

# The psychometric properties of the Parents' Preference Test (PPT) revisited

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## *Abstract*

The Parents' Preference Test (PPT) is an attempt to construct a picture-based, objective measure of parenting style, in order to create a starting point for designing an intervention. The PPT measures four different constructs: Focus of Attention, Experiential Modality, Regulation Style and Energy. Since its publication nearly a decade ago, the PPT has been used in several Danish institutions, but the initial data stem from a rather select sample, wherefore it seems pertinent to re-evaluate the initially established psychometric properties.

The current study is a re-investigation of these properties of the PPT, based on a new sample of 1466 subjects. It was found that three out of the four PPT scales are Rasch-homogeneous, whereas the final scale (Energy) is not. Hence, the PPT does display valid psychometric properties, albeit to a lesser degree than initially assumed.

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## *Introduction*

The Parents' Preference Test (PPT) (Westh, 2003a, 2003b; 2006) is a picture-based test developed to measure parenting style objectively. The test consists of four unrelated dimensions: Energy, Focus of Attention, Experiential Modality, and Regulation Style. There is no item overlap between the Focus of Attention, Experiential Modality, and Regulation Style dimensions, whereas the Energy dimension consists of items also included in the three other dimensions.

The dimensions have been selected on the basis of intensive clinical observations by test author Finn Westh and of pervasive literature studies of the essential components of parenting, e.g. the needs identified by Killén (1996) as well as others (e.g. Bateson et al., 1956; Satir & Baldwin, 1983; Kelly, 1963; and From, 1963), as compared to one of the central modern theories of general and clinical personology, developed by Theodore Millon (1969; 1990; Ferrer, 2006; Millon & Davis, 1996; Millon & Everly, 1985; Millon et al., 1996). Hence, it is an operationalization of a clinico-theoretical hypothesis concerning the applicability of the four-dimensional Millon (ibid.) General Model of Personality to the field of parenting – i.e., a description of parenting styles, seen as parents' internal representations of their preferred ways of interacting with their children.

### *The PPT dimensions:*

Energy: Are the parents primarily active or passive in their interaction with their children? Active parents tend to take the initiative and be more responsive while interacting, whereas passive parents come across as more hesitant and receptive.

A central parenting-style challenge with regard to Energy and child development is for the parents to engage in interaction with their children, without dominating or pampering them, while fostering self-sufficiency and turn-taking.

The Energy dimension is seen as a subjacent dimension which – although independent of the other three dimensions – influences the expression of these, by determining to which degree and in what form Attention, Experiential Modality, and Regulation manifest themselves.

Focus of Attention: Do the parents focus their attention primarily on their children or on themselves? Focus on the children – Paedoptic Focus – means that the parents are prepared to be with their children and to respond to them, as well as being attentive to the children's perspectives, intentions, and initiatives. Focus on themselves – Autoptic Focus – refers to parents who will respond if needed but who are, in general, preoccupied with their own thoughts and activities – which are not connected with their interaction with their children.

A central parenting-style challenge with regard to Attention and child develop-

ment is for the parents to create a consistent, stable, predictable, and emotionally safe environment, as well as to teach the children when (not) to expect and/or demand attention.

Experiential Modality: Are the parents emotionally or rationally oriented in their experience of their children's situation and needs? Reason-oriented parents experience their children's intentions, initiatives, perspectives, and needs from a logical-rational point of view, whereas emotion-oriented parents experience their children's intentions, initiatives, perspectives, and needs from an empathic-emotional point of view.

A central parenting-style challenge with regard to Experiential Modality and child development is for the parents to create an environment that fosters the children's ability to master a flexible approach when using their rational and emotional competencies.

Regulation Style: As far as the regulatory aspects of their child rearing is concerned, are the parents focusing on general principles or on the situation at hand? Rule-oriented (Preceptual) parents regulate their children's behaviour on the basis of previously established norms and precepts which are then applied to the current situation. Situation-oriented (Contextual) parents regulate their children's behaviour on the basis of an ad hoc assessment of the potential inherent in each situation.

A central parenting-style challenge with regard to Regulation and child development is for the parents to ensure boundaries and regulations that will protect their children from harm – while, on the other hand, refraining from overprotecting them. Simultaneously, the children's independence and common sense must be allowed to grow in order for the children to develop their own standards and procedures for remaining safe.

