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The Contribution of Mixed Methods Research to the Field of Childhood Trauma: A Narrative Review Focused on Data Integration.

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ABSTRACT

In mixed methods research (MMR), integrating the quantitative and the qualitative components of a study is assumed to result in additional knowledge (or "yield"). This narrative review examines the extent to which MMR is used in the field of childhood trauma and provides directions for improving mixed methods studies in this field. A systematic literature search resulted in 13 studies that were achieving four different research objectives: (a) measures and meaning, (b) intervention evaluation, (c) theory building, and (d) measurement instrument development and validation. Although some studies produced yield by integrating the components, there is room for improvement and better use of MMR's potential. We conclude by presenting recommendations for improving the application and dissemination of MMR in childhood trauma.

Traditionally quantitatively oriented areas of social science research, such as the field of trauma, increasingly acknowledge the value of qualitative studies (Creswell & Plano Clark, 2007; Creswell & Zhang, 2009; Ivankova & Kawamura, 2010; Malterud, 2001). Qualitative research is valuable, among others, for its capability to build and validate theory, which is particularly needed in the field of childhood trauma (Wesel, Boeije, Alisic, & Drost, 2012; Brom, Pat-Horenczyk, & Ford, 2009). It is also valuable for developing and evaluating interventions, for example, to support the recovery of traumatized children (Forbes et al., 2010; Lewin, Glenton, & Oxman, 2009). Creswell and Zhang (2009) already stated that methods in trauma research are well suited for mixed methods research (MMR) because trauma research has traditionally known a lively quantitative branch with many scales as well as a branch with qualitative (therapeutic) data collection and analysis. Combining these quantitative and qualitative branches by applying mixed methods will likely result in unique knowledge or yield that could not have been achieved by simply conducting separate qualitative and quantitative studies (O'Cathain, Murphy, & Nicholl, 2007).

Integration in Mixed Methods Research

Many mixed methods authorities argue that the weakest link in most mixed methods designs is the actual integration of the quantitative and the qualitative component (Bryman, 2007; Lewin et al., 2009; O'Cathain et al., 2007). Mixed methods studies often conduct and present the components parallel instead of integrated (Caracelli & Greene, 1997). When integration is not or only partly realized, the merits of MMR will continue to be a point of discussion (Creswell, Fetters, & Ivankova, 2004; Östlund, Kidd, Wengström, & Rowa-Dewar, 2010; Tashakkori & Teddlie, 2003). If MMR results in separate publications on the qualitative and quantitative data, it should be clear that integration will be completely absent. But even in those projects resulting in mixed methods publications, the extent to which actual integration takes place may vary or even be absent and, therefore, needs to be investigated carefully (O'Cathain et al., 2007).

Moran-Ellis et al. (2006) define integration in MMR as a "specific relationship between two or more methods where the different methods retain their paradigmatic nature but are inter-meshed with each other in pursuit of the goal of 'knowing more'" (p. 51). The greatest level of integration is referred to as integrated methods, in which intermeshing occurs from conceptualization to the final reporting of the research. They acknowledge that in many mixed methods projects integration takes place at later stages of the process, for instance when authors interpret the qualitative and quantitative data in the discussion section. Moran-Ellis et al. refer to this type of integration as interpretive integration. In this article, we focus on interpretive integration, that is, integration of the findings and the interpretations.

Design Issues Influencing Integration

Certain choices in a mixed methods design will influence the opportunities for integrating the qualitative and the quantitative components. First of all, integration can be influenced by the motivation for choosing mixed methods. Researchers generally distinguish confirmation and complementarity (Small, 2011). When researchers strive for confirmation (or triangulation) they use different kinds of data collection methods to verify the findings derived from one type of data with those derived from another. The challenge for integration here is to discuss the potential confirming or conflicting outcomes and to ensure whether the findings have primarily been influenced by the data collection method or not (O'Cathain, Murphy, & Nicholl, 2010; Small, 2011). When researchers strive for complementarity they do not want to limit themselves to the type of data that can be produced with a single method. Integration would mean showing which areas of social reality have been revealed by either method (Pope & Mays, 1995) and how they are connected. Previous research demonstrates that it is difficult for researchers to clearly express the motivation or rationale behind a mixed methods methodology in a specific study (Gannon & Sun, 2010; Östlund et al., 2010; Wiggins, 2011). We can think of several applications of both motivations in the field of childhood trauma, but what motivates current research in this area is unknown.

A decision on sampling and sequencing of data collection has consequences for the integration of both components and the resulting knowledge yield. Qualitative and quantitative data can be collected in the same sample or in a subsample, that is, a nested design, or in different samples, that is, a nonnested design (Small, 2011). In a nested design, qualitative and quantitative observations are available for all or some

of the participants and can be compared. Qualitative and quantitative data collection can be used at the same time or one after the other, referring, respectively, to a concurrent and a sequential design. For instance, a quantitative component can show which group of children is most at risk for negative mental health consequences and a sequentially conducted qualitative component can provide in-depth knowledge explaining why the consequences are most severe for this specific group. The literature currently lacks information on the research objectives of authors in the field of childhood trauma. Moreover, the reasons for researchers choosing mixed methods research, and their preferences for sampling and data collection techniques remain undocumented.
Different types of analytical methods will also influence the ability to integrate the components. Small (2011) distinguishes

1. Conventional analytical methods: quantitative techniques are used for quantitative data, for example, regression, and qualitative analysis techniques for qualitative data, for example, thematic coding
2. Cross-over analyses: qualitative data are analyzed by primarily quantitative, formal, statistical techniques or quantitative data are analyzed with qualitative analytical techniques, turning them into narratives for example
3. Integrative analyses, wherein two or more different analytical approaches or techniques are merged in a single study

We will examine which analytical methods are used in childhood trauma research and which methods still need exploration.

