Author's postprint:

Walls of Glass. Measuring Deprivation in Social Participation

Nicolai Suppa

February 2021

Keywords

social participation, capability approach, deprivation, life satisfaction, multidimensional poverty, SOEP

Abstract

Abstract

This paper proposes a measure for deprivation in social participation, an important but so far neglected dimension of human well-being. Operationalisation and empirical implementation of the measure are conceptually guided by the capability approach. Essentially, the paper argues that deprivation in social participation can be convincingly established by drawing on extensive non-participation in customary social activities. In doing so, the present paper synthesizes philosophical considerations, axiomatic research on poverty and deprivation, and previous empirical research on social exclusion and subjective well-being. An application using high-quality German survey data supports the measure's validity. Specifically, the results suggest, as theoretically expected, that the proposed measure is systematically different from related concepts like material deprivation and income poverty. Moreover, regression techniques reveal deprivation in social participation to reduce life satisfaction substantially, quantitatively similar to unemployment. Finally, the validity of the measure and the question of preference vs. deprivation are discussed.

Abbreviations

DSP	Deprivation in social participation
OECD	Organization of Economic Development
SOEP	Socio-Economic Panel

JEL-Codes: D63, I32

1 Introduction

Social participation has attracted scholarly attention for a long time and still figures prominently in many disciplines, like sociology, economics, or psychology. Moreover, it also matters in political and practical affairs. For instance, the Universal Declaration of Human Rights of the United Nations endorses the right to freely 'participate in the cultural life of the community' (Art. 27. I). The principal relevance of social connections and relatedness for human well-being is undisputed. Indeed, recent efforts to improve the measurement of human well-being unequivocally demand measurement of 'social connections' in one form or another (see, e.g., the reports of Atkinson et al. 2002, Stiglitz et al. 2009, OECD 2011). However, these surveys also document that there is little consensus on how to ideally measure achievements or deprivation in social participation, partly because of conceptual ambiguities. While the aforementioned reports all highlight the need for more research, they also agree that proxy-measures, like formal membership in associations and political processes, voter turn-out, or charitable giving are inappropriate indicators. Instead, social activities and meeting friends are frequently enumerated indicators. Additionally, a large array of further indicators is usually listed, which relate, however, to different concepts (which is freely admitted). These include social capital (trust and reciprocity), social support, social networks, the number of close friends, workplace engagement, or religious engagement. After all, social connections frequently serve as an umbrella term for phenomena and concepts, which still demand clarification and more rigorous research.

In addition to this, more difficulties arise on the empirical side. First, social participation is an abstract activity, which manifests in a plethora of concrete social activities. These concrete social activities, moreover, vary markedly—*inter alia* with time, culture, or age. In fact, social participation is an inherently relational concept, meaning that it refers to a specific society at a given point of time (e.g., Sen, 1983). To appropriately address these issues, conceptually and empirically, is essential for any exercise in measuring deprivation in social participation (DSP). Finally, Stiglitz et al. (2009) also note that aggregation is not trivial, which also applies to a rather narrow concept of social participation in the sense of social activities. Thus, despite its importance, a grounded approach to measure social

participation is still lacking, partly due to conceptual intricacies, partly due to empirical diversity, and partly due to methodological challenges. To close this gap is the aim of the present paper.

This paper uses the capability approach to guide the conceptualisation and measurement of deprivation in social participation.[1] According to the capability approach, human well-being is a constitutively multidimensional construct, where social participation is one among other so-called functionings (the doings and beings a person has reason to value, e.g., Sen 1985, 1992). The paper argues that adopting a capability perspective entails several implications that not only sharpen the contrast to related concepts like social capital but also facilitate operationalisation and measurement. Broadly speaking, the present paper proposes to rely on a wide set of specific social activities and to assert a deprivation if an individual is not performing any of these activities. Technically, a dual-cutoff counting approach is applied, which draws on dichotomised variables indicating whether or not a certain set of activities is performed, in combination with an intersection approach to aggregate across activities (Atkinson, 2003, Alkire and Foster, 2011).

