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Analysis of the Scale of Parenting and Life Functioning Using the Rasch Measurement Model

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Abstract

The purpose of the current study was to examine dimensionality, reliability, invariance, targeting, scale use and functioning of items across subgroups for a sample of 278 on the Scale of Parenting and Life Functioning (SPLF). Analysis was conducted using a Rasch partial credit model. Overall, the SPLF showed good overall fit to the model. Unidimensionality of the scale was supported in the analysis, with over 60% of the raw variance explained by the measure. Item fit also provided evidence that the items fit the model. Scale categories displayed clear monotonicity. No differential item functioning was found for mother's age, race/ethnicity, or primary language. Further examination of the SPLF in larger samples is recommended to confirm the findings of the current study. Future studies should also attempt to examine inter-rater reliability by pursuing samples with rater connectivity to fully understand the conceptualization of the scale for clinicians.

Acknowledgements

I wish to thank the Community Infant Program staff and for their diligent work to improve the lives of the families they served. I also wish to thank staff for taking the time to administer the measure. Thank you to the scale developers, Janet Dean and JoAnn Robinson for their continued commitment to increasing program effectiveness through the development and study of the SPLF. Finally, I would like to thank to my advisor Kathy E. Green for her expertise and guidance.

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Chapter One: Introduction

Despite decades of research seeking to provide insight into the issues of identification and treatment, the eradication of child maltreatment remains elusive and costly. It is estimated that $124 billion is spent per year on social service interventions with substantiated maltreating families (Fang, Florence, & Mercy, 2012). Research has indicated that preventive services are not only more cost effective but have the potential to yield better sustained outcomes in prevention of abuse and neglect (U.S Department of Health and Human Services, Administration for Children and Families; Children's Bureau, Child Information Gateway, 2013). Programs have been established with the goal of providing effective prevention for high risk families. However, these programs must have mechanisms for evaluating the families they serve in order to identify needs, allocate resources efficiently, provide appropriate interventions, and establish program outcomes. All of these program functions balance on the use of valid and reliable measurement. Unfortunately, we often measure these programs with little concern for the quality of measurement. In cases where the potential for child abuse and neglect are assessed, the consequences of false negatives could be devastating for both the child and family while on the other hand false positives could carry social stigma that is also detrimental. Therefore, measure validity is crucial in these high stakes situations.

Far too often assessments are developed and administered without thorough attention to the psychometric properties of the instrument or its validity as a measure of the construct under investigation. It is therefore the goal of the current study to provide some insight, for at least one preventive program, of their child maltreatment assessment.

The Community Infant Program

The Community Infant Program (CIP) is a preventive-intervention service whose aim is to improve parent-child health outcomes, promote positive parent-child relationships, and prevent child abuse and neglect. As described by the program director, "The primary concern of the program is the strengthening of families in our community and the reduction of family violence. Our mission has been defined as follows: 1) Ensure health, safety, and developmental progress during the sensitive time of infancy. 2) Strengthen family development during the early parenting experience. 3) Engage in community education concerning the importance of prevention for infant's age zero to three years." (J. Dean, personal communication, June 15 2012).

The Community Infant Program began providing preventive services in 1984. The program combines intervention approaches from the fields of Infant Mental Health (parent-infant psychotherapy), Nurse Home Visitation, and Prevention of Child Abuse and Neglect. Research from these areas has demonstrated that these program models have the ability to: 1) effect positive change in family functioning, 2) reduce the chance of harm to an infant from physical abuse and neglect, 3) increase parent-infant capacity to securely attach, 4) enhance a family's ability to utilize services, 5) reduce the chance of

unwanted pregnancies, and 6) be highly cost-effective when compared with other services not aimed at prevention.

In an attempt to integrate the best of these efforts and mold a home-based outreach program that is preventive in scope, and contains the therapeutic capacity to intervene intensively with seriously at-risk families, the program employs a multidisciplinary, multicultural system of service delivery, utilizing parent-infant psychotherapists and nurse home visitors as the primary service team.

The service team assessment is part of an informed and grounded approach to providing services to clients. The use of assessment allows the program to gather baseline data not only for assessing risk and providing customized interventions for each family, but also in order to record and provide data for program outcome research. Scales used in the battery of assessments include the Scale of Parenting and Life Functioning (SPLF), Parent-Infant Relationship Global Assessment Scale (PIRGAS), Global Anxiety Scale (GAD-7), Edinburgh Post-Natal Depression scale (EPDS), the HOME Inventory, Ages and Stages Questionnaire (ASQ), and the Colorado Client Assessment Record (CCAR). The SPLF was developed specifically with the needs of the program and it's clinicians in mind.

The Scale of Parenting and Life Functioning (SPLF)

The Scale of Parenting and Life Functioning (SPLF: Dean & Robinson, 1984, Revised 2005), was developed for use by the Community Infant Program to aid clinicians in organizing observations, gathered in therapeutic sessions, of attitudes and behaviors that occur in potentially maltreating parents and to guide customization of interventions

for high risk families and mothers with young children who exhibit potential indicators

for abuse and neglect. Developed in 1985 and revised in 2005, the Scale of Parent and

Life Functioning (SPLF) has been used in practice by the Boulder Mental Health

Community Infant Program for the past 28 years.

Despite the extensive use of the scale, only one preliminary investigation of the

scale has been conducted to establish validity and reliability of the scale. Using a

classical test theory approach, Oderberg (1987) examined the initial version of the SPLF

(Robinson & Dean, 1985). The review and investigation of the SPLF properties included

examination of each SPLF item with all other items, interrater reliability, concurrent

validity, and convergent validity. Consideration of item correlations led to the author's

conclusion that a global "functioning level" was present. Interrater reliability was not

confirmed with only one half of interview ratings demonstrating agreement, but

correlations between raters revealed strong associations between raters' scores. A case for

concurrent validity was made through the examination of a previous study that had used

similar SPLF items. Finally, convergent validity was examined through comparison of

the Beck Depression Inventory (BDI) and the Family Inventory of Life Events and

Changes (FILE) self-report assessments, which Oderberg argued were supported as

measures strongly associated with maltreatment. However, the study did not find

evidence of significant associations between the BDI, FILE and family functioning scale.

One primary limitation of this study was the very small sample ($n = 13$). As a result the

study did not examine the reliability or report Cronbach's alpha for the scale.

Furthermore, this sample size limited the researcher's ability to conduct an exploratory

factor analysis. Though it is not clear whether the author considered performing these analyses, their absence limits our knowledge of the psychometric quality of the SPLF.

Significance of the examination of SPLF using IRT

Only preliminary evidence for the SPLF validity is available. Though this evidence provides insight into the psychometric properties of the assessment, the study suffered from a small sample size and the inability to provide standard quantitative indices such as Cronbach's internal consistency reliability coefficient or an exploratory factor analysis of the measure. The current study sought to provide evidence of the scale's factor structure and reliability, as well as insight into the functioning of items across subgroups of the sample. The validity of the SPLF was investigated using a Rasch model. The guiding questions that directed this examination were:

1. Is the development of the SPLF and its content supported in the research on predictors of child abuse and neglect?

2. Is the use of the SPLF as a total score of parental and life functioning supported by examination of unidimensionality using the Rasch Model?

3. Is there evidence that the SPLF is reliable as supported by person and item separation and reliability of separation?

4. Is there evidence for the measure's overall validity, as a result of individual item fit to the model?

5. Is there evidence that the scale is well targeted for the population it was designed for and are items varied enough in difficulty to capture clients along the continuum of function?

6. Is the measure's rating scale utilized as expected?

7. Do any items of the scale perform differently across different subgroups of the sample?

8. How do results of the analysis direct further modification and use of the SPLF?

By addressing these questions I provide evidence that can be used to determine the validity and reliability of the scale and guide its development and use in the future. It is expected that analysis will aid in the identification of any gaps in the SPLF so that new item development can occur quickly. Of importance is the fact that little is known about whether the SPLF measures families of the lowest and highest levels of functioning effectively. If it is the case that lower functioning families are not being accurately identified this is of great concern. It is an obvious failure to inaccurately assess lower functioning families and thus fail to provide adequate and appropriate intervention. Therefore, it is of practical importance that the measurement error of the scale at the lower extreme be understood. It is also anticipated that the information obtained from the IRT analysis will provide opportunities for further research, and validate the need for multiple raters of each family to examine the interrater reliability of the instrument in the future

Child Maltreatment

Child abuse and neglect continue to be a significant problem in society. According to recent national reports on the prevalence of child maltreatment, an estimated 681,000 children in the United States were known to child protective service (CPS) agencies to be victims of substantiated child maltreatment in 2010.The recent National Incidence (NIS-4) Study of Child Abuse and Neglect published by the United States Department of Health and Human Services as part of the NIS-4, however, estimated that closer to 1.25 million children were victims of child maltreatment that resulted in observable harm and 3 million children experienced physical harm or were endangered (Sedlak et al., 2010). The national incidence studies include cases of child maltreatment that may not be reported or investigated by sources other than official child protective services system (CPS) and therefore may provide a more accurate estimation of child maltreatment prevalence.

