CHILD'S RESILIENCE IN FACE OF MALTREATMENT: A META-ANALYSIS OF EMPIRICAL STUDIES

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The growing field of empirical studies on child's resilience encouraged us to conduct a meta-analysis in order to integrate the findings across studies targeted at child's adaptive functioning after experiences of maltreatment. In face of substantial and unbiased empirical evidence (published in scientific databases before 2010), research questions were raised about extant verifiable explanatory knowledge as well as implications for countries just starting such research. Domain-specific resources accounted for the majority of attributes of resilience. The aim of the study was to investigate the attributes of a child's positive functioning in face of maltreatment. We used the Comprehensive Meta-Analysis V2 software program and applied the guidelines for psychometric meta-analysis. Attributes of resilience were treated as moderator variables and assigned to one of three categories according to the framework of the study, namely, individual characteristics (classified through the domains of child cognition, self-perception and temperament / personality traits), characteristics of Interpersonal relatedness (domain of close relationships within family, domain of relations outside family, i. e. connectedness with peers and other competent adults), and characteristics of Community. Our findings suggest that a child's individual characteristics are somewhat more related to resilience than his / her interpersonal relations or the setting of a community network. The overall effect sizes are small, the total number of participants is 19 300. Empirical evidence does not support the linear increase of resilience with the child's age. At present, the measurement is of crucial importance for studies of resilience considered as a dynamic characteristic of functioning. In the studies of early childhood development, it is difficult to differentiate between correlates of post facto resiliency outcomes and attributes of age-appropriate positive functioning. Statements can be made only with regard to the overall quality of life of a child.

Key words: *resilience, child maltreatment, development, meta-analysis*

At present, the empirical field of resiliency studies is quite heterogeneous from both conceptual and methodological points of view. Since the early sixties when the term "resilience" was derived from Levin's notion of "elasticity" (1951, according to Csikszentmihalyi & Rathunde, 1998), its investigation has undergone at least three waves (Wright & Masten, 2006). From the very beginning two main conceptions emerged: resilience was viewed as a personality trait ensuring the optimal psychological adaptation to changing circumstances (Block, 1971) or as a process of resistance to adverse psychosocial experiences (Rutter, 1999). The framework of developmental psychopathology supplemented the main constant – good outcomes in face of serious threats – with an emphasis on the transaction between a person and the adverse environment (Masten, 2001). The current shift of modern behavioural sciences to develop personality strengths and manage weaknesses focuses on explaining the resilience from the integrative perspective, for instance, as a function of neurobehavioural regulation (Cicchetti & Rogosch, 2007) or common adaptive systems (Healey & Fisher, 2011; Wyman, 2003).

The different understanding of resilience imposes the variety of research methodologies including *post hoc* studies evaluating retrospectively life history changes (Daining & DePanfilis, 2007) and *ad hoc* studies assessing the ongoing processes in children from high-risk environments (Obradović, 2010), conducted in longitudinal and cross-sectional designs. Beside the ordinary questions about the validity and reliability of findings, the studies on resilience face the challenge of restrained

research methods as classical experiments in this field are neither acceptable (for professional ethics) nor possible to conduct in laboratory settings. One of the critical issues of positive psychology – to develop measurement procedures that account for the dynamics of healthy processes – is still in the process (Lopez & Snyder, 2003) after a long domination of the measurement tradition biased to identify psychopathology. M. E. P. Seligman pointed the shift from deficit models of social sciences to "positive ones" to be not easy (Goldstein & Brooks, 2006). In our opinion, it's not sufficient simply to fix the absence of symptoms as the evidence for resilience. Assessment of resilience must identify some positive indicators as the basis for creating preventions.

Resilience doesn't *cause* children to do well in the face of adversity (Yates et al., 2003). It takes its roots in the processes across the domains of both inter-individual (in proximal and distal environments) and intra-individual functioning (at phenomenological and biological levels). After nearly forty years of resilience studies, psychologists come to the agreement on three major groups of attributes of a child and his environment enabling to build resilience, which are the individual characteristics of a child, parenting quality, and external support system (Masten & Powell, 2003; Luthar & Zelazo, 2003; Malinosky-Rummell & Hansen, 1993). A considerable agreement has been reached on a positive association of resilience with the high IQ and the stability of the living environment (Eckenrode et al., 1995), emotional support from an important adult in child's life (Collishaw et al., 2007), developmental level at the time of maltreatment (Pollak, 2004), perceived control of

self-efficacy (Bolger & Patterson, 2003). However, many issues still remain unclear. For example, is the resilient functioning context-specific or universal? Is the typical constellation of domain characteristics strong enough to foster child's resilience? Do different adversities require different resources of resilience?

From all the adversities of child development, maltreatment stands in a special position as, in our understanding: a) it affects quite large groups of children as it is reported in the official reports and supposed from non-reported cases. The global prevalence of child sexual abuse around the world reported in 1982 to 2008 was estimated to be 11.8% (Stoltenborgh et al., 2011); b) due to short- and long-term negative impacts on child's development there is little, if any, need to question it as a serious vulnerability factor; c) this adversity encompasses some other adversities such as poverty, low parenting quality, living with one parent / in foster placement.