Research Questions and Aim

In this article, we explore what MMR approaches researchers currently use and how the potential of MMR can be used even further to expand its contributions to the field of childhood trauma. First, we examine the research objectives of authors in the field of childhood trauma who are currently using MMR. This is relevant because we not only explore the different objectives they wish to achieve with their research, but we also examine whether different objectives may need a different approach or degree of integration. Second, we describe (a) the rationale provided by researchers in this field for choosing a mixed methods design, (b) how data collection and sampling in both components are related, (c) how data analysis was conducted, and (d) whether the results of both components are presented separately or in an alternating manner. Third, we examine the extent to which additional knowledge or yield is generated by integrating the components and how studies can be improved. This could help trauma researchers design mixed methods studies in a way that moves both the field of MMR and the field of childhood trauma forward.

Methods

Reviewing Mixed Methods Studies

As a method we chose the narrative review, which is defined as synthesizing primary studies and descriptively exploring their heterogeneity (Petticrew & Roberts, 2006). The interpretation in a narrative review is largely case-bound; it often has a broad coverage and emphasizes narrative explanation.

Retrieving Mixed Methods Studies

We searched five electronic databases, namely, PsycINFO, CINAHL, PubMed, EMBASE, and, PILOTS, to cover literature on psychological, behavioral, and medical sciences. We used an additional issue-by-issue search of seven relevant scientific journals not covered by these databases (see Figure 1).

[FIGURE 1]

The literature search for mixed methods articles on children and trauma included all studies published between January 1980 and October 2011. We conducted a search for qualitative articles on children and trauma as well, in order to locate articles that do not explicitly refer to the use of mixed methods. We inspected references of retrieved articles as well.

The search procedure is depicted in Figure 2. Our initial search resulted in 3,023 hits, which were identified through the specific mixed methods search and the search for qualitative research. After removing duplicates and studies not dealing with trauma, 1,234 unique citations remained.

[FIGURE 2.]

Screening for Inclusion

We screened titles and abstracts to see whether articles included children in their study population, used a combination of qualitative and quantitative methods, and examined trauma—defined as a sudden and unexpected life-threatening event or the witnessing of such an event in others that is experienced with anger, shock, and helplessness (American Psychiatric Association, 2000). This resulted in 61 studies being selected. For these studies, we retrieved the full-text article. By searching reference sections we found one additional article.

Two of the researchers (HB and MS) independently checked the 62 articles against eligibility criteria. In case of disagreement concerning the inclusion or exclusion of an article, they discussed the decision with the third author (FvW) until agreement was reached. The studies were included (Figure 2) if (a) children's average age was less than 19 years; (b) they examined the children's experience of the traumatic event, the processing of it or the factors influencing the recovery process; (c) they addressed the children's perspective either by examining the children themselves or their parents or caregivers; (d) they reported an empirical research project combining qualitative and quantitative studies; and (e) they were published in a peer-reviewed journal in the English language. Based on these criteria, we included 13 articles (Charles, Butera-Prinzi, & Perlesz, 2007; Feeney & Ylvisaker, 2003; Gaskell, 2007; Haight, Black, & Sheridan, 2010; Haight, Marshall, Hans, Black, & Sheridan, 2010; Jones & Kafetsios, 2002, 2005; London Bocknek, Sanderson, & Britner, 2008; Miller, 1996; Miller, Fernando, & Berger, 2009; Nyamukapa et al., 2010; Ostler et al., 2007; Roberts, Mitchell, Witman, & Taffaro, 2010; see Table 1). One group of researchers had published three articles and one group published two. We decided to include all of them because our aim is to explore the potential of different mixed methods variants and not to synthesize the studies' outcomes. Although these studies originated in the same project, their objectives and designs differed.

[TABLE 1.]

ANALYSES

Two of the researchers (HB and MS) independently coded each study using a detailed coding system (see the appendix). We resolved disagreements through consulting the studies and discussion with the third author [FvW] until consensus.

Coding the Research Objectives, Motivation, Terminology, and Rationale

First, we examined the research objectives of each study and wrote down which research questions and aims the authors formulated. Following Small's (2011) terminology, we coded the motivation for a mixed methodology as either confirmatory or complementary. We coded a referral to the terminology mixed methods as either yes or no. Following Gannon and Sun (2010), we defined the rationale as none provided, weak, sufficient, or strong. Studies in which the authors stated that they would be using MMR without any further clarifications were coded as providing no rationale. A weak rationale consisted of a general remark as to why mixed methods are useful, without linking this to the specifics of their own study. When studies provided more elaborate arguments including a specific motivation, we coded it as sufficient. Finally, those studies that included a reference of why a study that used mixed methods was needed in the field of children and trauma, on top of elaborating on the justification in their own study, received the coding strong.

Coding Data Collection and Analysis

With concern to data collection and data analysis we again followed Small's (2011) distinctions. We coded the articles as concurrent in case of simultaneous data collection and as sequential in case one type of data collection preceded the other. We coded a sample as nested when multiple data types were collected from the same cases and nonnested if different types of data were collected from different cases. For data analysis we coded for conventional analytical methods, cross-over analyses, and integrative analyses as described in the introduction.

Coding Results and Integration

Finally, we coded whether the study had integrated the two components in the context of what the authors wished to achieve. We first coded whether the results were reported separately or in an alternating fashion. Next, we coded the extent and type of interpretive integration, that is, integration of findings and interpretations. We coded as parallel if no interpretive integration was used and findings and interpretations were presented independently, without relating the two components; we coded as linked if the findings and interpretations were partly related, for instance only in the discussion; finally, we coded as integrative if the findings and interpretations were fully integrated, for instance reflected in alternating reports of quantitative and qualitative findings and a discussion of their meaning.

RESULTS

Research Objectives in Mixed Methods Research

We discovered that MMR was used for different research objectives serving the field of traumatized children: (a) measures and meaning, (b) intervention evaluation, (c) theory building, and (d) measurement instrument development and validation (second column of Table 2).

[TABLE 2]

Measures and Meaning

Four studies (Studies 1, 3, 4, and 11) fell into the category "measures and meaning" because they wanted to measure a specific construct using quantitative methods and add the meaning the children attached to specific situations using qualitative methods. For instance, in Study 1 the socioemotional outcomes of children of incarcerated parents are measured using quantitative methods and information is obtained about the children's experiences with loss and support using qualitative methods. The motivation for using MMR in this category is complementary by definition.