The empirical part of this paper explores an implementation based on a dual-indicator approach using German data and, in particular, investigates the links to related concepts. The results show that income poverty, material deprivation, and deprivation in social participation to a large extent identify different people as deprived. Using standard fixed effects regression techniques to analyse potential determinants provides conclusive findings. Importantly, the results also document that deprivation in social participation is associated with a considerable loss in life satisfaction, indeed, quantitatively similar to unemployment (e.g., Clark and Oswald, 1994, Winkelmann and Winkelmann, 1998).[2] Overall the empirical analyses support the validity of the measures and encourage the construction of social indicators along the suggested lines.

---

[1]This paper follows Robeyns (2017, p. 29) in using 'capability approach' only for the general, open, and underspecified approach. In contrast the actual empirical exercise is one particular 'capability application' carried out within the capability approach.

[2]Previous research on social activities and life satisfaction either relies on cross-sectional data or only examines specific social activities, or both (Kahneman and Krueger, 2006, Winkelmann, 2009).

The suggested approach offers several advantages. First, the measure captures low achievements, i.e. outcomes. Consequently, the measure is sensitive to different mechanisms causing deprivation, like insufficient income, the denial of rights, stigmatisation, or any combination thereof (e.g., Mood and Jonsson, 2016, Kunze and Suppa, 2017).[3] The empirical findings also suggest responsiveness to policy interventions. Additionally, the conceptual integration entails implications for both operationalisation and measurement, which prove useful to guide empirical exercises. For instance, social activities and the relational nature of social participation are placed at the heart of both conceptualisation and measurement. In contrast, social activities often play only an ancillary role in previous work. The research following Townsend (1979), for instance, seeks to measure relative deprivation through the 'absence or inadequacy of those diets, amenities, standards, services and *activities which are common or customary in society*' [p. 915, emphasis added].[4] For research on social exclusion, Levitas (2006, p. 154) observes that the social aspects and consequences have so far received rather little attention.[5] More fundamentally, this literature is still plagued by severe difficulties in providing clear definitions—in particular with regard to closely related concepts like poverty (e.g., Room, 1999, Levitas, 2006).[6] Unlike, these lines of research which extensively rely on information from the resource space, i.e. goods, services, or income, the present approach seeks (i) to shift identification of deprivation into the functioning space, and (ii) confines the measurement to one specific functioning.

Another advantage follows from borrowing methods from axiomatic research on multi-dimensional poverty measurement as it facilitates the understanding of the measure's be-

---

[3]Accordingly, the present approach also goes beyond a purely right-based or purely skill-based approach.

[4]On this line of research, see in particular Mack and Lansley (1985), Gordon and Pantazis (1997), but also the more recent work on material deprivation (e.g., Nolan and Whelan, 2010, Whelan and Maître, 2010).

[5]Measurement exercises in social exclusion usually distinguish four dimensions: exclusion from the labour market, from public or private service provision, from consumption, and from 'social interactions' in one form or another. Empirical applications include Burchardt (2000), Burchardt et al. (2002) but also Gordon et al. (2000). Social relations are measured at times by social activities, the extent of social support (practical or emotional), and the number of friends. Membership in civic organisations has also been suggested (e.g., Robinson and Oppenheim, 1998).

[6]On the value-added of the research on social exclusion see, e.g., Atkinson (1998), Room (1999), Sen (2000).

haviour and, moreover, allows to select methods which actually have been designed to work with ordinal indicator information (e.g., Alkire and Foster, 2011, Bossert et al., 2013). In return, the present paper introduces a new concept into this line of research, which does require multidimensional measurement techniques, but conceptually demands a large number of complementary indicators combined with an intersection approach. In contrast, Dotter and Klasen (2014) recommend for poverty measurement to adopt a union-approach in combination with only a few selected indicators. Furthermore, a concern figuring prominently in research on poverty and deprivation is the question whether low achievements are actually caused by preferences rather than constraints (e.g., Mack and Lansley, 1985, Piachaud, 1987, Sen, 1992, McKay, 2004). However, both the design of the proposed measure and the presented empirical evidence support an interpretation as deprivation.