Resilience is largely responsible for the fact that not all maltreated children will experience problems in their further development (Houshyar & Kaufman, 2006). This is called to be *multifinality*, i.e. various developmental outcomes from a similar starting position (Cicchetti, 2006). During school years, children acquire more cognitive and interpersonal possibilities to foster resilience. At the same time, it appears that some representational limitations protect children from fully understanding the meaning and impact of their experience if the initial exposure to sexual abuse occurred at a very early age. However, a more detailed picture of age-related responses is far from being clear because of surprisingly little systematic evidence (Rutter, 2003). Empirical evidence suggests some related questions: Are there any periods of child development, critical to evoke resilience? To what extent is it subjected to other *force major* influences during development, such as exceptional achievements, or illness, or a shift in living conditions, etc.

In face of maltreatment, children form very specific patterns of functioning. Empirical evidence suggests that emotional distancing was an efficient way to cope with challenges of basic trust. These children had a minimal engagement and emotional involvement in primary caregivers, a low level of affective responsiveness to others' feelings (Wyman, 2003). Maltreated children who displayed a positive adjustment in the long-term perspective drew on *fewer* relational resources, had a more restrictive emotional self-regulation (Wright & Masten, 2006).

The review of empirical studies made us to conclude that there is a substantial yet not one-sided field of research concerning the resilience of maltreated children. We realized the necessity to summarize and integrate empirical findings in order to gain answers to **research questions:** What explanatory knowledge is verified up till the present time about the resilience among maltreated children? What implications from the already conducted studies on this issue can be drawn for future research in order to create intervention programs for maltreated children? Which particular domain of child functioning accounts for the majority of attributes of resilience? The **objective** of our study was to investigate the attributes of positive functioning in face of maltreatment associated with his / her resilience at different periods of child development.

Materials and methods

In order to integrate research findings on resilience across the studies published up till 2010, we conducted a meta-analysis, i.e. a quantitative synthesis enabling to generalize the common features of a number of studies (DeCoster, 2004). We used the Comprehensive Meta Analysis (CMA) V2 software program (Borenstein et al., 2006). The persistent search to gain as generalizable results as possible directed us to combine the possibilities of the program with the principles of psychometric meta-analysis, outlined by Hunter and Schmidt (2004). Considering all the artifacts in data collection and processing helps to reveal the patterns of relatively invariant underlying causalities as well as to obtain the findings that need to be explained by theory.

Study inclusion criteria. We stand for the framework offered by A. S. Masten and J. D. Coatsworth (1998): resilience "...is an inference about a person's life that requires two fundamental judgments: (1) that a person is "doing okay" and (2) that there is now or has been significant risk or adversity to overcome" (Masten & Powell, 2003, p. 4). "Doing okay" was considered as maintaining adaptive functioning in spite of serious hazards (Rutter, 1990). We have chosen to re-analyze the results of studies based on the variable-focused approach to resilience. We investigated the individual attributes of children, characteristics of interpersonal relations and community network.

The criteria for inclusion were:

- empirical evidence of child's maltreatment (emotional, physical and / or sexual abuse and neglect);
- indicators of child's positive functioning after maltreatment;
- quantitative methodology of studies. We collected data on descriptive statistics ($\bar{x}$, SD) of variables supplied (where possible) with additional data on measurement;
- focus on the age of subjects – not older than 18 years, in order to fix direct consequences of maltreatment on the child's psychological adjustment.
- We conducted a systematic search for the articles published in ERIC, JSTOR, MEDLINE, Science Direct, Wiley InterScience databases using the keywords of resilien* AND maltreat*, resilien* AND abuse, resilien* AND neglect. The articles were published before January 2010. The initial search indicated 1714 studies; 1688 of them were unsuitable due to:
- other than chosen theoretical framework operationalizing the low level of psycho-pathological symptoms, emotional / behavioural problems as indicators of resilience (1389 studies);
- not available data of descriptive statistics (50 studies);
- qualitative methodology (49 studies);
- retrospective research with adults, tracking the long-term consequences of maltreatment (200 studies).

We also left aside the investigations that used a more advanced statistical analysis (in the form of linear and hierarchical regressions) in favour of those with data on descriptive statistics. We found it as a prerequisite for the methodological soundness outlined by J. E. Hunter and F. L. Schmidt (2004). Firstly, slopes are comparable across the studies only if exactly the same instruments were used. Secondly, the di-

sadvantage of conducting meta-analysis using slopes and intercepts is rooted in their distancing from standard score units. Lastly, the correct integration of research requires the same statistical methods that were used in the primary analysis.

The final list consisted of 26 studies with the overall N of 26 260. The agreement between the two independent raters was 82%.

Coding. In line with guidelines for meta-analysis notes (DeCoster, 2004; Hunter & Schmidt, 2004), we coded three groups of characteristics relevant for the effect size across the studies, namely, study identification, sample characteristics, and characteristics of measurement. These are important factors possibly attenuating the data and results. Such understanding lies on the assumption that in every real data three main artifacts are present (sampling error, measurement error, and range restriction). Our coding categories are listed below.

Study identification. Each included study was assigned with a unique number and was presented in the text via a short reference (the name of authors, publication year) and later in the list of literature via a full reference.

