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Nested Sampling in Sequential Mixed Methods Research Designs: Comparing Recipe and Result

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Abstract: In this contribution, I focus on nested sampling as it is applied in sequential quantitative-qualitative mixed methods research. The function of this design element is to integrate quantitative and qualitative data. I refer to a specific type of recommendation that has proved particularly useful for the analysis of social milieus. An important feature of this approach is that the quantitative sample is divided into subgroups in order to then collect more qualitative data than would otherwise be the case. I present two projects in which nested sampling was implemented in this respect, but each in a different way. Subsequently, recipe and result will be compared. This reveals a number of discrepancies that are of interest both from a methodological point of view and in terms of research application. Above all, it will become clear that nested sampling is not only applicable to the analysis of social milieus. The same approach can also be applied to the analysis of complex causal relationships. But it may be difficult to provide all subgroups with sufficient qualitative cases. As I will show, nested sampling can be employed and implemented in such studies as well. However, the effort involved should not be underestimated.

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1. Introduction

The debate on use and function of nested sampling has evolved over several iterations. An important reference point in this regard concerns the discussion of research designs and their fit to empirical questions (KELLE, 2001). STOLZ (2017) developed it in more detail with regard to the analysis of social milieus. His contribution will serve as my point of reference for this paper. My goal here is to stimulate a discussion relating to practical experiences in dealing with this kind of case selection and a specific framework on the application of this design element. I begin with a brief contextualization of nested sampling. I then introduce some major theoretical concepts that are relevant to this type of mixed methods research (in the following: MMR). Subsequently, I focus on a specific research process and situate nested sampling as a design element within this context. I will introduce two studies from the sociological study of religion (Section 2). Both of these projects were based on the implementation of a sequential design involving nested sampling. In the main part of the paper, I then show for different phases

how the studies evolved, what decisions had to be taken, and how these relate to the theoretical framework (Sections 2.1 and 2.2). I end with a summary of the discussion and a list of suggestions (Section 3). [1]

Generally speaking, the term sampling refers to the process of systematically selecting units of analysis within a given population or total of data points. In this paper, I focus on nested sampling, which is a specific sampling strategy that is applied in the context of sequential quantitative-qualitative studies—the corresponding design can be formalized as QUAN -> qual (MORSE, 1991). Nested samples are not used in all studies of this type. But if they are used, they are, so to speak, sitting in the center of the respective research design. There are different reasons for using this strategy. A widespread position (which I advocate in this contribution) originates from the focus on strengthening validity. Proponents of his approach postulate that different methods should be mixed in such a way that their strengths are complementary to each other and their weaknesses do not overlap (BREWER & HUNTER, 2006). ONWUEGBUZIE and COLLINS approached this aspect via the concept of meaning-making as a multi-layered and iterative process that evolves toward understanding a specific phenomenon: The authors emphasized that "meaning making is very much dependent on the quality of inferences that emerge, which, in turn, is dependent on the quality of the underlying sampling design" (2017, p.133). Across multiple publications, they developed a framework that culminates in this reflection. GUEST and others likewise referred to sampling as a point of interface. Alongside with this concept, there is a

> "shift in focus from the entire study to the point of interface between two data sets. The point of interface refers to any point in a study where two or more data sets are mixed or connected in some way" (GUEST, 2013, p.146). [2]

Sampling then becomes an important parameter in the integration of multiple data types. STOLZ (2017) has introduced a framework in which these considerations are addressed with reference to nested sampling. This framework is used as a central point of reference for my research note. He pointed to nested sampling as a key element of a sequential quantitative-qualitative design. STOLZ developed the argument that the technique of nested sampling can be used as a point of interface to combine survey data with a large number of semi-structured interviews. In this way a MMR-study can be applied to analytical sociology in order to identify and describe social milieus. Thereby, nested sampling is used as linkage between quantitative and qualitative data. This ensures that the different data are referring to one and the same empirical phenomenon or "thing" (p.367). [3]

A central feature of STOLZ's approach is that a rather large number of qualitative interviews should be at hand in order to "distinguish and compare more subgroups and variable-code-combinations inside the qualitative sample" (p.368). This approach differs fundamentally from others in qualitative social research. The aim is not to achieve thematic saturation, as it is postulated in designs with proximity to grounded theory methodology (MASON, 2010). It is rather about

being able to categorize the collected interviews into different subgroups. How many cases there should be as well as how to obtain these are both questions that need to be addressed when planning a study. An important tool toward this purpose is the sampling plan which in turn is integrated into a larger sequence of steps.

