appendixes 3 and 4, respectively.

Some items presented mediocre properties (with factor loadings below 0.4 or modification indices that strongly linked the item with several other dimensions) and were therefore removed, such as item 24: "*places his needs first*".

Item 14: "*Doesn't approve my dating*" was also excluded. The IPR is aimed at adolescents from 13 years of age. Several adolescents did not respond to this item because they did not feel concerned by emotional relationships as yet.

The *Aggression* dimension (items 17 and 35) was excluded from the analyses but retained in the Short-IPRF and the Short-IPRM. Performance for these items was mediocre, including a floor effect, but the content was deemed necessary for evaluating attachment, especially insecure attachment.

The final version of the Short-IPRF, comprises 15 items divided into the dimensions outlined above. CFA was carried out on 4 dimensions. The dimension assessing *Availability* had only one item, namely item 41 ("*My father does not respond when I'm in trouble*") and could not be included in this analysis. However, it was decided to leave this item in the paternal scale to explore the representation of the father's availability to the adolescent, which is an important feature in assessing attachment. The Short-IPRF items did not show any modification indices > 10 or any factor loadings < 0.4 during CFA in the development group.

The final version of the Short-IPRM, relating to the mother, comprises 16 items divided into 4 + 1 dimensions. The *Reliability* dimension was not included in the maternal scale as the responses were not discriminatory. CFA was carried out using 4 dimensions. The Short-IPRM showed only two items with a modification index > 10 and no item with a factor loading < 0.4 in the development group.

Factor analysis for the final forms of both questionnaires gave good results with good or acceptable fit indices (Table 2).

Table 2
Results of Classical Test Theory Analyses of Short Paternal and Maternal Versions of the Inventory of Parental Representations.

	Short-IPRF		Short-IPRM	
	Development	Validation	Development	Validation
CFI	0.980**	0.987**	0.947*	0.943*
TLI	0.973**	0.982**	0.932*	0.927*
RMSEA	0.035**	0.027**	0.061*	0.068*
Loadings	0	1	0	0
Legend : Results of Classical Test Theory Analyses (Confirmatory Factor Analyses and Correlation Coefficient) of Short Paternal and Maternal Versions of the Inventory of Parental Representations Proposed in These Study (respectively Short-IPRF and Short-IPRM) in the Development Group and the Validation Group				
CFI = <i>Comparative Fit Index</i> , TLI = <i>Tucker-Lewis Index</i> , RMSEA = <i>Root Mean Square Error of Approximation</i> , Loadings : number of items with loadings < 0.4				
* reasonable adjustment; ** good adjustment.				

Analysis on validation group

The good results obtained with the fit indices in classical test theory were corroborated in confirmatory analyses: Short-IPRF: CFI = 0.987, TLI = 0.982, RMSEA = 0.027; Short-IPRM: CFI = 0.953, TLI = 0.927, RMSEA = 0.068 (Table 2). The adjustment was reasonable for the Short-IPRM scale and good for the Short-IPRF scale. Only 1 item, item 21 in the paternal version, presented a loading between 0.35 and 0.40 during validation group analyses. This item was retained in the short version after discussions with the reduced committee on the basis of preserving the content of the questionnaire.

The sequencing of items in their dimension was good with the Rasch method (Fig. 2). Only one item presented a misfit in the Short-IPRF, namely item 50, and none in the maternal scale. The Person Separation Reliability indices remain mediocre in each dimension studied in isolation (Table 3).

Table 3

Results of Item Response Theory Analyses for the Short Paternal and Maternal Versions of the Inventory of Parental Representations.

	Dimension	Person Separation Reliability	MNSQ (fit)
Short-IPRF	Dimension 1 : Reliability	0.33	0
	Dimension 2 : Autonomy	0.64	0
	Dimension 3 : Respect	0.61	0
	Dimension 4 : Intrusion	0.31	0
	Dimension 5 : Aggression	<i>Excluded from the analyses</i>	
	Dimension 6 : Availability	<i>No Rasch Modelling (only one item)</i>	
	TOTAL		0.79
Short-IPRM	Dimension 1 : Reliability		
	Dimension 2 : Autonomy	0.70	0
	Dimension 3 : Respect	0.75	1
	Dimension 4 : Intrusion	0.36	0
	Dimension 5 : Aggression	<i>Excluded from the analyses</i>	
	Dimension 6 : Availability	0.38	0
	TOTAL		0.86
Legend: Results of Item Response Theory Analyses for the Short Paternal and Maternal Versions of the Inventory of Parental Representations proposed in these study (Short-IPRF and Short-IPRM) in the Validation Group			