Intervention Evaluation

In the second category, the combination of both methods serves the evaluation of an intervention (Studies 5, 6, 7, and 12). For example, in Study 5 the outcomes of a therapy for families living with brain injury are examined using quantitative methods and the experiences and mechanisms that underlie these outcomes are examined using qualitative methods. Only Study 7 was motivated by confirmation. In this study, camps for school-aged burn victims were evaluated with qualitative and quantitative outcome measures that subsequently were compared for confirmation.

Theory Building

We found three studies (Studies 2, 9, and 13) in the category "theory building." They belong in this category because they used the quantitative methods mostly to describe variables and the relationships between the variables, and used the qualitative methods to search for processes that could explain the relationships that were found. All were motivated by a complementary use of the components. For example, in Study 13 quantitative methods were used to examine relationships between children's mental health, support and aggression, and qualitative methods were used to find out the paths that led children at risk to use and assess aggression in daily life.

Measurement Instrument

Finally, in a fourth category, authors wished to develop or validate measurement instruments for clinical purposes (Studies 8 and 10). The aim of Study 8 was to validate the use of a self-report symptom checklist with qualitative methods for assessing adolescent psychological well-being in a war-affected society. The two components were used alongside each other in Study 10, to develop a culturally sensitive measurement instrument.

This analysis demonstrates that mixed methods studies, when applied in the field of childhood trauma, can have different research objectives relevant to the field. We found 11 studies with research objectives that aimed at the complementary use of qualitative and quantitative research methods and two studies that started with confirmatory motivations.

RATIONALE AND TERMINOLOGY FOR MIXED METHODS RESEARCH

Rationale Provided

The reasons for combining qualitative and quantitative techniques were not always clearly stated, even though we could usually deduce these reasons from the studies' research aims. We found seven studies to have no or a weak rationale, whereas six

had a sufficient or strong rationale. In the studies with an absent or weak rationale, the authors often mentioned that qualitative and quantitative methods would be used, but failed to indicate what each of the components should accomplish and why they should be used and integrated in a single study. For example,

Conventional assessment instruments were adapted for use in this unique context, and semistructured interviews were utilized to gather phenomenological data from children regarding various development, sociocultural, and political topics. (Study 2, p. 89)

The project was evaluated using qualitative and quantitative research methods, with pre, post group and 3 month follow up measures of individual, couple and family functioning. (Study 5, p. 61)

In studies with sufficient or strong rationale, the authors specified what qualitative and quantitative methods could achieve in their study and explained clearly how it would be possible to derive new knowledge from combining these two components. For example,

This research is case based (Stake, 2005) and employs a mixed-methods design (Creswell et al. 2004; Tashakkori and Teddlie, 2003), using case records, child interviews, and child and caregiver standardized assessments. Note that neither qualitative nor quantitative data alone are likely to provide a complete account of children's perceptions and functioning. (. . .) By drawing on both standardized assessments completed by foster mothers and children, and semistructured interviews with children, we provide multiple opportunities for children to communicate and for triangulation of child and caregiver reports. (Study 3, p. 501)

Mixed Methods Terminology Use

As can be seen in Table 2, seven studies in our sample did not use the mixed methods terminology to refer to the methods they used (including a study that used the term only once in the abstract) and six did. A referral to the term *mixed methods* can not only reflect different things, for instance, how well-known mixed methods were at a certain time but also journals' or authors' preferences. In one of the two studies by Jones and Kafetsios the term *mixed methods* is used to describe the study (Study 9) and in the other (Study 8) it is not, although both articles are from the same research project and both explicitly use a combination of both methods.

There is a relationship between the use of the terminology mixed methods and the rationale provided. The studies that explicitly referred to the use of mixed methods were also the ones that provided a sufficient or strong rationale for using mixed methods, $\chi^2(1, n = 13) = 3.90$, $p < .05$, Cramer's $V = .55$. The studies providing a strong rationale can be considered as best practices in mixed methods methodology in this respect.

SAMPLING

Nesting

Of the 13 studies, 11 studies used a nested sample (Studies 1, 2, 3, 4, 5, 6, 7, 8, 9, 12, and 13), one (Study 10) a nonnested sample, and one study (Study 11) did not clearly report the sampling procedure. Of the 11 nested studies, 8 collected quantitative and qualitative data for all participants. In the other three studies, a subsample from the total sample was selected in which both types of data were collected. In Study 7, the subsample was chosen conveniently as the authors conducted a quantitative

evaluation of 5 years of burns camps and a qualitative evaluation of just the last year. In Studies 8 and 9 (resulting from the same research project) the subsample of 40 adolescents in which both qualitative and quantitative data were collected was purposively selected on the basis of the extreme positive or negative scores on the self-report of psychological well-being.
One study (Study 10) used a nonnested sample. In this case, the qualitative data about daily stressors in a war context were collected from a sample of the target population and were used to generate a measurement instrument. The instrument was then used and its psychometric characteristics were tested in a different sample of the target population.

Sequencing
We examined whether data collection was conducted concurrently or sequentially. In eight studies quantitative and qualitative data were concurrently collected, in four studies sequentially, and in one study it was unclear (see Table 2). A combination of a concurrent nested design was most frequently used (eight studies), followed by a sequential nested design (three studies), and finally a sequential nonnested design (one study). A concurrent nonnested design was the only combination absent.

Data Analysis
We can be brief about the data analysis methods used in the studies. All studies used conventional data analysis methods. This means that authors used qualitative methods to analyze qualitative data and quantitative methods for quantitative data. No crossover analyses in which qualitative data were analyzed with quantitative methods or vice versa were used. Also no innovative or hybrid methods were used.

Extent and Nature of Integration
Now, we will examine the reporting of the results (separately vs. alternating) and the type and the extent of interpretive integration (parallel, linked, integrative). We will address this topic by means of the four research objectives that were described earlier, because the different objectives may require different ways and degrees of integration. We will also examine whether the choices made exploit the potential of the mixed methods.