Obviously, these four dimensions do not describe all aspects of parenting style, and although the dimensions are fundamentally unrelated, the interpretation of each single dimension needs to be viewed in relation to the other dimensions.

### *The items*

The PPT consists of 24 picture-based items. Each item is fully picture-based, consisting of one stimulus picture showing a typical parent-child interaction, followed by four smaller selection pictures from which the parents must select the picture that *best represents their typical behaviour in the stimulus situation*.

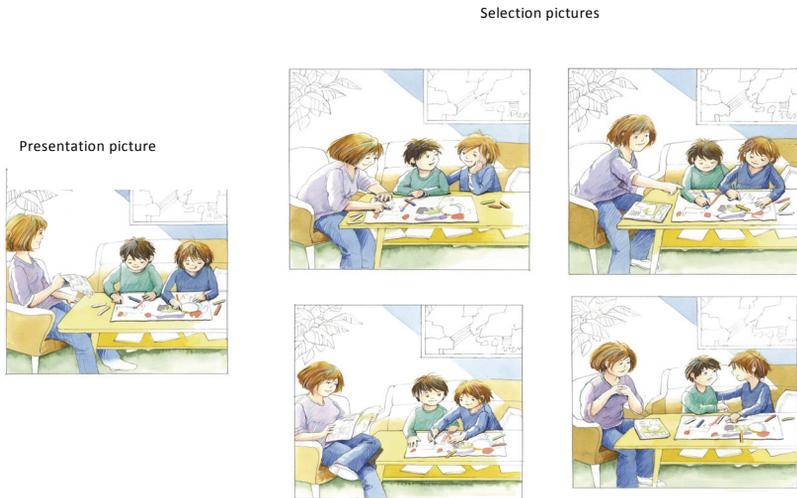


Figure 1

Each item (set of stimulus and selection pictures) is designed to represent a situation defined by the Energy dimension and ONE of the three other dimensions – Focus of Attention, Experiential Modality, and Regulation Style. Hence, the stimulus pictures set the stage for a behaviour pattern categorized as a combination of Energy and one of the other dimensions. The four selection pictures, then, each represent a combination of the Energy dimension and one of the other dimensions – e.g. Active vs. Passive combined with Paedoptic vs. Autoptotic Focus (see Figures 1 & 2).

Whereas the Energy dimension is thus represented in all items and all selection pictures, Focus of Attention, Experiential Modality, and Regulation Style are only represented in eight items each.

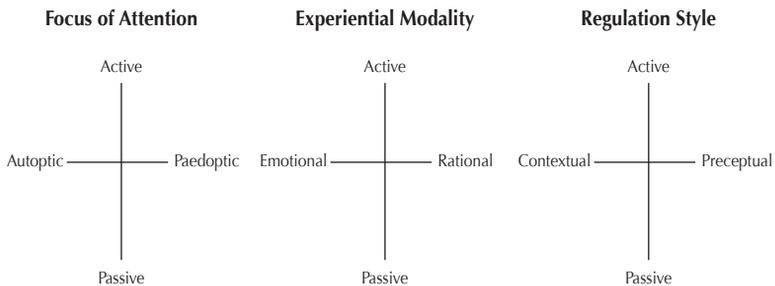


Figure 2

The scoring of the scales is based on the simple sum of the number of times a selection picture representing the specific expression of that dimension is selected by the respondent – e.g. Paedoptic vs. Autoptic Focus. Needless to say, scores range from zero to eight, and the sum of the two expressions of the dimension always add up to eight (except in cases of missing values). The Energy dimension which is represented in all items is scored in the same way (selection of the Active vs. the Passive representation in the selection pictures), but only 15 items are used for the scoring, due to the fact that the originally intended combination of all 24 items did not measure up to the statistical requirements arrived at by means of the Rasch analysis (see Hansen, 2004).

### *The initial construction and internal validation of the test*

The initial construction and validation of the PPT was done in a series of trials that were constructed to ensure ecological validity and internal validity (see Westh, 2003a, 2003b, 2006; Westh & Westh, 2004). For instance, a lot of focus was given to how the pictures were perceived, so as to ensure that the content was understood uniformly. Subsequently the psychometric properties were investigated using a Rasch analysis.

A potential drawback of this previous validation has been the fact that it has been undertaken with relatively few subjects in the normally functioning range, recruited in proximity to the test developers, whereas the test is used clinically also with low-functioning parents, e.g. as a helpful tool in assessing parental competencies. Hence, it may be argued that the sample used to establish the initial psychometric properties was too small and not representative of the intended client group.

