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From Dimensionalizing to Theory Development in Grounded Theory Methodology: A Case Example from Disability Studies

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Abstract: Dimensionalizing has been discussed in the Grounded Theory Methodology (GTM) literature primarily as a component that informs the later stages of GTM coding (Strauss) or as a property and variety of human thinking (Schatzman). In this context, dimensional analysis is understood as an approach to concept formation, focusing on identifying the properties and empirical instances of a concept. Through this process, the scope conditions of a theory are clarified and explicitly defined. However, this perspective often overlooks how dimensionalizing contributes not only to concept formation but also to theory building. Specifically, the transition from dimensional analysis to theory development is seldom articulated. This article addresses this gap by using interview data from the substantive field of disability studies — specifically, parents raising a person with a disability (PwD). We demonstrate how dimensional analysis can be effectively applied at the conclusion of open coding, rather than solely at the final stages of GTM analysis, and how it can serve as a methodological tool for connecting categories, rather than for identifying the core category.

Keywords: *Connecting categories, dimensionalizing, grounded theory, theoretical coding.*

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Introduction

Coding in Grounded Theory Methodology (GTM) has been commented in depth in the last two decades, mostly the versions of coding which have been developed by Glaser (1978, 1998, 2001, 2005, 2011), Strauss and Corbin (1990) and Charmaz (2009, 2014). Generally speaking, coding involves labeling and organizing data to uncover and generate emergent themes, concepts, and ultimately, theory. In this article, we will try to show that although dimensionalizing has been discussed in the relevant literature as a crucial part of coding, the details of the transition from dimensionalizing to theory development have not yet been fully explored and presented. This is a point made by other scholars, too (Wasserman et al., 2009).

In this article, we aim to contribute to this ongoing discussion by presenting a methodological argument that explicates the transition from dimensionalizing to theory development through the connection of categories. As we aim to demonstrate in the following sections, this transition has been approached in the existing grounded theory methodology (GTM) literature in two distinct ways. In some cases, dimensionalizing is introduced at the end of the analysis; in others, researchers adopt a "core category" approach. When dimensionalizing is deferred until the final stage of analysis, it becomes challenging for researchers to theorize the latent patterns within their area of interest. Even when such theorizing occurs, it is often difficult to justify why a particular theoretical interpretation was chosen over alternative possibilities. Conversely, when researchers employ a core category approach, there is a risk of presenting the phenomenon in a thematic or descriptive manner, thereby undermining the development of a substantive theory (Stough & Lee, 2021). A notable exception is the work of Wasserman et al. (2009), who propose the use of fractals as a means of justifying the transition from substantive to theoretical coding. However, in the example they provide, it remains difficult to avoid "pet theorizing," insofar as the ontological level of abstraction becomes conflated with the methodological level.

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In contrast to these approaches, we propose a slightly different strategy for achieving theorizing within the GTM literature – one in which dimensionalizing emerges as the outcome of the initial round of coding, rather than as the final stage of analysis. This is subsequently followed by the development of connections among categories. The central methodological premise of this approach is that, without such connections, abstraction – an essential component of theorizing – remains difficult to attain. To clarify our methodological position, the article is structured into three parts. First, we briefly outline the three versions of coding in GTM and discuss the limitations associated with each. Second, we examine the role of dimensionalizing in GTM coding. Finally, using interview data collected from mothers raising persons with disabilities (PwD), we demonstrate how substantive theorizing can become a shareable process by integrating dimensionalizing with the connection of categories.

Coding in the Three Versions of GTM

Although coding in GTM has been extensively discussed, the following figure outlines the key points of convergence and divergence among the three coding versions, which represent the most detailed approaches to data analysis in GTM research.

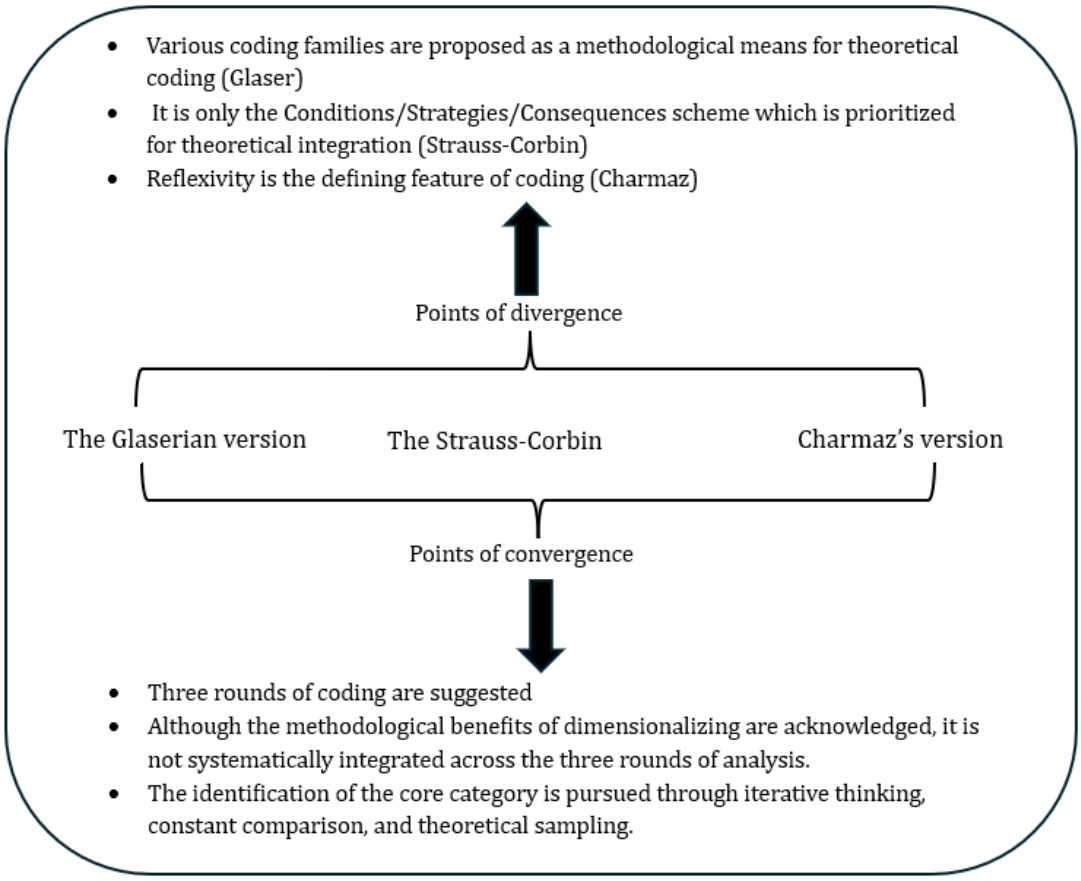

Figure 1. Points of Convergence/Divergence Between the Three Versions of GTM

In the Glaserian approach to Grounded Theory, coding is central to developing theory directly from data, with an emphasis on letting theory emerge rather than forcing it to fit a predetermined structure. Glaser (1978, 1998) advocates for a flexible, iterative process where the researcher stays open to discovery throughout data collection and analysis. The key Features of Glaserian approach to coding are the following. First, the initial phase of coding is often termed open coding, where data is broken down into discrete concepts without preconceptions. The researcher remains open, generating numerous codes that closely reflect the data itself, staying as close to participants' language as possible. Glaser (2001) stresses constant comparison here, where new data is continually compared with existing codes to refine and modify categories as they develop. Second, once a core category (a central theme that captures the main concern of the participants) begins to emerge, the researcher transitions into selective coding. At this point, coding becomes more focused, with attention narrowed to data related to the core category, which organizes and integrates the emerging theory. In this phase, the researcher stops coding non-essential data, thereby focusing on elements that explain the core issue. Third, a unique feature of Glaser's approach is theoretical coding (Glaser, 2005, 2007), where theoretical codes are used to specify possible relationships between categories. This step helps to weave together the selective codes into a cohesive theory. These theoretical codes are broad ideas that help form the structure of the theory, such as processes,

strategies, or conditions, often using a flexible set of theoretical coding families identified by Glaser, like "causal," "strategic," or "interactive" codes.