Table 1: Sequential MMR design with nested sampling as a design element. Click here to download the PDF file. [4]

In Table 1 we see an example of a typical research process as it is implemented in the case of a sequential study with nested sampling. Within this sequence, the sampling plan is a specific element due to which a connection between the two types of data (point of interface) is ensured. This plan is, so to speak, located in the center of any sequential quantitative-qualitative MMR. It is based on methodological considerations and contains specifications about how many qualitative cases have to be collected as well as how they are to be selected. In order to design such a plan, the quantitative data in the population under study have to be divided into different subgroups. Subsequently, persons in each of these subgroups are invited to participate in qualitative data collection. In order to achieve this segmentation into groups, several parameters have to be defined. Some of these can be specified during the planning phase of a study, while others can only be determined after the quantitative survey has been completed. In this respect, the process of nested sampling differs from way data are collected in monomethod quantitative research. The sequence is too complex for exhaustive pretesting. Suitable variables are those that have been completed by as many participants as possible (low number of missing values) and when there are enough contacts for each characteristic (level) of a given item. In order to be able to apply this technique, the following considerations need to be taken into account:

1. Phase 1: This phase is about conceptually mapping out a link between the two types of data. A main research question has to be phrased in such a way that it can be addressed by using mixed data. Furthermore one must assess whether there are potentially enough individuals in the population studied who will participate in the qualitative phase of the study, in this case a qualitative interview (accessibility, willingness, language).
2. Phase 2: As part of the operationalization, it must be clarified which items will be used to establish subgroups within the quantitative data set in order to determine the qualitative sample. This clarification depends on the central question and is important with respect to the creation of these subgroups (link between datasets).
3. Phase 3: In the quantitative phase of the study, contact data must be collected in addition to the actual survey data in order to be able to get in touch with all selected individuals at a later point in time. Once the quantitative data collection is complete and the data has been cleaned (3a), the sampling plan can be created (3b). This serves as a key junction point and is used to bridge the gap between the two data sets. It consists of multiple variables

from the quantitative data that are used to create subgroups. For each of these, a predetermined number of qualitative interviews will then be conducted.

4. Phase 4: Once the collection of both types of data is complete, the quantitative data set can be supplemented with information on the qualitative data set. At the same time, the quantitative items can be added to the qualitative data set. This way, the data of the other type is always within reach during the analysis. [5]

In order to advance my arguments, I will refer to those phases in this process that are of particular importance. These are Phases 3a and 3b. I will also discuss the decisions that have to be made in the context of Phases 1 and 2. Phase 4 is merely a preliminary technical step to prepare the analysis. Decisions made at this point no longer fundamentally affect the process of integrating quantitative with qualitative data. [6]

2. Hands-on Experience With Nested Sampling

Let me now introduce two specific studies, both of which were conducted in the field of sociology of religion. This is a broad area of study where researchers focus mainly on topics such as the status of religion in different societies (CORNELIO, GAUTHIER, MARTIKAINEN & WOODHEAD, 2022), religious diversity (BEAMAN, 2017), and social change (POLLACK & ROSTA, 2017; STOLZ et al., 2022). One topic that has become increasingly important in recent years is that of non-religion and secularity (BEAMAN & TOMLINS, 2015; TANNER, 2022; THIESSEN & WILKINS-LAFLAMME, 2017). Many investigators in this field developed their analyses either on the basis of premises from quantitative or from qualitative social research and exclusively use data from these respective methods. The mixing of methods is rather rare (STOLZ, 2017). Nevertheless, several studies have already been conducted in which a mixed-design approach has been shown to be successful (KELLE, LANGFELDT & METJE, 2019; PICKEL & SAMMET, 2014; STOLZ, KÖNEMANN, SCHNEUWLY PURDIE, ENGLBERGER & KRÜGGELER, 2018; THIESSEN & WILKINS-LAFLAMME, 2020). [7]