On the basis of this fact, it was decided to reanalyse data collected with the PPT.

## *Method*

### *The sample*

The data stem from a total of 1466 subjects who had been referred to a public family clinic or to a psychologist in private practice due to different kinds of family dysfunctions ranging from mild to more severe levels – in some cases for family therapy, in other cases for parental competency assessment. Hence the subjects range from potentially dysfunctional parents to parents functioning normally; and the sample thus consists of a convenience sample that

underwent the PPT as part of an assessment. Given the fact that the PPT is a psychometric tool available only to psychologists, it must be assumed that in each case the test has been administered and scored by the book and on the basis of previous supervised experience, since deviations from such an approach would constitute a serious breach of professional ethics in Denmark. The motivation of the individual respondents and e.g. their inclination to attempt to present themselves in a socially desirable way is unknown.

The sample consisted of 608 (41.5%) males and 858 (58.5%) females, with a mean age of 36.16 (SD: 9.54), and the median at 36.

As far as level of education was concerned, app. 50% of the sample had had only nine years of schooling (mandatory in Denmark), whereas app. 13% had had vocational training or diploma education, while app. 37% had college/university degrees.

### *Data analysis*

Item scores for the four dimensions were calculated as either 0 or 1, depending on the selected answer in relation to the scoring of the scale, the total score being calculated as the simple sum of the correct answers.

In order to make an internal cross-validation of the results, it was decided to randomly select 500 cases (the target sample) out of the 1466 available ones and do the analysis on these, and subsequently compare these with 466 randomly selected cases (the validation sample). The subsamples did not differ in any relevant way from each other or from the total sample. This division was selected in order to 1) ensure a sufficient number of cases for a valid Rasch analysis and 2) ensure that there were enough subjects for completely random selections of subjects for the target sample and the validation sample.

Similar results across the target and validation sample would give a strong indication that the obtained results are valid for the given type of sample.

It was decided to use strict one-parameter Rasch modelling for testing the dimensions of the PPT – as in previous validation studies. In order to conduct a stern test by means of the Rasch model in relation to the internal structure of the dimensions, and to test for bias due to demographic influences, each dimension was independently tested, i.e. with four independent Rasch analyses.

1. Score (High-Low): The target sample (and subsequently the validation sample) was split into two subgroups consisting of the 50% of the sample scoring above the median and the 50% scoring below the median. The purpose of this split was to ensure that the rank order of the item difficulty and the regression were invariant across the total score.
2. Age: The target sample (and subsequently the validation sample) was split

- into “Younger” (35 or below) and “Older” (36 and above). The purpose of this split was to ensure that the rank order of the item difficulty and the regression were invariant across age, i.e. no age bias.
3. Gender: The target sample (and subsequently the validation sample) was split into “Males” and “Females”. The purpose of this split was to ensure that the rank order of the item difficulty and the regression were invariant across gender – i.e. no gender bias.
  4. Education: The target sample (and subsequently the validation sample) was split into “Higher Education” (College degree or more) and “Lower Education” (Mandatory school, vocational training or diploma education). The purpose of this split was to ensure that the rank order of the item difficulty and the regression were invariant across education – i.e. no education bias.

## Results

### *Results of the Rasch analysis*

The results from the Rasch analysis of the target sample are reported in Tables 1, 2, 3, and 4. Similar results were found for the validation sample. Column two shows the item parameters (easiness parameters), columns 3, 4, 5, and 6 show Wald's z-values for the individual items for the specific Rasch analysis.

The last line reports the Andersen  $\chi^2$  for the specific analysis as an indication of the fit to the model. The Andersen  $\chi^2$  is compared to the Wilson-Hilferty approxi-

Table 1: Focus of Attention

<i>Estimated reliability 0.69</i>		<i>Score (S)</i>	<i>Age (A)</i>	<i>Gender (G)</i>	<i>Education (E)</i>
	<i>Item parameter</i>	<i>Wald z-Value</i>	<i>Wald z-Value</i>	<i>Wald z-Value</i>	<i>Wald z-Value</i>
Item 1	0.9521	-0.3455	1.7797	-2.8933*	1.8265
Item 2	0.1121	-0.0903	1.4946	-4.6646*	-0.1331
Item 3	0.4653	1.5632	-1.1352	-0.5961	-3.1606*
Item 4	-0.2476	-1.7813	-0.0017	4.7167*	0.7208
Item 5	-0.8808	-1.4402	0.2362	0.0742	-1.8343
Item 6	-0.1756	1.6286	-0.3482	-1.2102	0.2780
Item 7	0.1413	1.7622	3.7439*	4.2622*	4.5964*
Item 8	-0.3668	-0.2776	-5.0593*	1.0564	-0.6988
Andersen $\chi^2$		11.64	14.94	11.64	9.38
(Significance level at $\chi^2 = 18.5063$ )					