The Straussian approach to GTM, associated with Anselm Strauss and Juliet Corbin, introduces a more structured, systematic method for coding qualitative data than Glaserian GT. In the Straussian methodology, coding is organized as open coding, axial coding, and selective coding (Strauss & Corbin, 1990). This approach provides a structured pathway for researchers to build and refine their theories. Open coding involves breaking down the data into discrete parts, examining it closely, and assigning labels to significant events, actions, or interactions. The goal is to capture initial categories and concepts that arise from the data without concern for their hierarchical order. During axial coding, the focus shifts to developing connections among categories identified in open coding (Apramian et al., 2016). Strauss and Corbin advocate for identifying relationships among categories, often organized around a central category, using the "paradigm model," which consists of causal conditions, context, intervening conditions, action/interaction strategies, and consequences. Finally, selective coding involves integrating and refining categories to form a coherent theory. Here, researchers identify a core category, which becomes the main theme that encapsulates the primary patterns in the data. Categories that do not align with this central category are refined or reclassified to strengthen the overall theory.
Kathy Charmaz's (2009) approach to coding in GTM, often referred to as Constructivist Grounded Theory, emphasizes flexibility, reflexivity, and co-construction of meaning between researcher and participants. Charmaz critiques both the original Glaserian and Straussian models, arguing that their rigid coding frameworks can overly constrain the process (Charmaz, 2014). Instead, her constructivist approach sees coding as a dynamic process that unfolds as researchers deeply engage with their data, and she offers two main coding stages: initial coding and focused coding (Charmaz, 2014). Initial coding is characterized by an open-ended and exploratory approach, where researchers quickly examine data line-by-line to identify actions, meanings, and ideas within the text. Charmaz emphasizes the use of gerunds (e.g., "experiencing," "adapting") to keep the analysis active and process-focused, which helps in identifying potential patterns and leads to a more fluid theory that remains closely tied to participants' experiences. During focused coding, researchers revisit initial codes to identify the most significant and frequently appearing ones. These codes become more conceptual and are selectively applied to the data, allowing the researcher to start building core categories that structure the emerging theory. Focused coding also serves as a bridge to further theoretical analysis, such as memo-writing and theoretical sampling, helping the researcher refine and deepen their understanding of the core phenomena.

Main Criticisms on GTM Coding Versions

While the Glaserian approach to GTM coding offers flexibility and an inductive focus, it also presents some potential limitations related to lack of structured guidance, subjectivity in code selection and reliance on researcher's theoretical sensitivity. In particular, the Glaserian emphasis on emergent theory means there is limited structured guidance for researchers, especially beginners (Apramian et al., 2016; Belgrave & Seide, 2019). The open-ended nature of coding, with concepts and categories arising directly from data, can be challenging without clear procedural steps, leading to confusion or inconsistency, especially for novice researchers. Bryant and Charmaz (2007) address how the lack of coding structure can lead to biases in category formation, particularly in the Glaserian approach that emphasizes emergent categories without prescriptive guidelines. The need for theoretical sensitivity, first emphasized by Glaser (1978) himself, has been critiqued by those who argue that it presumes prior experience or familiarity with qualitative methods (Urquhart, 2023). Without systematic criteria, researchers might unintentionally impose their own biases or preconceived notions onto the data, impacting the theory's grounding in participants' perspectives. This over-reliance on emergence can potentially limit the consistency of findings, as researchers with varying levels of theoretical sensitivity may generate different theories from the same dataset.

Because the approach lacks a rigid coding structure, studies using Glaserian GT can be hard to replicate or compare with one another. The fluidity in developing and refining codes may yield distinct theories that make it difficult to draw comparisons across studies, reducing the generalizability of findings (Kelle, 2007). This critique has been acknowledged by Strauss and Corbin (1990), who argue that the Glaserian GT's lack of standardized coding techniques can impede reproducibility. Holton (2007), also explores these challenges, noting that the flexible approach can limit cross-study comparability. Finally, while the Glaserian stance on emergence is intended to avoid "forcing" data into pre-existing frameworks, it can also prevent the use of valuable theoretical lenses that might enrich the analysis. By discouraging preconceived frameworks, this approach may miss opportunities to connect findings with established theories, potentially limiting the broader contextual relevance of the research (Apramian et al., 2016).

While the Straussian approach is praised for its systematic structure and ability to guide novice researchers, several critiques have been raised regarding its rigidity and potential limitations. Critics argue that the highly structured coding process of the Straussian approach can impose too much rigidity on data interpretation, potentially stifling creativity. Glaser himself critiqued this approach, arguing that Strauss and Corbin's methods result in "forcing" theory rather than allowing it to emerge naturally from the data (Glaser, 1998). In addition, the Straussian approach's reliance on complex coding phases and the paradigm model can be challenging for new researchers to master. This level of detail requires significant familiarity with GT principles and may intimidate or overwhelm those less experienced (Charmaz, 2009). Another criticism concerns that the Straussian approach has been critiqued for potentially aligning too closely with

positivist traditions, which emphasize verification and hypothesis testing over discovery. Charmaz (2014) and Bryant and Charmaz (2007) argue that this may push GTM away from its original aim of fostering flexible, inductive theory generation. Finally, the coding structure, especially axial coding with its paradigm model, might lead researchers to focus more on fitting data into predefined categories rather than exploring deeper, emergent insights (Birks & Mills, 2015). As a result, some argue that the depth and nuance of qualitative research might be compromised.

Critics on the Charmaz version on coding argue that it is a reflexive and subjectively oriented approach making it challenging to achieve theoretical "objectivity" (Kelle, 2007). Charmaz's approach is often celebrated for its flexibility, which allows researchers to adjust codes as they progress. However, some argue that this fluidity can lead to ambiguity, especially for novice researchers, who may benefit from more structured guidance in coding and category formation (Birks & Mills, 2015). While this participant-centered focus is an advantage, some critiques highlight that it can limit the analytical distance needed to form robust theories. Glaser, for example, argued that this emphasis on co-construction could dilute the researcher's analytical authority and lead to descriptive rather than explanatory theory (Glaser, 2002).

Dimensionalizing in GTM

In the GTM approach to coding, dimensionalizing involves examining a code or concept in terms of its different dimensions, qualities, or variations to clarify how it operates across contexts (Strauss, 1987). This process helps researchers to deepen their understanding of a category and its characteristics by analyzing variations in participants' experiences and responses. By dimensionalizing, researchers identify the range of attributes or conditions that make up a particular concept, which can help differentiate more nuanced meanings within data. For example, if analyzing "coping mechanisms" in a study of healthcare workers, the researcher might dimensionalize this category by identifying different types (emotional, practical, relational) and then exploring the context in which each type is enacted or becomes relevant. Through dimensionalizing, the researcher not only unpacks a category but also develops the range of possible variations within it, thus creating a "spectrum" of meaning (Strauss, 1987). Charmaz (2014) suggests this can make theory more contextualized and dynamic, representing real-world complexities more accurately.