Sample characteristics. Initially, we considered two sampling characteristics to be important for our study (sample size and the method of recruitment), but finally we stood for the first one. The main reason for this decision was the specific character of samples. Cases of the maltreatment of children cannot be subject to probability sampling – these are always incident-dependent. Having in mind that the sampling error tends to be the largest when no probability-sampling approaches, such as con-

venience sampling or quota sampling, are employed (Wasserman & Bracken, 2003), we must conclude that this cannot be fully applied in our study. Thus, the guideline about sampling artifact as one of the most damaging forces (Hunter & Schmidt, 2004) we considered with regard to sample size and the age of subjects and not to the recruitment of participants and therefore their representativeness. Two remaining sample characteristics were as follows:

- *type of maltreatment.* We supposed "maltreatment" as an expression of "… all forms of physical and / or emotional ill-treatment, sexual abuse, neglect or negligent treatment … resulting in actual or potential harm to the child's health, survival, development or dignity" (Wenar & Kerig, 2006). In all the studies included, maltreatment was treated as a dichotomous independent variable (presence / absence of incidence);

- *attributes of resilience.* As mentioned before, we have considered that the indicators of child's positive functioning after experience of maltreatment stand for the attributes of resilience. These were treated as moderator variables and assigned into one of three categories according to the framework of the study, namely, Individual characteristics (classified through the domains of child cognitions, self-perceptions and temperament / personality traits), characteristics of Interpersonal relatedness (domain of close relationships inside the family, domain of relations outside the family, i. e. connectedness with peers and other competent adults), and characteristics of Community. We selected the descriptive statistics ($\bar{x}$, SD) from each study

as the quantitative representation of the attributes.

Characteristics of measurement. Our study was based on the random-effects model allowing the variance of parameters across the studies. In order to get the knowledge about the variance in measurement, we collected all the possible information about assessment. As the confidence in research results relies on data stability and consistency, we find it truly useful to look over the instruments and their reliability in order to obtain valuable data on their psychometric utility to evaluate resilience. W. A. Walsh, J. Dawson, and M. J. Mattingly (Walsh et al., 2010) also made a list of instruments and estimates of child functioning. As the aim of their study was different (to review the literature and describe variations), the authors didn't include reliability data. The final list of selected studies is presented in Table 1.

Statistical procedures. In the **first step,** the database was created and effect sizes using CMA were calculated:

1. Means, standard deviations, reliabilities and sample sizes of each study were entered into the database.

2. Effect sizes were calculated for each variable. If the variables were analyzed via several comparisons, they were converted into a composite correlation in the overall analysis. In this case, the reliability of the composite correlation was calculated according to the Spearman–Brown formula:

$$r_{yy} = \frac{n\bar{r}_{yy}}{1+(n-1)\bar{r}_{yy}} .$$

3. Effect sizes were adjusted to the sample size. For the further analysis, there were selected only the studies that had significant effects in regard to weighted sample sizes ($p < 0.05$).

In the **second step,** the results obtained by CMA were detailed following the guidelines of meta-analysis described by Hunter and Schmidt (Hunter & Schmidt, 2004), i.e. the observed correlations were corrected for the sampling error and measurement error as follows:

1. The mean correlation for each group of studies was calculated:

$$\bar{r} = \frac{\sum_{i=1}^{k} n_i r_i}{\sum_{i=1}^{k} n_i} ,$$

where r_i is the correlation of the i-th study, and n_i is the sample size of the i-th study.

2. Then the sampling error of each study was obtained using the formula

$$s_e^2 = \frac{(1-\bar{r}^2)^2}{n_i - 1} .$$

3. The sample size weighted variance of the observed correlations was estimated as

$$s_r^2 = \frac{\sum_{i=1}^{k} n_i (r_i - \bar{r})^2}{\sum_{i=1}^{k} n_i} .$$

4. If $s_r^2 - s_e^2 \leq 0$, it meant that differences in correlations were due to the sampling error.

5. In regard to corrections for the sampling error and the measurement error, the average corrected correlation *rho* was calculated:

