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Integrating and Consolidating Data in Mixed Methods Data Analysis: Examples From Focus Group Data With Children

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Abstract

The challenge in data analysis often lies in accounting for the multidimensionality and complexity of the data while simultaneously discovering patterns. Integrating and consolidating different types of data during analysis can broaden the perspective and permit obtaining complementary views. This methodological research study on data collection illustrates how one type of data collection generates different types of data, which can be linked and consolidated to reach a better understanding of the topic. Procedures and practicalities are illustrated to offer a good practice example for data integration and consolidation. With the methodological reflection of research practice, I evaluate the consequences for the field of mixed methods research, in which the practicalities of an integrated mixed analysis still need to be elaborated.

Keywords

data analysis, consolidation, merging, link data, integration

What do we mean by mixed methods analysis? *Mixed methods data analyses* consist of qualitative and quantitative analyses under a similar framework and entail the analysis of qualitative *or* quantitative or qualitative *and* quantitative data. The data could stem from sequential, convergent, or iterative processes in one or more phases of data collection (Onwuegbuzie & Hitchcock, 2015). The extent to which the strands interact in the analysis depends on the overall research design. In convergent designs, the results from both strands are typically integrated in the interpretation phase (Moseholm & Fetters, 2017). This constitutes a basic convergent mixed methods *analysis* design. Alternatively, analytical strategies can interact during the generation of results (Onwuegbuzie & Hitchcock, 2015) in a more complex form of mixed methods analysis.

Mixed methods data analysis generally implies different methods of data collection. As a specific variant, ‘‘mixed analyses’’ can deal with data from one data collection methods that is then (partly) transformed to be analyzed in a different strands. However, beside the source of

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the data being one or multiple data collections, many challenges are comparable between mixed analysis and mixed methods analysis.

Another distinction is relevant in this context: data combination versus integration (Creswell & Plano Clark, 2018; van Velzen, 2016; Woolley, 2009; Yin, 2006). *Data combination* refers to an ''additive process'' in which different types of data are combined (1 + 1 = 2). In contrast, *data integration* means that a joint product is constructed from different sources of data by using various analytical strategies (Li, Marquart, & Zercher, 2000). These strategies deal with elements in the source data in different ways, but each aims for the same research objective. Speaking in mathematical terms, the product of integration is more than the sum of its constituent parts (1 + 1 = 3; Fetters & Freshwater, 2015). As Bazeley (2010) explained,

> Integration can be said to occur to the extent that different data elements and various strategies for analysis of those elements are combined throughout a study in such a way as to become interdependent in reaching a common theoretical or research goal. Thus, the elements cannot be treated separately again. (p. 432)

Therefore, *integrated mixed methods data analysis*, in contrast to mono-method analysis, not only involves the analysis of a qualitative and a quantitative strand—but also entails an analysis of the interaction between the two strands. For example, the difference between having one child in a family and having two children is more than a simple doubling of the number of children; it also includes the interaction between the siblings, which can turn out to be anything but trivial (Kuckartz, 2014). Through integration, the results have the potential to produce insights that would not be possible with a mere combination of data—let alone with mono-method research. The higher workload is ''rewarded'' with a higher level of ''sophistication'' in the results—at least this is the idea.

Purpose and Implementation of Mixed Methods Analysis

In the probably oldest typology by Greene, Caracelli, and Graham (1989), the *purposes of mixed methods analysis*—analogous to mixed methods design and data collection—are described in terms of triangulation, complementarity, development, initiation, and expansion (Caracelli & Greene, 1993; Greene et al., 1989; Onwuegbuzie & Hitchcock, 2015; Schoonenboom & Johnson, 2017). Integrative data analysis strategies are particularly well suited for initiation, but they also serve for expansion and development. If the purpose of a mixed methods study is triangulation—in the sense of researching the same topic from different perspectives to increase validity—analytical strategies have to be independent of each other and integrated data is not suitable (Caracelli & Greene, 1993; Onwuegbuzie & Combs, 2010).

Closely linked to the purpose and function of mixed methods are four key decisions regarding the *implementation of mixed methods analysis* (Creswell & Plano Clark, 2018): (a) degree of interaction of strands, (b) relative weight of strands, (c) temporal relation of strands, and (d) ways of combining or integrating strands. These decisions can be the result of the research conceptualization and be taken a priori, or they can emerge during the study as a posteriori or iterative decisions (Onwuegbuzie & Combs, 2010). However, mixed methods analyses are not an end in themselves; they must be reflectively fed back to the research question. The framing of the research question affects when, how, and to what extent data from different methods are integrated (Brannen & O'Connell, 2015)—even if, or especially when research questions are revised in the research process. Researchers must have (or develop) a clear view of what ''dynamic mixes they suggest or permit'' (Sandelowski, 2000, p. 254) and to what end.

Typologies of Mixed Methods Analysis

Typologies of mixed method analysis have to potential to systematize different strategies and ease the practical decision of analytical strategies that match certain purposes. However, the respective scholarly debate is limited by a lack of common conceptual foundations, leading to terminological confusion regarding types of analysis. Classifications by Creswell and Plano Clark (2011) and Caracelli and Greene (1993) are commonly cited but have some shortcomings: Creswell and Plano Clark (2011) defined four basic integrative processes. The first process involves merging the results of analyses of the quantitative and qualitative datasets to compare results—which means data as such are not merged, only results. Thus, integration happens more on an interpretation level than during analysis. This process assumes that analysis and interpretation are distinct steps, which may be more appropriate for quantitative research. The second process is merging analyses through data transformation, which implies merging of actual data. The third process connects the analysis of quantitative data to the collection of qualitative data, which are then used to explain the previous findings. This process represents a sequential, explanatory model of integration. Finally, the fourth process connects the analysis of qualitative data to the collection of quantitative data, which are then used to build on the previous findings (Bazeley, 2018, p. 62)—in other words, a sequential exploratory mixed methods analysis. In the third and fourth types, qualitative and quantitative data remain separate because of the sequential design. However, the analytical steps and the interpretation are interdependent. Again, the degrees of integration vary for these four types, and the extent of both analysis and interpretation varies.