The first project was about organized secularism in Switzerland.[1] The other project was a study on religion and spirituality among the elderly during the first phase of the COVID pandemic.[2] Both of these studies are based on STOLZ's approach to sequential quantitative-qualitative MMR design. Nested sampling was implemented in both of them. They were conducted in Switzerland and funded by the Swiss National Science Foundation (SNSF). I was involved in both projects as a member of a group of researchers from different disciplines. Both

1 "Seculars in Switzerland: A Mixed-Methods Project" (project number 156241). Involved in this project were Jörg STOLZ, Stefan HUBER, and Christophe MONNOT.

2 "La religion et la spiritualité des seniors en temps de COVID [Religion and Spirituality Among the Older Population During Times of COVID]" (project number 2000878). Involved in this project were Pierre-Yves BRANDT, Etienne ROCHAT, Jörg STOLZ, Zhargalma DANDAROVA, Grégory DESSART, and Laeticia STAUFFER. When I write "we," I am referring to the individuals who were involved in one or both of these projects.

projects are already well advanced, some analyses have been completed and the first publications are about to be finalized. But in this contribution I am not interested in the results as such, but specifically in the question of how nested sampling was implemented. In what follows, this implementation is what I refer to as a result. In the study on organized secularism, STOLZ's framework for analyzing social milieus was adopted in a straightforward manner. But the study on the elderly and COVID had a slightly different orientation. In this study, we applied the same framework to the analysis of complex causal relationships. Whether it is a social milieu or a causal mechanism that we want to study makes no difference from STOLZ's perspective. In the theoretical part of his paper, these two orientations are treated alike. Both, according to the author's argument, exist "out there" and can therefore be represented by either descriptive or explanatory inference form data to "reality" (2017, p.366). Yet, there is a lack of practical guidance and experience regarding the application of this approach to the analysis of mechanisms. Our study on COVID had exactly this focus. This adjustment resulted in several consequences, particularly at the level of planning and implementing nested sampling.

Table 2: Overview MMR design, populations, and data in two sample studies. Click here to download the PDF file. [8]

The main objective of the study on secularism in Switzerland was to provide a sociological description of this milieu. Organized secularism is an area in society in which criticism of religion, non-religion and secularization play a crucial role. Emphasis was put on the Free Thought Movement, which is the largest and most important organization of this type in Switzerland. The study was set up to cover the entire field of organized secularism—based on extensive field research. When collecting the qualitative data and during the analysis, the focus was then put on Free Thought. The central question was: Who are the persons who join a secularist movement and why do they do so? Two objectives were specified in relation to this question:

1. A comprehensive sociological portrait of the milieu of organized secularism in Switzerland was created along four themes: mobilization, membership, orientation, and identity;
2. In the study we examined how organized secularism and its supporters adapt to an increasingly secular and politicized religious environment. [9]

The main objective of the study on religion and spirituality of older people during the COVID pandemic was to gain a deeper understanding of the potential role of spirituality and religion in mental health, morale, well-being, and quality of life as perceived by homebound seniors aged 65 and older during the first phase of the current pandemic crisis. The central question was: How did religion and spirituality influence the way older people experienced the beginning of the COVID pandemic? Four objectives were specified, namely to identify

1. the impact of the pandemic on mental health, morale, well-being, and quality of life of individuals aged 65 and older;
2. the resources (psychological, social, religious, and spiritual) mobilized by seniors to cope;
3. potential changes in religious/spiritual beliefs and practices as a result of the current situation; and
4. potential needs and expectations in terms of spiritual support of elderly homecare clients during the current crisis and to find out whether the services provided by institutional or associative support services for elderly people could be improved with regard to the spiritual and religious experience of individuals who receive care and assistance at home from a healthcare facility. [10]