There are methodological strengths as well as criticisms regarding dimensionalizing which have been highlighted in the literature. First, dimensionalizing allows for a more complex and layered theoretical framework by differentiating between sub-categories and conditions, enhancing analytical depth. This process can lead to theoretical density, where each category is fully fleshed out with clear, context-specific dimensions (Charmaz, 2014). Adding dimensions enriches each category, producing more nuanced, layered insights. Categories become multidimensional rather than one-dimensional, aligning well with complex social realities. This process can lead to a more refined, well-developed theory where each concept includes specific contextual elements that clarify "when" and "how" each social process unfolds (Strauss & Corbin, 1990).

However, it has been noted that dimensionalizing can be overly complex, particularly for newer researchers, who might struggle to manage the analytical depth required to effectively dimensionalize categories (Birks & Mills, 2015). This challenge can lead to inconsistencies and confusion if not applied systematically. In addition, since dimensionalizing requires interpretative depth, some scholars argue that it can introduce subjectivity, potentially leading to researcher bias. Although Charmaz supports reflexivity and transparency in coding, critics warn that the added interpretative layers could skew findings if not carefully managed (Morse et al., 2009).

To address some of these challenges, Charmaz (2014) advocates for reflexive memo-writing and constant comparison during dimensionalizing, which can help researchers remain aware of their interpretative choices and refine categories with attention to empirical data. By comparing instances within each dimension, researchers can iteratively refine categories and validate patterns, ensuring that each dimension remains grounded in participants' experiences rather than researcher presuppositions.

Despite its recognized importance, the implications of dimensionalizing for theory development remain insufficiently specified. While Strauss (1987) and Strauss and Corbin (1990) clarify the conceptual meaning of dimensionalizing, the process by which codes generated during open coding are dimensionalized, as well as the connection between dimensionalizing and theory development, remains ambiguous. This lack of clarity has led many researchers to interpret dimensionalizing as a step that should be completed at the end of the analysis, after theoretical codes have been constructed and applied. In our view, such an interpretation undermines the potential of dimensional analysis, stripping it of its ability to actively contribute to theorizing. In the following sections, we aim to address this issue by elucidating the role of dimensional analysis and highlighting its strengths in facilitating theory development.

Theoretical Model

Relating Dimensionalizing With Connecting Categories

When conducting dimensionalizing, codes have to be organized in a way through which the dimensions and the properties of each category can be easily presented. For instance, if a category is "student engagement", the property might be "participation level" and the dimensions "non-participatory → Passive → Active → Highly Engaged". Some

questions which might enable this process of identifying categories, properties and dimensions could be the following: what conditions lead to movement along this dimension? How do participants describe changes or shifts within this property? Are there contextual factors influencing dimensional variation? What contextual factors (e.g., teaching style, peer interaction) influence a shift along these dimensions? How do these shifts interact with other properties like "motivation" or "sense of belonging"? At the end of this first stage of coding, in which open coding is included, the full range of codes can be organized according to this tripartite scheme of categories-properties-dimensions.

According to Bowers and Schatzman (2009), the concept of dimensionalizing dates back to the 1970s, when Leonard Schatzman argued that the answer to the question, "How do you conduct analysis?" – often posed to his colleague Anselm Strauss – could not simply be, "Observe how I do it and replicate the process." Schatzman devoted considerable effort to refining this methodological approach, which ultimately contributed to their professional divergence. For Schatzman (1991), dimensional analysis was essential and indispensable for qualitative data analysis, given the inherent complexity of social phenomena. Notably, it facilitates an understanding of "the whole, the totality," rather than merely fragmented or isolated components. The central methodological idea, which Strauss strongly contested, was that identifying and working on dimensions is both akin to and distinct from open coding. The similarity lies in the ongoing process of constant comparison across excerpts, codes, interviews, and cases in both approaches. However, they diverge in that dimensional analysis focuses on identifying the dimensions of a phenomenon without prematurely categorizing or labeling the codes as "structures," "processes," or "outcomes/consequences" during this phase (Schatzman, 1991).

Instead, the emphasis is on distinguishing and classifying three distinct levels of abstraction: from the highly tangible and specific (which can be approached as nominal variables or as measurable and gradable entities), to an intermediate level (which captures a particular aspect of a broader concept), and finally to a more general level (which encompasses the aspects identified at the preceding level of abstraction).

Furthermore, "dimensionalization" occurs toward the latter stages or concurrently with "open coding," rather than exclusively at the end of the analysis, as Strauss advocated. In this context, all codes represent dimensions of a broader construct (with properties serving as dimensions of the category, and the values or nominal variables at the more empirical or "lower" level of abstraction acting as dimensions of the properties).

In other words, during "dimensional analysis," codes are grouped and subgrouped based on empirical data, and the levels of abstraction of these clusters are then hierarchically organized. Through this process, dimensions and properties "operationalize" the concept, enhancing its density and precision. The outcomes of this process should ideally be represented diagrammatically or schematically using visual representation techniques.

As Schatzman (1991) emphasizes, the significance of "dimensionalization" lies in its capacity to help researchers identify relationships and connections between categories in a verifiable and shareable manner, rather than relying solely on intuition. Furthermore, dimensionalizing the material is a prerequisite for developing a theoretical perspective on the connections between categories. Without this step, researchers risk being overwhelmed by an unmanageable volume of codes or resorting to intuitive approaches that lack systematic rigor.

Once dimensionalizing has been completed, the categories must be connected in a manner that explains participants' main concern. Holton and Walsh (2017) emphasize that the goal of GTM coding is to uncover a "latent pattern of social behavior that explains a main issue or concern within an area of research interest". This latent pattern serves to elucidate participants' main concern, with the core category representing one manifest aspect of the pattern.

However, equating the core category solely with the latent pattern is problematic, as it conflates the non-observable (the latent) with the observable (the pattern). In contrast, we argue that a latent pattern can be expressed not only through the core category but also by illuminating the connections between categories. By illustrating these connections, emphasis is placed not only on what is observable but also on the non-observable, as connections are formed under specific conditions where mechanisms and processes drive outcomes.

In other words, identifying the core category and presenting how categories are connected are both methodological tools for uncovering the latent pattern. The second stage of GTM analysis involves demonstrating these connections between categories. Several popular methods exist for establishing these connections, including the following:

First, connecting categories can be conceptualized as a social process. According to Glaser (1978), basic social processes are crucial because they underscore the dynamic and transformative nature of social phenomena. A process must involve at least two stages where transformations or critical turning points occur. These processes can operate on two levels: the level of lived experience or the level of social structure. Fundamentally, a process is a temporal concept, involving phenomena that evolve over time or require time, with pivotal points marking transitions or changes. The concept of process is one of the most theoretically developed in GTM, as it encompasses individuals and institutions, socio-psychological mechanisms, and transitions.

Second, Glaser (2005) emphasizes conjunctural causality as another approach for connecting categories. Conjunctural causality refers to identifying sufficient conditions that lead to the same outcome (see Figure 1). This method enables

researchers to examine how different configurations of conditions can produce similar results, thus enriching the theoretical understanding of the phenomena under study.