In their classic article, Caracelli and Greene (1993, p. 197) suggested four strategies for integrating qualitative and quantitative data during analysis:

1. *Data transformation* means transforming one type of data into the other in order to analyze both types together, for example, numerical coding or ranking of qualitative data to analyze it statistically together with quantitative data (Caracelli & Greene, 1993; Tashakkori & Teddlie, 2010). Teddlie and Tashakkori (2009) called this process ''quantitizing'' and ''qualitizing'' as a strategy in conversion designs to provide a third option beyond sequential and parallel temporal order of strands (Greene, 2007). Quantitizing means assigning numeric values to nonnumeric data (Sandelowski, Voils, & Knafl, 2009), and qualitizing means converting quantitative data into narrative representations (Teddlie & Tashakkori, 2009; van Velzen, 2016).
2. In *typology development*, the aim is to construct types or create substantive categories that allow analysis of homogeneity within and heterogeneity between subgroupings of data. The typology is incorporated into the analysis of the respective other types of data, which could also stem from data transformation (Jang, McDougall, Pollon, Herbert, & Russell, 2008). The typology development can be an iterative process: results from one analysis can feed into the analysis of another type, which then feeds back into the reanalysis of the first type.
3. In *extreme case analysis*, analyzing one type of data serves to identify extreme cases, which are then tested and refined with the other data type. The extreme cases can also guide further data collection. Thus, this approach also has the potential for iteration.
4. With *data consolidation*, the joint use of both data types leads to consolidated variables or whole data sets in qualitative or quantitative form which are comprehensively analyzed. In other words, a quantitative data set is not augmented solely with the addition of converted qualitative data but rather new variables are created and through a merging of qualitative and quantitative data (Caracelli & Greene, 1993). This strategy is well suited for initiation purposes.

Reviewing this typology, these four types do not seem necessarily distinct. Rather, they address the aim (2 and 3) and practice (1 and 4) of mixed methods analysis: Consolidation and transformation could serve for extreme case analysis or typology development. Furthermore,

‘‘transformation’’ and ‘‘merging’’ occur in both Creswell and Plano Clark’s and Caracelli and Greene’s typology. However, transformation is a distinct strategy for Caracelli and Greene, whereas Creswell and Plano Clark identify merging (type 4 in the Caracelli and Greene typology) to be achieved through transformation (Caracelli and Greene type 1). It is indeed a practical question, how consolidation can be achieved. Presumably, it would contain some kind of transformation, making transformation a necessary but not sufficient step for consolidation. In sum, despite a consensus on the added value of integrating qualitative and quantitative approaches during data analysis, methodological reflection and practical applications remain open to further exploration.

Onwuegbuzie and Teddlie (2003) introduced a more process-oriented model for mixed methods analysis. They distinguish seven steps during data analysis–data reduction, data display, data transformation, data correlation, data consolidation, data comparison, data integration. They extend the Caracelli and Greene typology, but again processes are not distinct and potentially overlapping. Other approaches are more closely linked to research designs (e.g., Creswell & Plano Clark, 2018; Moseholm & Fetters, 2017). Moseholm and Fetters (2017) introduce five types of data integration via merging in convergent designs. They introduce a directional dimension of merging and distinguish between explanatory unidirection, exploratory unidirection, simultaneous bidirectional, explanatory bidirectional, and exploratory bidirections. This approach advances terminological discussions but has shortcomings regarding actual integration procedures.

This short and noncomprehensive review illustrates the limitations of typologies and underlines the call for practical examples. Although some publications reflect on data analysis in mixed methods research on a conceptual level (Bazeley, 2012, 2016; Kerrigan, 2014; Kuckartz, 2017; Sandelowski et al., 2009; Weaver-Hightower, 2014), practical examples for integrating qualitative and quantitative data in mixed methods analysis are comparatively rare—particularly when it comes to more complex forms of analyses (Kelle, 2007; Kuckartz, 2014, 2017; Onwuegbuzie & Hitchcock, 2015; e.g., see Bazeley, 2018).

In practical terms, the key issue is how to achieve integration: How can the sum of qualitative and quantitative parts become more than the individual parts? This remains a challenging question: For example, Bryman (2007) concluded that a lack of integration hinders the development of mixed methods research. Many consider integration to be the hallmark of mixed methods research (Moseholm & Fetters, 2017). In addition, Fetters and Freshwater (2015) suggested that, despite a rapid adoption of mixed methods, there remains an ‘‘integration challenge’’ (p. 116; see also Johnson, Grove, & Clarke, 2017). Integration can be achieved ‘‘through the philosophical, research design, methods and data collection and/or during the interpretation and reporting levels of the research’’ (Moseholm & Fetters, 2017, p. 1). Within the research process, data analysis may be the most difficult step of all, especially when it is done in an integrative way (Onwuegbuzie & Combs, 2010; Yin, 2006). A scarcity of good examples, and insufficient literature about the research process and techniques of integration (Woolley, 2009) makes integrative data analysis strategies a fruitful area for further research.

The purpose of this article is to contribute to the methodological discussion about mixed methods data analysis as a response to a call for more systemic research into mixed methods integration of findings (Bryman, 2007; Greene, 2007; Kuckartz, 2014; Woolley, 2009). First, I review definitions and conceptualizations of mixed methods data analysis, focusing on data integration and consolidation. Second, I exemplify integrative analyses through data linkage and consolidation in a methodological study on the applicability of focus groups with children. Finally, I conclude by methodologically reflecting on this example and evaluating implications for the field of mixed methods research.

Data Integration: How Is It Done?