2.1 Research question and linkage at the conceptual level (Phases 1 and 2)

From a purely technical perspective, the MMR research presented here was about combining two data sets. With regard to the conceptual level of any study, however, focusing on combining two elements is rather misleading. This is because at this level, the point is not to establish a connection. Instead, multiple data types are generated starting from a single point. In planning the actual research, one such single and clearly identifiable point of origin has to be specified. This is why the research question is of such central importance. In the case of a quantitative-qualitative study where nested sampling is included as a design element, it has two main functions: It is used to define the focus of an investigation, as is the case in all studies in all types of research. However, one particular difference occurs in relation to mixed-methods studies with nested sampling. This involves determining, along with the research question, how different types of data are connected at a conceptual level (phase 1). Subsequently, based on this clarification, it is possible to decide which quantitative items will be required in the further course of the investigation in order to create a sampling plan (Phase 2). [11]

In our research on organized secularism, we used this approach in order to focus on describing a specific social milieu. For establishing a link between the qualitative and quantitative data, we had to pick variables that would then be used to create sample-subgroups. Reviewing the general methods literature showed that sociodemographic variables are particularly well suited for such analyses (KELLE & KLUGE, 2010). We therefore decided to build the sampling plan on the basis of sociodemographic characteristics. This recommendation can be supported with studies from research on non-religion and atheism. Many such studies contain the conclusion that sociodemographic parameters have a significant impact on religious affiliation, tendency toward secularism, and activism (CIMINO & SMITH, 2014; KEYSAR, 2017). In order to be able to create a sampling plan later, a good range of relevant variables on sociodemographic characteristics needs to be available. Since these data are collected anyway, as in all other quantitative sociological studies of religion, no specific items or scales

need to be found and tested with this application in mind. This approach was simple and quick to implement. We did not need to make any additional effort. [12]

The study of the elderly and COVID was focused on a different aspect. This was concerned not with group profiling, but with exploring cause-and-effect relationships and mechanisms. As has been shown in other contributions to aging research, spirituality and religion can be important resources for coping with stress, anxiety, and the vagaries of growing older. They have the function of a supporting factor to physical and mental health of older people (LEVIN & IDLER, 2021). What role these resources played in the context of the COVID pandemic is a question that is currently the subject of intense research debate (PARLAPANI et al., 2021). However, it is difficult to answer it by using a monomethod approach. In a purely quantitative study, the ability to map the dimensions of coping is very limited. And in purely qualitative studies, it is difficult to specify the extent to which a pattern of coping occurs. Therefore, in our study we were interested in analyzing these relationships with the help of a MMR design. The particular strength of a mixed-method design in this context is that it connects the level of social structure to personal narratives, subjective perceptions, religiosity, and spirituality in a nuanced way. [13]

At the stage of operationalization, we were confronted with the question of how to measure potential mechanisms and which variables we wanted to use in order to create the sampling plan at a later stage. In contrast to the study on organized secularism, we had to include specific variables in the quantitative data set for this purpose. Searching for respective items resulted in the decision to work with EQ-5D which is a set of items on health (SZENDE, JANSSEN & CABASES, 2014). In addition, several items were created and tested that can be used to measure religious-spiritual needs and to quantify the subjectively perceived impact of COVID. In this context, testing meant confirming the validity of a measurement with the help of participants (comprehensibility, adequacy of predefined answers). This approach was more demanding than the one taken in the research on organized secularism. It was based on more complex theoretical assumptions and involved an additional testing phase. This made it possible to ensure that the selected items were going to be suitable for the creation of a sampling plan. Suitability in this context means that participants were able to understand and respond to the respective items. [14]