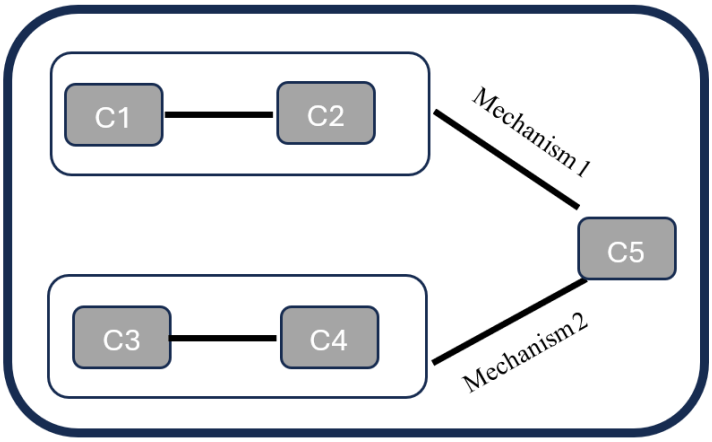

Figure 1. Conjunctural Causality

In Figure 1 what is emphasized is that either the connection of C1 and C2 categories or the connection of C3 and C4 categories may lead to the same outcome (C5), because specific mechanisms are implemented within these two conditions.

Finally, creating typologies is another effective method for understanding how categories are connected. For example, in a study examining the integration of immigrant students into the university, one of the properties of Category A could be Property X, which pertains to the "role of social networks" and is characterized by the dimensions "closed" and "open." Similarly, one of the properties of Category B might be Property Y, referring to "investment in studies," with dimensions "high" and "low" (see Table 1).

Table 1. Creating Typologies by Connecting Categories

		property X (the role of social networks)	
		closed	open
Property Y (investment in studies)	high	Type 1	Type 2
	low	Type 3	Type 4

Cross-tabulating these two properties could reveal patterns within the analyzed data. For instance, a significant number of cases might fall into type 2, where "high investment in studies" intersects with "open social networks." More broadly, visual tools such as charts, matrices, or diagrams are invaluable for mapping the dimensions of properties across different cases or contexts. These tools not only aid in visualizing variability within the data but also help identify relationships between dimensions and other categories. Moreover, they highlight patterns or trends that contribute to theoretical insights. By providing a clear and structured view of these connections, visual representations facilitate an understanding of how the integration of categories drives theory development.

Theorizing is not a mechanical or ready-made operation but rather an inventive and collaborative process. Glaser's frequent emphasis on the need for researchers to be theoretically sensitive in framing their data, underscores that his approach to theorizing is not purely inductive. Beyond theoretical sensitivity, the ability to identify puzzles within the data also plays a critical role in theorizing (Swedberg, 2014). Specifically, the gap between what the data reveal and theoretical expectations must be reinterpreted and explained through the development of new concepts.

In other words, the goal of the third stage of GTM coding is to theoretically redescribe the connections between categories using coding families and addressing identified puzzles. To summarize, we propose activating three rounds of coding:

- A first round of coding in which dimensionalizing is the methodological tool for organizing open coding
- A second round in which categories are connected in a way through which the latent pattern is brought to light
- A third round, which entails the theoretical redescription of explaining this connection of categories

In the following pages, we will present in detail these three rounds related to the GMT coding and theorizing processes. In particular, we present an interview-based research on the substantive area of families raising a person with disability (PwD). We take this area as a case example of how substantive theorizing can be achieved by implementing these three methodological moves.

The Case Example: The Research Context

This study examines the lived experiences of families raising a person with disabilities (PwD) through narrative interview-based research. The primary aim was to explore how parents of PwDs navigate socialization, with a particular focus on education and social life. The research involved 20 interviews with mothers whose PwDs regularly attended a rehabilitation center offering psychomotor support for children with disabilities. The interviews employed a biographical-narrative approach, emphasizing the mothers' biographical details, including key turning points such as schooling, marriage, the birth of their first and subsequent children, and the educational paths of their PwD. This approach allowed for a nuanced reconstruction of their life narratives. Participation in the study was voluntary. Mothers were assigned pseudonyms during the interviews to ensure confidentiality. After transcription, the interview texts were returned to the participants for their review, allowing them to approve the content or provide additional comments. Each interview was transcribed, generating a dataset of approximately 350 pages. The disabilities identified in this study were as follows:

Table 2. Distribution of Disabilities to Families Researched

Autism	7
Intellectual disability/mobility problems	2
Cerebral paralysis	5
Blindness	2
Prader-Willy syndrome	2
Epilepsy	2

The First Round of Coding: Dimensionalizing the Material

The first round of coding focuses on dimensionalizing the material. For the sake of parsimony, we have constructed Table 3 that provides a detailed presentation of categories, properties, and dimensions. Given that, as previously noted, this table represents the final outcome of the current round, it is important to acknowledge the challenges researchers typically encounter at this stage of analysis. Two key challenges can be identified. First, researchers must engage in intensive and in-depth reading of the transcribed interviews, adhering to standard GTM guidelines – such as the constant comparison of codes and emerging categories, and the avoidance of over-coding or the use of "pet" codes. Second, it would be beneficial for two or more researchers or coders to collaboratively construct such a table during this initial round, in order to enhance the reliability of the analysis.

Table 3. Dimensionalizing Data

Categories	**Properties**		**Dimensions**
1. Disability as an opportunity space for alternatives	I. Tightening of family ties		a) With relatives / with husband-wife
	II. Emotional maturity		b) Empathy resilience ⟷
	III. Ideational resistance/agentic actions		c) Cognitive / behavioral
2. Micro/macro difficulties	I. Macro situations leading to invisibility		a) Restrictions to work/education
	II. Dealing with everyday life		b) Stigma (high / low)
3. Active parental involvement to the educational growth of the PwD	I. Active intervention for choosing type of school		a) Special education school/parallel learning/private school
	II. Monitoring of learning development	a) Monitoring of out of school learning practices	b) Home schooling / educational support from health professionals
		b) Creation of relational communities	c) Parental groups with PwD/Associations for PwD/summer camps for socializing PwD
4. Structural/cultural resources for handling PwDs' needs	I. Frustrated/disappointed from educational resources		a) Unskilled teachers on special education/lack of infrastructural accessibility/lack of state support
	II. Contribution of health professionals		b) Not at all important ⟷
	III. Support from community		c) Parents / friends / church
5. The processual nature of reconciling with disability	I. Gradual acceptance ↑		a) Learning the routine becoming "expert" ⟷
	II. Psychological shock ↕		b) Depression (officially diagnosed)/concealed
	III. In search for a diagnosis ↓		c) Uncertain certain ⟷

To illustrate how substantive codes informed the development of the table during the first round of interview coding, we present selected narrative fragments from the interviews with four mothers (Box 1).