Generally, starting points for integrative mixed methods analyses can be from any of the following four points in a project:

> (a) directly from the various sources of data in their more or less raw form, as elements from them (''data items'' and insights) are brought together without prior processing; (b) from ''preprocessed'' data, that is using data that have undergone some preliminary processing and descriptive analyses, usually involving some form of coding or indexing; (c) during the analysis process, where different styles of analysis are worked interactively side by side and together; and (d) during the writing process, where a focus on writing about the substantive issues covered means integration will develop further as the writing proceeds. Most integrative analysis strategies described in the literature focus on categories (b) and (c). (Bazeley, 2018, p. 65)

Usually, data from each component are analyzed with ''appropriate'' methods (Creswell & Plano Clark, 2018). Then, in the simplest form of integration, illustrative quotes from qualitative interviews complement or supplement results from statistical analyses. Although this approach can assist in communicating statistical results, ''this type of integration strategy is quite limited'' (Bazeley, 2012, p. 817). More sophisticated integrative strategies are data linkage and data consolidation:

Linking data during analysis refers to the ''combination of data through association, comparison, or relational analyses'' (Bazeley, 2018, p. 137). However, the original data can still be separated. Generally, linking data for individual cases can serve comparative, additive, and/or relational (theory-building) purposes. On a group level, differences can be detected more easily because with linked, complementary data on a case level,

> a more nuanced account of how the different data corroborate, illustrate, or elaborate each other is possible. (. . .) Group patterns and differences are more reliably detected because they are based on data that have been matched for sample members. (Bazeley, 2018, p. 127)

Also, individual cases that diverge from the overall patterns are more easily detectable. The differences are still the same, but with linked data, they are easier to detect. Different sources can work together to constitute a complementary account or to reveal differences and patterns across subgroups that might otherwise be obscured (Bazeley, 2018).

Data consolidation is probably the most sophisticated *integration strategy.* It goes beyond linking different sources of data in that a new data set is created to serve further analysis. The originally separate sources can no longer be distinguished. To achieve consolidation, qualitative and quantitative data have to be merged into a new consolidated data set. Thus, they have to take the same (or similar) format, which means some form of data transformation is required (Collingridge, 2012; Sandelowski et al., 2009; van Velzen, 2016). From this data set, it is not possible to identify the original qualitative or quantitative data, instead, a genuine new piece of information is generated (Caracelli & Greene, 1993; Creswell & Plano Clark, 2018). Thus, qualitative, quantitative, and consolidated data can be analyzed as well as the interaction between the three.

Consolidating data sources to create new composite variables is a generative strategy, often used to resolve puzzles raised by the data, but it can also create new questions (Bazeley, 2018). It often seems to be the case that consolidated data sets take a quantitative form. That is, qualitative data are transformed into numbers and these numbers paired with the quantitative data constitute a new data set (e.g., Jang et al., 2008). However, data transformation can go both ways,

quantitizing and qualitizing (Bazeley, 2018; Vogl, 2017). Thus, a consolidated data set can also take a qualitative format.

I will now move on to illustrate data integration and consolidation in a methodological research project (Vogl, 2005, 2009). This example demonstrates how data from focus groups are multiplex and how transcripts yield not only verbal data but also information about nonverbal communication. It also illustrates how quantitative and qualitative characteristics can be integrated practically and methodically to gain complementary information on a phenomenon (complementarity) and to broaden the perspective (completeness). Finally, qualitative and quantitative results also support each other (corroboration). Consolidation offers new insights that go beyond what can be obtained with separate components.

Empirical Example for Integrated Mixed Analyses: Focus Group Data With Children

First, I outline the original research problem, the data collection, data analysis, and specifically the consolidation of different strands of analysis. Furthermore, I sketch results from the original project based on the integrated mixed analysis.

Research Problem of the Original Project

When the interests and needs of children are under study, we should rely not only on the assessments of adults but also be prepared to perceive children themselves as competent informants. Social research methods are typically developed to be used with adults. Specific demands are put on research design and researchers when children are the main subjects of research, due to different needs and abilities of the research subjects.

Focus groups seem to be especially suitable for researching the perceptions of children, since such a nonstandardized and communicative technique can allow children to have their say. As the children themselves direct the data collection to a great extent in focus groups, the risk of being a mouthpiece of adults is decreased. However, focus groups are very specific types of interaction that not only offer special performative, narrative, and argumentative possibilities but also require the respective skills and motivation. Interactive, discursive, and cognitive skills are essential for participating in focus groups and taking advantage of the methodology. Thus, this study focused on these skills, as well as on the different levels of activities during the focus groups, specifics of the group interaction, procedural aspects, and their implications for the feasibility of focus group research with children (Vogl, 2005, 2009).

Data Collection

I conducted five focus groups with children aged 6 to 15 years. Each focus group consisted of 8 to 10 participants of roughly the same age. Participants were recruited through a primary and a secondary school. Within each school, participants were randomly selected from a class list. To avoid a sense of strangeness among participants and toward the moderator in all groups, a preliminary meeting was held a few days before the focus group took place.

The focus group guideline was structured by ‘‘task complexes’’ to facilitate comparisons. These task complexes primarily anticipated specific group processes: Some tasks were formulated to prompt the group to establish consensus (‘‘collaboration tasks ‘‘), others to stimulate a discussion, and so on. The substantive content of these tasks (which were stimuli in the focus group guideline) was actually of secondary interest. The focus group lasted for 45 to 60 minutes