Discussion

The IPR is a self-administered questionnaire assessing parental attachment in adolescence with a specific focus on insecure attachment styles. However, none of the structures of the original and revised IPR versions were confirmed in the French population after the items were adapted. The psychometric properties of both these versions remained mediocre in the present study. These results could be anticipated given the fact that the structure was not stable in the various IPR studies as shown by the difference in the number of dimensions identified during the various exploratory factor analyses. This can be partly explained by the methodology used by previous authors in the elaboration of the revised version of the IPR.

The IPR items are particularly interesting since they are based on the attachment styles described by Ainsworth and seek to portray insecure attachment more effectively. Thus it was fitting to seek to improve the psychometric properties of this questionnaire. Through an iterative process of dimension generating, the psychometric properties were improved and a stable model was proposed. In the end six dimensions were identified using a qualitative approach, based on attachment theory.

It was clinically relevant to create two separate questionnaires based on paternal and maternal responses. Other questionnaires, such as the Inventory of Parents and Peer Attachment, distinguish between paternal and maternal responses based on the assumption that attachment style differs from early childhood, depending on the attachment figures [14, 31].

The item responses were all ordered according to the Rasch analysis. Qualitatively, items that seemed easier to the experts were indeed classified as easier in the Rasch analysis.

The results show, for each dimension, that the latent trait was covered by the items predominantly at one end of the latent trait. This is the part of the scale that corresponds to insecure attachment where the questionnaire is probably the most discriminating.

A lower discrimination parameter was evident for adolescents at the other end, corresponding to secure attachment. This explains why the Person Separation Reliability indices remained mediocre for most of the dimensions: the items coverage of insecure attachment means a lower discrimination for secure attachment.

Since the purpose of this scale is to define insecure attachment versus secure attachment and distinguish the various representations in terms of insecure attachment, it is particularly interesting to cover mainly insecure attachment.

The Aggression dimension was excluded from the analyses. Item 17, for example: *"Does things to humiliate me"* was particularly difficult and had a floor effect. This partly explains why it was not possible to retain it in the final structure. However, Aggression can be present in the relationship between the adolescent and his/her parents in case of insecure attachment, especially resistant-ambivalent insecure attachment. The committee therefore opted to keep it in both versions. A reliable scoring system should now be established.

Cultural differences between the USA and France may be one of the reasons why the structures proposed in the American versions of the IPR did not give good results in this study. However, during the cultural adaptation process, few items posed difficulties that could not be resolved and that involved deep changes in the items or the questionnaire. The 62-item version may not have good psychometric properties, regardless of language.

Although attachment is universal, there may be cultural differences in attachment patterns. However no differences have been proposed in the literature within Western cultures. For non-western cultures, the modalities of attachment assessment could be discussed and the fitness of the IPR reevaluated in the context of said cultures. For the sake of completeness it would be interesting to validate the proposed shorter structure in other western cultures and in English-speaking countries in particular. The expected results would be to find the same results than in the present study. If this shortened structure is indeed stable in different Western cultures, then the Short-IPR could be used as a short, high-performance, international tool, the content of which is designed to measure attachment.

Conclusion

A step-by-step process involving both content analysis and psychometric property analysis based on the classical test theory and item response theory led to the generation of two questionnaires, a paternal scale, the Short-IPRF (15 items), and a maternal scale, the Short-IPRM (16 items). Their good psychometric properties were confirmed in an independent sample.

This new structure should be tested and used in other languages and culture, on English-speaking adolescents, in particular.

This new tool adapted for the French population has good properties and is based on sound content.

Declarations

Ethics approval and consent to participate: this study has been approved by the ethics committee "Comité d'Éthique du Centre Hospitalier Régional Universitaire de Nancy", in France, the 26th October 2016. The responses to the questionnaires were considered as a consent by the ethics committee.

For the content validity, a written consent of parents and participants was obtained. For the quantitative part, the study of the metric properties, consent was deemed to have been given when the adolescent and his/her parents completed all of the questionnaires distributed. The inclusion of adolescents was only effective if all the questionnaires intended for the parents were returned. The ethics committee validated this method of collecting consent.