\* Indicates that the item deviates from the strict Rasch model and can be considered biased if the overall fit fails.

Table 2: Experiential Modality

Estimated reliability 0.75		Score (S)	Age (A)	Gender (G)	Education (E)
	Item parameter	Wald z-Value	Wald z-Value	Wald z-Value	Wald z-Value
Item 1	0.6579	0.3146	0.7397	0.8182	0.3731
Item 2	0.2259	0.3435	-0.6481	-0.6268	1.3398
Item 3	-0.9026	2.1976*	-0.6666	-2.2859*	-0.1867
Item 4	0.4407	0.3368	-0.3836	0.6439	-2.0898*
Item 5	0.4985	0.2426	-0.6019	1.1623	-0.2672
Item 6	0.0695	-1.3416	-0.2605	3.2325*	3.0093*
Item 7	-0.2978	-1.7696	2.3581*	-2.0982*	0.6346
Item 8	-0.6921	-0.5501	-1.1100	-1.3578	-2.9410*
Andersen $\chi^2$		6.35	5.13	12.27	10.32
(Significance level at $\chi^2 = 18.5063$ )					

\* Indicates that the item deviates from the strict Rasch model and can be considered biased if the overall fit fails.

Table 3: Regulation Style

Estimated reliability 0.74		Score (S)	Age (A)	Gender (G)	Education (E)
	Item parameter	Wald z-Value	Wald z-Value	Wald z-Value	Wald z-Value
Item 1	-0.6977	-1.2640	-1.5260	1.3350	0.5011
Item 2	0.4337	-1.1564	2.0503	2.6950*	2.6285*
Item 3	-0.2316	1.8869	-0.1822	-0.5706	-2.2826
Item 4	-0.5285	-1.0109	-0.1906	0.6128	0.5691
Item 5	0.4486	-2.8319*	-1.4401	1.7678	1.5922
Item 6	0.8696	1.3189	1.4500	-1.7613	0.5017
Item 7	0.6691	2.1326	-1.3832	-1.6556	1.5263
Item 8	-0.9632	1.1446	1.1359	-1.7700	-2.7869*
Andersen $\chi^2$		17.82	8.72	13.30	16.07
(Significance level at $\chi^2 = 18.5063$ )					

\* Indicates that the item deviates from the strict Rasch model and can be considered biased if the overall fit fails.

mation for significance testing. An Andersen  $\chi^2$  lower than the Wilson-Hilferty approximation indicates a fit to the Rasch model ( $df = 7$  and  $14$ ), and hence, any significant deviation of the specific items in the scale for the specific splits is considered irrelevant.

Table 4: Energy

Estimated reliability 0.43		Score (S)	Age (A)	Gender (G)	Education (E)
	Item parameter	Wald z-Value	Wald z-Value	Wald z-Value	Wald z-Value
Item 1	0.6533	-0.9464	0,2799	-1,1583	2,1310
Item 2	1.5741	-0.2971	1,0726	-2,6094*	-1,0574
Item 3	0.0620	-2.8781*	3,2831*	2,4844	0,1567
Item 4	-0.9961	-1.5524	-1,7532	-2,9259*	1,5408
Item 5	0.2334	-2.9607*	1,9387	1,1480	2,6253*
Item 6	-0.6099	-1.6030	3,4518*	0,3523	6,7495*
Item 7	0.6734	-1.8261	3,2286*	0,4440	2,9115*
Item 8	-0.1463	1.3959	-2,7917*	5,0575*	-1,6980
Item 9	-0.1851	4.8165*	3,1624*	-4,4262*	0,6121
Item 10	-0.2939	9.5391*	-3,1067*	-2,0379	-6,1744*
Item 11	-0.4957	2.1975	-4,9943*	-7,7173*	-3,3222*
Item 12	-0.2235	-0.0453	1,4212	4,8192*	-2,4909
Item 13	-1.3450	2.5740	-3,7563*	3,6338*	-8,7225*
Item 14	0.4017	-0.0779	-3,1284*	0,3175	2,8518*
Item 15	0.6977	-1.9297	-0,6682	3,7793*	0,4865
Andersen $\chi^2$		69.62**	53.51**	84,86**	103,13**
(Significance level at $\chi^2 = 29.1688$ )					

\* Indicates that the item deviates from the strict Rasch model and can be considered biased if the overall fit fails.