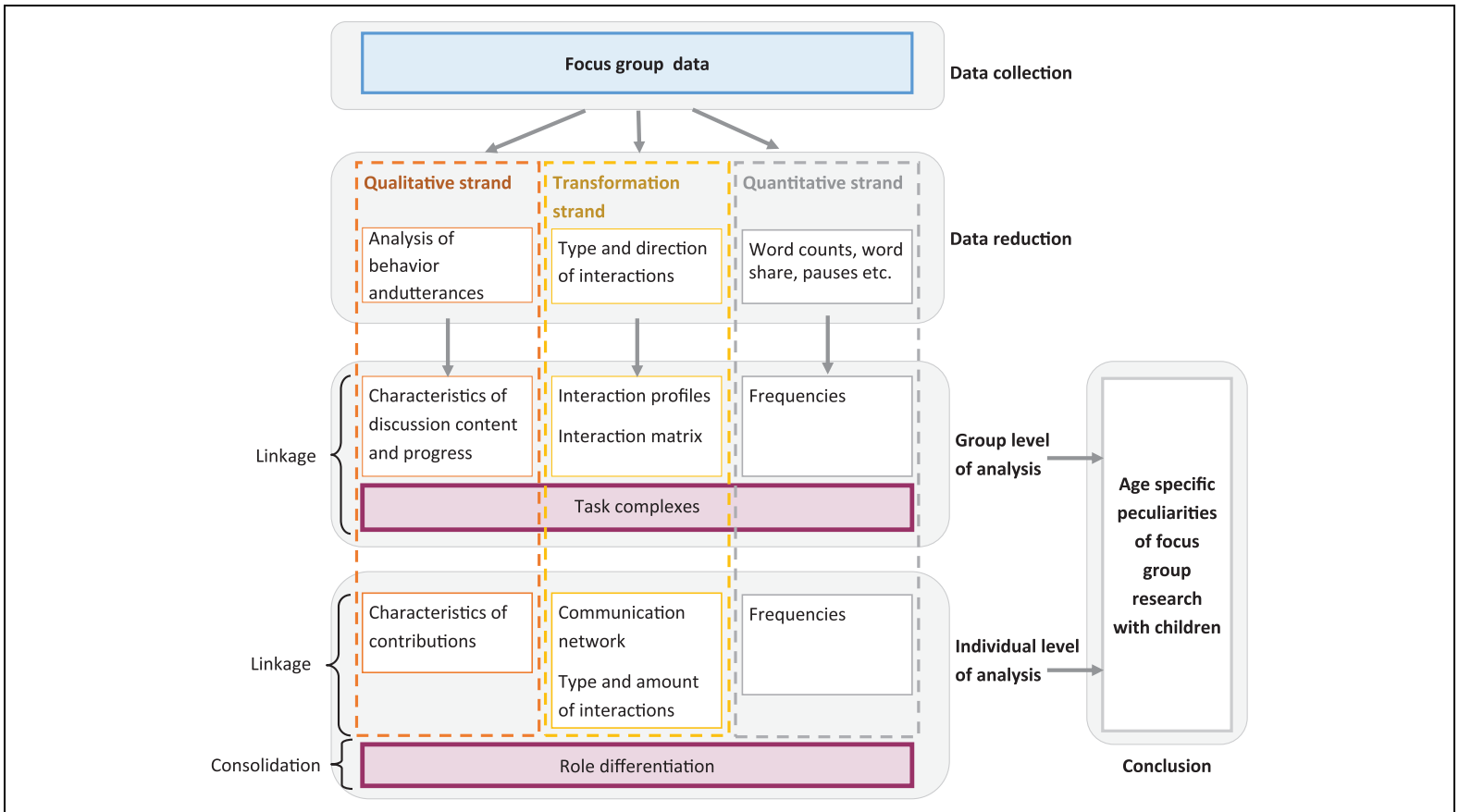

Figure 1. Analytical steps in study "focus groups with children."

and was video recorded and transcribed in detail, including information about the addressee of communication (moderator, specific group members, the group as a whole).

Data Analysis

The analysis aimed at methodical and methodological specifics by comparing results from the different age groups. Since the substantive content of the focus groups was of secondary interest, the analysis dealt with more formal aspects, such as the progress of the conversation, group dynamics, role differentiation, and, of course, the abilities of the participating children. A role differentiation among participants is crucial for the momentum of a focus group. Role differentiation facilitates independence from the moderator because participants organize the communication more independently. This, in turn, is necessary to take advantage of focus group research, for example, by gaining opinions of participants validated in a group process (Bohnsack, 2014; Lamnek, 2005).

Although raw data stemmed from data collection that would be labeled as qualitative, a wide range of different types of information were available for analysis. Thus, to achieve a broad picture of processes during the focus groups and individual participants' contributions, qualitative and quantitative aspects were considered. Figure 1 illustrates the analytical steps.

Data analysis begins with *data reduction*. To reduce data, I employed three different strategies in a qualitative, a quantitative, and a transformation strand. Within these strands, a group level and an individual level of analysis can be distinguished. On the group level, aggregated information, but differentiated for task complexes, was considered to create *focus group profiles*. On the individual level, information by participant was compiled to create *participant profiles*, containing information about activity level, role within the group, contribution to the content and progress of the focus group, and other characteristics.

Quantitative characteristics were word counts, number of ''private'' conversations in a subgroup, duration of pauses, and number of overlapping and of incomprehensible utterances.[1] These aspects were differentiated by participants and task complexes (see Table 1). Practically speaking, the transcripts were saved in an Excel sheet with a new cell for each contribution. Speaker, nonverbal or paralinguistic utterances, and verbal utterances were separated in columns. Per formula, only words in the column for verbal utterances were counted automatically and corrected manually for other notations like pauses and so forth.

The purpose of those quantitative characteristics was to provide an overview of procedural aspects of the focus group material and to facilitate comparisons across age groups.

Empirical example: Across the five age groups, the focus group with 6- and 7-year-olds had the highest share in overlapping utterances (32% of the words were overlapped with utterances

Table 1. Counts Without Moderator Involvement.

	Participants' age in years				
	6-7	8-9	10-11	12-13	14-15
Word count	3,390	3,251	4,761	2,063	3,920
Words per participant	424	406	476	229	436
Utterances	828	725	921	451	254
Utterances per participant	104	91	92	50	28
(Incomprehensible)	109	78	104	50	32
Overlapping	1.075	718	1.099	372	181
Pause/duration	6.9%	9.8%	7.6%	11.8%	21.4%

from two or more speakers). As a consequence, this led to a high share of incomprehensible sections and a low share in pauses. On the one hand, this result illustrates the high engagement of the youngest focus group participants, but on the other hand, it also shows the practical challenges.