The national estimate of child fatalities as a result of child maltreatment in 2011 was 1,570 children, an incidence rate of 0.02 per 1,000 children (U.S. Department of Health and Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau, 2012). National and State statistics about child maltreatment are derived from the data collected by child protective services agencies and reported to the National Child Abuse and Neglect Data System (NCANDS) of the Children's Bureau. Again, more children have likely died from maltreatment than are counted by NCANDS, because data are only included on children already known to CPS agencies (United States Government Accountability Office, 2011). According to the

NIS-4, an estimated 2,400 children died as a result of abuse or neglect, an incidence rate

of 0.03 per 1,000 children (Sedlak et al., 2010). Results of the NIS-4 also found that an

additional 509,300 children (6.9 per 1,000 children) suffered serious harm which resulted

in a life-threatening condition, or a long-term impairment of physical, mental, or

emotional capacities. Approximately 27% of the children that were victims of child

maltreatment were under the age of three (U.S. Department of Health and Human

Services, Administration for Children and Families, Administration on Children, Youth

and Families, Children's Bureau, 2012). The youngest children were also the most

represented in child fatalities with 73.8% of fatalities occurring in children under the age

of three (Sedlak et al., 2010). The majority (81%) of all children were maltreated by their

biological parents (U.S. Department of Health and Human Services, Administration for

Children and Families, Administration on Children, Youth and Families, Children's

Bureau, 2012).

Given the prevalence of child maltreatment it is also important to note the impact

of maltreatment. It is estimated that child maltreatment costs 124 billion dollars a year

(Fang et al., 2012). Additionally, children who are maltreated are less likely to practice

safe sex, are more likely to experience teen pregnancy, and are more likely to enter the

penal system (U.S Department of Health and Human Services, 2006). Furthermore

children who have experienced child maltreatment have a higher risk of inflicting child

maltreatment as adults, often resulting in the entry of their own families into social

services systems (Coohey & Braun, 1997; Whipple & Webster-Stratton, 1991). As a

result of the prevalence and impact of maltreatment early preventive services for children

and families is of crucial importance (U.S. Department of Health and Human Services,

Administration for Children and Families, Children's Bureau, Child Information

Gateway, 2013).

Preventive Care and Early Interventions

The cost of providing services for families following substantiated child

maltreatment is far more than that of preventive services. Therefore, prevention has

gained attention as an ethical and fiscally attractive alternative. Dubowitz (1989) and

Leventhal (1997) have suggested that interventions for child maltreatment may be less

effective in producing favorable family outcomes than prevention. According to

Dubowitz, preventive services can focus on families before the dysfunction is a

permanent feature of the family's interactional style. Leventhal articulated this idea well

when saying "An ounce of prevention may, in fact, be worth a pound of cure."

There are many programs that attempt to provide preventive services based on

known risk and protective factors (Dubowitz, 1989). These programs seek to protect

children by providing services early in development during a child's infancy. Programs

often include interventions for improving maternal mental health, enhancing parent

affective relationships and understanding of child development, and fostering healthy

family functioning. One such approach that has gained considerable interest has been

home visiting by nurses, paraprofessionals, and trained volunteers. Using this approach,

home visitors work on relationships, parenting behaviors, and concrete needs in the

family's home.

Reviews of randomized trials of secondary preventive efforts suggest that home

visits can prevent childhood injuries and appear promising in reducing the occurrences of

abuse and neglect (Guterman, 1997; Roberts, Kramer, & Suissa, 1996). These programs have documented success in preventing maltreatment, improving the infant-parent relationship, developing the family's functioning and increasing family stability.

Olds and colleagues (1986) found that families visited by a nurse had fewer instances of verified child maltreatment during the first years of life. Findings also suggested that the program was more cost-effective than the cost of services provided to families entering the social services system after abuse had occurred.

A more recent study by Olds (1999) found that the home visit program resulted in fewer childhood injuries and in family planning, which provided an opportunity for mothers to move into the workforce and so stabilized the mother's ability to find employment and provide a stable income. Additionally, these children were less likely in adolescence to experience incarceration, and substance abuse. These studies provide evidence for programs that target mutable factors with several promising outcomes

Parenting and Life Functioning Risk Factors

There have been several thorough reviews of literature on the risk factors that contribute to parental functioning and child abuse potential. These reviews are exhaustive in their list of factors that have been studied in the past years that may predict maltreatment (Belsky, 1993; Black, Heyman & Smith Slep, 2001;Milner& Chilamkruti, 1991;Schumacher, Slep,& Heyman, 200; Stith, Liu, Davies, Boykin, Alder, Harris, Som, McPherson & Dees, 2009; Slack, Berger, DuMont, Yang, Kim, Ehrhard-Dietzel& Holl).As a result, a comprehensive approach to the prevention of child maltreatment is needed due to multiple predictors that influence child maltreatment potential. Ultimately,

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experts conclude that no single indicator predicts maltreatment, but a complex interaction contributes to maltreatment potential (Belsky, 1993; Black et al., 2001).

The U.S Department of Human Services has identified six protective factors that are amenable to intervention. These factors include: Parent Child Attachment (Affective Relationship), Parental Knowledge of Caregiving (Parental Sensitivity) and Knowledge of appropriate Developmental milestones (Expectations), Parental Resilience (Coping), Social Support, and Concrete supports (Stability meeting basic needs) (U.S Department of Health and Human Services, Administration for Children and Families. Children's Bureau, Child Information Gateway, 2013).

The SPLF includes a range of items measuring mutable factors recognized as potential areas to affect change in families. The items assessed by the SPLF were included because they are recognized child maltreatment indicators that are amenable to intervention (U.S Department of Health and Human Services, Administration for Children and Families, Children's Bureau, Child Information Gateway, 2013). While several other risk factors have been identified in the search to provide a comprehensive model for maltreatment such as childhood history of abuse or neglect (Coohey & Braun, 1997; Whipple & Webster-Stratton, 1991), geographic location of residency (Sedlak, 1997), and the number of children in the family(Connelly & Strauss, 1992; Wolfner & Gelles, 1993), these along with other sociological characteristics are all external to the perpetrator and not applicable in the current setting and therefore were excluded from the SPLF.

The areas assessed by the SPLF for the potential for dysregulation are thoroughly supported as risk factors for child maltreatment. The current literature review describes the support for the inclusion of each item in identifying parenting and life functioning. The scale evaluates parent expectations of age-appropriate child behaviors, the affective relationship (positive interaction with the child), sensitivity to caregiving functions, social support; family conflict, stress and coping; self-appraisal, and stability of basic needs.

Social Support. A family's access to and utilization of social support is a well-documented predictor of child abuse and neglect (Bishop & Leadbeater, 1999; Salzinger, Kaplan, & Artemyeff, 1983; Seagull, 1987; Williamson, Borduin, & Howe, 1991). Studies of maternal social support systems have found that maltreating mothers often have fewer supports, may not perceive that members of their support system provide adequate support, and in some cases are unable to initiate relationships (Bishop & Leadbeater; Salzinger et al., 1983).It has been suggested that access to social support may increase parental efficacy and helps to moderate the effects of stress (Milner & Chilamkruti, 1991).

Family Conflict, Stress, and Coping. Stress is a central factor in understanding maltreatment (Cantos, Neale, O'Leary, & Gaines, 1997; Williamson et al., 1991). Several studies have consistently found that maltreating parents report more stressful life events than their non-maltreating counterparts (Conger, Burgess, & Barrett, 1979; Coohey & Braun, 1997). However, higher stress may not be the only variable. Several studies indicate that families may exhibit high stress without the co-occurrence of child maltreatment (Straus, 1980). This has led some researchers to suggest that coping

strategies are an important mediator (Cantos et al., 1997; Gaines, Sandgrund, Green & Power, 1978). Cantos and colleagues (1997) found that maltreating mothers respond with strong emotional reactance when faced with conflict which inhibits the use of effective coping strategies, greater reliance on emotion-focused coping, avoidance, and less problem-focused coping at the highest levels of stress. Other studies also suggest that abusive mothers may have stronger physiological responses to stressors (Cassanova, Domanic, McCanne & Milner, 1992). Coping with stress may also be impacted by low self-esteem (McCubbin, Cauble, &Patterson, 1822).