*Table 1. **Summary of study characteristics***

No.	Study identification	Sample characteristics		Type of maltreatment	Attributes of resilience	Measurement characteristics	
	Authors, publication year	n	Age in years			Assessment instruments	Reliability
1.	Asgeirsdottir, Gudjonsson, Sigurdsson, & Sigfusdottir, 2010[a]	9113	M = 17.2 SD = 1.1	SA	Self-esteem Parental support	Rosenberg self-esteem scale (1965) Parental support (Gudjonsson, et al., 2008)	0.90 0.87
2.	Bolger, Patterson, & Kupersmidt, 1998[b]	214	At the onset: 8–10	PA, EA, SA	Self-esteem Reciprocated best friend, reciprocated playmate, friendship quality Social preference	Self-perception profile (Harter, 1985) Network of relationships inventory (Furman & Buhrmester, 1985) Group sociometric testing (Coie et al., 1982)	NR NR NR
3.	Cicchetti & Rogosch, 1997[b]	213	At the onset: M = 8,03 SD = 1,47	PA, EA, SA, N	Intelligence Self-esteem Ego-resiliency Maternal emotional availability, desire for maternal closeness Prosocial behaviour	Peabody picture vocabulary test – revised (Dunn & Dunn, 1981) The self esteem inventory (Coopersmith, 1981) The California child Q-set (Block & Block, 1969) Relatedness scales (Wellbom & Connell, 1987) Behaviour ratings (Wright, 1983)	0.80 0.72–0.85 0.80–0.87 NR 0.67–0.85
4.	Cicchetti, Rogosch, Lynch, & Holt, 1993[a]	206	M = 9.58 SD = 1.45	PA, SA, N	Intelligence Self-esteem Ego-resiliency Prosocial behaviour	Peabody picture vocabulary test – revised (Dunn & Dunn, 1981) The self esteem inventory (Coopersmith, 1981) The California child Q-set (Block & Block, 1969) Behavior ratings (Wright, 1983)	0.80 0.72–0.85 0.74–0.93 0.90
5.	Fantuzzo, Sutton-Smith, Atkins, Meyers, Stevenson, Coolahan, Weiss, & Manz, 1996[b]	46	At the onset: M = 4.46	PA, N	Self-control, interpersonal skills, verbal assertion Family cohesion Interactive play, social attention	Social skills rating system (Gresham & Elliott, 1990) Family adaptability and cohesion scales (Olson, Portner & Bell, 1982) Interactive peer play observational coding system (Authors of article)	NR 0.87 0.80–0.96
6.	Flores, Cicchetti, & Rogosch, 2005[a]	133	M = 8.68 SD = 1.78	PA, EA, SA, N	Receptive vocabulary, cognitive performance Ego-resiliency Prosocial behaviour	Peabody picture vocabulary test – revised (Dunn & Dunn, 1981) The California child Q-set (Block & Block, 1969) Behavior ratings (Wright, 1983)	0.80 0.68–0.86 0.67–0.85
7.	Graham-Bermann, Gruber, Howell, & Girz, 2009[a]	219	M = 8.49 SD = 2.16	EA	Global self-worth, social competence Warmth parenting, effective parenting Problem solving, responsive family	Perceived self-competence scales for children (Harter, 1982; 1985) Anxiety and parental childrearing styles scale (Sameroff, Thomas & Barrett, 1990) McMaster family assessment device (Epstein, Boldwin & Bishop, 1983)	0.53–0.65 0.85–0.86 0.84–0.90
8.	Haskett, Allaire, Kreig, & Hart, 2008[a]	153	M = 7.2 SD = 1.4	PA	(parental) Sensitivity Prosocial behavior	Qualitative ratings of parent–child interactions (Cox, 1997; Payley, Cox & Kanoy, 2001) Children's social behaviour scale – teacher form (Crick, 1996) and the preschool social behavior scale –teacher form (Crick, Casas & Mosher, 1997)	0.78 0.86
9.	Howell, Graham–Bermann, Czyz, & Lilly, 2010[a]	56	M = 5.01 SD = 0.8	EA	Emotion regulation skills, behavioral competence, social skills	Social Competence Scale (Conduct Problem Prevention Research Group, 2002)	0.67–0.84

Continue Table 1

No.	Authors, publication year	n	Age in years	Type of maltreatment	Attributes of resilience	Assessment instruments	Reliability
	Study identification	Sample characteristics				Measurement characteristics	
10.	Jaffee, Caspi, Moffit, Polo-Tomas, & Taylor, 2007[b]	2181	At the onset: 5; 7	PA	Sibling warmth	Sibling warmth scale (Authors of article)	0.76
					Maternal warmth	Expressed emotion interview (Caspi et al., 2004)	NR
					Prosocial behavior	Teacher report form (Achenbach, 1991)	0.75
					Social cohesion	Informal social control and social cohesion (Sampson et al., 1997)	0.83
11.	Kim & Ciccetti, 2006[b]	251	M = 8.46 SD = 1.11	PA, EA, SA, N	Self-esteem	The self-esteem inventory (Coopersmith, 1981)	0.85
					Self-agency	Social behavior scale (Sroufe, 1983)	0.67
12.	Lynch & Ciccetti, 1992[a]	215	Range of M = 9.1–9.5	PA, EA, SA, N	Positive emotion with the teachers, psychological proximity seeking	Rochester assessment package for schools (Wellborn and Connell, 1987)	0.75-0.88
13.	Martinez-Torteya, Bogat, von Eye, & Levendosky, 2009[b]	190	At the onset: 2; 3; 4	EA	Cognitive ability	Peabody picture vocabulary test – revised (Dunn & Dunn, 1997)	0.93-0.98
					Easy temperament	Carey temperament scales (Fullard, McDevitt, & Carey, 1984)	0.81-0.85
					Positive parenting	Parent behavior checklist (Fox, 1994)	0.74-0.79
14.	Perkins & Jones, 2004[a]	3281	M = 14.5 SD = 1.6	PA	Other adult support, peer group, school climate	Search institute's profiles of student life: Attitude and behavior questionnaire (Benson, 1990; Blyth, 1993)	0.57 – 0.70
					Involvement in extra-curricular activities, religiosity	Questionnaires by Perkins & Jones, 2004	0,35-0.79
15.	Rosenthal, Feiring, & Taska, 2003[b]	147	8–11; 12–15	SA	Self-esteem	Self-perception profile for children and adolescents (Harter, 1985; 1988)	NR
					Caregiver support, same-sex friend, other-sex friend	My family and friends (Reid & Landesman, 1988; Reid et al., 1989)	NR
16.	Sabourin Ward, & Haskett, 2008[a]	175	M = 7.33 SD = 1.54	PA	Breadth of solutions, solution quality	Social problem solving measure (conduct problem Prevention Research Group, 1991)	0.92
					(parental) Sensitivity	Qualitative ratings of parent–child interactions (Cox, 1997; Payley, Cox & Kanoy, 2001)	0.78
					Prosocial behaviour	Children's social behavior scale – teacher form (Crick, 1996) and the preschool social behavior scale – teacher form (Crick, Casas & Mosher, 1997)	0.78-0.93
17.	Sagy & Dotan, 2001[a]	226	8th graders	PA, EA	Perceived competence	Hebrew version of the Perceived competence scale for children (Harter, 1982)	0.79
					Family coherence	Sense of the family coherence scale (Sagy, 1998)	0.76
					School membership	Psychological sense of school membership (Goodenow, 1993)	0.73
					Social support	Social support scale (Authors of article)	NR
18.	Wood-Schneider, Ross, Graham, & Zielinski, 2005[a]	806	4–8	PA, SA, N	Daily living, socialization	Vineland screener (Sparrow et al., 1993)	0.89-0.98
19.	Shonk & Ciccetti, 2001[a]	229	M = 8.81 SD = 1.66	PA, EA, SA, N	Academic engagement	Teacher's rating of perceived competence (Harter, 1985)	0.94
					Ego-resiliency	The California child Q-set (Block & Block, 1969)	0.65
					Social competence	Teacher's checklist of children's peer relationships and social skills (Coie & Dodge, 1988)	0.92