Measures and Meaning
The four studies (Studies 1, 3, 4, and 11) that aim to measure a construct and combine this with the children's meaning of situations and events, all use similar designs: concurrent data collection, nested sample (sample similar for both components), and conventional methods of analysis. All four studies present the results of both components separately. Three studies (Studies 3, 4, and 11) do not achieve interpretive integration leaving only one study (Study 1) that links both components when discussing the quantitative and qualitative findings.
In Study 3, the researchers notice that some of the children of parents who abuse methamphetamine have a high score on the underreporting and dissociation scale (involving a detachment from reality). In the interviews they find indications too that children deny the problems at hand and avoid taboo topics. With the nested sample they could have examined whether the child's expressions in the interview confirmed the quantitative measurement of mental health needs but these outcomes are not presented. If they had integrated the findings of the two components, they could have

informed clinical practice about the interview being a comparable, better, or worse instrument to be used when dealing with this specific group of vulnerable children.

Study 4 presents the mental health needs of victims of hurricane Katrina, followed by some qualitative illustrations. Although the difficult circumstances very much restricted the possibilities of the study, the study could have benefited from more extensive and systematically used qualitative methods to narrate the victims' voices. These elaborate qualitative findings could have been used to explain the mental health needs, for example.

Study 11 aimed at discovering ingredients for an effective intervention addressing distress among orphans in Zimbabwe. The factors that possibly influenced distress were discussed with the target group, although it is not clearly reported whether the discussions took place on the basis of the quantitative outcomes, that is, sequential data collection. Although the discussions could potentially generate ideas for interventions matching the experiences of the local group, this is not realized because the qualitative component is short and underdeveloped and its connection to the quantitative component is unclear.

Study 1 presents results about the prevalence of posttraumatic stress disorder, socioemotional functioning, support, and resilience, followed by elaborate results about the children's experiences with their parents' incarceration. In the discussion section, the findings of both methods are interpreted and linked, that is, the qualitative findings are used to provide a general context for the quantitative findings. The researchers could have pushed it somewhat further by comparing the themes they described, for example, support, loss, and resilience, more systematically. They also could have reported what they learned about these themes from each of the methods, demonstrating the value of mixing the two.

In conclusion, in all studies in this category of meaning and measurement the results of both components were reported separately. With the exception of one study (Study 1), the components stay parallel as they are not integrated during the interpretation phase of the studies either. A systematic integration would have increased the yield in these studies, in terms of more elaborate theoretical explanations, exploring and targeting effective interventions or confirmatory aims. The studies do not fully use the opportunities of MMR because the answers to their research questions aimed at measurement on one hand and meaning on the other, are not integrated.

Intervention Evaluation

Four studies aim at evaluating interventions by means of MMR (Studies 5, 6, 7, and 12). In all four studies the authors present the qualitative and quantitative results separately. Three studies (Studies 5, 6, and 12) use both components in parallel, nowhere integrating the two. This leaves one study (Study 7) that links both components in the discussion and partially uses the potential of MMR.

Study 5 has a very thorough qualitative component providing elaborate knowledge about families with a parent with brain injury and the working mechanisms of the therapy that is offered. Although this design offers great potential to relate these

mechanisms to the intervention's effectiveness, this is not used by the authors. This leaves the potential of refining the underlying theory of the intervention unused.

Study 6 uses a single-subject reversal design in which two children are followed during a program and a follow-up. Quantitative data measuring change and effectiveness are collected during the program and qualitative data are collected afterward. No integration of the components takes place. Although the researchers suggest a chain of events that can explain the long-term effects, the study could have benefited from a more thorough qualitative component providing evidence about the process of the intervention.

Study 12 offers an experimental assessment of the impact of an intervention on children's mental health and behavioral functions. Qualitative methods are used to add the experiences of the children and professionals involved in the intervention, and the possible working mechanisms of the intervention. In this nested design, the questionnaire scores of children that showed the most progress and children that showed the least progress could have been integrated with the qualitative data of the children, in an attempt to explain why few significant differences were found between pre- and postintervention scores. Alternatively, cross-over analysis, that is, "quantitized" themes derived from the qualitative data could have been used as moderator variables to explain the variation and changes from pretest to posttest scores.

Study 7 is the only study in this group with a confirmatory aim, as the researchers wish to compare the quantitative and qualitative outcomes of the intervention. Because the outcomes do not converge—quantitative results showing no effect on psychological rehabilitation of burn victims and qualitative results showing a beneficial effect—the authors discuss the divergence. They could have taken the integration somewhat further if they had pursued their own questions about these results. For instance, they could have used the nested sample and examined whether the camps are beneficial for some and not for others, by using the qualitative findings to predict the quantitative findings for each child and vice versa.

To conclude, these studies demonstrate that MMR has a contribution to make to evaluation studies in the applied field of childhood trauma. Because the qualitative and the quantitative component in these studies involve the same intervention it could be argued that they are integrated, but this is not automatically so. If the results and the interpretations are not integrated, the authors do not fully take advantage of the potential of the mixed methods design. In this category the potential mainly seems to be building and refining underlying theories that can explain why an intervention works for some and not for others.

Theory Building

Three studies (Studies 2, 9, and 13) with complementary motivations aim for theory building. The quantitative components are used to determine the relationships between the variables and the qualitative components are used to fill in the working mechanisms or paths between the variables. The difference with the former category

is that the objective to develop social science theory is characteristic of fundamental research, not of applied research. Two studies (Studies 2 and 13) use concurrent data collection within a nested sample (similar samples for both components) and one study (Study 9) uses sequential data collection with qualitative observations in a subsample of the entire sample. Two studies (Studies 9 and 13), of which one presents the results separately, fully use the potential of MMR (*integrative*). One study (Study 2) presents the results separately and does not integrate the components at all (*parallel*).

In Study 2, researchers wish to address hypotheses with both quantitative and qualitative methods. For example, they expect very young children living in refugee camps to be unaware of the war and atrocities in their home country, resulting in a low level of traumatic stress. They quantitatively measure a low level of trauma in these children, which is congruent with their expectation, but while interviewing they discover that children do know about the war, which is in contrast with their expectations. Instead of combining the outcomes of both components to come up with explanations for these findings, the components are presented without integration.

The focus of Study 9 is to find out how the meaning given to different types of war events moderates the association between exposure to war events and psychological well-being. The large sample of youths used in the quantitative component is used to determine the association between exposure to war events and well-being with a survey in two communities. The qualitative method is needed to explain how the context of war and the meaning attached to events influences the psychological effects. Qualitative data are collected among the individuals with extreme scores on the survey to examine the different meanings of war events in a sequential design. Per theme the quantitative and qualitative results are presented and compared, exploiting the full potential of the design for explanatory purposes.