Finally, having well-defined measures for social participation and its deprivation is important for several reasons. First, it allows promising research into links to related concepts like social networks or social capital—links in which economists have recently become more interested (e.g., Bauernschuster et al., 2014, Satyanath et al., 2017). Indeed, a main criticism levelled against research on social capital is that distinct concepts are mixed (e.g., Portes, 1998, Durlauf, 2002). The present paper locates social participation outside of, but in relation to, social capital. Second, previous studies in applied research on multidimensional poverty in fact identified social connectedness as a missing dimension (e.g., Alkire, 2007, Zavaleta, 2007). The present paper adds novel and grounded indicators to this line of research. The relation to relevant concepts like social networks, social capital, or social isolation is briefly discussed.

Moreover, operationalizing deprivation in social participation is also important for research on the capability approach. Indeed, the entire approach as such has been criticised for providing too few measurable functionings (let alone capabilities) to be useful at all (e.g., Comim, 2008). Additionally, the present paper seizes on the social contingency and relational nature of social participation, i.e. on what Sen (2002b, p. 85) calls 'socially dependent individual capabilities'. Therefore, the present paper also paves the way for an empirical analysis, of what, e.g., Evans (2002), Ibrahim (2006) called 'collective capabili-

ties', i.e. capabilities that can only be reached through collective actions. See, however, also Robeyns (2017) on this. Finally, an accurate and sound measure for deprivation in social participation is also much-needed for both policy purposes and well-being measurement, more generally. Unlike achievements in health or education, social participation is severely under-researched. In the absence of grounded deprivation indicators, previous studies only examined single activities or an average level of activity.

The remainder of this paper is structured as follows: section 2 introduces the conceptual underpinnings, section 3 outlines the operationalisation, section 4 presents the empirical results, whereas section 5 offers a discussion, and section 6 some concluding remarks.

2 Conceptual Considerations

2.1 Conceptual Integration of Social Participation

The capability approach posits that human well-being is constitutively multidimensional.[7] Dimensions are called functionings, meaning the doings and beings that a person has reason to value; for instance being well-nourished, being well-sheltered, being healthy, or being happy. One such functioning often enumerated is participating in social life. In addition to considering achievement in a single functioning, the capability approach also underlines the importance of the freedom to do so, which leads to the concept of an individual's capability: the set of all functionings the individual can actually choose from. Poverty is then conceived of as capability deprivation, implying not only severe shortfalls in achievements in one or several functionings but also that it was impossible to choose higher achievements, i.e. better achievements were not in the capability set in the first place. The capability approach claims that intrinsic importance can only be assigned to elements in the functioning space, i.e. functionings or capabilities. Howsoever important goods, income, and other resources are as a means to achieve functionings, they are of instrumental relevance only. More for-

---

[7]On the capability approach see in particular Sen (1980, 1985, 1992, 1999b), for introductions see Alkire (2009), Robeyns (2011).

mally, the resources-functionings link is often described as follows (e.g., Sen, 1985):[8]

$$b_i = f(x_i, z_i, z_s, z_e), \tag{1}$$

where x_i is a vector of goods and services (i.e. resources) that are transformed into functionings by a conversion function $f(\cdot)$, which is governed by conversion factors $z_\bullet$, which can vary with environment, society, and individual. For the present case it is instructive to focus on one coordinate of the functioning vector b_i, say general social participation, denoted as SP_i and, moreover, to explicitly introduce a vector of time-consuming activities a_i. An individual's social participation can then be described as

$$SP_i = f(x_i, a_i, z_i, z_s, z_e), \tag{2}$$

where a_i like x_i is a choice variable, subject to a time constraint (e.g., $\sum a_{ij} = 1$), and SP_i is non-decreasing in both arguments. While some activities in a_i are social, like visiting friends, others are not, like house production. The capability of an individual can then be written as the set of all actually available functioning vectors, given the amount of resources (where X_i is set of commodity vectors the individual is entitled to):

$$Q_i = \{b_i \mid b_i = f(x_i, a_i, z_i, z_s, z_e) \quad \forall x_i \in X_i, \quad \forall a_i \in A_{ct}\}. \tag{3}$$