20.	Schultz, Tharp-Taylor, Havi-land, & Jaycox, 2009[b]	1044	M = 5.86 SD = 1.55	PA, EA, SA, N	Daily living, socialization	Vineland Screener (Sparrow et al., 1993)	0.87–0.98
					Peer relationships	Social skills rating system (Gresham & Elliott, 1990)	0.83–0.94
21.	Spaccarelli & Kim, 1995[a]	43	10–17	SA	Active coping, seeking support	Children's coping strategies checklist (Sandler, Tein & West, 1994)	0,76–0.84
					Parent support	Children's reports of parental behaviour inventory (Schaefer, 1965)	0.88
22.	Sunday, Labruna, Kaplan, Pelcovitz, Newman, & Salzin-ger, 2008[a]	191	12–18	PA	Family cohesion, family adaptability	Family adaptability and cohesion evaluation scale (Olson, 1986)	NR
					Care father, care mother, control father, control mother	Parental bonding instrument (Parker, Tupling & Brown, 1979)	NR
23.	Toth & Cicchetti, 1996[a]	61	M = 9.83	PA, SA, N	Ego-resiliency	The California child Q-set (Block & Block, 1969)	NR
					Social acceptance	Teacher's rating scale of child's actual behaviour (Harter, 1985)	NR
24.	Tremblay, Hebert, & Piche, 1999[a]	50	M = 9.2	SA	Global self-worth	Perceived self-competence scales for children (Harter, 1982; 1985)	NR
25.	Valentino, Cicchetti, Rogosch, & Toth, 2008[a]	224	M = 10.0 SD = 1.46	PA, EA, SA, N	Cognitive performance	Peabody picture vocabulary test – revised (Dunn & Dunn, 1981)	NR
26.	Wong, Leung, Tang, Chen, Lee, & Ling, 2009[a]	6593	M = 14.2 SD = 1	PA, SA	Self-esteem	Chinese version of Rosenberg self-esteem scale (Shek, 1992)	0.72–0.85
					Life satisfaction	Chinese version of the life satisfaction scale (Shek, 1992)	0,81
					Social support	Chinese version of the social support scale (Yan & Tang, 2003)	NR

Note. Terminology of coding characteristics coincides with their definitions in original studies. *M:* mean of age; *SD:* standard deviation; *SA:* sexual abuse; *PA:* physical abuse; *EA:* emotional abuse; *N:* neglect; *NR:* data not reported.

[a] Cross-sectional study; [b] Longitudinal study.

Table 2. **Effect sizes corrected for research artifacts**

Characteristics	k	n	r	S²ᵣ	ρ	S²ρ	% VE	80% CV		95% CI	
Individual: cognitions	6	1180	0.159	0.002813	0.192	0.003486	100	0.12	0.27	0,14	0,24
Individual: self-perceptions	5	13750	0.086	0.000676	0.118	0.001284	45	0.07	0.16	0,09	0,15
Individual: temperament / personality traits	4	781	0.197	0.005185	0.257	0.006889	80	0.15	0.36	0,16	0,35
Interpersonal: close relationships inside family	6	2793	0.082	0.010132	0.107	0.017173	18	-0.06	0.27	0	0,21
Interpersonal: relationships outside family	10	18789	0.074	0.001530	0.095	0.002235	33	0.03	0.16	0,06	0,13
Community characteristics	2	4588	0.063	0.000015	0.076	0.000021	100	0.07	0.08	0,07	0,08

Note. k: number of studies for variables; *n:* total sample size for all studies combined; *r:* sample size weighted average of the observed correlation indicating effect size; *S²r:* sample size weighted variance of the observed correlations; *ρ:* average correlation corrected for sampling and measurement error; *S²ρ:* variance for average corrected correlations; *VE:* variance accounted for by artifacts; *80% CV:* 10% lower and 90% upper limits of 80% credibility interval; *95% CI:* 2.5% lower and 97.5% upper limits of 95% confidence interval.

Effect sizes (r) are significant (p < 0.05). If a variance accounted for artifacts exceeded 75%, it indicated that the differences between studies were caused solely by the artifacts in question. Otherwise, the outcomes were influenced by other not identified factors. In our study, both credibility and confidence intervals excluded zero (except the attribute of Interpersonal: close relationships inside family), i. e. rho was significant, and the correlations were generalizable.

$$rho = \frac{\sum\limits_{i=1}^{k} \omega_i r_{C_i}}{\sum\limits_{i=1}^{k} \omega_i} \ , \ \ \omega_i = n_i A_i^2 \ ,$$

were r_{C_i} is a corrected correlation and, A_i^2 is the reliability coefficient for the i-th study.