Study 13 uses quantitative research to find patterns in the use and development of aggression in children. Qualitative research is used concurrently to provide a better understanding of the role of aggression in the lives of children from families involved in methamphetamine abuse. A high level of aggression coincides with particular information, gathered in the interviews, about using and accepting aggression among a specific group of girls. This relationship is later given a more in-depth examination. The nested design facilitates integration between the quantitative scores and the interviews—capitalizing on the potential of mixed methods.

In conclusion, mixed methods studies have much potential for developing theoretical explanations for phenomena of interest in childhood trauma. Different designs can be used to provide these theoretical insights. In our review, two studies integrated the components, leading to yield, and in one study the potential was not exploited.

Instrument Development and Validation

Two studies in our sample (Studies 8, 10) address the development and validation of measurement instruments for clinical practice. Both studies use a sequential design

and the results are presented separately. Study 8 has a confirmatory motivation and Study 10 a complementary one. Study 8 fully integrates the components (*integrative*) and Study 10 partly integrates them (*linked*).

Study 8 explicitly seeks to compare whether adolescent psychological well-being measured with a self-report symptom checklist confirms the findings obtained by qualitative methods; in other words: does the clinical outcome depend on the method that is used. Youths with extreme scores in the sample at large are selected and interviewed while the interviewers are blind to their scores on the questionnaire. The outcomes are compared per participant. In this study, the potential of the sequential, nested data collection is used and leads to the conclusion that the self-report checklist did not discriminate between individuals varying in well-being as reliably as other, qualitative, means.

Study 10 has a complementary purpose and uses the qualitative methods to generate items for a questionnaire, that is, a list of culturally relevant daily stressors, such as unemployment, poverty, and violence. The questionnaire is tested for its psychometric properties in a different sample, turning this study into the only one with a nonnested sample. In this study, the prior data collection facilitates the subsequent alternative data, and the yield of the integration is the resulting instrument. The researchers could have reached a higher level of integration if they had reported the qualitative results that shaped the questionnaire. They also could have used qualitative (cognitive) interviews with a subset of participants concerning their understanding of the instrument. This could have provided additional information as to why a third of the items did not belong in the scale according to the factor analysis.

In conclusion, instrument development and validation can benefit greatly from the potential that MMR has to offer. Again, different designs can serve this objective. For clinical purposes, a nested design seems essential to compare the outcomes of both methods per participant. One study fully integrated the components (integrative) and the other was coded as linked, leaving room for improvement. To be able to reconstruct the development of a measuring instrument, not only the psychometric results of the new instrument but also an accurate description of the qualitative results leading to the construction of the instrument must be presented.

CONCLUSIONS AND DISCUSSION

Narrative Review of Mixed Methods Research

Rationale for Mixed Methods Research

We obtained 13 studies through a systematic literature search that combined quantitative and qualitative methods in a single study on childhood trauma, either with or without the term mixed methods. Half of the studies in this narrative review provided an inadequate rationale for using both methods, which is in line with other studies (Östlund et al., 2010). The relationship between the use of the terminology and the provided rationale indicates that the referral to mixed methods terminology implicates an explicit awareness of what mixed methods are expected to accomplish

and may contribute to the field. Emphasizing the rationale for conducting MMR is believed to facilitate integration (Bryman, 2007) which is thought to be essential for generating the knowledge yield of MMR.

Facilitating Integration

In our sample, we found studies that lived up to the expectations of MMR and integrated both components to produce original, additional knowledge. Studies that integrated well used the opportunity to compare the qualitative and quantitative data—either concurrently or sequentially collected—which the nested sample permitted them to do. Sometimes this is shown in the alternating presentation of the results, which can be used in a thematic way. This forces the researchers to be clear about the themes that they have examined and to systematically list the qualitative and quantitative findings for comparison. Sometimes the studies that integrated well had a complementary motivation and sometimes a confirmatory one. For complementary studies, the challenge seems to be to explicitly define what each of the components adds to the knowledge. An essential part of confirmatory studies is to take divergence into account, for which different strategies are currently being developed (Pluye, Grad, Levine, & Nicolau, 2009).

Methodological guidance for researchers on the integration of data and findings from qualitative and quantitative methods is under way. Methodological frameworks have been developed to facilitate integration (Creswell & Plano Clark, 2007; González Castro, Kellison, Boyd, & Kopak, 2010; Heyvaert, Maes, & Onghena, 2011). O'Cathain et al. (2007) examined at what research phase integration took place in MMR and developed concrete techniques for integrating data in MMR (O'Cathain et al., 2010). In our study, it turned out that it is not only integration that troubles researchers. Many studies also had trouble clearly formulating the new insights they had gained from combining the two methods.

Innovation in Mixed Methods Research

Of the 13 articles examined, 8 combined a complementary aim with a nested sample, concurrent data collection and conventional methods for analysis. Although different combinations of these elements are possible, it seems that the diversity of mixed methods designs is not yet fully explored. Sequential designs were a minority (four times) but hold the promise of understanding mechanisms behind newly discovered associations or to test emergent hypotheses (Small, 2011). Most striking was the homogeneity in analytical methods. Although Small (2011) points at the existence of crossover analysis, for example, network analysis, and innovative analytical methods, such as qualitative comparative analysis, these methods are not experimented with.

Limitations of the Study

In this study, we did not explicitly pay attention to the quality of the separate qualitative and the quantitative components because we concentrated on the element of "mixing." In agreement with Lewin et al. (2009), the rigor of the qualitative

components was of concern but we also found a large variation in the quality of the quantitative components. The quality of MMR is a highly debated topic (Bryman, Becker, & Sempik, 2008, O'Cathain, Murphy, & Nicholl, 2008; Pluye, Gagnon, Griffiths, & Johnson-Lafleur, 2009) and initiatives such as the Mixed Methods Appraisal Tool (Pace et al., 2012) are currently undertaken to concomitantly appraise qualitative, quantitative, and mixed methods studies.