Table 4. Examples of Substantive Coding

c1. Creation of an association for occup therapy c2: control of pedag approach by parents	Interviewer: you mentioned something about "the school that we have created." Could you explain that a bit to me? Informant: Yes, we have created an association, in which my kid and some other children participate. In this association, occupational therapy sessions are provided—umm—which take place daily, and my kid has to go there to attend them. And umm, we hope that this association will grow, that more children will join, so we can offer help to other children who have similar difficulties. Interviewer: As if he were going to school, for example? Informant: As if he were going to school, yes, but we have chosen it to be a school where we can control the pedagogical approach, because we feel that in public schools, things are not under parental control.
c3: Embodied adjustment of parents to the routines of PwD	Informant: Eating and drinking is a whole ritual. Interviewer: When you say a ritual, do you mean he needs his time? Informant: A ritual, I'm telling you, properly so. This and that, his little toys, specific things. There's a specific pattern he follows to eat. You understand? If he gets bored, that's it—he won't eat.
c4: Disappointment from state support or health professional	Interviewer: was there any help or support at the hospital or at daycare? Informant: No, there was no one else. Unfortunately, no matter what kind of work someone does, if they don't truly take ownership of it, they cannot genuinely help others. That was the case for us as well – everyone was simply doing their job, nothing more, and no one supported us with this. No one (emphasis added). Even the professionals we took our child to – for speech therapy, occupational therapy – did not really engage. For example, we were taking our child to occupational therapy, and there was a blind child there, but the therapist wasn't even speaking to him. How can you communicate with a blind child without speaking to him?
c5: Strengthening of the marital	Informant : The positive thing for me in all of this is that I have my husband – my supporter and companion through everything.

Codes 1 and 2 enabled us to create gradually the Properties I and II of the Category 3, code 3 enabled us dimensionalize Property I of the Category 5, code 4 enabled us create the Properties I and II of the Category 4 and code 5 enabled us dimensionalize the Properties of Category 1.

In more general terms, this table highlights both substantive and methodological details. Regarding the substantive aspects, it is important to emphasize that the original codes, which form the basis for constructing the

categories/properties/dimensions scheme, are preserved. In empirical research, the context in which a code is attributed to a specific fragment can be narratively elaborated in the "Results" section.

For instance, dimension (b) of property II (Category 1: Disability as an Opportunity Space for Alternatives) could be explained by illustrating how and in what ways parents of PwD "became more patient," "realized that life is short and conflicts are better avoided," "developed empathy," and "learned to think outside the box." Similarly, dimension (a) of property I (Category 3: Active Parental Involvement in the Educational Growth of the PwD) might be detailed with narrative examples of mothers' efforts to decide whether the PwD would attend a special education school, a private school, or receive support through parallel learning arrangements.

Regarding the methodological contribution of the table, it underscores the distinct levels of abstraction between categories, properties, and dimensions. For example, the micro- and macro-level difficulties faced by mothers of PwD (Category 2) are conceptualized as either accessibility restrictions to work or education (dimension (a)), which reflect macro-level situations leading to invisibility (Property I), or as various manifestations of stigma (dimension (b)), experienced in everyday life (Property II). Moreover, the table facilitates the identification of possible sub-properties or processes. For instance, Category 3 comprises two properties, one of which includes two sub-properties, while the three properties that constitute Category 5 are articulated as a process. Category 3 is specifically constructed in a processual manner because:

a) The diagnosis of a disability in a newborn is often not straightforward — mothers may receive an incorrect diagnosis or spend considerable time searching for a specialist.

b) Following the diagnosis, parents often experience emotional distress, including shock, depression, or despair.

c) Over time, parents gradually come to accept the new reality of raising a PwD by learning, through lived experience, the embodied and routine requirements of caregiving. This practical learning process often results in parents becoming "more expert than the experts" in managing their child's needs.

In other words, we view this table as a crucial tool for elucidating substantive details that bring participants' main concerns to light while emphasizing the variability of the phenomenon under study. Beyond these substantive insights, the table also encapsulates methodological details relevant to the context of justification, thereby enabling other researchers to replicate or expand the conceptual dimensions that frame a particular substantive area (in this case, the area is "raising a PwD"). However, as outlined in earlier sections, GTM coding is not confined to dimensionalizing; rather, dimensionalizing serves as the methodological foundation for theory construction through the process of connecting categories.

The Second Round of Coding. Connecting Categories.

Identifying the core category is not the sole pathway to theory building in our approach to GTM coding; rather, it can be complemented by demonstrating how categories are interconnected. Coding families play a pivotal role in this process by providing a framework for establishing these connections. Specifically, in the example we present, a careful examination of Table 1 led us to identify a particular way in which the categories from Table 1 can be connected (see Figure 2).

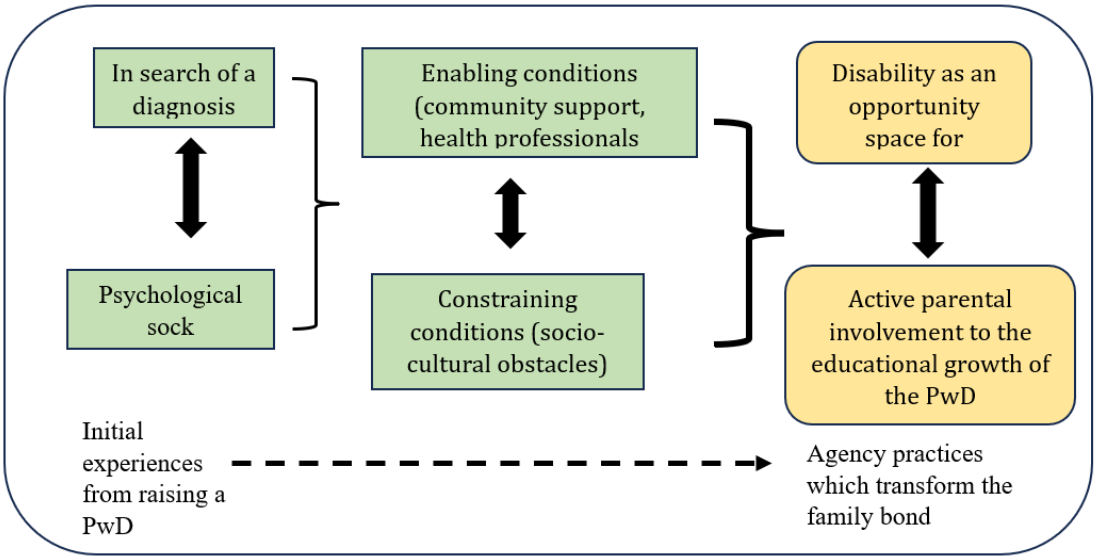

Figure 2. Connecting Categories

The connection of these categories is conceptualized through the coding family of the "process." The rationale for this choice lies in the fact that the categories are linked through a sequential logic of stages, which, when considered collectively, constitute a process. Through this process, mothers' initial experiences with disability and raising a PwD are

transformed into practices of self-agency under specific conditions. As a result, the central theoretical idea that emerges is that, under particular circumstances, the familial bond undergoes a transformation. While this idea is grounded in the data, the theory that could describe the logic of each stage and explain the mechanisms through which this transformation occurs remains undeveloped. In other words, coding families serve as methodological tools for connecting categories during the second round of coding.

However, GTM coding does not conclude at this stage. If it did, researchers would risk analyzing the material through the lens of a predetermined theoretical code, as Holton and Walsh (2017, p.43) caution against. During the second round of coding, researchers may employ a coding family to shed light on how categories are connected. Nevertheless, a final round of coding is essential to provide a more detailed explanation of these connections. Figure 3 attempts to illuminate this level of detail.