Reliability coefficients were presented not in each study. In these cases, they were substituted by averaged mean of reliability coefficients in relevant groups.

6. The variance for average corrected correlation s_{rho}^2 was calculated as

$$s_{rho}^2 = \frac{\sum\limits_{i=1}^{k} \omega_i (r_{C_i} - rho)^2}{\sum\limits_{i=1}^{k} \omega_i} \ .$$

Finally, the percentages of variance accounted for by artifacts were estimated.

Results

After a rigorous screening for the overall analysis, 13 studies were left, meeting all the criteria for CMA with the total amount of participants n = 19 300. The results featured a great variety concerning the conceptualization of resilience as well as its operationalization. D. Cicchetti and F. A. Rogosch (Cicchetti & Rogosch, 1997; Cicchetti et al., 1993) elaborated the "composite of resilient functioning", leading to more calibrated decisions about these children. In many other studies, the "*resilience*" is undermined for children having the highest scores of adaptive functioning among the maltreated children.

The effect sizes for six distinct groups of attributes are shown in Appendices (*Appendices 1–6*). The obtained correlations may

be evaluated as small. These, however, are suitable for the interpretation as random effects models which usually produce small effect sizes with a higher power of generalizability than the fixed-effect models (Harvey & Taylor, 2010). Two main features caught our attention, namely, the prevalence of distinct research teams in some groups of attributes and the additional interpretative value of effect sizes given by adjustment for artifacts (Table 2).

Studies on the individual characteristics of resilience, mainly originated by the research of Cicchetti et al. (conducted in the period from 1993 to 2005), had a considerable impact on the overall mean values and in large part influenced the generalization that the adaptive functioning of children in face of maltreatment was significantly related to the *individual characteristics* of a child (his / her cognitions, self-perceptions and temperament / personality traits). For example, the existing evidence of a child's personality / temperamental traits relied on their investigations using the California Q-set (used in three of four studies in this group). As for subjective *self-perceptions,* it looked worth to have a more detailed view on outcomes. In this group of five studies, data from Wave 1 of a longitudinal research by J. Kim and D. Cicchetti (2006) accounted for the third part of the final effect value, but the correction for artifacts shows a profound influence (45%) of other, not identified, factors. According to J. E. Hunter and F. L. Schmidt (2004), artifacts infer the imperfections of a study due to supposed factors of the research procedure or unknown factors. The subsequent analysis of data on Wave 4 from this longitudinal study confirmed our assumption that the overall

effect size may be related to the age of participants (i.e. the effect of self-perception in face of maltreatment becomes stronger with the age of the child).

Considerably more studies represented the field of *child's relationships* both *inside* and *outside the family* (6 and 10, respectively). For example, S. R. Jaffee et al. (2007) dealt with the analysis of "resilient children" monitored on the basis of individual strengths. W. C. W. Wong et al. (2009) also made every effort to investigate a large group of "resilients", analyzing their relationships with peers and trusting adults. The relative weight of these two studies in the group of relations outside the family accounted for the half of the final effect (among 10 studies).

Regarding the effect in the group of *close relationships* inside the family, we found both negative and positive effects; thus, no distinct generalization may be drawn. This proves the assessment of processes inside the family to be very complicated (confirmed by the high value of variance across the studies, which accounted for other than corrected artifacts, VE 33%).

The results concerning *community characteristics* related to child's resiliency should be interpreted with extreme caution as this context was investigated in two studies only (Jaffee et al., 2007; Sagy & Dotan, 2001).

Our findings suggest that child's individual characteristics are slightly stronger related to resilience than his / her interpersonal relations or the setting of community network. The small effect sizes constrain this generalization not only because of its absolute value, but of its nature as well. We found the effect size to be positively influenced by the homogeneity of studies and counterbalanced by unknown factors of operationalization. Therefore, we have reasonable doubts as to how much our conclusions are relevant to reality.

Discussion

In our understanding, this study has emphasized the issues of a link between the criteria of resilience and its assessment. This study displays rather a long list of variables as attributes of resilience, revealing the lack of consensus among researchers. We found two main ways to identify the "resilients". In most cases, they appear among the targeted group of maltreated children. This can be called as the "classical" way to recognize resilient children. In the very few studies, S. R. Jaffee et al. (2007) among them, the efforts were proactively directed to assess resilient children. Not surprisingly, the criteria of "resilience" in both cases differed. It looks like the decade-old guidelines on studying the resilience (Kinard, 1998) look still actual. The author insisted, among others, on the great benefit to distinguish between factors defining resilience and those related to resilience and to choose the scoring criteria to indicate resilience. According to the inferences that signs of resilience do no necessarily mean emotional health or cannot be simply equated with adaptation resources, we have come to the conclusion that the "resilient functioning" requires more explicit criteria.