In the *qualitative strand*, utterances were analyzed regarding their type of content; for example, whether an utterance was a new aspect or a repetition or confirmation of something said before. This step was based on ''manual'' inspection of the transcripts considering the progress and ''outcome'' of tasks and per participant. The purpose of the qualitative analysis was to evaluate participants' contributions to the course of the focus group discussion and within the group as such. Furthermore, these qualitative aspects enabled judgment of social, cognitive, and verbal skills, for example, the ability to change perspective (decentration), to deal with different views, to engage in argumentation, and so on. On a group level, the qualitative analysis allowed for characterizing content-related outcome of the discussion.

In relation to the quantitative strand, the qualitative analysis added depth to numerical values. As Bazeley (2018, p. 8) explains, phenomena intrinsically have ''both qualities *and* quantities'' Thus, it is natural to use qualifying words and numbers to indicate magnitude or count for descriptions.

Empirical example: In the focus group with the 6- and 7-year-olds, the task that aimed for consensus by creating a typical daily routine for a child showed that next to no progress was made regarding the content. Participants' contributions did not relate to what others said; rather, they kept repeating the same statements and preferences. Thus, neither a consensus nor a compromise occurred. Participants only wanted to impose their views on others. This situation is in principle problematic for the focus group methodology, in which a discursive exchange among participants is central.

In the age comparison, qualitative results revealed that from the age of 10 to 11 years, contributions were more related and utterances referred to previous statements. However, fewer new aspects were contributed; rather, confirmations or slight variations were offered.

In the *transformation strand*, I coded utterances with the interaction process analysis (IPA) coding scheme. The IPA is ''an observational method for the study of the social and emotional behavior of individuals in small groups—their approach to problem-solving, their roles and status structure, and changes in these over time'' (Bales, 1972, p. 465). At the core of the method are 12 categories that can be ascribed to two different areas: task-oriented (answers: IPA-Codes 4 to 6; questions: IPA-Codes 7 to 9) and a social–emotional area (positive social–emotional behavior: IPA-Codes 1 to 3; negative social–emotional behavior: IPA-Codes 10 to 12; see Figure 2). The categories build six complementary pairs, each of which deals with a functional problem in interaction. These problems pertain to communication, evaluation, control, decision, tension reduction, and reintegration (Bales, 1950). Any act of communication can be identified as belonging to one of these 12 categories (Bernard, 2013). This coding scheme allows for insights into social and cognitive skills, as well as into the adequacy of responses given the task complex in which they occur.

Task-oriented and social–emotional interaction can be differentiated, and the direction or addressee(s) of interactions noted. Subsequently, interaction profiles of participants and individual tasks could be created, which entailed information on frequencies of these 12 types of interactions used (Table 2). Furthermore, interaction matrices—so-called who-to-whom matrices—with information on direction and type of interaction could be constructed per task complex and for the focus group overall (Table 3). Based on these matrices, I created visual representations of interaction frequency and direction of interactions in a simplified network graph, which illustrated the relations in each group of participants and facilitated age comparisons (Figure 3

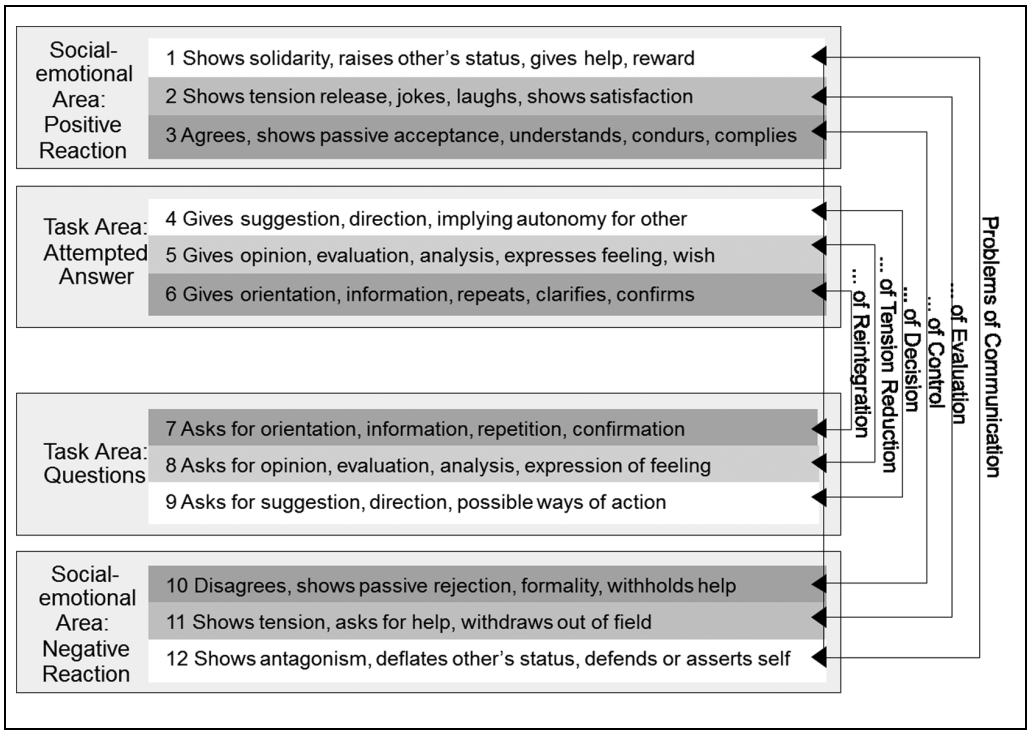

Figure 2. Interaction process analysis coding scheme.
Source. Bales (1950, p. 9).

and Figure 4). Subgroups became evident, as did the involvement of individual participants and the centrality of the moderator.