Appraisal of Self. Parents who maltreat their children report lower self-esteem than parents who do not. (Anderson &Lauderdale, 1982; Evans, 1980; Milner, 1988; Rosen, 1978) Christensen, Brayden, Dietrich, McLaughlin, Sherrod, and Altemeier (1994) found that neglectful mothers had more negative perceptions of self, were less satisfied with their own behavior and had lower feelings of adequacy. Additionally, these feelings have been found to accompany defensiveness (Steel & Pollock, 1968).

Stability Meeting Basic Needs. Families' abilities to adequately provide for basic needs is often found in the literature by proxy based on the relationship of income and SES to child maltreatment. Previous findings of the National Incidence studies have confirmed that even when controlling for a variety of demographic factors, family household income is still a significant predictor of all forms of child maltreatment. (Sedlak, 1997). Wolfner and Gelles (1993) also have found that other proxies for stability such as constancy of residence and employment resulted in decreases in family violence. Adequacy of "material level of living" which includes access and sufficiency of food has

also been linked to child maltreatment (Kotch, Browne, Ringwalt, Stewart, Ruina, Holt, Lowman, & Jung, 1995; Wolock & Horowitz, 1979).

Expectations. "Unrealistic parental expectations" is often cited in the literature as a predictor of child maltreatment (Azar & Rohrbeck, 1986; Larrance and Twentyman 1983; Spinetta, 1978; Steele & Pollock, 1974; Twentyman & Plotnik 1982; Williamson et al., 1991). Steele and Pollock (1974) theorized that parent's unrealistic expectations result in frustration on the part of the parent and that when these expectations are not met the result is child maltreatment. In many cases parents with unrealistic expectations are less knowledgeable about appropriate child development milestones (Twentyman & Plotkin, 1982). These parents also fail in their ability to separate their own emotions from their children's emotions (Spinetta, 1978). Additionally, studies have found parents who maltreat their children to have more rigid expectations of their children (Milner & Robertson, 1990).

Affective Relationship. Bousha and Twentyman (1984) found that abusive and neglectful mothers had fewer interactions with their child, and did not initiate interactions with their child. Additionally, neglectful mothers showed less affection and did not play as much with their child compared to controls. Bousha and Twentyman also observed that mothers had significantly more verbal aggression towards the child during interactions. Studies have also found in child mother interactions neglectful mothers gave more commands to their children (Burgess & Conger, 1978) and were also more critical of their children (Whipple & Webster-Stratton, 1991).

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Sensitivity to Caregiving. Mothers with the potential for child abuse and neglect are often unresponsive to their children's needs. This is likely not a surprise if one considers that neglect in itself is defined as failure to provide for basic needs. Bavolek (1979) was one of the first to identify this unresponsiveness as a lack of empathetic awareness of their child's needs. Main and Goldwyn (1984) also found neglectful mothers were unable to respond to distress in their infant. Studies have also found that maltreating mothers are inconsistent in meeting their children's needs (Steel, 1985), less likely to comply or respond to their children's requests (Burgess and Conger, 1978) and are generally isolated from their children (Spinetta, 1978). Furthermore, Bavolek (1979) observed that parents with an inhibited sense of empathy for their child's needs exhibited an impulse for abuse. More recent studies have provided corroborating evidence of the lack of impulse control in neglectful mothers (Rohrbeck & Twentyman, 1986). Of some distal importance are findings from Mash and colleagues (1983) suggesting that mothers who exhibit child physical abuse report feeling less competent in their caregiving role.

Customizing Intervention through Assessment

All items assessed in the SPLF are supported as identifiable risk factors for maltreatment. However, the SPLF is not only used in practice as a diagnostic tool but is also used to guide treatment planning for families. Tymchuk and colleagues (1999) suggest that customized interventions are most successful for families facing parenting dysfunction. Assessments like the SPLF can provide information to be used by clinician in customizing interventions; Tymchuk and colleagues suggest that to design effective interventions, assessments must be functional. Furthermore, assessments must adhere to psychometric standards and be appropriate for the stated purpose of the measure; for

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example, if formative in nature they must provide ample information for directing the

intervention (Tymchuk et al., 1999). These measures must have utility in a therapeutic

setting, allowing home visitors to gather data on multiple areas to provide information for

designing a treatment plan. The Community Infant Programs has utilized the SPLF in this

capacity for over three decades. The SPLF has also been used by CIP and other home

visitation settings to test changes in parenting and life functioning as a result of

interventions (Gray et al, 2001) for some time. Still, only one study has investigated the

validity of the SPLF in measuring parenting and life function in clients, with inconclusive

findings (Oderberg, 1987). It is therefore necessary that the SPLF be examined further to

provide vital information to the CIP program for decision making on its continued utility

and function as an assessment of parental functioning.

Chapter Two: Method

Participants

Participants were recruited to participate in CIP across an urban tri-city area in Colorado. Clients were referred to the program from numerous sources including; community hospitals, public health clinics, Women, Infants and Children's Program (WIC), The Department of Social Services, private providers, and self-referrals. A total of 278 mothers, ranging in age from 14 to 46 years (M= 25.4 yrs., SD = 6.3) were administered the SPLF. Ages of mother's children ranged from 2 weeks to 3 years (M = 3.5 months, SD =2.0). Mothers had between 1 and 6 children (M=1.73 children, SD =1.0). The majority of women (76%) spoke English (n = 209), while 21% (n = 58) primarily spoke Spanish. Forty-six percent of mothers were Caucasian (n = 128) and 44% (n = 122) were Hispanic.

Procedure

As part of the program service delivery, evaluation measures and surveys were administered to clients during routine visits every six months. Data were collected at and near intake (baseline) followed by administration at six-month intervals, and at case closure. Multiple evaluation measures and surveys were administered including the SPLF. The SPLF was rated by the family's assigned therapist following in home and clinical observation. In addition to the battery of assessments, staff also gathered a variety of descriptive data from clients. All mothers who were administered the SPLF were

eligible for inclusion in the analysis. Data were provided for analysis via secure data transfer from the programs data management personnel.

Measure

The Scale of Parenting and Life Functioning (© 1984: Dean & Robinson, Revision 2005) is composed of 7 items, using a five-point clinical diagnostic scale. The scale response categories range from 1-5 (1 = "critical dysregulation"; 2 = "serious dysregulation"; 3 = "moderate dysregulation"; 4 = "good enough"; and 5 = "optimal").The scale is summed for a total score of parenting and life functioning and used to measure outcomes over time. Items of the SPLF cover parent expectations of age-appropriate child behaviors, the affective relationship (positive interaction with the child), sensitivity to caregiving functions, social support; family conflict, stress and coping; self-appraisal, and stability of basic needs, in order to determine overall family functioning. The scale was developed by Dean and Robinson and has undergone preliminary evaluation by one other researcher (Oderberg, 1985).

Analysis

The Rasch model is a mathematical formula that specifies that the relationship between a person's ability and the probability of item response that can be characterized by an s-shaped sigmoid curve. In this relationship, item responses are a function of a person's position on the underlying trait and the item's difficulty. The probability of higher scores increases as people have more of the trait and decreases as they have less of the trait. The current analysis examined whether current data from the administration of the SPLF fit the s-shaped function that characterizes the Rasch partial credit model,

which allows format and categories of the scale to vary by item. Using this model,

analyses assessed SPLF dimensionality, reliability, invariance, targeting, and scale use.

Chapter Three: Results

Dimensionality

Unidimensionality refers to the assumption that one dominant factor is being investigated and allows for a "one attribute at a time measurement" (Bond &Fox, 2007, p. 32). This assumption is tested in several ways; it can be verified through overall person and item fit, principle components analysis of residuals (PCAR), and exploration of model fit for individual items. In the current analysis dimensional structure was explored using information on overall person and item fit, PCAR, and individual item fit.

According to Bond and Fox (2007), fit indices provide information to confirm the alignment of the scale to the model and aid in verifying unidimensionality. Fit statistics include infit and outfit mean square and standardized mean square of persons and items. Bond and Fox suggest that all four indices can be used separately or together to determine fit. If the data fit the Rasch model, we expect values of the mean square and standardized fit indices to approach 1.0 and 0.0, respectively. Using Linacre's (2002) recommendations, mean square fit values between .5 and 1.5 can be considered "productive of measurement."

Examination of overall person and item fit for the SPLF provided information to support model fit (Table 1). The mean infit for items was .99 with a standard deviation (SD) of .26, the mean outfit was 1, SD= .25. The mean infit for persons was .99 with a SD of .91, and mean outfit of 1, SD= .95. The mean standardized infit and outfit for

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persons was -.2, with item standardized infit of -.3 and standardized outfit of -.2. These results indicate that there might be slight "overfit" with mean squares less than 1.0 and standardized mean squares less than 0.0.