Resilient children are a very specific group standing in an intermediate zone between those not exposed to adversities and clinical cases. As it is obvious from total number of participants involved in our study (N = 19 300), this group can be quite numerous. The other authors also reported quite

a high proportion of children (37–49%) whose functioning after maltreatment could be at least not poorer than that of their peers (Howell et al., 2010; Jaffee & Gallop, 2007). This is in line with the common ongoing processes of self-righting, deeply rooted in what A. S. Masten (2001) far-sightedly called to be "ordinary magic". On the other hand, in our opinion, these children seem to be "double exceptional" as they differ from both non-maltreated and maltreated but non-resilient ones. For instance, sexually abused adolescents used fewer support-seeking coping than did other adolescents (Bal et al., 2003). Resilient children are not "simply common" – they overcame and coped with profound stresses until they arrived at the level of adaptive functioning. Resiliency can't be equated to social competence or positive mental health (Rutter, 2006). Due to the dynamic nature of resilience, it is difficult to differentiate between the correlates of post facto good outcomes and protective factors. There is currently no criterion by which a particular variable is determined to be a risk factor, a protective factor, or merely a measure related to the outcome in question (Kaplan, 2006). As for the resilience, it is argued to be either a moderator between risk factors and clinical symptoms (Fincham et al., 2009), a protective factor or developmental asset (Richardson, 2002).

We witnessed the realization of one of the fundamental methodological points for studying resilience, i.e. concern about more than one area of child functioning (Mersky & Topitzes, 2010; Haskett et al., 2006). All the studies included in our investigation were targeted at no less than two contexts, mainly the individual and interpersonal ones. This tendency perhaps

will keep on and gain its full strength in the nearest future as the fourth wave of resilience – integration of neurobiological and psychological findings – is taking its force. Such extremely complex research requires much more scientific rigor than it is applied at present. We hope it will be directed first of all toward the psychometric accuracy of assessment instruments. We faced the confusing evidence that some studies didn't present reliability characteristics, not to speak about their validity. Without psychometrically sound measurements it is impossible to gain relevant knowledge. Some promising tendencies are obvious; for example, L. Campbell-Sills (Campbell-Sills & Stein, 2007) reported about a psychometric analysis and refinement of the Connor–Davidson Resiliency Scale, S. Prince-Embury (2006) developed three-factor Resilience Scales for adolescents, J. A. Naglieri and P. A. LeBuffe (2006) suggested that a nationally standardized rating scale – the Devereaux Early Childhood Assessment – is aimed to determine skills related to resilience, S. M. Shonk and D. Cicchetti (2001) validated the New Criterion Q-Sort Scale. Scientific knowledge cumulated up to the present makes it possible to create techniques proactively targeted to measure the resiliency at its own – not social – competence or cognitive mastery or some other psychological phenomenon closely related to resilience. In our opinion, the conceptualization of this assertive construct leaves behind the research methodology focused on the measurement of very broad constructs. The role of gender / ethnicity still remains not clear (Howell et al., 2010).

The variety in research methodology as well as construct conceptualization made it

difficult to clearly generalize the findings about a resilient maltreated child. We faced more diversity in the scientific accuracy of studies than were supposed from previous analytical investigations (Atkinson et al., 2009). In some cases, studies differed so much that it looked difficult to put them together. The breakthrough came from the *a priori* assumption of meta-analysis that reliance on "perfect studies" did not provide a solution to the problem of conflicting research findings. All studies contain measurement and/or other errors which can be adjusted for the sake of overall comparisons (Hunter & Schmidt, 2004).

We coded only the studies that were available in databases for systematic search. Sometimes this limitation is called "availability bias", "retrieval bias", or "selection bias" referring to the source of analysis. The other reason challenging the representativeness of studies on child's resilience over a discrete period of time derives from the design of included studies. In that way, we could grasp the correlations at one time-point usually present in cross-sectional studies or just one wave of a continual study. Our initial research sketch included the aim to analyze findings from longitudinal studies, but after some consideration we gave up this task because of a complicated interpretation of the aggregated measures (for instance, R or R^2). To some extent, we realized it was a pragmatically reasonable choice as during the coding we faced missing descriptive characteristics of the data, not to speak about a zero-order correlation matrix necessary to start the integration of more advanced correlations. Finally, we didn't control the time interval from child's exposure to maltreatment and the very moment of assessment. As the resilience requires some time to take its shape, the "incubation period" can be an important mediator to collect the available positive resources. The guidelines for future research will possibly be narrowing the focus of studies as regards time intervals, the age of a child, and the type of maltreatment.

Conclusions

For positive functioning in the face of maltreatment, child's individual characteristics (cognitions and temperament / personality traits) are relatively more important than the characteristics of interpersonal relationships and community. Empirical evidence doesn't support a *linear* increase of resilience with the child's age.

At present, the measurement is of crucial importance for the studies of resilience. Positive psychology stimulated the studies on child's resilience with a little impact on research methodology still operationalizing the positive functioning as a mere simple absence of negative outcomes instead of the presence of specific positive ones. The dominating view on resilience as a dynamic characteristic clarifies that the cross-sectional methodology falls short to answer the main questions concerning resilience. Statements on child's resilience in face of maltreatment can be made only with regard to his overall functioning. In the studies of early child development, it is difficult, if possible at all, to differentiate between the correlates of *post facto* resilience outcomes and the attributes of the age-appropriate positive functioning.