Our findings apply to the field of childhood trauma and we cannot be sure that they are transferable to other fields. Some studies were conducted in the context of war and disaster and had few facilities available. Some groups, such as children of parents abusing drugs, were difficult to access. Both conditions limit a generalization of our findings to other scientific areas.

MIXED METHODS RESEARCH IN CHILDHOOD TRAUMA

Theoretical Contribution

Mixed methods studies have theoretical explanations to offer about issues related to traumatized children. Especially in the field of childhood trauma, fundamental theory development (Category 3: theory building) is highly relevant because most theory is generated for adults and is not automatically applicable to children (Alisic, Jongmans, Van Wesel, & Kleber, 2011). Theory building is also relevant for applied purposes in clinical practice to evaluate interventions and programs (Category 2). The potential for theory building in our sample was especially suitable when the quantitative components established the associations between variables and the qualitative components helped to reveal the mechanisms. However, this yield was only produced when the components were integrated.

Improving Mixed Methods Research

We found that not all studies in the field of childhood trauma were able to exploit integration. Integration was found especially problematic in the first two categories—measures and meaning and evaluation studies—which confirms the findings of previous research on health care interventions (Lewin et al., 2009). In both categories the studies were motivated by assessing constructs or outcome measures on one hand and giving insight into the children's experiences on the other. These studies gave the impression that the sheer fact that both methods obtained a different type of knowledge about social reality was sufficient to justify the use of both methods in a single study. However, if the results are reported separately and do not contain an indication of what the outcomes specify about the topic or the intervention of interest, then the potential of MMR is underutilized. Our analysis shows that a more systematic integration of the components would likely move these studies forward, helping them provide theoretical explanations or increase the effectiveness of interventions. Our recommendations for improving the application and dissemination of MMR in childhood trauma are presented in Table 3.

[TABLE 3]

Targeting Traumatized Children

We found other motivating factors for choosing MMR, arising more directly from the target group of traumatized children. Several studies in our sample suggested that multimethod approaches were necessary for studying vulnerable children living in unsafe situations. In these cases, standardized measurements needed to be balanced with qualitative methods that leave more room for building trust and collecting data on the children's terms. For similar reasons, they also plead for multi-informant studies because children sometimes did not want to show their problems, avoided the researchers, or did not want to talk about taboo topics. Under such circumstances, using different methods that compensate for each other's weaknesses will benefit the quality of the study. None of the studies used a pragmatic transformative framework of MMR (Mertens, 2007), which would allow for participation and empowerment of the groups involved. This framework can be considered a suitable alternative for studying issues in childhood trauma that ask for improvement and change.

We conclude that the application of mixed methods has entered the field of childhood trauma research and serves various valuable aims for scientific progress in the field. However, we also observed that the performance of the mixed methods studies can be improved greatly. First, integrating the two components would increase the yield of the studies. Second, considering designs rarely used in childhood trauma could discover the innovative power of MMR for the field, for example, nonnested designs and cross-over or integrative analyses. MMR in childhood trauma is still a young field and its use and value will need to evolve in the years to come.

APPENDIX

Coding Scheme

- Type of trauma (topic)
- Setting or location
- Research objectives
    - Aim of the study
    - Research questions
- Research design
- Motivation for mixed methodology (confirmatory, complementary)
- Provided rationale (type of rationale; none–weak–sufficient–strong)
- Mixed methods terminology (yes/no)
- Sample composition qualitative component (number of participants, gender, age)
- Sample composition quantitative component (number of participants, gender, age)
- Relationship between samples in both components
    - Sequence (concurrent, sequential)
    - Sampling (nested, nonnested, unclear)
- Data collection methods qualitative component
- Data collection methods quantitative component

- Relationship between data collection in both components
- Data analysis qualitative component
- Data analysis quantitative component
- Relationship between analysis in both components (conventional, cross-over, integrative)
- Reporting qualitative and quantitative findings (separate, alternating)
- Reporting conclusion and discussion (separate, alternating)
- Extent of integration (parallel, linked, integrative)
- Exploitation of MMR (combined yield generated)

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FIGURE AND TABLES

Databases searched:

- PsycINFO
- CINAHL
- PubMed
- EMBASE
- PILOTS

Journals searched:

- Qualitative Research
- Journal of Mixed Methods Research
- Trauma, Violence and Abuse
- Traumatology
- Clinical Child Psychology and Psychiatry
- Transcultural Psychiatry
- Journal of Interpersonal Violence

Key words used to search titles, abstracts, key words, heading words and tables of contents:

- *In search for mixed methods studies:*

mixed-method* or "mixed method*" or (multitrait AND method) or "methodological triangulation" or hybrids or (qualitative AND quantitative)

- *In search for qualitative studies:*

qualitative or mixed-method* or "mixed method*" or "unstructured interview*" or "semistructured interview*" or "semi-structured interview*" or "focus group*" or "grounded theory" or ethnograph* or phenomenologic* or hermeneutic or "life history" or "participant observation"

- *In both searches:*

AND (trauma* or PTSD or "posttraumatic stress") AND (child* or youth or adolescen* or toddler or infant or youngster or kid or teen* or preschool or kindergart*)

Note. * means a wildcard.

Figure 1. Databases, journals, and key words used during the search procedure.