Though initial fit analysis suggested unidimensionality, the scale was further examined for dimensionality through the investigation of principle components analysis of residuals. When exploring unidimensionality through PCAR, it is recommended that the variance explained by the measure should be greater than 40% and the eigenvalue for the first contrast should have a value less than 2 and an unexplained raw variance 5% or less (Linacre, 2012b). The principle components analysis of the residuals revealed a first residual factor accounting for 63 % of the total raw variance explained, well above the 40% minimum recommendation, 11.5% of the variance was unexplained by the first contrast with an eigenvalue of 2.2 (Table 2).

Linacre (2012b) suggests that PCAR is not conclusive about the presence of a secondary dimension, and recommends additional analysis comparing simulated eigenvalues to the data. Winsteps software was used to create three simulated data files of Rasch fitting data with the same characteristics as the raw data being examined. The files were the analyzed using the same procedures to verify PCAR results. The results of analyses for each of the simulated files resulted in identical PCAR findings. PCAR results of the simulated datasets were then compared to the results obtained for the raw data. The first contrast in the residuals explained 7% of the variance for the simulated data compared to 11.5% in PCAR results for the SPLF. The eigenvalue of 2.2 for the first contrast was bigger than the 1.6 expected to be observed by chance in the simulation. However, according to Linacre (2012b, p. 496), "a 'secondary dimension' must have the

strength of at least 3 items, so if the first contrast has 'units' less than 3 then the test is probably unidimensional." Additionally, contrast plots were examined to determine the contrast between the content of the items occupying the upper positions of the plot and the lowest position. According to Linacre (2012b) this examination can be used to establish whether the content in these items contrast to a degree that we might identify a substantive second factor. Examination did not yield any further evidence to support a 2nd dimension.

In the final consideration of dimensionality, individual items were examined for evidence of fit to the Rasch model. Mean square fit values lower than 1.0, and a negative standardized fit are markers of "overfit". "Underfit" is indicated if a mean squares are greater than 1.5 and standardized fit is greater than 2.0 (Bond & Fox, 2007). The examination of individual item fit permits assessment of the validity of an overall measure by providing a mechanism for identifying less than adequately functioning items.

The final set of items is presented in Table 4, with items in order of misfit. No absolute rules exist regarding what is considered acceptable and unacceptable fit, but for the current scale recommendations for mean square infit or outfit of between .5 and 1.7 for clinical observation were adopted (Wright & Linacre, 1994). Following this rule of thumb, all items appear to fit within the recommended range and all items were retained.

Reliability

Person and item separation and reliability of separation assess instrument dispersion across the trait continuum. For an instrument to be useful, separation should exceed 1.0, with higher values indicating desirable levels of item and persons dispersion

across the continuum. However, if lower values of separation are observed this may be considered an indicator of item redundancy and less variability of clients on parenting and life functioning. Separation determines reliability. The combination of desirable item and person separation result in higher reliability. Person separation reliability (Wright & Masters, 1982) estimates the ability to replicate person rating on other items of the measure, much like Cronbach's alpha.

Person and items separation exceeded 1, for persons, separation was 2.60 for the data and 2.97 expected model. Item separation was 5.62 for the data and 5.88 for the expected model. The larger item separation is expected, due to the larger sample size in comparison to the number of items being examined. The reliability of person separation was .87, with Cronbach's alpha of .90, indicating sufficient internal consistency reliability for the sample.

Scale Use

The fit of the measures response scale to the partial credit model was also examined. This model is frequently used when items in a test vary in their response categories. In the current analysis this model was considered in order to incorporate the possibility of having variable response opportunities for different items. Bond and Fox, (2007) suggest that while likert scales should have the same number of response categories possible, this doesn't imply that they are used in practice in the same way for all respondents and items. With this analysis might reveal that a different number of categories for different items were utilized.

If a scale is utilized as expected, clients rated highly would have more of the characteristic being measured than a client who is rated lower on the scale. Additionally,

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response categories within items should form a continuum of less to more. We expect that a rating of "critically dysregulated" should represent lower parental and life functioning than endorsement of "optimal" for the current scale. Lack of order in the response categories suggests a lack of common understanding of the use of the scale between the developer and the therapists.

For these data, the response scale was 1 ("critical dysregulation") to 5 ("optimal"). Items did not differ substantially in response patterns observed. For example, for item 2 persons responding with a "1" on item 2 had an observed average (-4.13) lower than those responding with a "2" (observed average = -2.09), persons responding with a "2" had an observed average lower than those responding "3" (observed average = -.12), etc. Item 7 was the item with the most a typical response category, persons responding with a "1" had an observed average (-3.24) lower than those responding with a "2" (observed average = -1.94), persons responding with a "2", etc. While, response categories for each item differed slightly in step logit positions there were no large differences in response category use across the 7 items. "Sample expected" values were not highly dissimilar from the "observed averages" for any items and the Andrich Thresholds were ordered and increased with category value. Infit and outfit mean squares are each expected to equal 1.0, with any values less than 1.5 considered nonproblematic (Linacre 2012b). Mean square values ranged from .90 to 1.5 for all items response categories, indicating no substantial misfit for categories 1 through 5 for any of the items, with both infit and outfit mean squares less than 1.5.

Steps for each item were also examined via probability curves; response category probability curves were similar for all items. Probability curves are presented for item 2

(Figure 1) which is typical of all other items in the scale and the most atypical item, item

7 (Figure 2). This examination of the curves also reveals that each categories were

utilized as expected along the continuum, there were no inversions and categories each

contained greater than 10 responses as recommended by Linacre (1999), therefore all

categories were retained in their original format for all items of the measure

Invariance

Invariance or specific objectivity assumes "measurement of any person on a trait

is independent of the dispersion of the items used to measure the trait and item calibration

is independent of the distribution of the ability in the sample of persons who take the test"

(Bond & Fox, 2007, p. 313). If invariance holds true, then the logit position of items of

the scale should not vary across sample groups. Differential item functioning (DIF) was

explored for mother's age, race/ethnicity, primary language, and number of children in

the home, using an adjusted p value of .01. Examination of results for the Welch's t-

statistics yielded no evidence of DIF, all test probabilities exceeded the adjusted alpha

value of $p < .01$ and item positions were fairly consistent across groups with all logit

positions observed closely within the recommended cut off of .5 logits (Linacre, 2012b).

Targeting

Finally, the item person map was examined to assess the distribution of person

logit positions (Figure 3). The positioning of items and person responses together allows

for visualization of person ratings with respect to scale items. In order to conclude that

the scale is well targeted the items are expected to cover the full range of person logit

positions. Additionally, items should not occupy the same logit position on the scale. If

two items occupy the same logit position on the scale these items may be redundant since

they are measuring the same degree of the trait and may suggest that more items that increase range need to be developed.

In Figure 3 we see that the distribution of person logit positions is relatively normal with most respondents falling within plus or minus one logit. However, there are numerous persons whose positions are higher and lower than where items are measuring—and that there are no items that match these persons' levels of the trait very well. The items cover a range with in -1 to +1 logits in difficulty, narrower than the full range of -6.0 to +7.0 for persons. As a result, the scale might benefit from the development of additional items to extend the range of the items. Also, four of the seven items occupy two positions on the scale with two items at the same position and another 2 in the same position, these items may be redundant since they are measuring the same degree of the trait and again suggest that more items that increase range need to be developed.

Chapter Four: Discussion

The purpose of the present study was to use the Rasch measurement model to assess the psychometric properties of the SPLF. Overall, the Scale of Parenting and Life Functioning shows good overall fit with person and item infit and outfit approaching one and standard deviations less than 2. Unidimensionality of the scale was supported in the analysis, with over 60% of the raw variance explained by the measure. Item fit also provided evidence that the items fit the model. Scale categories displayed clear monotonicity no categories had frequencies less than 10 with no evidence of misfitting items for the 7-item scale. Furthermore, examination of differential item functioning also indicated not significant sources of bias among the group classifications examined.

In need of resolution is whether the intent of the measure is to assess each of the defined variables that have been shown to correlate with potential child maltreatment and lower levels of parenting and life functioning or if it is the goal to measure one perfect factor conceptualized as parenting and life functioning.

There appears to be no evidence of DIF for mother's age, race/ethnicity, or primary language, indicating that the items do not appear to have different meanings for different groups of participants. This lack of DIF could be attributed to the fact that the scale is utilized as an observational scale and therapists are more consistent in their understanding of each item, while this may lead to the conclusion that biases based on participant demographics do not introduce bias into the therapists' observations, it is

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possible that other variables could affect the therapists that were not observed in the present study. Future work should examine possible interaction between family and rater demographics. Specifically, families' race/ethnicity and rater race/ethnicity should be considered to further understand how rater characteristics impact item ratings. Examining use of the measure across therapists would also help provide further clarity. Additionally, not all categories within each classification group could be assessed due to the limited sample size within the subgroup. Subgroups with samples less than 30 were not considered based on Linacre's (2012b) recommendation for a minimum sample size of 30 when conducting DIF analyses.