\*\* Indicates that the scale is not Rasch homogenous, and hence, that there is item bias and that the scale fails.

Although the concept of reliability is generally not of interest in Rasch analyses, but only in classical test theory, the upper left corner of the table reports the estimated reliability of the scales, calculated by means of Fischer's formula (personal communication) based on Webb, Shavelson & Haertel (2007), using the item parameter to estimate the reliability.

As is apparent from Tables 1, 2, and 3, these three scales fully measure up to the Rasch model irrespectively of the splits (score, age, gender, education) – results that were cross-validated across the target and validation sample. There were some items (e.g. item 7 in Focus of Attention) which deviated from the model and would be interesting to revisit in case of a later revision.

The results from Table 4 – the analysis of the Energy scale – indicated that the scale did not measure up to the Rasch model for any of the splits, indicating that the scale is not Rasch-homogeneous. From a Rasch perspective, this means that the scale is invalid, primarily due to scale items 9, 10, 11, and 13.

Table 5: Scale Characteristics.

<i>Dimension</i>	<i>Focus of Attention (Self)</i>	<i>Experiential Modality (Emotional)</i>	<i>Regulation Style (Situational)</i>	<i>Energy (Active)</i>
Mean	3.23	5.04	2.67	9.37
Standard deviation	1.54	1.48	1.50	2.25
Minimum	0	0	0	0
Maximum	8	8	8	15
1 <sup>st</sup> quartile	2	4	2	8
2 <sup>nd</sup> quartile	3	5	3	10
3 <sup>rd</sup> quartile	4	6	4	11

### Scale characteristics

Table 5 shows the scale characteristics for the current sample.

### Scale intercorrelations

Table 6 shows the scale intercorrelations, and Table 7 shows the results of an orthogonalization operation with a Principal Component Analysis (PCA) with the extraction of the maximum number of components (four) and subsequent Varimax rotation with Kaiser normalisation.

Table 6: Scale Correlation Matrix

<i>Dimension</i>	<i>Focus of Attention (Self)</i>	<i>Experiential Modality (Emotional)</i>	<i>Regulation Style (Situational)</i>	<i>Energy (Active)</i>
Focus of Attention (Self)	1.00	0.02	0.13	-0.14
Experiential Modality (Emotional)	0.02	1.00	0.07	0.06
Regulation Style (Situational)	0.13	0.07	1.00	0.05
Energy (Active)	-0.14	0.06	0.05	1.00

Table 7: Scale Component Matrix With Rotation

<i>Dimension</i>	<i>I' component</i>	<i>II' component</i>	<i>III' component</i>	<i>IV' component</i>
Focus of Attention (Self)	-0.07	0.07	0.01	≈1.00
Experiential Modality (Emotional)	0.03	0.03	≈1.00	0.01
Regulation Style (Situational)	0.03	≈1.00	0.03	0.07
Energy (Active)	≈1.00	0.03	0.03	-0.07
Eigenvalue	1.00	1.00	1.00	1.00

The tables indicate that there is close to no relevant relationship between the scales and that the sum score is nearly identical to the component score, indicating that the latent constructs truly are conceptually independent.

## *Discussion*

The Parents' Preference Test was developed in order to provide an objective measurement of parenting style based solely on visual stimuli. The developmental process was conducted through a series of trials in order to ensure the ecological validity of the specific items, as well as to ensure valid scales, by means of one of the strictest psychometric models in existence – the one-parameter Rasch model. However, the validation process in general was based on a convenience sample primarily including non-clinical subjects, whereas the test is often used with subjects referred for family therapy or for an assessment of their parental competencies. Hence, it was deemed relevant to re-evaluate the PPT using data from client subjects as well as non-clinical subjects in order to ensure the validity of the test also for the typical test subject in clinical practice.