2.2 Creation of sampling plan and collecting data (Phase 3b)

For nested sampling, the creation of subgroups is an important step. This step is performed with the help of a sampling plan. Such a plan contains a specification of how many subgroups are to be formed as well as the criteria to be used in this process. For a comparative study, it makes sense to have equal representation of all levels of a variable. This means that the empirical distribution from the quantitative data set has to be transformed into a quota distribution. Before the sampling plan can be compiled, some of the selected variables may need to be recoded and/or summarized. Only variables with a discrete scale level with as few categories as possible can be used. In addition, the number of cases per

subgroup (combination of all characteristics) must be determined. It is useful to have more than one case per subgroup, to ensure that there will be sufficient material for comparisons afterwards. However, it is not possible to predetermine the exact number of subgroups, as this depends on several factors that are not known at the time of operationalization. In particular, it is not possible to know how many contacts and addresses will be available before the collection of the quantitative data is completed. Once quantitative data is in place, the information needed to create the sampling plan is available. [15]

In the two studies, we determined which variables should be used to create the subgroups during operationalization (Phase 2). After completion of the quantitative survey (Phase 3a), the situation was as follows: In the study on organized secularism, 1113 individuals participated in the quantitative survey. Among them, 306 provided their address information. This corresponds to a rate of almost 30%. This surprisingly high rate can be explained, at least in part, by a general affinity for research and science in the milieu of organized secularism (SCHRÖDER, 2018). In the study on older people and COVID, we had a total of 662 quantitative cases, 122 of whom provided their address data. This corresponds to a quota of about 20%. This means that the initial situation was somewhat less satisfactory than in the first study. [16]

Based on this information, as well as the available responses for each item, we then drew up the actual sampling plans. In the study on organized secularism, we used four variables to create a total of 24 subgroups. For each of these variables, we defined a quota which had to be achieved (Table 3). During the preparation of the study (field research), it turned out that some organizations were present in specific regions of the country and others in other regions. Therefore, the variable on membership was included in a slightly different fashion. We created a mix that seemed to make sense in terms of content and did not result in too many subgroups. It was composed of regional distribution and group membership in one variable. The quota chosen for all selected variables was homogeneous. It consisted of either 50% for each variable with two levels or 33% for the variable with three. Finally, 24 subgroups were created. These subgroups covered several dimensions of membership which were important for us as well as the corresponding combinations of different characteristics.

Table 3: Sampling plan for project "Organized Secularism." Click here to download the PDF file. [17]

We applied the same procedure to the study on older people and COVID. But in this study, the willingness to participate in an interview was lower. The reasons for this are complex. On the one hand, it certainly has to do with the fact that older individuals are reluctant to engage in exchanges with anyone they don't know. On the other hand, the pandemic situation has also influenced how one feels about face-to-face communication (GÖTZENBRUCKER, GRIESBECK & PREIBISCH, 2022). In contrast to the other study, we were forced to simplify the originally planned sampling strategy. In order to achieve a quota of about two persons per subgroup on the basis of the available address data, we had to limit

ourselves to a total of 12 subgroups (Table 4). But instead of removing one of the planned variables from the sampling plan altogether (this would have been a rather harsh and difficult to justify method), we opted for recoding. Therefore, the dimension of health was measured by determining a score. This score was calculated on the basis of the five items for the subjective evaluation of health, which was then divided into three groups of equal size. The other two variables were transformed as well, condensing them on the basis of thematic criteria so that they consisted of only two levels each. Across these subgroups, we think, the entire spectrum of dealing with the lockdown becomes tangible in various expressions and combinations.

Table 4: Sampling plan for project "Older People and COVID." Click here to download the PDF file. [18]

Despite careful planning, it was unfortunately not possible to achieve the planned quota of more than one interview for all subgroups. In both studies, there were groups represented by only one interview. In the study on organized secularism, there were problems with two groups in particular. First, this was the group with the characteristics: female, older, active, and Free Thinkers in the Romandie or Ticino region. Second, this was the group with the same characteristics among those individuals who were not active in Free Thought but in another organization. In both cases, we had only one address at hand and were able to conduct only one interview. The main reason for these discrepancies was an empirical one: Most secularists are male, especially those who are actively involved in a movement. Thus, this skewed distribution of the gender variable spilled over into our sampling plan, and we were unable to compensate for this. In the study on older persons and COVID, we were also confronted with several subgroups that could be described as thin. One variable in particular was problematic, namely the relation between the lockdown and religious-spiritual support during this phase. Again, the problem was that we were facing a skewed distribution in the quantitative data. In both studies, we succeeded in fully exploiting the available data and conducting the planned interviews. However, if just one contact person had not participated, this would have meant that one of the subgroups just mentioned would have remained empty as there was no replacement at hand. [19]