The dispersion of items along the logit position compared to the dispersion of participants' parental functioning was less than desirable. Examination of the person item map indicated that the scale does not have enough range to cover the dispersion of parental function in the present sample. Therefore, designers should consider development of both more difficult and easier items to expand scale coverage to better fit the person ability range observed. Additionally, developers might consider item revision or additional training for items that appear to be measuring the same level of ability and occupying the same logit position.

Limitations of this study entail inadequate sample size of all subgroups which inhibited the ability to conduct a comprehensive analysis of differential item functioning. Of special interest was the examination of DIF across infant age at the time of administration. A previous study of the Edinburgh Postnatal Depression Scale using Rasch found that differential item functioning occurred for mothers across infants' age (Pallant, Miller & Tennant, 2006). Since this instrument is commonly used in intensive

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infant- maternal health research and is administered to the current CIP sample it was the goal of the current study to examine differential item function based on child's age across the categories of: 2-5 weeks, 6-12 weeks, 3months- 6 months, 6 months-12months, 12-18 months, 18-24, 24-36 months. However, data were not available to provide a one to one match of mother's to children's ages. Finally, limited data and the absence of connectivity in ratings by therapist inhibited the ability to assess inter-rater reliability, an important component of understanding whether this clinical tool is used consistently by clinicians.

Summary

This was the first study to undertake a rigorous examination of the SPLF using a Rasch measurement model. The results provided support for the measure's internal consistency reliability, targeting, scale use, and unidimensionality. No differential item functioning was found for mother's age, race/ethnicity, or primary language. Further examination of the SPLF in larger samples is recommended to confirm the findings of the current study. Future examinations of DIF should include the examination of the interaction between client demographics and rater demographics and also attempt to examine inter-rater reliability by pursuing samples with rater connectivity to fully understand the conceptualization of the scale for clinicians. It is also clear as previously discussed that the content coverage of the scale would benefit from further expansion, to include items which are easier to endorse when rating clients and items which are more difficult.

References

Anderson, S. C., & Lauderdale, M. L. (1982). Characteristics of abusive parents: a look at self-esteem. *Child Abuse & Neglect, 6*(3), 285-293. doi: 10.1016/0145-2134(82)90031-x

Azar, S. T., & Rohrbeck, C. A. (1986). Child abuse and unrealistic expectations: Further validation of the Parent Opinion Questionnaire. *Journal of Consulting and Clinical Psychology, 54*(6), 867-868. doi: 10.1037/0022-006x.54.6.867

Bavolek, S., Kline, D. F., McLaughlin, J. A., & Pulicover, P. R., (1979). Primary prevention of child abuse and neglect: Identification of high risk adolescents. *Child Abuse and Neglect, 3,* 1071-1080.

Belsky, J. (1993). Etiology of child maltreatment: a developmental-ecological analysis. *Psychological Bulletin, 114*(3), 413-434. doi: 10.1037/0033-2909.114.3.413

Bishop, S. J., & Leadbeater, B. J. (1999). Maternal social support patterns and child maltreatment: Comparison of maltreating and nonmaltreating mothers. *American Journal of Orthopsychiatry, 69*(2), 172-181. doi: 10.1037/h0080419

Black, D. A., Heyman, R. E., & Smith Slep, A. M. (2001). Risk factors for child physical abuse. *Aggression and Violent Behavior, 6*(2), 121-188. doi: 10.1016/s1359-1789(00)00021-5

Bond, T. G., & Fox, C. M. (2007). *Applying the Rasch model: fundamental measurement in the human sciences* (2nd ed.). Mahwah, NJ: L. Erlbaum.

30

Bousha, D. M., & Twentyman, C. T. (1984). Mother-child interactional style in abuse, neglect, and control groups: Naturalistic observations in the home. *Journal of Abnormal Psychology, 93*(1), 106-114. doi: 10.1037/0021-843x.93.1.106

Burgess, R. L., & Conger, R. D. (1978). Family Interaction in Abusive, Neglectful, and Normal Families. *Child Development, 49*(4), 1163. doi: 10.2307/1128756

Cantos, A. L., Neale, J. M., O'Leary, K. D., & Gaines, R. W. (1997). Assessment of coping strategies of child abusing mothers. *Child Abuse & Neglect, 21*(7), 631-636. doi: 10.1016/s0145-2134(97)00022-7

Casanova, G. M., Domanic, J., McCanne, T. R., & Milner, J. S. (1992). Physiological responses to non-child-related stressors in mothers at risk for child abuse. *Child Abuse & Neglect, 16*(1), 31-44. doi: 10.1016/0145-2134(92)90006-d

Christensen, M. J., Brayden, R. M., Dietrich, M. S., McLaughlin, F. J., Sherrod, K. B., & Altemeier, W. A. (1994). The prospective assessment of self-concept in neglectful and physically abusive low income mothers. *Child Abuse & Neglect, 18*(3), 225-232. doi: 10.1016/0145-2134(94)90107-4

Conger, R. D. (1979). Child Abuse Related to Life Change and Perceptions of Illness: Some Preliminary Findings (Vol. 28, pp. 73-77).

Connelly, C. D., & Straus, M. A. (1992). Mother's age and risk for physical abuse. *Child Abuse and Neglect, 16*(Sep/Oct 92), 709-718.

Coohey, C., & Braun, N. (1997). Toward an integrated framework for understanding

    child physical abuse. *Child Abuse & Neglect, 21*(11), 1081-1094. doi:

    10.1016/s0145-2134(97)00067-7

Dean, J, & Robinson, J. (1984). The Familiy Functioning Scale.

Dean, J. (2005). Scale of Parenting and Life functioning. Dubowitz, H. (1989).

    Prevention of Child Maltreatment: What Is Known. [Article]. *Pediatrics, 83*(4),

    570.

Evans, A. L. (1980). Personality characteristics and disciplinary attitudes of child-abusing

    mothers. *Child Abuse & Neglect, 4*(3), 179-187. doi: 10.1016/0145-

    2134(80)90006-x

Fang, X., Brown, D. S., Florence, C. S., & Mercy, J. A. (2012). The economic burden of

    child maltreatment in the United States and implications for prevention. *Child

    Abuse & Neglect, 36*(2), 156-165. doi: 10.1016/j.chiabu.2011.10.006

Gaines, R., Sandgrund, A., Green, A. H., & Power, E. (1978). Etiological factors in child

    maltreatment: A multivariate study of abusing, neglecting, and normal mothers.

    Journal of Abnormal Psychology, 87(5), 531-540. doi: 10.1037/0021-

    843x.87.5.531

Gray, J., Spurway, P., & McClatchey, M. (2001). Lay therapy intervention with families

    at risk for parenting difficulties: The Kempe Community Caring Program.

    [Article]. *Child Abuse & Neglect, 25*(5), 641-655.

Guterman, N. B. (1997). Early Prevention of Physical Child Abuse and Neglect: Existing
Evidence and Future Directions. *Child Maltreatment, 2*(1), 12-34. doi:
10.1177/1077559597002001003

Kotch, J. B., Browne, D. C., Ringwalt, C. L., Stewart, P. W., Ruina, E., Holt, K., . . .
Jung, J.-W. (1995). Risk of child abuse or neglect in a cohort of low-income
children. *Child Abuse & Neglect, 19*(9), 1115-1130. doi: 10.1016/0145-
2134(95)00072-g

Larrance, D. T., & Twentyman, C. T. (1983). Maternal attributions and child abuse.
Journal of Abnormal Psychology, 92(4), 449-457. doi: 10.1037/0021-
843x.92.4.449

Leventhal, J. (1997). The Prevention of Child Abuse and Neglect: Pipe Dreams or
Possibilities? *Clinical Child Psychology and Psychiatry, 2*(4), 489-500. doi:
10.1177/1359104597024003

Linacre, J.M. (2012a). Winsteps® (Version 3.75.0) [Computer Software]. Beaverton,
Oregon: Winsteps.com. Retrieved January 10, 2013. Available from
http://www.winsteps.com/

Linacre, J. M. (2012b). Winsteps® Rasch measurement computer program User's Guide.
Beaverton, Oregon: Winsteps.com

Linacre, J.M. (2002).What do Infit and Outfit, Mean-square and Standardized mean? *Rasch Measurement Transactions,16(2)*, 878. Retrieved March 15, 2013.Available fromhttp://www.rasch.org/rmt/rmt162f.htm.