The results indicate that the model is valid with regard to all of the four scales except for the Energy scale – which is clearly not Rasch-homogeneous, meaning that test results from that particular scale have less than perfect validity, and that results from this scale should be interpreted with caution due to pervasive differential item function. Interestingly, Hansen (2004) pointed out that this same scale displayed complexity already in the final phase of the process of the development of the PPT, necessitating a reduction from 24 to 15 items in order to achieve sufficient homogeneity.

A drawback in the present study is the nature of the sample. The sample might be fairly representative of the target population for the test, but neither of the general population nor of a truly objectively dysfunctional or clinical population.

Hence, it is uncertain to what extent the present findings can be generalized to the entire population.

Furthermore, if the results of the present study are taken as valid, then this raises several questions regarding the use and the future of the test. First and foremost, the Energy scale does not conform to Rasch criteria: hence, the scores on the Energy scale are biased, and the sum score subsequently less valid. Although the concept of Energy as a relevant factor in parenting style is fairly clear, as demonstrated in the relevant literature, the PPT in its present form seems to have problems in measuring this without bias – contrary to the findings in the original study.

It would be interesting to obtain a truly representative sample of the population and compare this with the client sample in order to see whether the original or the present findings create an artefact or whether the problems with the Energy

scale are due to sample differences. This was actually attempted during the original validation study, but with no apparent difference; however, the number of respondents was very small, wherefore no solid conclusions could be drawn.

Secondly, as is apparent from Table 5, the means of the three scales (excluding Energy) are not identical, and deviate from the hypothesized "optimum mean" of 4. This indicates either that the items are not perfectly distributed or that the specific sample does indeed have these specific characteristics – i.e., that the typical referred client is apparently rather focused on the child, rather emotionally oriented, and inclined to regulate according to rather inflexible rules.

Given the specific sample these results are somewhat difficult to interpret.

Initially, the results indicate that the typical client with problems in the family has a parenting style that is a little too child focused, too emotional and too focused on rules. However, since the sample is rather heterogeneous with respect to the proportion between clinical and non-clinical clients, one must consider two competing interpretations. If the sample is actually mostly representative of rather normally functioning parents with only minor difficulties, possibly unrelated to their parenting style, then it would suggest that "normal" parenting as measured by the PPT is slightly more focused on the child, more emotionally oriented, and more inclined to regulate according to rules. If this is the case, it is so either because the items are not fairly distributed, or because this is the preferred and normal parenting style in Denmark at this given time. This in turn would be something the test administrator would need to take into consideration, or else run the risk of classifying "normally" scoring subjects as deviating from the optimum mean of four, and hence potentially disharmonious in their parenting style.

If, however, the present sample is more characterized by dysfunctional parenting styles, then the present findings would suggest that a typical dysfunctional parenting style is characterized by being too child-focused, too emotional, and too focused on rules. However, the relationship might not be a simple one, and is probably not linear, given the assumptions of the flexible parenting style stated earlier, so one might expect that a single score for parenting is not massively predictive in itself, but that it is extreme scores or even specific constellations of scale scores (i.e., parenting style profiles) that indicate problems.

Obviously, there are ways of investigating this. It would be desirable to initiate a study of (preferably several) clinical groups, a truly non-clinical group, and a truly representative sample, in order to investigate whether there are mean differences across groups – hence uncovering to what extent dysfunctional parenting can be predicted by parenting style. Then, by providing norm-reference scores for the PPT based on these groups, one might be able to identify the range of typical functional parenting styles, as well as the typical dysfunctional parenting styles in relation to specific problems in the family (depending on the nature of

the clinical group investigated), thus making it possible to predict existing or future family problems, based on the test results. Furthermore, the existence of such actual norms (and preferably, multiple sets of norms gathered from different cultures) would provide a glimpse of the parenting style characteristics prevalent in each culture – and, quite possibly, in each subculture.

This would be helpful not only when it comes to clinically guiding parents seeking counsel, but even more so in providing indications of whether a basic Human Standard Parenting Style can be determined, or whether the characteristics of an Optimum Parenting Style differs from culture to culture, meaning that no overall values can be agreed upon – as the differences between Italian and Danish results seem to indicate (Baiocco et al., 2008). Finally, if this is the case, one would expect similar differences to appear over time in the course of development of each single culture.

Thus, it would seem that the PPT is only commencing to display its true potential – but also that much more research is needed, if this potential is to come to fruition.

### *Acknowledgement*

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