Empirical example: The interaction profile of the focus group with the first graders (aged 6-7 years) shows a balance between positive and negative social–emotional behavior. The comparatively high level of disagreement illustrates little pressure for conformity, which clearly changed with the increasing age of participants. As for the group task aforementioned, due to a lack of compromise and a strong desire to dominate the result, tension and dissatisfaction increased, as the IPA shows clearly in accord with the qualitative analysis.

Regarding the age group comparison, the interaction counts demonstrate that older participants contributed more and the interaction share of the moderator decreased with older participants. Furthermore, a comparison of the interaction network among age groups illustrates that interaction among participants increased with age. At the same time, interactions were more dominated by individual participants, whereas others seemed only marginally involved (see Figure 3 and Figure 4).

Comparing task, group and participant profiles across age groups showed that positive social–emotional reactions increased until the age of 12 to 13 years, while negative social–emotional reactions decreased. This finding could be related to the increased peer pressure until puberty and developing control of emotions and tolerance of frustration. Comparing requests with speak per task complex shows that collaboration tasks and discussion topics had the biggest share overall. However, with increasing age of participants, the focus shifted from collaboration tasks toward discussion tasks. This finding suggests that older participants have the necessary argumentative skills for discussions and enjoy this type of task more.

Table 2. Interaction Profile of Focus Group With 6- to 7-Year-Olds (Without Moderator).

	IPA Code	Total, %	Total
Positive reactions			
Solidarity	1	0.3	4
Tension release	2	4.4	51
Agreement	3	13.8	162
Answer			
Suggestions	4	8.0	94
Opinions	5	21.8	256
Information	6	22.4	262
Question			
Ask for orientation	7	2.7	32
Ask for opinion	8	0.8	9
Ask for suggestion	9	0.7	8
Negative reactions			
Disagreement	10	14.9	175
Tension	11	3.3	39
Animosity	12	1.4	16
Not clear (e.g., incomprehensible)		5.5	64
Total		100	1,172

Note. IPA = interaction process analysis.

Data Linkage

So far, I have illustrated results from the three strands separately. However, for the group level of analysis, I linked analysis from the qualitative, quantitative, and transformation strands. Integrating these results not only offers a more comprehensive understanding but also allows findings to mutually explain each other. Integrating results from different strands allows for a more complex understanding of processes within each focus group discussion in that not only numbers but also ''qualities'' are considered. This linkage produced profiles per age group with a focus on participation and motivation, task complexes, atmosphere, and collaboration/interaction. Based on these profiles, age-specific characteristics could be determined.

On a group level, the quantified information like word share per task complex, progress of the discussion regarding the content, and overall interaction profiles, and who-to-whom matrices were compiled to create a verbal description of the process of the focus group situation. The original results from the qualitative, transformation, and quantitative strands can still be disentangled.

Empirical example: The 10- and 11-year-olds had an enormous need to talk (quantitative strand) and were quite excited (qualitative strand). No reservation or nervousness was noticeable. The approval and sympathy of the moderator frequently seemed to be more important to the participants than their contribution to the content (qualitative strand). Thus, the moderator was the main addressee of interactions (transformation strand). At the same time, interaction among peers remained limited.

Also on the individual level of analysis, I linked information from all three strands to reach a better understanding of individual participants and their role regarding the functioning of the group and the content of the discussion. In the next step, I consolidated the information into role descriptions for each participant, which were compiled on a group level to provide information about role differentiation within a specific focus group.

Table 3. Interaction Matrix of Focus Group With 6- to 7-Year-Olds.

	Speaker, %								Sum of interactions (without those originated from moderator), %	Moderator interaction, %
	Bernd	Florian	Hanna	Katharina	Lara	Marion	Tobias	Stefan		
Addressee										
To group	1.3	1.4	1.1	3.7	1.5	1.5	3.8	1.1	15.4	49.0
Multiple addressees	0.1	0.0	0.1	0.0	0.1	0.0	0.3	0.0	0.6	2.4
No addressee	0.7	0.9	0.9	2.0	2.6	1.1	2.8	1.4	12.3	0.5
To Bernd	0.0	0.6	0.3	0.1	0.0	0.0	0.3	0.3	1.5	3.4
To Florian	0.4	0.0	0.1	0.0	0.0	0.0	0.6	0.1	1.2	1.5
To Hanna	0.3	0.3	0.0	0.2	0.1	0.1	0.2	0.3	1.3	5.1
To Katharina	0.1	0.1	0.6	0.0	0.2	0.1	1.5	0.3	2.8	12.4
To Lara	0.1	0.3	0.1	0.3	0.0	0.2	0.3	0.3	1.5	2.2
To Marion	0.0	0.1	0.2	0.3	0.2	0.0	0.3	0.9	2.0	3.7
To Tobias	0.3	0.7	0.6	2.6	0.3	0.5	0.0	0.5	5.5	9.0
To Stefan	0.4	0.1	0.3	0.6	0.6	0.9	0.7	0.0	3.7	10.5
To Moderator	3.4	2.8	6.7	7.4	4.8	2.6	6.1	7.8	41.6	0.0
Not clear (nonverbal)	1.2	1.3	1.3	1.8	0.9	1.2	1.7	1.2	10.6	0.2
Total	8.3	8.4	12.2	18.9	11.3	8.3	18.7	14.0	100.0	100.0

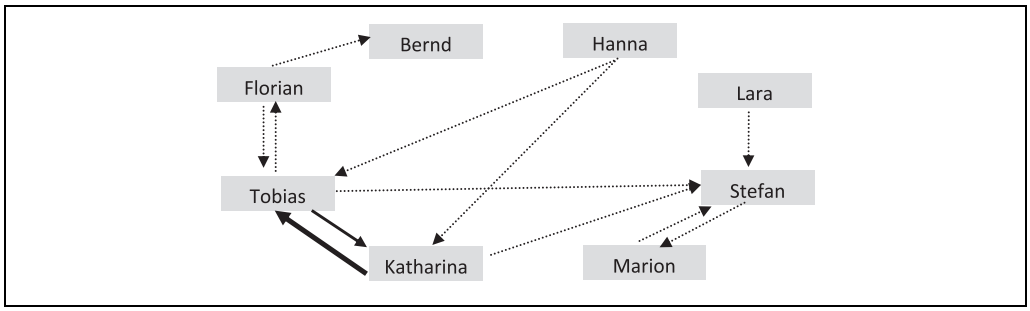

Figure 3. Interaction network among 6/7-year-old participants.[a]
[a]Interactions with a relative frequency between 0.6% and <1.0% are represented with a dotted arrow, ≥ 1.0% with an arrow with a respective thickness.