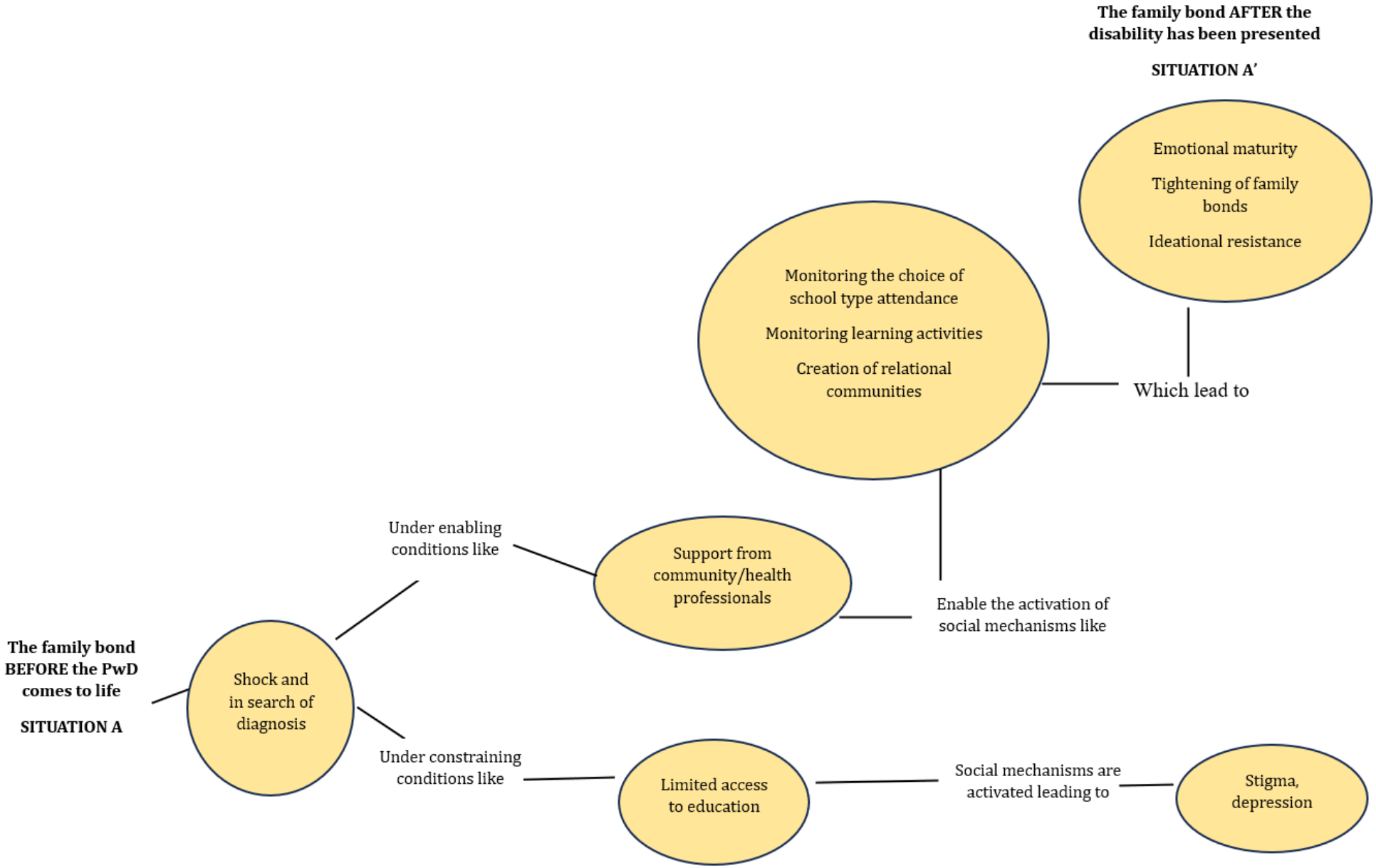

Figure 3. Conceptual Model Which Explains the Transformation of the Family Bond

Third Round of Coding. Elaboration of the Theoretical Code

Providing detailed reasoning for selecting a specific way of connecting categories over another constitutes theoretical coding. Since a theory fundamentally addresses how its concepts are interconnected, theoretical codes are advanced abstractions that imbue these connections with explanatory depth. It is important not to conflate theoretical codes with core categories (Glaser, 2005). While a core category highlights the latent pattern in participants' experiences, theoretical codes are employed to explain the conditions that render this pattern latent. As Glaser and Holton (2007) emphasize, participants are typically unaware of the latent pattern, let alone the conditions that bring it into existence. Specifying the relationships among concepts is pivotal to a theory's ability to provide a comprehensive account of how phenomena unfold.

The objective of Figure 3 is to provide a theoretical elaboration on Figure 2, which demonstrated the connections between categories using the "process" coding family. Through this elaboration, we aim to explain the transformation of the familial bond in families raising persons with disabilities (PwD). To achieve this, we introduce the concept of "transformed relational agency," which posits that families, as relational units, gradually develop a form of agency under specific conditions by actively intervening in the socialization of the PwD. This concept seeks to describe the process by which familial bonds are preserved amidst external stressors but in a transformed and dynamic state.

We chose to adhere to this concept by taking into account the key insights that emerged from Figure 3 – specifically, first, that the family bond undergoes a transformation through a process, and second, that raising a PwD should be understood primarily as a relational phenomenon rather than merely a psychological event. Accordingly, we, as authors, engaged in a reflective discussion to determine which of our theoretical sensitivities best aligned with these two core elements and the rconnection of the categories identified in the previous round of coding. This reflective process ultimately led us to the concept of "transformed relational agency."

Drawing on systems theory, "transformed relational agency" can be conceptualized as an autopoietic mechanism within the familial bond. The term "autopoiesis" refers to the self-renewing characteristics of living systems, which continuously regulate their internal processes to preserve structural integrity. This concept underscores the adaptability of complex systems in maintaining autonomy when faced with external pressures for change. Autopoiesis ensures resilience against disruptive forces or facilitates change only to the extent that the system's coherence and identity remain intact. In the context of families raising PwD, autopoiesis — understood as a form of orderly transformation — is realized through the evolving agency of family members. This agency manifests in their proactive efforts to sustain familial cohesion amidst challenging and disorganizing experiences such as disability.

This way of approaching theoretical coding means that it is an explanatory story researchers construct through which

- objects and events have to be clearly designated,
- dimensions and properties have to be clearly stated,
- contexts for these properties have to be brought to light and
- the conditions in which actions and consequences are deployed have to be detailed

In Figure 3, the explanatory narrative can be summarized as follows: Families raising Persons with Disabilities (PwD) navigate an emotionally challenging process as they seek a definitive and reliable diagnosis for their child's symptoms. When parents encounter constraining conditions, such as restricted access to education or insufficient state support, the trajectory of raising their child is likely shaped by stigma and exclusion. Conversely, under enabling conditions — such as access to expert health professionals or supportive workplace environments for parents — they are more likely to develop what we term "transformed relational agency." This term refers to parents' capacity to initiate social mechanisms, such as actively monitoring their child's educational trajectory (e.g., selecting appropriate schooling options) or fostering relational communities that provide recreational and social opportunities for their child. Within these supportive contexts, parents often grow in maturity, strengthen their familial and social bonds, and/or cultivate resistant ideational beliefs that challenge dominant medicalizing ideologies. To encapsulate this dynamic process, we introduce the concept of "transformed relational agency," which highlights the adaptive and transformative capacities of families raising PwD in response to varying external and internal conditions.

Conclusion

In more general terms, dimensionalizing, as presented in Table 3, serves to illuminate participants' main concern (first round of coding). Connecting categories is a methodological approach to uncovering the latent pattern underlying this concern (second round of coding). Theoretical coding, in turn, seeks to explain this latent pattern in theoretical terms – addressing the "why" and "how" of the connections between categories (third round of coding). In essence, we posit that dimensionalizing constitutes the foundational methodological device for theorizing within Grounded Theory Methodology (GTM). While we do not claim this to be a groundbreaking revelation within the methodological discourse of GTM, we believe our contribution lies in three specific areas.