The participants received an information letter and they could contact us for any questions.

Consent for publication: not applicable

Availability of data and materials: The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

Competing interests: The authors declare that they have no competing interests

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Authors' contributions: All authors are responsible for reported research.

ML, FL and JE conceptualized and designed the study, drafted the initial manuscript, and reviewed and revised the manuscript. They designed the data analyzed, carried out the initial analyses. ML carried out all the data collection. ML and FL have contributed equally to this study.

FG conceptualized the study, critically reviewed the manuscript for important intellectual content and helped the Discussion sections of the text.

All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

They all have approved the manuscript as submitted and they have no conflict of interest.

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Figures

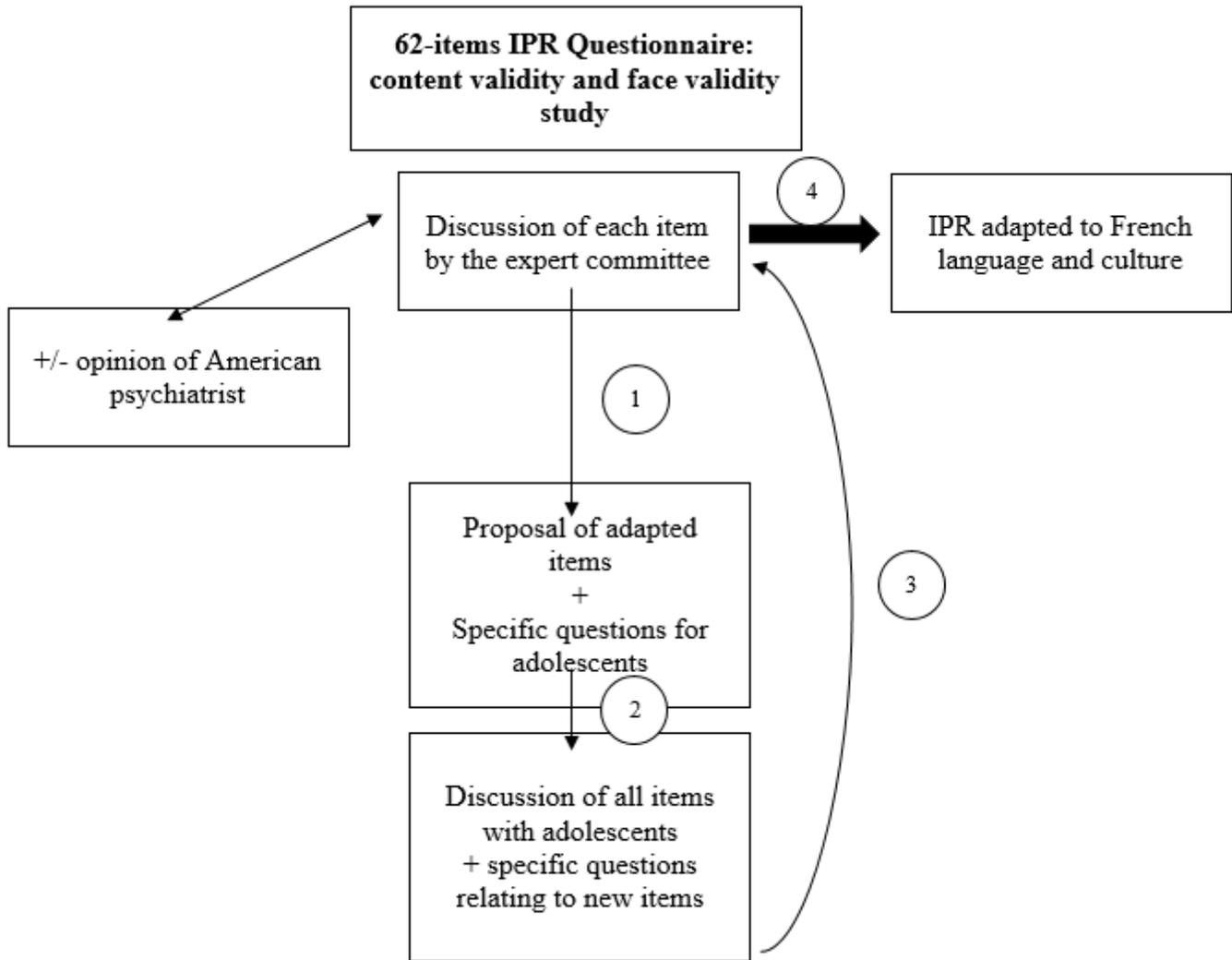


Figure 1

Process of Adapting the Inventory of Parental Representations (IPR) to French Language and Culture.