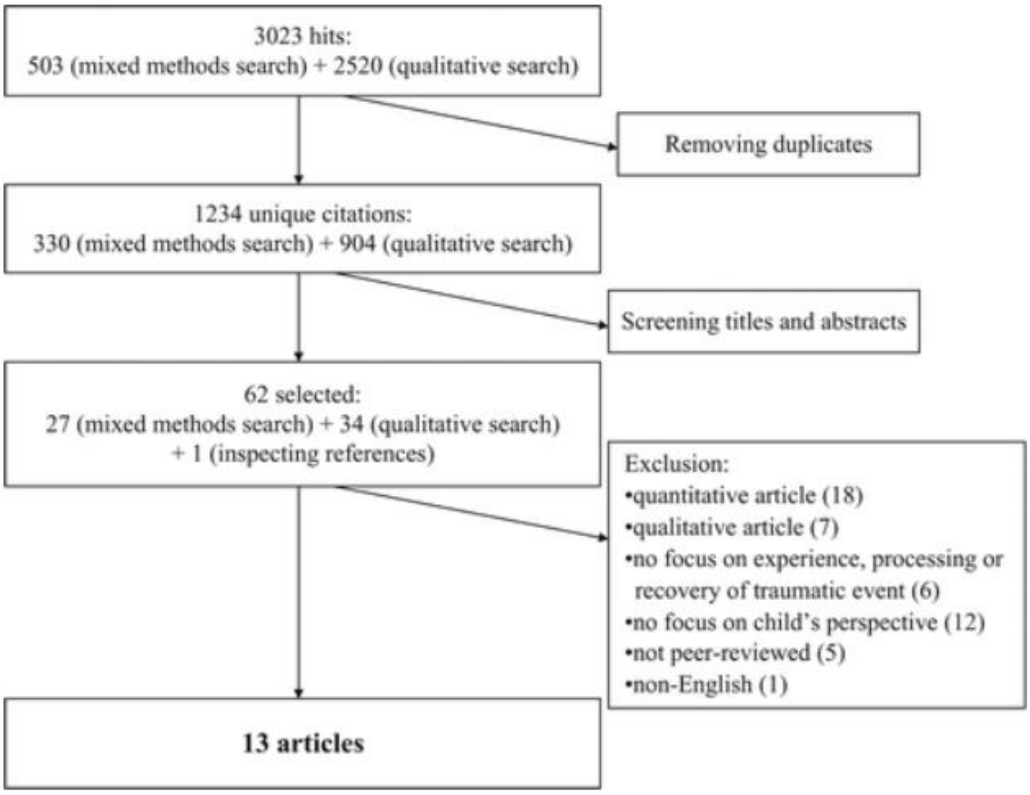

Figure 2. Search procedure and inclusion of mixed methods studies.

Table 1. Primary Mixed Methods Studies Retrieved.

Authors	Type of trauma	Aim/Questions	Sample	Methods
1. London Bocknek, Sanderson, and Britner (2008)	Ambiguous loss due to parental incarceration	Examine the socioemotional outcomes of children of incarcerated parents	Children of incarcerated parents in a mentoring program	*Data collection.* QL: semistructured interviews. QN: questionnaires
			N: 35. *Gender*: 16 F; 19 M. *Age*: 1st to 10th grade.	*Analysis*. QL: Grounded theory approach. QN: Descriptive statistics and correlations
			Sample: similar QL and QN	
2. Miller (1996)	State terrorism, living in a refugee camp	Examine mental health and psychosocial development of Guatemalan Mayan Indian children living in refugee camps and their understanding of the violence	Children living in two refugee camps in Mexico and their mothers	*Data collection.* QL: Semistructured interviews of children. QN: Questionnaires of mothers
			QN: *N*: 58. *Gender*: 24 F; 34 M. *Age*: 7-16 years	*Analysis*. QL: Not reported. QN: Factor analysis, reliability analysis, descriptive statistics, ANOVA, correlations
			QL: subgroup for qualitative component on gender and age. *N*: 40. *Gender*: 19 F; 21 M	
3. Ostler et al. (2007)	Parental methamphetamine abuse	Understand mental health needs and perspectives on their experiences of children reared by parents who abuse methamphetamine	Rural children entering the child protective system as result of parental methamphetamine abuse	*Data collection*. QL: Semistructured interviews. QN: Questionnaires, case records, and caseworker reports
			N: 23. *Gender*: 8 F; 15 M. *Age*: 7-14 years.	*Analysis*. QL: Coding. QN: Descriptive statistics, ANOVA, Spearman's rank correlations
			Sampling: similar QL and QN	

(continued)

Table 1. (continued)

Authors	Type of trauma	Aim/Questions	Sample	Methods
4. Roberts, Mitchell, Witman, and Taffaro (2010)	Hurricane Katrina and its aftermath	Explore prevalence and severity of depressive, anxious, and posttraumatic symptoms among children and adolescents in a longitudinal design	St. Bernard Parish community southeast of New Orleans *N*: 43. *Age*: 11-18 years *Sampling*: similar QL and QN	*Data collection*. QL: Qualitative items on questionnaire, informal stories shared during administration of questionnaires. QN: Questionnaires, (retrospective) reports on mental health symptoms, demographic information *Analysis*. QL: Not reported. QN: Descriptive statistics, mixed effect modeling, ANOVA
5. Charles, Butera-Prinzi, and Perlesz (2007)	Having a parent with an ABI	Explore experiences of families with a parent with ABI and explore application of MFG therapy	Families with a parent with ABI and one or more children in one health center. Parents suffering injuries prior to and after starting a family *N*: 9. *Age*: 7-13 years *Sampling*: Similar QL and QN.	*Data collection*. QL: Transcripts of MFG sessions, process notes, and reflections by group facilitators. QN: Questionnaires pregroup, postgroup, and 3-month follow-up completed by parents and children *Analysis*. QL: Thematic analysis. QN: Descriptive statistics
6. Feeney and Ylvisaker (2003)	Traumatic brain injury	Evaluate effectiveness of support-oriented, context-sensitive, multicomponent behavioral and cognitive intervention for improving behavioral self-regulation	Children referred for help in the development of school-based behavioral interventions *N*: 2. *Gender*: 1 F; 1 M. *Age*: 6-7 years *Sampling*: similar QL and QN	*Data collection*. QL: Interviews with classroom staff. QN: Judgments of intervention effectiveness by classroom staff using a rating scale. Functional behavior analysis using questionnaires and observations *Analysis*. QL: Thematic analysis. QN: Descriptive statistics
7. Gaskell (2007)	Burn injury	Evaluate burns camps	Children who had attended the burns camps in 2000 to 2003	*Data collection*. Questionnaire administered to parents, children, and camp staff with closed and open questions

(continued)

Table 1. (continued)