Main, M., & Goldwyn, R. (1984). Predicting rejection of her infant from mother's representation of her own experience: implications for the abused-abusing intergenerational cycle. *Child Abuse & Neglect, 8*(2), 203-217. doi: 10.1016/0145-2134(84)90009-7

Marshall, N. A. (2012). A clinician's guide to recognizing and reporting parental psychological maltreatment of children. *Professional Psychology: Research and Practice, 43*(2), 73-79. doi: 10.1037/a0026677

Mash, E. J., Johnston, C., & Kovitz, K. (1983). A comparison of the mother-child interactions of physically abused and non-abused children during play and task situations. *Journal of Clinical Child Psychology, 12*(3), 337-346. doi: 10.1080/15374418309533154

McCubbin, H. I., Cauble, A. E., & Patterson, J. M. (1982). *Family stress, coping, and social support*. Springfield, Ill: Thomas.

Milner, J. S. (1988). An Ego-Strength Scale for the Child Abuse Potential Inventory. [Article]. *Journal of Family Violence, 3*(2), 151-162.

Milner, J. S., & Chilamkruti, C. (1991). Physical Child Abuse Perpetrator Characteristics. *Journal of Interpersonal Violence, 6*(3), 345.

Milner, J. S., Robertson, K. R., & Rogersdebbie, L. (1990). Childhood History of Abuse
and Adult Child Abuse Potential. [Article]. *Journal of Family Violence, 5*(1), 15-34.

Oderberg, N. S. (1987). *Family Functioning in High Risk Populations.* University of Colorado.

Olds, D. L., Henderson, C. R., Kitzman, H. J., Eckenrode, J. J., Cole, R. E., & Tatelbaum, R. C. (1999). Prenatal and Infancy Home Visitation by Nurses: Recent Findings. *The Future of Children, 9*(1), 44-65.

Olds, D. L., Henderson, J. C. R., Chamberlin, R., & Tatelbaum, R. (1986). Preventing child abuse and neglect: a randomized trial of nurse home visitation. *Pediatrics, 78*(1), 65.

Pallant, J. F., Miller, R. L., & Tennant, A. (2006). Evaluation of the Edinburgh Post Natal Depression Scale using Rasch analysis. *Bmc Psychiatry, 6*(1), 28-28. doi: 10.1186/1471-244x-6-28

Polansky, N. A., Gaudin, J. J. M., Ammons, P. W., & Davis, K. B. (1985). The psychological ecology of the neglectful mother. *Child Abuse & Neglect, 9*(2), 265-275. doi: 10.1016/0145-2134(85)90019-5

Roberts, I., Kramer, M. S., & Suissa, S. (1996). Does home visiting prevent childhood injury? A systematic review of randomised controlled trials. *BMJ (Clinical research ed.), 312*(7022), 29-33.

Rohrbeck, C. A., & Twentyman, C. T. (1986). Multimodal assessment of impulsiveness
in abusing, neglecting, and nonmaltreating mothers and their preschool children.
Journal of Consulting and Clinical Psychology, 54(2), 231-236. doi:
10.1037/0022-006x.54.2.231

Rosen, B. (1978). Self-concept disturbance among mothers who abuse their children.
Psychological Reports, 43(1), 323-326. doi: 10.2466/pr0.1978.43.1.323

Salzinger, S., Kaplan, S., & Artemyeff, C. (1983). Mothers' personal social networks and
child maltreatment. *Journal of Abnormal Psychology, 92*(1), 68-76. doi:
10.1037/0021-843x.92.1.68

Schumacher, J. A., Slep, A. M. S., & Heyman, R. E. (2001). Risk factors for child
neglect. *Aggression and Violent Behavior, 6*(2-3), 231-254. doi: 10.1016/s1359-
1789(00)00024-0

Seagull, E. A. W. (1987). Social support and child maltreatment: A review of the
evidence. *Child Abuse & Neglect, 11*(1), 41-52. doi: 10.1016/0145-
2134(87)90032-9

Sedlak, A. J. (1997). Risk Factors for the Occurrence of Child Abuse and Neglect.
Journal of Aggression, Maltreatment & Trauma, 1(1), 149-186. doi:
10.1300/J146v01n01_09

Sedlak, A.J., Mettenburg, J., Basena, M., Petta, I., McPherson, K., Greene, A., and Li, S.
(2010). *Fourth National Incidence Study of Child Abuse and Neglect (NIS–4):*

Report to Congress, Executive Summary. Washington, DC: U.S. Department of

Health and Human Services, Administration for Children and Families.

Slack, K. S., Berger, L. M., DuMont, K., Yang, M.-Y., Kim, B., Ehrhard-Dietzel, S., &

Holl, J. L. (2011). Risk and protective factors for child neglect during early

childhood: A cross-study comparison. *Children and Youth Services Review, 33*(8),

1354-1363. doi: 10.1016/j.childyouth.2011.04.024

Spinetta, J. J. (1978). Parental personality factors in child abuse. *Journal of Consulting

and Clinical Psychology, 46*(6), 1409-1414. doi: 10.1037/0022-006x.46.6.1409

Steele, B. F. (1986). Notes on the lasting effects of early child abuse. *Child Abuse and

Neglect, 10*(3), 283.

Steele, B. F., & Pollock, C. B. (1968). A psychiatric study of parents who abuse infants

and small children. In R. E. Helfer & C. H. Kempe (Eds.), *The battered child* (pp.

414-463). Chicago: University of Chicago Press.

Steele, B. F., & Pollock, C. B. (1974). A psychistric study of parents who abuse infants

and small children. In R. E. Helfer & C. H. Kempe (Eds.), *The battered child* (2nd

ed.). Chicago: University of Chicago Press.

Stith, S. M., Liu, T., Davies, L. C., Boykin, E. L., Alder, M. C., Harris, J. M., . . . Dees, J.

E. M. E. G. (2009). Risk factors in child maltreatment: A meta-analytic review of

the literature. *Aggression and Violent Behavior, 14*(1), 13-29. doi:

10.1016/j.avb.2006.03.006

37

Straus, M. A. (1980). Stress and physical child abuse. *Child Abuse & Neglect, 4*(2), 75-88. doi: 10.1016/0145-2134(80)90016-2

Twentyman, C. T., & Plotkin, R. C. (1982). Unrealistic expectations of parents who maltreat their children: an educational deficit that pertains to child development. *Journal of Clinical Psychology, 38*(3), 497-503. doi: 10.1002/1097-4679(198207)38:3<497::aid-jclp2270380306>3.0.co;2-x

Tymchuk, A. J., Lang, C. M., Dolyniuk, C. A., Berney-Ficklin, K., & Spitz, R. (1999). The Home Inventory of Dangers and Safety Precautions-2: Addressing critical needs for prescriptive assessment devices in child maltreatment and in healthcare. *Child Abuse & Neglect, 23*(1), 1-14.

U.S. Department of Health and Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau. (2012). *Child Maltreatment 2011*. Retrieved from http://www.acf.hhs.gov/programs/cb/research-data-technology/statistics-research/child-maltreatment

U.S Department of Health and Human Services, Administration for Children and Families. Children's Bureau, Child Information Gateway (2013).*Preventing Child Maltreatment and Promoting Well-Being: A Network for Action 2013 Resource Guide*. Retrieved fromhttps://www.childwelfare.gov/preventing/preventionmonth/guide2013/

United States Government Accountability Office, 2011. Child maltreatment:

strengthening national data on child fatalities could aid in prevention (GAO-11-

599). Retrieved from http://www.gao.gov/new.items/d11599.pdf

Whipple, E. E., & Webster-Stratton, C. (1991). The role of parental stress in physically

abusive families. *Child Abuse & Neglect, 15*(3), 279-291. doi: 10.1016/0145-

2134(91)90072-l

Williamson, J. M., Borduin, C. M., & Howe, B. A. (1991). The ecology of adolescent

maltreatment: a multilevel examination of adolescent physical abuse, sexual

abuse, and neglect. *Journal of Consulting and Clinical Psychology, 59*(3), 449-

457. doi: 10.1037/0022-006x.59.3.449

Wolfner, G. D., & Gelles, R. J. (1993). A profile of violence toward children: a national

study. *Child Abuse & Neglect, 17*(2), 197-212. doi: 10.1016/0145-

2134(93)90040-c

Wolock, I., & Horowitz, B. (1979). Child Maltreatment and Material Deprivation among

AFDC-Recipient Families. *Social Service Review, 53*(2), 175-194. doi:

10.1086/643725

Wright, B. D., & Linacre, J. M. (1994). Reasonable mean-square fit values. *Rasch

Measurement Transactions, 8*, 370.