3. Discussion and Conclusion

The purpose of this paper was to draw a connection between theory on a specific MMR framework and a number of hands-on experiences during its realization. I focused on the implementation of a sequential quantitative-qualitative design and on nested sampling in particular. This sampling strategy serves as a point of interface and is used to integrate qualitative and quantitative data. This ensures that different types of data are referring to one and the same phenomenon. This perspective on MMR and the related idea of nested sampling is a common practice. In this paper, I concentrated on the approach developed by STOLZ (2017), who refined this method for the study of social milieus. I then showed how nested sampling was implemented by looking at two studies from the field of

sociology of religion. One of the studies was about the milieu of organized secularism, the other about the analysis of the effects of the COVID pandemic on older people. [20]

By comparing the recipe and the results, it became especially clear that the conceptual framework developed for the study of social milieus works well in practice. In both hands-on examples, the methodological guidelines were useful for establishing a solid link between the quantitative and qualitative elements of a study that was rooted in the data. Nevertheless it became clear that the effort in planning a study with nested sampling may vary, depending on which types of variables are used. And this choice, again, depends on what type of research question is being investigated. If sociodemographic variables can be used towards creating a sampling plan, then the effort is comparatively low, as these variables are surveyed in (almost) every sociological study. Sociodemographic variables are an integral part of socioanalytical routine; all entities involved in a study (researchers, readers, participants, and others) know how to think of this type of variables and what they measure. Since they are collected almost automatically, so to speak, they can be used to create nested samples in a particularly efficient way. They are especially well suited for use in studies on social milieus. We saw this in the example on organized secularism shown in this article, and STOLZ pointed this out in two other examples. A causal analytical application of nested sampling is in principle also possible, but a suitable example is not readily available. If it becomes necessary to work with variables of another type because of the research question, then the effort for planning will increase as a result. This became clear with regard to the study on older people and COVID. Not only did we have to find appropriate variables for this study, but we then also had to check in detail whether they actually worked. Because of this extra step, additional effort is required, resulting in an increase in the overall complexity of a project. [21]

Further challenges then became apparent over the course of the research, especially with regard to the creation of a sampling plan. It turned out that good planning alone is not sufficient in order to achieve a robust integration of the data. One major problem was that empirical distributions from the quantitative dataset have to be converted into quota distributions. But whenever there is a highly skewed distribution, it may not be possible to find instances for all defined subgroups. Therefore, some sort of balance has to be found between the number of subgroups to be formed and the number of available addresses. In the examples discussed here, we succeeded in filling all created subgroups with at least one interview. We were thus able to follow the logic of comparing many cases as suggested by STOLZ (ibid.). At the same time, however, it became clear that this approach is prone to obstacles which are difficult to anticipate because information on the distribution of a variable is usually not available before the quantitative data have been collected. Likewise, it is difficult to say how many of the survey respondents are going to provide their contact information. However, one must have an idea of what the sampling plan should look like before conducting the survey. In order to meet the requirements of a nested sampling plan, the cases for the qualitative part of the project have to be

selected on the basis of variables that are integrated into the quantitative data set. [22]