Authors	Type of trauma	Aim/Questions	Sample	Methods
			QN: *N* = 97. *Gender*: 40 F; 57 M. *Age*: 7-19 years *Sampling*: Subgroup for QL of last year burns camp (2003). *N*: 14. *Gender*: 8 F; 6 M. *Age*: 8-16 years	*Analysis*. QL: Thematic analysis. QN: Descriptives and Wilcoxon signed ranks test
8. Jones and Kafetsios (2002)	War	Compare the use of self-report symptom checklists with qualitative methods for assessing adolescent psychological well-being in a war-affected society	Adolescents from two communities on opposite sides of the Bosnian conflict QN: *N* = 337. *Gender*: 182 F; 155 M. *Age*: 13-15 years QL: subgroup based on questionnaire scores from each city. *N*: 40. *Gender*: 20 F; 20 M	*Data collection.* QL: Narrative interviews of children and parents, lifeline drawn by adolescents, story writing, and participant observation. QN: Questionnaires and functioning (school marks) *Analysis*. QL: Grounded theory approach. QN: Descriptive statistics, ANOVA, Spearman's rank correlations, discriminant analysis
9. Jones and Kafetsios (2005)	War	Examine the relationship between specific types of war-related events, the social and political context, and psychological well-being	Adolescents from two communities on opposite sides of the Bosnian conflict QN: *N* = 337. *Gender*: 182 F; 155 M. *Age*: 13-15 years QL: subgroup for qualitative part based on questionnaire scores from each city. *N*: 40. *Gender*: 20 F; 20 M	*Data collection*. QL: Narrative interviews of children and parents, lifeline drawn by adolescents, story writing, and participant observation. QN: Questionnaires and functioning (school marks) *Analysis*. QL: Grounded theory approach. QN: Descriptive statistics, ANOVA, correlations, χ^2 tests

(continued)

Table 1. (continued)

Authors	Type of trauma	Aim/Questions	Sample	Methods
10. Miller, Fernando, and Berger (2009)	Daily stressors relative to war and natural disaster	Develop a measure of daily stressors in the lives of Sri Lankan youth	Sri Lankan region affected by civil war and tsunami QN: *N* = 427. *Gender*: 240 F; 187 M. *Age*: 7th-13th grade QL: different sample for qualitative part. *N*: Six focus groups with an average of 7 participants per group (range: 5-8). *Gender*: evenly split. *Age*: 13-19 years	*Data collection.* QL: Focus groups, input collaborating counselors. QN: Questionnaires *Analysis.* QL: Identification of items for scale development. QN: Reliability, factor analysis, correlation, multiple regression
11. Nyamukapa et al. (2010)	Orphanhood in the context of HIV/AIDS	Examine the mechanisms through which orphanhood can lead to psychological distress and develop understanding of which children need support and how to target community-based programs	Orphans traced from household survey in rural regions of Zimbabwe QN: Random, stratified to give equal numbers of paternal, maternal, double, and nonorphans. *N*: 551. *Gender*: 272 M; 279 F. *Age*: 12-18 years QL: Different sample for four focus groups with 8 to 13 children per group	*Data collection.* QL: Four focus groups with children and nine with caregivers and professionals. QN: Structured interviews *Analysis.* QL: Content theme analysis. QN: Reliability, factor analysis, multivariate Poisson regression, logistic regression
12. Haight, Black, and Sheridan (2010)	Methamphetamine-involved families including neglect and abuse	Examine the cultural adaptation, implementation, and impact of a mental health intervention in an experimental design	Rural children from methamphetamine-involved families who are in foster care	*Data collection.* QL: Semistructured interviews, open-ended questionnaires with caregivers and community clinicians, clinicians' field notes. QN: Questionnaires, government records

(continued)

Table 1. (continued)

Authors	Type of trauma	Aim/Questions	Sample	Methods
			N: 15. *Gender*: 6 F; 9 M. *Age*: 7-17 years	*Analysis*: QL: Emic codes based on interview transcripts. QN: Descriptive statistics, *t* tests, χ^2 tests, repeated measures ANOVA
			Sampling: similar QL and QN	
13. Haight, Marshall, Hans, Black, and Sheridan (2010)	Methamphetamine-involved families and aggression	To examine mental health and experiences of physical aggression in children from families involved with methamphetamine misuse	Rural children from families who misuse methamphetamine and are involved with the child welfare system	*Data collection*: QL: Individual semistructured interviews, field notes, clinicians' judgments. QN: Questionnaires, government records, observations
			N: 41. *Gender*: 18 F; 23 M. *Age* 6-14 years	*Analysis*: QL: Emic codes based on interview transcripts. QN: Descriptive statistics, *t* tests, χ^2 tests, repeated measures ANOVA
			Sampling: Similar QL and QN	

Note. ABI = acquired brain injury; MFG = multifamily group; QL = Qualitative; QN = Quantitative; M = Male; F = Female; ANOVA, analysis of variance.

Table 2. Studies by Research Objective, Motivation, Mixed Methods Label, Rationale, Data Collection, Sampling, Data Analysis, Reporting, and Integration.

Study	Research objective	Motivation	Label MM	Rationale	Data collection	Sampling	Data analysis	Reporting results	Integration
1	Measures and meaning	Complementary	In abstract	Weak	Concurrent	Nested	Conventional	Separate	Linked
3		Complementary	Yes	Strong	Concurrent	Nested	Conventional	Separate	Parallel
4		Complementary	Yes	None	Concurrent	Nested	Conventional	Separate	Parallel
11		Complementary	No	Weak	Unclear	Unclear	Conventional	Separate	Parallel
5	Intervention evaluation	Complementary	No	None	Concurrent	Nested	Conventional	Separate	Parallel
6		Complementary	No	Weak	Sequential	Nested	Conventional	Separate	Parallel
7		Confirmatory	No	None	Concurrent	Nested	Conventional	Separate	Linked
12		Complementary	Yes	Strong	Concurrent	Nested	Conventional	Separate	Parallel
2	Theory building	Complementary	No	None	Concurrent	Nested	Conventional	Separate	Parallel
9		Complementary	Yes	Sufficient	Sequential	Nested	Conventional	Alternating	Integrative
13		Complementary	Yes	Strong	Concurrent	Nested	Conventional	Separate	Integrative
8	Measurement instrument	Confirmatory	No	Strong	Sequential	Nested	Conventional	Separate	Integrative
10		Complementary	Yes	Strong	Sequential	Non-nested	Conventional	Separate	Linked