First, we argue that the initial round of coding extends beyond open coding and must culminate in a precise and well-defined presentation of categories, properties, and dimensions. Diagrammatic tools for visualizing dimensionalizing can be highly effective in achieving this clarity (Buckley & Waring, 2013). Second, we emphasize that theorizing does not solely arise from identifying a core category but also from demonstrating how categories are interconnected. We prioritize the connection of categories because it fosters theorizing by compelling researchers to construct an explanatory narrative that elucidates participants' latent pattern. Finally, we propose that dimensionalizing serves as the methodological foundation for theory development in a counterfactual sense: without dimensionalizing, the transition to theory development remains unclear and difficult to communicate. While this may seem self-evident, we note that the literature on the substantive field related to our example (families raising a person with disabilities, or PwD) often overlooks these three crucial points. In the following paragraphs, we briefly analyze empirical studies on parents raising a PwD where GTM served as the primary methodological approach.

A specific pattern comes to the fore through a close reading of the eight research articles we found. Six of them follow the “core category” style of analysis in which a core category and its main categories are presented in narrative terms while two of them follow the “connecting categories” style of analysis in which emphasis is placed on how the categories are connected. We believe that these two style of analysis lead to different ways of theorizing data.

Regarding the studies using the “core category” style of analysis, Prager (2015) identifies participants’ main concern (readiness) and four categories ("normalcy," "burden," "mortality," and "support system") connected to the core category ("parents cannot be caregivers forever"). In doing so, the author attempts to explain how parent caregivers manage readiness to make a residential group home placement decision for their PwD. However, since the author employs the "socio-psychological process" as the core category, the stages participants undergo and the transformations they experience are not explicitly outlined. We suggest that this omission stems from the absence of dimensionalizing. A similar analytical approach is evident in the research of Roquette-Viana et al. (2021) and Lowers-Roach (2021), where four main categories are connected to a core category to explain the participants’ main concern. Yet, the connections between these categories are not clearly articulated, leaving the theoretical code that explains the latent pattern underdeveloped. Drumm (2019) adopts a slightly different analytical strategy by identifying a core category and narratively presenting its subcategories. However, given the large number of categories analyzed through interview excerpts, the explanatory story the author aims to construct becomes difficult to follow. Finally, in the studies by Auman et al. (2022), and Tekola et al. (2023), while GTM is proposed as the methodological framework, the results are presented in a thematic style rather than following the structured principles of GTM coding and theorizing.

Research articles by O' Connor et al. (2021) and Moonpanane et al. (2021) follow a "connecting categories" style of analysis. Specifically, the theoretical code “confident championing” proposed by O' Connor et al. (2021) explains how parents refine their perspectives on disability awareness, aspirations, and parenting capacity. Additionally, the authors identify three types of champions—novice, explorer, and confident—who undertake tasks such as creating pathways and sustaining their well-being. This approach demonstrates how connecting categories allows for a more robust and integrated theorizing process.

A key limitation of the "core category" style of analysis lies in the fact that the core category and other main categories often appear to exist at the same level of abstraction. For instance, it is unclear how the level of abstraction between a core category like “the challenges parents face” and a main category like “burden” (Prager, 2015) differs. While identifying a core category is not inherently problematic, it can be challenging for researchers to distinguish the abstraction level of the core category from other related categories. If abstraction levels are not clearly delineated during the coding process, achieving theoretical integration becomes significantly more difficult.

In contrast, when researchers elaborate on how the categories are connected, theoretical integration brings to light explanations of participants’ latent pattern. For example, the results section in research by O' Connor et al. (2021), and Moonpanane et al. (2021) is not focused on presenting a core category but on providing an explanatory story on how the main categories are connected. In that way, researchers are experimented with a theoretical model or with crafting a theoretical model through which the latent pattern is explained.

In all the aforementioned research, dimensionalizing is either entirely absent or presented only at the conclusion of the research process. Classic works on dimensional analysis (Glaser, 1978; Schatzman, 1991; Strauss, 1987; Strauss & Corbin, 1990) do not explicitly address when dimensionalizing should be considered complete or how it shapes the theorizing process. To address this gap, we propose that dimensional analysis can serve as a powerful tool for organizing open coding by identifying discrete levels of abstraction within the categories/properties/dimensions framework. This approach can help researchers experiment with how categories are connected and explore how these connections are explained through a theoretical code that is firmly grounded in the dimensionalizing of the material.

Our argument that dimensionalizing offers a more promising approach to addressing the challenges outlined in the introduction, compared to the fractal concepts proposed by Wasserman et al. (2009), can be justified as follows. According to their perspective, the MIC generator facilitates the organization of ontologically distinct observations within a logical structure, thereby constructing a conceptual model rather than merely a theoretical taxonomy. However, if

socio-ontological concepts are directly applied to raw data, how can researchers ensure they avoid what Glaser (1998) critiques as "pet theorizing"?

In particular, in their example on homelessness, substantive codes are organized into the four basic ontological categories of the MIC generator: (1) static, (2) dynamic, (3) evaluative, and (4) self/identity categories. By applying these categories to substantive codes, two conceptual models emerge: (1) the elements of poverty and addiction (static), engaged in cyclical interaction (dynamic), produce the emotional fatigue and exhaustion associated with prolonged homelessness (evaluative); and (2) people's actions of giving money (dynamic) produce feelings of embarrassment (evaluative), which result in a diminished concept of self (self/identity). A contradiction arises from this line of reasoning: if one asserts that ontological categories are distinct because they differ in kind, then why could "self/identity" not be considered a dynamic entity that evolves over time? In what sense do these two categories ontologically differ? In other words, our critique of fractal concepts lies in the observation that Wasserman et al. (2009) fall into the very trap they aim to avoid. By making an ontological argument into a methodological one, they conflate two distinct levels of abstraction.

Recommendations and Limitations

While we do not claim that a lack of dimensionalizing necessarily results in poor theoretical outcomes, we argue that without dimensionalizing, the resulting theory cannot be fully justified or effectively shared with others. To this end, we recommend that two or more researchers collaborate in constructing the dimensionalizing table at the conclusion of the first round of coding. Although Glaser (2011) opposed member checking as a strategy for achieving internal validity, we argue that engaging multiple coders in discussions about the development of this table enhances the conceptual validity of dimensionalizing, as it allows for a more comprehensive representation of the multiple facets of the phenomenon under study. However, since coding in GTM begins inductively – without a predefined codebook – a limitation of this approach is that researchers must make a concerted effort to reach consensus regarding the range of categories' properties, the codes comprising each property, and the measurement of each dimension.

In any case, the approach to dimensionalizing presented in this article can be applied across various subfields of educational studies—not only in disability research, but also in areas such as minority education, curriculum studies, and teacher development. As is well known, grounded theory methodology (GTM) is a suitable methodological strategy for areas of inquiry where substantive theories are lacking. Accordingly, dimensionalizing and connecting categories can serve as a style of GTM analysis through which substantive theories may be developed—for instance, in the field of teacher identity in minority education or strategies of inclusion in problem-based learning. This approach also holds the potential for contributing to the development of formal theories.