Table 1

Overall model fit, item and person separation and reliability, and mean logit of the Scale of Parenting and Life Functioning (SPLF)

```
    SUMMARY OF 274 MEASURED (NON-EXTREME) PERSON
-----------------------------------------------------------------------
|           TOTAL                      MODEL       INFIT      OUTFIT    |
|           SCORE      COUNT   MEASURE  ERROR    MNSQ  ZSTD  MNSQ  ZSTD |
|---------------------------------------------------------------------|
| MEAN       22.2       6.9      .33     .69      .99  -.2   1.00  -.2  |
| S.D.        5.0        .4     2.18     .09      .91  1.3    .95  1.3  |
| MAX.       33.0       7.0     6.15    1.09     7.77  5.7   7.97  5.9  |
| MIN.        8.0       4.0    -6.21     .60      .09 -2.7    .08 -2.6  |
|---------------------------------------------------------------------|
| REAL RMSE     .78 TRUE SD    2.04  SEPARATION 2.60  PERSON RELIABILITY  .87 |
|MODEL RMSE     .70 TRUE SD    2.07  SEPARATION 2.97  PERSON RELIABILITY  .90 |
| S.E. OF PERSON MEAN = .13                                            |
-----------------------------------------------------------------------

    SUMMARY OF 7 MEASURED (NON-EXTREME) ITEM
-----------------------------------------------------------------------
|           TOTAL                      MODEL       INFIT      OUTFIT    |
|           SCORE      COUNT   MEASURE  ERROR    MNSQ  ZSTD  MNSQ  ZSTD |
|---------------------------------------------------------------------|
| MEAN      882.6     274.6      .00     .11      .99  -.3   1.00  -.2  |
| S.D.       46.6       2.6      .65     .00      .26  2.8    .25  2.5  |
| MAX.      979.0     277.0      .68     .12     1.57  5.6   1.56  5.4  |
| MIN.      832.0     271.0    -1.34     .10      .73 -3.3    .72 -3.3  |
|---------------------------------------------------------------------|
| REAL RMSE     .11 TRUE SD     .64  SEPARATION 5.62  ITEM   RELIABILITY  .97 |
|MODEL RMSE     .11 TRUE SD     .64  SEPARATION 5.88  ITEM   RELIABILITY  .97 |
| S.E. OF ITEM MEAN = .26                                              |
-----------------------------------------------------------------------
```

Table 2

Standardized Residual variance (in eigenvalue units) for the SPLF

```
                                         -- Empirical --     Modeled
Total raw variance in observations    =  19.0 100.0%          100.0%
  Raw variance explained by measures  =  12.0  63.1%           62.9%
    Raw variance explained by persons =   8.8  46.3%           46.1%
    Raw Variance explained by items   =   3.2  16.8%           16.7%
  Raw unexplained variance (total)    =   7.0  36.9% 100.0%    37.1%
    Unexplned variance in 1st contrast =  2.2  11.5%  31.1%
    Unexplned variance in 2nd contrast =  1.2   6.4%  17.4%
    Unexplned variance in 3rd contrast =  1.1   5.6%  15.2%
    Unexplned variance in 4th contrast =  1.0   5.3%  14.3%
    Unexplned variance in 5th contrast =   .9   4.8%  13.1%
```

Table 3

Standardized Residual variance (in eigenvalue units) expected by chance in simulated data

```
                                           -- Empirical --    Modeled
Total raw variance in observations    =     22.5 100.0%        100.0%
 Raw variance explained by measures   =     15.5  68.9%         68.6%
   Raw variance explained by persons  =     12.1  53.9%         53.7%
   Raw Variance explained by items    =      3.4  15.0%         14.9%
Raw unexplained variance (total)      =      7.0  31.1% 100.0%  31.4%
   Unexplned variance in 1st contrast =      1.6   7.0%  22.5%
   Unexplned variance in 2nd contrast =      1.3   5.6%  18.0%
   Unexplned variance in 3rd contrast =      1.1   5.1%  16.4%
```

Table 4

Item fit statistics in order by misfit for the SPLF

```
-------------------------------------------------------------------------------------
|ENTRY   TOTAL  TOTAL          MODEL|   INFIT  |   OUTFIT |PT-MEASURE |EXACT MATCH|      |
|NUMBER  SCORE  COUNT  MEASURE  S.E. |MNSQ  ZSTD|MNSQ  ZSTD|CORR.  EXP.| OBS%   EXP%| ITEM  |
|-----------------------------------+----------+----------+-----------+-----------+--------|
|    7    901    276    -.13     .11|1.57   5.6|1.56   5.4|A .69   .78| 52.7  62.9| BLSTABIL|
|    1    883    272    -.09     .11|1.08    .9|1.04    .5|B .79   .78| 65.1  62.8| BLEXPECT|
|    4    835    277     .65     .10| .94   -.7| .96   -.4|C .78   .79| 65.3  60.9| BLSOCSUP|
|    2    891    272    -.18     .11| .96   -.5| .95   -.5|D .81   .78| 63.9  63.0| BLAFFECT|
|    6    857    277     .41     .11| .89  -1.3| .90  -1.2|c .80   .79| 65.3  61.1| BLSELFAP|
|    5    832    277     .68     .10| .78  -2.9| .85  -1.8|b .81   .79| 65.3  60.8| BLFAMCON|
|    3    979    271   -1.34     .12| .73  -3.3| .72  -3.3|a .81   .76| 73.9  67.0| BLSENSIT|
|-----------------------------------+----------+----------+-----------+-----------+--------|
| MEAN   882.6  274.6    .00     .11| .99   -.3|1.00   -.2|           | 64.5  62.6|      |
| S.D.    46.6    2.6    .65     .00| .26   2.8| .25   2.5|           |  5.7   2.0|      |
-------------------------------------------------------------------------------------
```

```
         CATEGORY PROBABILITIES: MODES - Structure measures at intersections
P        -+-------+-------+-------+-------+-------+-------+-------+-
R   1.0 +                                                         +
O       |11                                                       |
B       |  11                                                  55 |
A       |    1                                               5    |
B   .8 +|      11                                         55      +
I       |        1                               4444          5  |
L       |         1                            44      44     5   |
I       |          1         2222        3333      4        4  5  |
T   .6 +|           1      2      2     33     3  4          4  5  +
Y       |            1    2        2  3      3 4           4 5     |
    .5 +|             12             23        34            *     +
O       |             21             32        43          54      |
F   .4 +|            2 1            3 2       4  3        5  4      +
        |           2   1          3  2      4    3      5    4    |
R       |          2     1        3    2    4      3    5      4   |
E       |         2        1 3         2    4       3  5        4  |
S   .2 +|        2         13           2 4         33 5        44 +
P       |      22          31          4*2           355        4  |
O       |   22         33   11        4     2      5533         44 |
N       |22          333        1**44     2222 555    3333         |
S   .0 +**********************55*********************************** +
E        -+-------+-------+-------+-------+-------+-------+-------+-
         -7      -5      -3      -1       1       3       5       7
         PERSON [MINUS] ITEM MEASURE
```
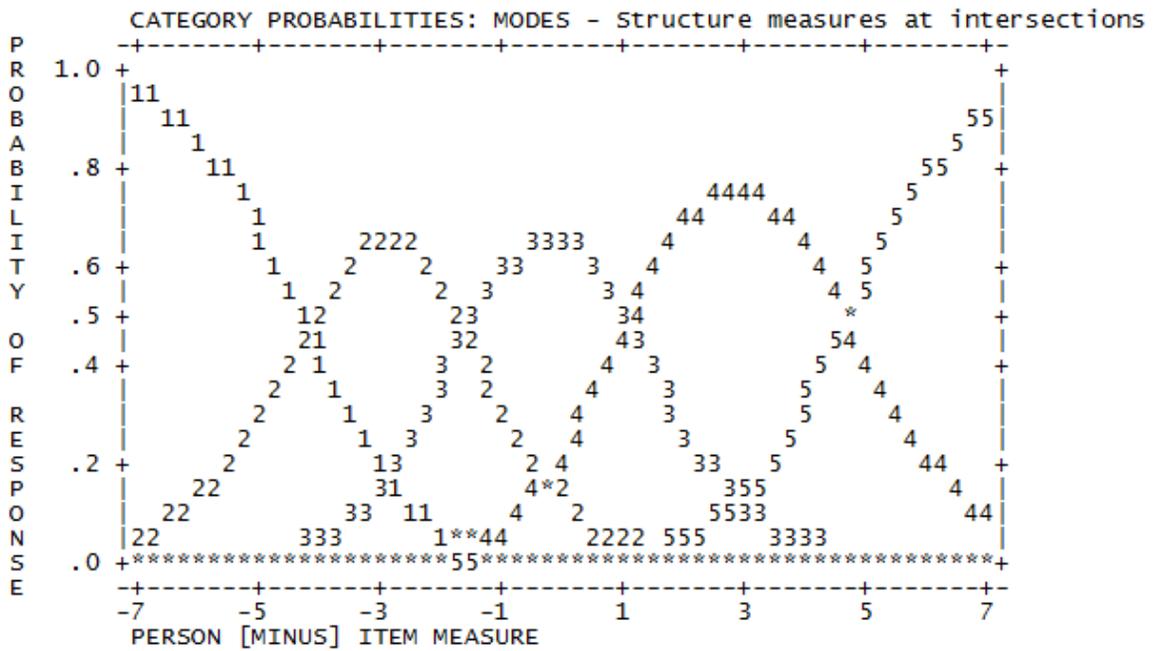
Figure 1. Probability of response category used at each logit position for the SPLF Item 2.

```
       CATEGORY PROBABILITIES: MODES - Structure measures at intersections
P      -+-------+-------+-------+-------+-------+-------+-------+-
R  1.0 +                                                                    +
O      |11111                                                               |
B      |    11                                                              |
A      |      1                              444444                     55  |
B   .8 +       1                          44          44              5     +
I      |        1                       4               4            5      |
L      |         1                     4                 4         5        |
I      |          1                   4                   4       5         |
T   .6 +           1                 4                     4     5          +
Y      |            1    22      333 4                      45             |
    .5 +            1 22   2  33    334                     45             +
O      |             *      23       43                     54             |
F   .4 +            2 1      32      4  3                    5   4          +
       |           2  1     3  2    4    3                  5     4         |
R      |          2      1  3    2 4      3                5       4        |
E      |         2      13       24        3             5         4       |
S   .2 +        22      31      42          3           5           4      +
P      |       2      3  1    4  2           3         5             44     |
O      |      22      33     114     22      333555                   44    |
N      |22222      333      44411     222   55553333                       |
S   .0 +*******************55555*****************************************+
E      -+-------+-------+-------+-------+-------+-------+-------+-
       -7      -5      -3      -1       1       3       5       7
       PERSON [MINUS] ITEM MEASURE
```