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NETINKAMĄ ELGESĮ PATYRUSIŲ VAIKŲ ATSPARUMAS: EMPIRINIŲ STUDIJŲ METAANALIZĖ

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S a n t r a u k a

Vaikų psichologinio atsparumo tyrimų gausa paskatino mus atlikti metaanalizę, apibendrinančią iki 2010 m. atliktų empirinių studijų rezultatus. Iki šiol nėra vienodo teorinio supratimo apie veiksnius, nulemiančius netinkamą elgesį patyrusių vaikų sėkmingą psichologinį prisitaikymą ir praktinių to įrodymų. Tyrimo klausimais siekta išsiaiškinti, kokie kintamieji – individualios vaiko savybės, tarpasmeniniai saitai ar bendruomenės kontekstas – labiausiai siejami su psichologinio atsparumo išraiška iki šiol atliktuose tyrimuose. Empirinių studijų, nagrinėjusių 19 300 vaikų psichologinį atsparumą, rezultatus apibendrinome programine įranga (Comprehensive Meta-Analysis V. 2), papildomai taikydami psichometrinės metaanalizės kriterijus. Kodavome šešis vaiko ir jo aplinkos kintamuosius, svarbius psichologinio atsparumo išraiškai. Metaanalizė išryškino, kad visų kintamųjų efektų dydžiai yra maži, tik individualaus konteksto kintamieji kiek stipriau susiję su psichologinio atsparumo išraiška. Išsami anksčiau atliktų studijų apžvalga mums leidžia manyti, kad iki šiol atliktų tyrimų metodologija neatspindi dinaminės psichologinio atsparumo esmės. Ankstyvosios vaikų psichologinės raidos tyrimams nuolat kyla uždavinys rasti takoskyrą tarp amžiaus tarpsniui būdingo sėkmingo funkcionavimo ir psichologinio atsparumo patyrus netinkamą elgesį. Iki 2010 m. atliktų vaiko psichologinio atsparumo tyrimų aiškinamąją galią riboja nepakankamas dėmesys bendrajam vaiko raidos kontekstui.

Pagrindiniai žodžiai: atsparumas, netinkamas elgesys su vaiku, raida, metaanalizė.

Appendices

*Appendix 1. **Effect of maltreatment on the child's cognition***

Attribute of resilience	Study No.	Lower limit	Upper limit	Relative weight	Correlation and 95% CI
Intelligence	4	0.04	0.30	17.48	
Intelligence	3	0.00	0.26	17.94	
Receptive vocabulary; cognitive performance	6	0.03	0.35	11.34	
Breadth of solutions; solution quality	16	0.11	0.39	15.11	
Academic engagement	19	0.02	0.27	19.34	
Cognitive performance	25	−0.05	0.21	18.78	
Effect size (random-effect model) 0.16					

*Appendix 2. **Effect of maltreatment on the child's self-perception***

Attribute of resilience	Study No.	Lower limit	Upper limit	Relative weight	Correlation and 95% CI
Self-esteem	4	−0.131	0.140	15.33	
Self-esteem	3	−0.039	0.225	15.67	
Self-esteem	11	−0.056	0.189	17.12	
Perceived competence	17	0.150	0.386	16.49	
Self-esteem	26	0.067	0.101	35.39	
Effect size (random-effect model) 0.103					

*Appendix 3. **Effect of maltreatment on the child's temperament / personality traits***

Attribute of resilience	Study No.	Lower limit	Upper limit	Relative weight	Correlation and 95% CI
Ego-resiliency	4	0.005	0.270	25.88	
Ego-resiliency	3	0.148	0.391	26.93	
Ego-resiliency	6	0.125	0.429	19.54	
Ego-resiliency	19	−0.002	0.251	27.65	
Effect size (random-effect model) 0.201					

−1   −0.5   0   0.5   1

*Appendix 4. **Effect of maltreatment on the child's close relationships inside family***

Attribute of resilience	Study No.	Lower limit	Upper limit	Relative weight	Correlation and 95% CI
Maternal emotional availability; desire for maternal closeness	3	−0.180	0.086	18.01	
Family cohesion	5	−0.169	0.586	6.59	
Sibling warmth; maternal warmth	10	−0.002	0.086	21.81	
Parental sensitivity	16	0.073	0.351	17.36	
Family coherence	17	0.234	0.455	18.42	
Family cohesion; family adaptability; care father; care mother; control father; control mother	22	0.041	0.306	17.81	
Effect size (random-effect model) 0.153					

−1   −0.5   0   0.5   1

*Appendix 5. **Effect of maltreatment on the child's relationships outside family***

Attribute of resilience	Study No.	Lower limit	Upper limit	Relative weight	Correlation and 95% CI
Prosocial behaviour	4	−0.037	0.231	7.81	
Prosocial behaviour	3	−0.137	0.130	7.97	
Interactive play; social attention	5	−0.277	0.527	1.08	
Prosocial behaviour	6	−0.006	0.318	5.78	
Prosocial behaviour; social cohesion	10	−0.018	0.041	22.08	
Positive emotions with the teachers; seeking psychological proximity	12	−0.146	0.119	8.06	
Prosocial behaviour	16	0.025	0.308	7.02	
School membership; social support	17	−0.050	0.207	8.30	
Social competence	19	0.001	0.253	8.40	
Social support	26	0.077	0.111	23.49	
Effect size (random-effect model) 0.071					−1 −0.5 0 0.5 1

*Appendix 6. **Effect of maltreatment on the child's community characteristics***

Attribute of resilience	Study No.	Lower limit	Upper limit	Relative weight	Correlation and 95% CI
Social cohesion	10	0.03	0.09	95.10	
Social support	17	−0.08	0.17	4.90	
Effect size (random-effect model) 0.06					−1 −0.5 0 0.5 1