To conclude, it can be said that the use of nested sampling entails specific advantages but also specific difficulties. On the side of disadvantages, one weakness in particular has been revealed on the basis of the examples discussed here: If the needed contacts are not available, it is impossible to create a sampling plan that includes enough cases for all subgroups. Based on the experiences from the two projects discussed, there are two ways to anticipate or solve this problem. First, one can try to make sure that there are enough cases available from the very beginning. This also implies that the appropriate amount of time and financial resources must be provided. But even though it is always good to have as much data as possible, from an efficiency perspective one also needs to keep an eye on how available resources are used best. In order to gain more room in this regard, one could optimize in other areas, for example with regard to the transcription of qualitative interviews. Automatic speech recognition could be used to make this very time-consuming but also important process more efficient. I have been following developments in this field for several years and have always wished that a good solution for this task was available. Unfortunately, this was not the case for a long time. The reasons for this are complex. They range from language-specific problems, to problems with data security, to costs. I have repeatedly experimented with speech recognition, but the results so far have not been satisfactory. However, with regard to newer developments in the field of artificial intelligence,[3] it is worthwhile to re-evaluate such possibilities. In my opinion, more automation should be possible by using a mixture of an optimized interview technique and good quality recordings. [23]

Secondly, one can try to reverse the process of finding cases for a specific subgroup. This implies that specific cases have to be found and subsequently included in the two datasets. However, the sampling then no longer takes place within the quantitative data set, but in the real world. Such cases, in other words, cannot be identified in a dataset; they must be found through direct personal communication or a call. For these individuals, both types of data would then be collected simultaneously. A qualitative interview would be conducted and immediately afterwards or shortly before, this person would be asked to complete the entire quantitative questionnaire. This data would then be inserted into the overall data set. This approach is only (and at most) applicable if sociodemographic variables are used for sampling because only for these variables is it realistic to find someone who fits into the subgroup in question. It is not suitable for items that measure for example values, experience, or for specific practices. However, such an approach entails various questions concerning methodology because a retrospective change of the quantitative data set would be required. The problems resulting from such a procedure merit further discussion. [24]

3 See in particular the speech processing system "wisper"—developed by a research and deployment company called OPEN AI—which is available free of charge. According to various tests, this application can generate particularly robust results in different contexts (RADFORD et al., 2022).

References

Beaman, Lori G. (2017). *Deep equality in an era of religious diversity.* Oxford: Oxford University Press.

Beaman, Lori G. & Tomlins, Steven (Eds.) (2015). *Atheist identities—spaces and social contexts* (Vol. 2). Cham: Springer.

Brewer, John & Hunter, Albert (2006). *Foundations of multimethod research.* Thousand Oaks, CA: Sage.

Cimino, Richard & Smith, Christopher (2014). *Atheist awakening: Secular activism and community in America.* New York, NY: Oxford University Press.

Cornelio, Jayeel Serrano; Gauthier, François; Martikainen, Tuomas & Woodhead, Linda (Eds.) (2022). *Routledge international handbook of religion in global society.* London: Routledge.

Götzenbrucker, Gerit; Griesbeck, Michaela & Preibisch, Kai (2022). Qualitative interview research with vulnerable groups. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, *23*(3), Art. 5, https://doi.org/10.17169/fqs-23.3.3934 [Accessed: January 6, 2023].

Guest, Greg (2013). Describing mixed methods research: An alternative to typologies. *Journal of Mixed Methods Research, 7(2)*, 141-151.

Kelle, Udo (2001). Sociological explanations between micro and macro and the integration of qualitative and quantitative methods. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, *2*(1), Art. 5, https://doi.org/10.17169/fqs-2.1.966 [Accessed: January 6, 2023].

Kelle, Udo & Kluge, Susann (2010). *Vom Einzelfall zum Typus.* Wiesbaden: VS Verlag für Sozialwissenschaften.

Kelle, Udo; Langfeldt, Bettina & Metje, Brigitte (2019). "Nun sag, wie hast du's mit der Religion?" – eine Mixed-Methods-Untersuchung verschiedener Items zu religiösen Überzeugungen im ALLBUS 2012. In Pascal Siegers, Sonja Schulz & Oshrat Hochman (Eds.), *Einstellungen und Verhalten der deutschen Bevölkerung: Analysen mit dem ALLBUS* (pp.93-122). Wiesbaden: Springer VS.

Keysar, Ariela (2017). Religious/nonreligious demography and religion versus science: A global perspective. In Phil Zuckerman & John R. Shook (Eds.), *The Oxford handbook of secularism* (pp.40-53). Oxford: Oxford University Press.