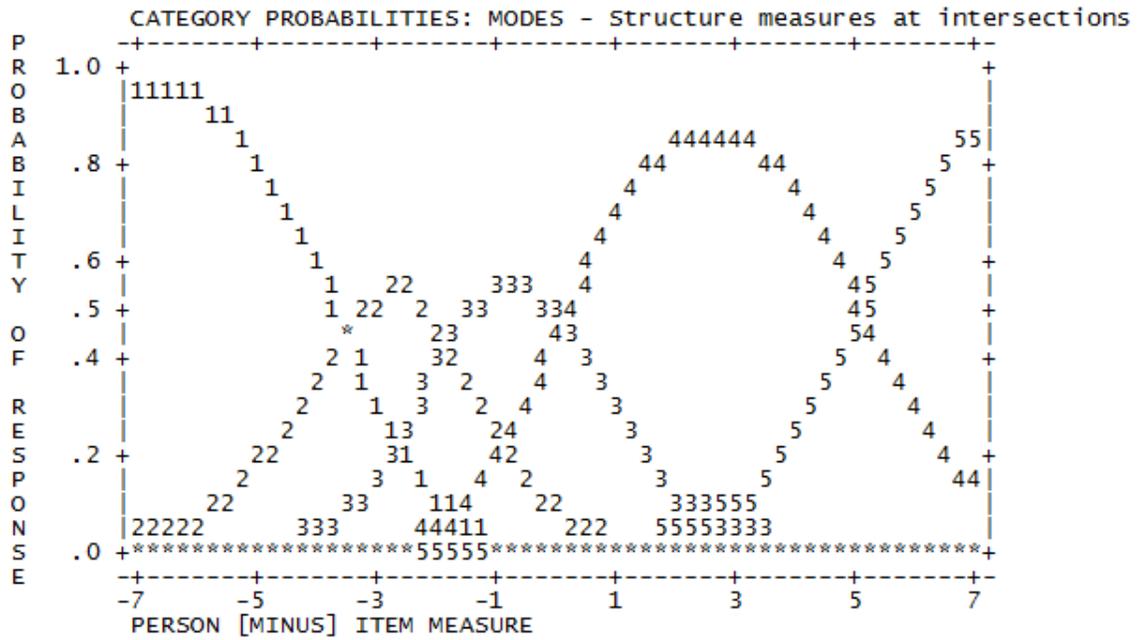*Figure 2*. Probability of response category used at each logit position for the SPLF Item 7.

```
Measure  PERSON LOGIT  ITEMS
                |
     7              .#  +
                        |
                        |
                     .  |
     6                  +
                        |
                    .#  |
     5             ###  +
                       T|
                        |
                     .  |
     4                  +
                    ##  |
                        |
     3     .#########   +
                       S|
         ##########     |
     2                  +
        ############    |
                   #    |
       .###########    |T
     1                  +
         ##########    |S BLFAMCON  BLSOCSUP
          ########    |    BLSELFAP
                     M|
     0      #######   +M BLEXPECT
                      |    BLAFFECT  BLSTABIL
          .#######    |
         #########   |S
    -1                  +
          ########   |T BLSENSIT
          .#######    |
                     S|
    -2      ####     +
            #####     |
                        |
                   .#  |
    -3           ##  +
                        |
                   .#  |
                   .#  |
    -4             T+
                 ###  |
                        |
                        |
    -5                  +
                        |
                     .  |
                        |
    -6                  +
                   .#  |
                        |
                        |
    -7                  +
                |
```
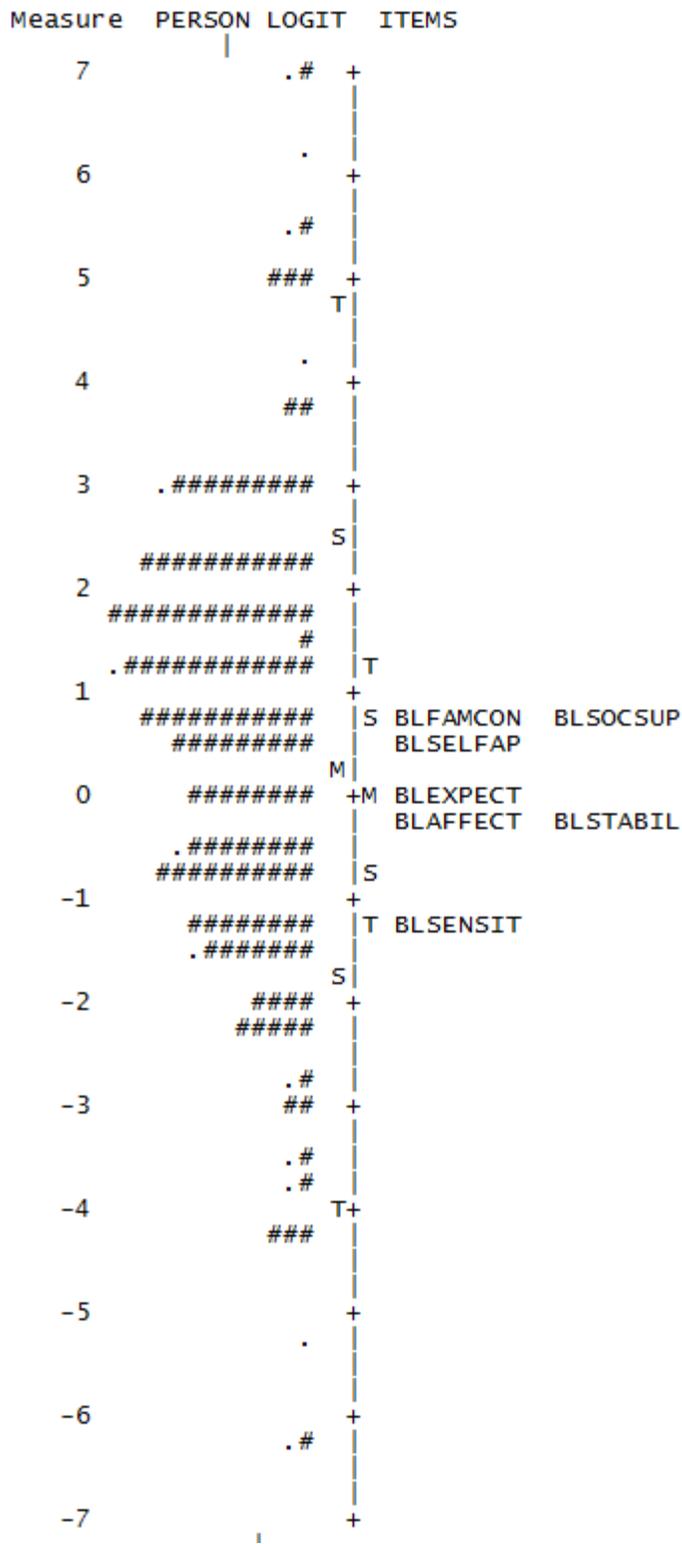
Figure 3. Item-Person Map of the SPLF.