Finally, we recognize that GTM coding is a flexible, iterative, non-linear, and creative process. The argument presented in this article aligns with the idea that dimensionalizing is inherently characterized by these features. By conducting dimensionalizing after completing open coding, researchers can enhance their intuition and foster greater innovation in their analytical work.

References

Apramian, T., Cristancho, S., Watling, S., & Lingard, L. (2016). (Re)Grounding grounded theory: A close reading of theory in four schools. *Qualitative Research*, *17*(4), 359-376. https://doi.org/10.1177/1468794116672914

Auman, M. N., Englis, P. T., & Abadiano, N. M. (2022). Discovering challenges of parents in handling their children with special needs: A grounded theory. *NeuroQuantology, 20*(6), 1494–1501. https://doi.org/10.14704/NQ.2022.20.16.880146

Belgrave, L. L., & Seide, K. (2019). Coding for grounded theory. In A. Bryant & K. Charmaz (Eds.), *The SAGE handbook of current developments in grounded theory* (pp. 167–186). Sage. https://doi.org/10.4135/9781526485656

Birks, M., & Mills, J. (2015). *Grounded theory: A practical guide* (2nd ed.). Sage.

Bowers, B., & Schatzman, L. (2009). Leonard Schatzman and dimensional analysis. In J. M. Morse, P. N. Stern, J. M. Corbin, K. C. Charmaz, B. Bowers, & A. E. Clarke (Eds.), *Developing grounded theory: The second generation* (pp. 86–126). Routledge. https://doi.org/10.4324/9781315169170

Bryant, A., & Charmaz, K. (2007). Grounded theory in historical perspective: An epistemological account. In A. Bryant & K. Charmaz (Eds.), *The SAGE handbook of grounded theory* (pp. 31–58). Sage. https://doi.org/10.4135/9781848607941

Buckley, C. A., & Waring, M. J. (2013). Using diagrams to support the research process: Examples from grounded theory. *Qualitative Research*, 13(2), 148–172. https://doi.org/10.1177/1468794112472280

Charmaz, K. (2009). Shifting the grounds: Constructivist grounded theory methods. In J. M. Morse, P. N. Stern, J. M. Corbin, K. C. Charmaz, B. Bowers, & A. E. Clarke (Eds.), *Developing grounded theory: The second generation* (pp. 127–155). Routledge. https://doi.org/10.4324/9781315169170

Charmaz, K. (2014). *Constructing grounded theory*. Sage.

Drumm, E. E. (2019). *Protecting myself and my child: A grounded theory of parents' journey through diagnostic feedback for autism* [Doctoral dissertation, University of Toronto]. University of Toronto Theses and Dissertations Archive. https://tinyurl.com/2cx2u688

Glaser, B. G. (1978). *Theoretical sensitivity: Advances in the methodology of grounded theory*. Sociology Press.

Glaser, B. G. (1998). *Doing grounded theory*. Sociology Press.

Glaser, B. G. (2001). *The Grounded theory perspective: Conceptualization contrasted with description.* Sociology Press

Glaser, B. G. (2002). Constructivist grounded theory? *Forum: Qualitative Social Research, 3*(3), Article 12. https://doi.org/10.17169/fqs-3.3.825,

Glaser, B. G. (2005). *The grounded theory perspective III: theoretical coding*. Sociology Press

Glaser, B. G. (2007). *Doing formal grounded theory*. Sociology Press

Glaser, B. G. (2011). *Getting out of the data. Grounded Theory conceptualization*. Sociology Press

Glaser, G. B., & Holton, J. (2007). Remodeling Grounded Theory. *Historical Social Research, 19*, 47-68, https://doi.org/10.17169/fqs-5.2.607

Holton, J. (2007). The coding process and its challenges. *Grounded Theory Review*, *6*(1), 1–22. https://doi.org/10.1177/160940690700600103

Holton, J. A., & Walsh, I. (2017). *Classic Grounded Theory. Application with qualitative and quantitative data.* Sage. https://doi.org/10.4135/9781071802762

Kelle, U. (2007). The development of categories: Different approaches in grounded theory. In A. Bryant & K. Charmaz (Eds.), *The SAGE handbook of Grounded Theory* (pp. 191-214). Sage. https://doi.org/10.4135/9781848607941

Lowers-Roach, M. (2021). *Parents raising children with intellectual/developmental disabilities in Jamaica: A grounded theory approach* [Doctoral Dissertation, Molloy College]. Molloy College Theses and Dissertations Archive https://tinyurl.com/3ahewm52

Moonpanane, K., Kodyee, S., Potjanamart, C., & Purkey, E. (2021). Adjusting the family's life: A grounded theory of caring for children with special healthcare needs in rural areas, Thailand. *PLoS ONE, 16*(10), Article e0258664. https://doi.org/10.1371/journal.pone.0258664

Morse, J. M., Stern, P. N., Corbin, J., Bowers, B., Charmaz, K., & Clarke, A. E. (2009). Grounded theories: On solid ground. In J. M. Morse, P. N. Stern, J. Corbin, B. Bowers, K. Charmaz, & A. E. Clarke (Eds.), *Developing Grounded Theory. The second generation* (pp. 236-251). Routledge. https://doi.org/10.4324/9781315169170

O' Connor, B. A., Carpenter, B., & Coughlan, B. (2021). Confident championing: A grounded theory of parental adjustment following a child's diagnosis of developmental disability, *British Journal of Learning Disabilities*, *49*(2), 247–258. https://doi.org/10.1111/bld.12360

Prager, L. A. (2015). *Grounded theory study of how parents made the decision about residential group home placement for their adult child with intellectual/developmental disabilities* [Doctoral Dissertation, Molloy College, Division of Nursing]. Molloy College Theses and Dissertations Archive. https://tinyurl.com/4f7sjhup

Roquette-Viana, C., Caldeira, S., Lourenço, M., & Simões Figueiredo, A. (2021). Parenting of children with autism spectrum disorder: A grounded theory study. *Healthcare*, *9*, Article 872. https://doi.org/10.3390/healthcare9070872

Schatzman, L. (1991). Dimensional analysis: Notes on an alternative approach to the grounding of theory in qualitative research. In D. R. Maines (Ed.), *Social organization and social process* (pp. 303–314). Aldine De Gruyter.

Stough, M. L., & Lee, S. (2021). Grounded theory approaches used in educational research journals. *International Journal of Qualitative Methods*, *20*(1), 1–13. https://doi.org/10.1177/16094069211052203

Strauss, A. L. (1987). *Qualitative analysis for social scientists*. Cambridge University Press. https://doi.org/10.1017/CBO9780511557842

Strauss, A. L., & Corbin, J. (1990). *Basics of qualitative research: Grounded theory. Procedures and techniques*. Sage. https://doi.org/10.4135/9781452230153

Swedberg, R. (2014). *The art of social theory*. Princeton University Press, https://doi.org/10.23943/princeton/9780691155227.001.0001

Tekola, B., Kinfe, M., Girma Bayouh, F., Hanlon, H., & Hoekstra, A. R. (2023). The experiences of parents raising children with developmental disabilities in Ethiopia. *Autism*, *27*(2), 539-551. https://doi.org/10.1177/13623613221105085

Urquhart, C. (2023). *Grounded theory for qualitative research*. Sage. https://doi.org/10.4135/9781526402196

Wasserman, A. J., Clair, M. J., & Wilson, L. K. (2009). Problematics of grounded theory: Innovations for developing an increasingly rigorous qualitative method, *Qualitative Research*, *9*(3), 355–381. https://doi.org/10.1177/1468794109106605