Levin, Jeff & Idler, Ellen (2021). Religion, aging, and public health. *The Oxford Research Encyclopedia of Global Public Health*, online only.

Mason, Mark (2010). Sample size and saturation in PhD studies using qualitative interviews. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, *11*(3), Art. 8, https://doi.org/10.17169/fqs-11.3.1428 [Accessed: January 6, 2023].

Morse, Janice (1991). Approaches to qualitative-quantitative methodological triangulation. *Nursing Research*, *40*(2), 120-123.

Onwuegbuzie, Anthony J. & Collins, Kathleen M.T. (2017). The role of sampling in mixed methods-research: Enhancing inference quality. *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie*, *69*(S2), 133-156.

Parlapani, Eleni; Holeva, Vasiliki; Nikopoulou, Vasiliki A.; Kaprinis, Stergios; Nouskas, Ioannis & Diakogiannis, Ioannis (2021). A review on the COVID-19-related psychological impact on older adults: Vulnerable or not?. *Aging Clinical and Experimental Research*, *33*(6), 1729-1743.

Pickel, Gert & Sammet, Kornelia (2014). *Einführung in die Methoden der sozialwissenschaftlichen Religionsforschung*. Wiesbaden: Springer VS.

Pollack, Detlef & Rosta, Gergely (2017). *Religion and modernity: An international comparison.* Oxford: Oxford University Press.

Radford, Alec; Kim, Jong Wook; Xu, Tao; Brockman, Greg; McLeavey, Christine & Sutskever, Ilya (2022). *Robust speech recognition via large-scale weak supervision*, https://cdn.openai.com/papers/whisper.pdf [Accessed: November 28, 2022].

Schröder, Stefan (2018). *Freigeistige Organisationen in Deutschland: Weltanschauliche Entwicklungen und strategische Spannungen nach der humanistischen Wende*. Boston, MA: de Gruyter.

Stolz, Jörg (2017). Milieus and mixed methods: Describing and explaining religion and secularity in Switzerland. *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie*, *69*(S2), 361-386.

Stolz, Jörg; Könemann, Judith; Schneuwly Purdie, Mallory; Englberger, Thomas & Krüggeler, Michael (2018). *(Un)believing in modern society: Religion, spirituality, and religious-secular competition.* London: Routledge.

Stolz, Jörg; Bünker, Arnd; Liedhegener, Antonius; Baumann-Neuhaus, Eva; Becci, Irene; Dandarova, Zhargalma R.; Senn, Jeremy; Tanner, Pascal; Wäckerlig, Oliver & Winter-Pfändler, Urs (Eds.) (2022). *Religionstrends in der Schweiz. Religion, Spiritualität und Säkularität im gesellschaftlichen Wandel.* Wiesbaden: Springer VS.

Szende, Agota; Janssen, Bas & Cabases, Juan (Eds.) (2014). *Self-reported population health: An international perspective based on EQ-5D.* Dordrecht: Springer Netherlands.

Tanner, Pascal (2022). Religionslose Personen in der Schweiz. Soziologisches Porträt einer wachsenden Bevölkerungsgruppe. In Jörg Stolz, Arnd Bünker, Antonius Liedhegener, Eva Baumann-Neuhaus, Irene Becci, Zhargalma R. Dandarova, Jeremy Senn, Pascal Tanner, Oliver Wäckerlig & Urs Winter-Pfändler (Eds.), *Religionstrends in der Schweiz. Religion, Spiritualität und Säkularität im gesellschaftlichen Wandel* (pp.65-82). Wiesbaden: Springer VS.

Thiessen, Joel & Wilkins-Laflamme, Sarah (2017). Becoming a religious none: Irreligious socialization and disaffiliation. *Journal for the Scientific Study of Religion*, *56*(1), 64-82.

Thiessen, Joel & Wilkins-Laflamme, Sarah (2020). *None of the above: Nonreligious identity in the US and Canada.* New York, NY: NYU Press.

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