Customary social activities always refer to a specific community c at time t, i.e. $a_i \in A_{ct}$, which clearly exposes the relational nature of social participation. Since an individual can achieve social participation through often quite diverse, concrete social activities, it seems appropriate to view these social activities in a_i as substitutes, i.e. alternative ways to achieve SP_i. For the present purpose social participation, a valued doing, is best conceived of as an abstract activity that is performed in an immediate social context in which individuals relate and connect to each other and share an experience.[9] Consequently, deprivation in social

---

[8]For a concise presentation the so-called characteristics function is dropped.

[9]Depending on the concrete research questions, finer distinctions may be appropriate. For instance, one may wish to examine social participation from a class perspective or, like the operationalisation in section 3, use

participation is then also located in the functioning space and established if an individual achieves less than a normatively set, critical threshold, $\underline{SP}$:

$$DSP_i = \mathbb{1}[SP_i < \underline{SP}]. \tag{4}$$

Observing an individual achieving $\boldsymbol{b}_i^* \in B \equiv \{\boldsymbol{b}_i \,|\, SP_i \geqslant \underline{SP}\}$ is sufficient to declare her as non-deprived. Capability deprivation with respect to social participation, however, not only requires $SP_i^* < \underline{SP}$, but in fact $\boldsymbol{b}_i^* \in S \equiv \{Q_i \cap B = \varnothing\}$, meaning that no functioning vector with an undeprived level of social participation was feasible. This requirement rules out low achievements due to preference (e.g., for religious beliefs). While empirically challenging, a thorough implementation of this condition is in practice often not necessary, see 5.2.

2.2 Selected Features and Implications

While the capability approach does entail several implications, it does not provide definite instructions for every single exercise. One reason is that the capability approach (in its general version) is 'open-ended', i.e. allows very different exercises to be carried out within its framework (e.g., measuring poverty or theorising justice), see Robeyns (2017, p. 29). Moreover, the capability approach is 'underspecified' (e.g., Robeyns, 2006, 2017) in that it not only allows, but in fact requires additional elements before becoming effective, which are often provided by the particular research question or the country-specific context (e.g., choosing the dimensions, see, e.g, Alkire 2008). Thus further considerations are gradually added, in particular in sections 2.3 and 3.

Defining social participation within a capability framework entails several features and implications central for the present study.[10] First, functionings and capabilities are of *intrinsic* relevance, i.e. objects of valuation (e.g., Sen, 1992, p. 43) whereas resources (including means and income) are not. Moreover, deprivation in social participation is located in the

---

two separate indicators to offer more nuanced insights.

[10]See also Klasen (2001) who enumerates similar aspects to be relevant for analysing the role of education in the social exclusion of children, which is, however, an entirely different exercise.

functioning space, too. Importantly, the intrinsic relevance of functionings does not preclude instrumental relevance for other achievements (e.g., Sen, 1999b, ch. 2). Social participation may, for instance, be helpful for other outcomes, like finding a good job. Additionally, since functionings are of intrinsic relevance for human well-being, they do not require additional justification. Consequently, if an individual is believed to be deprived in social participation, this is already reason enough for public policy to be concerned with this low achievement. In particular, there is no need to adduce an associated low income or low life satisfaction, even though this may provide valuable insights as to *why* someone is deprived in social participation.

Second, the dichotomy between concrete forms of social activities and the more abstract human functioning of social participation proves useful in several respects. Evidently, concrete forms of social activities vary substantially across time and among cultures, but also within societies, e.g, with socio-demographic characteristics. As highlighted by equation (2), different behavioural patterns and customs may however result in similar levels of social participation. Thus, the present conceptualisation allows for heterogeneity in the specific forms, or means of social participation, while emphasising the more abstract activity of social participation to be the same. Moreover, this dichotomy clearly exposes the relational nature of social participation, i.e. its contingency upon community and time—a key challenge for cross-country comparisons. For instance, since social activities vary with countries and activities vary in price, a relatively low income can translate into (absolute) deprivation in social participation in one country if most social activities there are costly, but it does not necessarily do so in others (e.g., Sen, 1983).