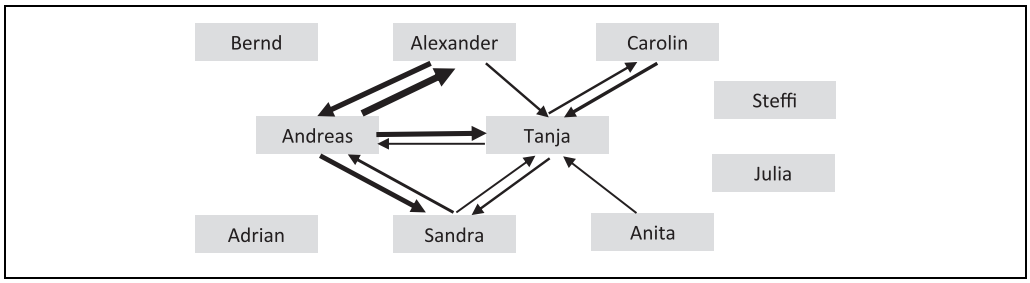

Figure 4. Interaction network among 10/11-year-old participants.[a]
[a]Only interactions with a relative frequency of at least 1.0% of all interactions in the group are represented with the respective thickness of the arrow.

Data Consolidation

The qualitative, quantitative, and transformed information was consolidated by integrating verbal and numerical data into participant profiles. The underlying questions were as follows: Which roles are taken on? What does the specific role differentiation mean for the application of focus groups?

To identify different roles within each group, a consolidation of different types of information gained in previous analytical steps was necessary. Quantified information (e.g., word counts, etc.), a description of the content-related contributions to the progress of the focus group discussion, the interaction profile, and the relational position determined by who-to-whom matrices were compiled to create a verbal characterization per participant, describing behavioral characteristics and function within the group. In essence, all results from the three strands were transformed into verbal or qualitative profiles to characterize each participant. Thus, an individual participant's role within the group and cooperation among participants were evident. With this consolidation into individual role profiles, age-specific types of behavior and underlying cognitive, social, and verbal skills could be defined. The results were case profiles as a new form of data, which were then compared both within and across age groups.

For identifying specific participant roles, I used existing terms from the literature; for example, Bales (1950) distinguished between a ''task leader'' and ''idea man'' and between a ''social–emotional leader'' and ''best-liked man.'' This distinction suggests a differentiation between contributing to the content of the discussion and dealing with social–emotional

aspects. Both aspects—group task roles and group building or maintenance roles—are crucial. Furthermore, some authors introduce a set of self-centered/individual roles, for example, ''joker'' (Ellis & Fisher, 1994). Other role terminologies were adapted from Barker, Wahlers, Watson, and Kibler (1987) and Ellis and Fisher (1994).

Empirical example: Participants aged 6 and 7 years showed great differences in their behavior. Some were rather quiet, others rather loud. I could identify two leaders. One could be described as class clown and showed inappropriate behavior by disturbing the focus group by suddenly laughing out loud, starting to sing, or dropping to the floor a couple of times. At the same time, this participant could be described as the ''opinion seeker'' who prods the group to contribute new aspects. The other leader could be considered the ''opinion giver'' by imposing personal views onto others and by being ruthless and aggressive at times. These two examples show that the two most active participants took self-centered roles, which was problematic for both the group maintenance and the content of the discussion.

Among the 10- and 11-year-olds, a clear role differentiation could be found (see Figure 4). One participant took on the role of the *task leader*, coordinating the discussion, giving direction, questioning statements, but also offering own accounts. Another participant was the *best-liked* person, being accepted by everybody. Thus, the organization of collaboration tasks was facilitated, while the social–emotional balance was maintained. The group was clearly trained in ''democratic'' processes. The differentiation between a *task leader* and a *social–emotional leader* was positive because the work on the task proceeded, and at the same time, negative reactions could be compensated for. More problematic was the number of so-called ''silent members.'' Three participants were central and dominated the whole discussion. Therefore, the spectrum of opinions was limited and equal participation was inhibited. However, this situation did not cause any tension within the group and probably just mirrored the group structure in a natural setting.

In the age comparison, I found greater role differentiation among participants with increasing age, which also meant that some participants were more active than others and the gap between silent members and leaders increased with age. However, the leaders did not necessarily only coordinate activities among participants. With increasing age, they rather acted as a kind of spokesperson toward the moderator. This scenario was noticeable for the 10- and 11-year-olds, and it was pronounced with the 14- and 15-year-olds.

This short abstract for results illustrates that the purpose of the consolidation was a new perspective and to create a more in-depth understanding. By consolidating the three strands, interrelations and patterns could be found that would not have been visible otherwise. Each strand, on its own, had only limited informational value regarding role differentiation. Meta-inferences on age-specific skills were only possible by consolidating different types of information.

Methodological Reflection

One round of data collection can lead to different types of data and therefore different analytical approaches. In this case, the different types of information were initially analyzed independently. The *interaction analysis* in the transformation strand was the core of the study, but without additional *qualitative analysis*, participants' role descriptions would have been too superficial. Without the additional *quantitative aspects*, age comparisons and the characterization of the course of the discussion would have been far more difficult and shallow. Furthermore, the number of words alone did not provide information on verbal or cognitive skills. Qualitative–descriptive aspects were crucial to interpret the quantified information and give a more detailed picture of verbal and communicative skills for children in focus group settings.