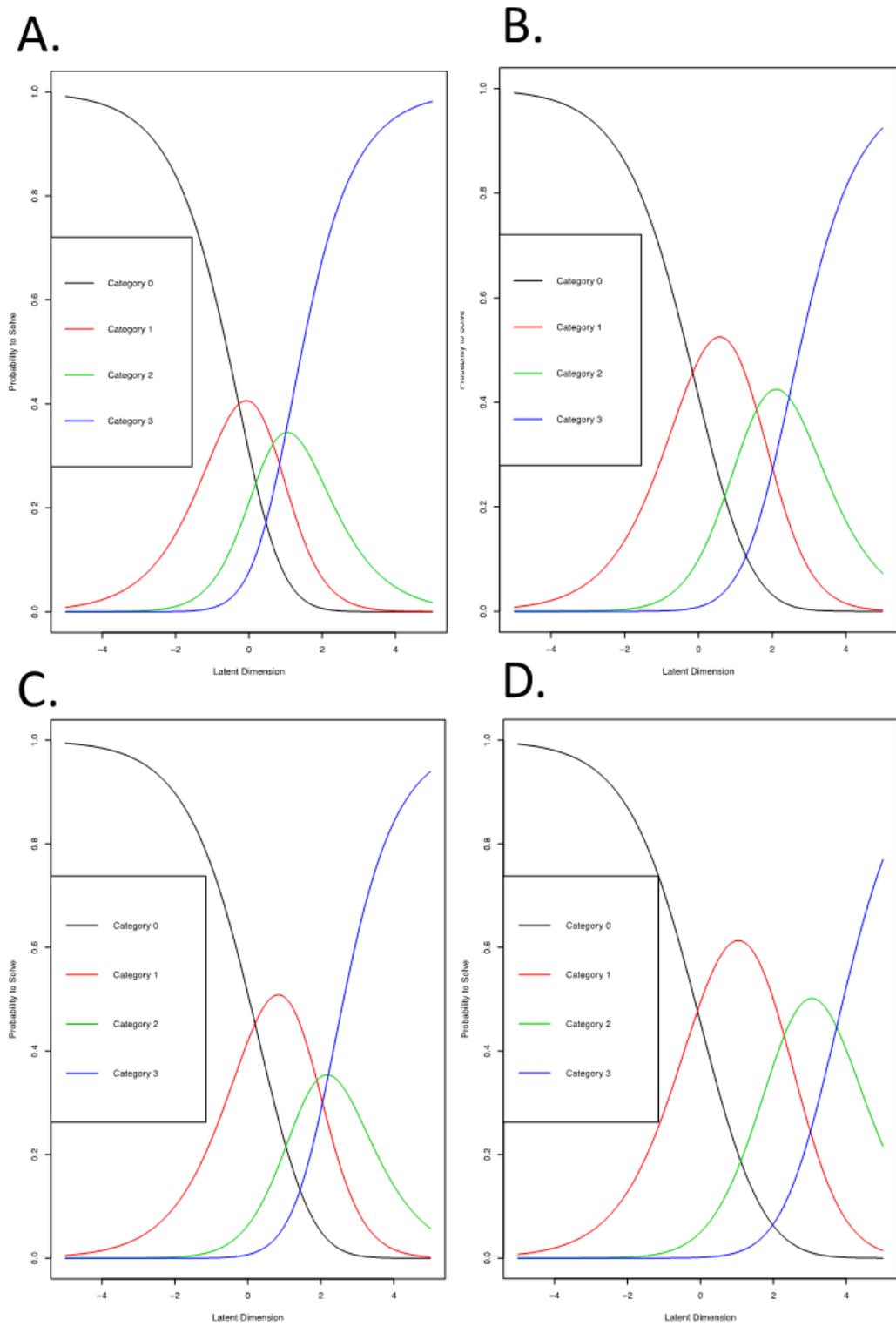


Figure 2

Item Response Category Characteristic Curves (ICC) for Fitted Item Response Theory Model in the Validation Group.

Supplementary Files

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