Taken on their own, neither strand could have offered sufficient information to answer the research question. Generally, results from qualitative, quantitative, and transformation types of

analyses contained aspects that could not be covered with the respective other methods. Qualitative, quantitative, and transformed information gave insights into partly overlapping but generally distinct aspects of the research problem. Thus, results from the different strands illustrated, complemented, or specified one another (Caracelli & Greene, 1993).

The *linked and consolidated data* offered yet another dimension of results. On an age group level, the strands were linked. Linking and matching components of complementary data offered a more nuanced account of how the different data corroborate, illustrate, or elaborate each other (Bazeley, 2018). For individual participants, the strands were consolidated into role descriptions and were a basis for further analysis. The linked and consolidated data were used in a comparative analysis on the functioning of focus group discussions in different age groups and consequently facilitated meta-inferences on age-related specificities. Integrating different aspects paid tribute to the multidimensionality of the data produced in focus groups. At the same time, the extensive raw data became manageable without neglecting either the breadth or depth, and systematic comparisons between age groups regarding structure and content of focus groups were facilitated.

Discussion and Contribution to the Field

The purposes of data consolidation strategies in mixed methods analysis can be varied. In the example here, the consolidation of results of the qualitative, quantitative, and transformation strands in the mixed analysis provided complementary insights and considerably extended the understanding of focus group research with different age groups. Furthermore, by merging different types of information and creating a new qualitative data set, credibility and intersubjectivity of results can be extended, thereby increasing the reach of results. It was also possible to elaborate on findings from various parts of the data set when one approach suggested an open question. It could be said, therefore, that ''the sum was greater than its constituent quantitative and qualitative parts'' (Woolley, 2009, p. 19). By intertwining analytical strands, it was possible to enhance our understanding by qualitizing and to facilitate comparisons by quantitizing.

The interlinkage and consolidation of data provide true added value of mixed analysis. However, researchers must resist the ''mix and match syndrome'' (Leininger, 1994, p. 103). Maintaining the connection between theory and methods is important to avoid method-centric approaches to mixed methods research (Hesse-Biber & Johnson, 2015). As Sandelowski (2000) has commented, ''Mixed-method research should never be used because of the misguided assumptions that more is better, that it is the fashionable thing to do, or, most importantly, that qualitative research is incomplete without quantitative research (Morse, 1996)'' (Sandelowski, 2000, p. 254). The research question determines the focus of the research and the analytical strategy.

Finally, it is worth considering a critique of the qualitative–quantitative differentiation that underlies the mixed methods approach: ''Qualitative and quantitative data are not so much different kinds of data as these data are experiences formed into, for example, words or numbers, respectively'' (Sandelowski et al., 2009, p. 209). The definition of mixed methods research assumes there are qualitative and quantitative data. I would like to suggest that this distinction is not always helpful when conceptualizing mixed methods data analysis. Data are always constructed—not collected or generated—regardless of how standardized the data ''collection'' process or method is. The data produced during interviewing are neither qualitative nor quantitative per se, neither is the recording of information necessarily exclusively qualitative or quantitative. Verbal utterances would be described as qualitative data and the number of words or share of words might be described as quantitative data (or transformed data), and duration or pauses as numerical. However, meaning is inherent to numbers, just as numerical characteristics are inherent to verbal utterances. Are word counts the product of data transformation, or do they

exist independently? Does the recording make the data qualitative or quantitative or the processing of the data? Data analysis or, more precisely, data interpretation brings these different qualities to light. The implication is that talking about data transformation suggests that the material underlying our research can be categorized as qualitative or quantitative. I would argue that the same material can be both, and it does not require a data transformation process. It could simply mean that researchers should approach the same material with different tools. Thus, in some instances, it is data consolidation rather than data transformation if, from the original data, meaning and numbers are extracted—numbers are, of course, not free of meaning. ''Ultimately all methods of data collection are analysed 'qualitatively''' (Fielding & Fielding, 1986, p. 12) in that analysis is also an interpretation and a ''selective rendering, of the 'sense' of the available data'' (Bazeley, 2018, p. 57).

The example for a consolidation strategy in mixed analysis in this article is based on one qualitative method of data collection. Some would question whether this approach is indeed a mixed methods study, given that there is only one strand of data collection. The label ''mixed analysis'' would probably be more consensual. However, practical problems of data integration and consolidation are very similar in mixed methods analysis based on two (or more) strands of data collection and mixed analysis based on one data collection. Thus, the labelling is secondary in this instance, especially, if different types of data are collected (and recorded) during one data collection process. For example, duration of the focus group and verbal utterances.

Also, the classifications of mixed methods analysis might sometimes hamper mixed methods practice. It is not always easy to match analytical practice that is driven by the research question with existing typologies. As the mixed methods community progresses, typologies will be much more nuanced, as can also be seen in Pat Bazeley's (2018) recent book in which she does not follow a classic mixed methods analysis typology. Terminology is helpful to communicate about research, but it should not limit options or be so general that every mixed methods analysis could be labeled as inherently mixed.

Mixed methods analysis strategies are at the heart of methodological discussions about mixed methods. More research needs to be done in this area. There is not necessarily a need for one single, shared terminology. Although clear definitions can provide a solid conceptual framework, we need to keep our general frameworks somewhat flexible in order to allow for ''informed creativity'' (Mertens et al., 2016, p. 3). Informed creativity in conducting integrated data analyses requires more good practice examples and critical reflections on strengths and limitations, as well as quality criterion and assessment. With this article, I hope to have contributed to an intensified discussion on good practice examples for making the best use of different methods.

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Note

1. As a matter of fact, it could be argued that counting in this form is already a transformation from qualitative (in this case, video) data. If the recording of original data determines the format, in this case the recording was a video tape, it implies qualitative and quantitative data, for example, utterances and duration of the focus group. However, if the utterances are then counted, it implies a

transformation from verbal to numerical data. Nevertheless, I decided to label the strand quantitative because the translation process from words to number of words is minimal.

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