Third, functionings are outcome variables, i.e. realised achievements.[11] Therefore, shortfalls may be caused by very diverse mechanisms. Low income is one explanation, particularly important in countries where most social activities are organised through markets. In fact, Mood and Jonsson (2016) present some evidence in support of this channel. However, equation (2) allows for other mechanisms as well, which may operate through

---

[11]For the contrast of achievement, the freedom to achieve, and means to achievement see, e.g., Sen (1992, ch. 2).

a conversion factor or through a further constrained individual activity set.[12] Both ways effectively prevent individuals from achieving higher social participation—irrespective of their resources, e.g., due to racist or sexist legal or social norms. Likewise, the accessibility of public places and facilities can fairly direct affect the achievement in social participation, e.g., of wheelchair users. Social norms may, however, also operate in more subtle or unconscious ways, e.g., through stigmatisation, which may induce behavioural responses (e.g., Kunze and Suppa, 2017).[13] An outcome-based measurement allows these mechanisms to be more carefully investigated.

Given the initial reference to the right to participate in social life, one may wonder how capability and rights-based perspectives differ from each other (see, e.g., Sen 2004, 2005 for more details). First of all, a rights-based perspective is consistent with the present approach to the extent it is only concerned with the right to participate in social life. However, a rights-based approach does not *imply* the focus on the functioning space, rather it could equally well emphasise the right to access the means necessary for social participation. Consequently, severe failures to achieve social participation may go undetected if the rights to access the means are not violated, but actual achievements are prevented through other mechanisms (e.g., discriminatory practices or bad health). Conversely, while the capability concept is well-prepared to reflect the opportunity aspect of freedom, a rights-based approach, allows to highlight the process aspect of freedom as well (see, e.g., Sen 1993, 2002a for this distinction). As Sen (2005, p. 163) put it "the two concepts—human rights and capabilities—go well with each other, so long as we do not try to subsume either entirely within the other."

---

[12]Formally, one could state $a_i \in A_{ict} \subseteq A_{ct}$.

[13]Specifically, Kunze and Suppa (2017) find that the unemployed reduce their public social activities less if the local unemployment rate is high and hence the norm to work rather weak. This evidence indeed suggests stigmatisation to cause behavioural responses.

2.3 Aggregation

In the present case, three types of aggregation can be distinguished, which are briefly addressed in sequence. First, there is no categorical answer to how many deprivation indicators should be used. Naturally, this depends on the concrete research question or measurement exercise. While a stronger aggregation into say one deprivation indicator condenses information, it may also prevent a more nuanced picture of deprivation. If the objective is to document more complex phenomena, a dual- or multi-indicator approach is advisable. In fact, a prominent issue in the social exclusion literature is the question of whether social exclusion refers to individuals or to entire neighbourhoods and communities (e.g., Barnes, 2002, Lupton and Power, 2002). Even though these studies address local service provision, this question also points to an important phenomenon of social participation in poor or deprived neighbourhoods (like 'ghettos' or 'banlieus'). While their residents may not participate in customary activities of the wider society under consideration, they may well participate in local social activities and share experiences with friends, enjoy meeting with peers, and provide and receive social support. The empirical part of this paper illustrates a dual-indicator approach: while one indicator captures activities with friends, peers, and family, another indicator captures participation in the most common activities of the society. Alternatively, using two dedicated indicators could also be argued to capture different qualities of social participation.

A second question is how to aggregate across concrete social activities to identify individuals deprived in social participation, which essentially corresponds to the identification step in poverty and deprivation analysis (Sen, 1976). As outlined in section 2.1, DSP is located in the functioning space and concrete social activities serve as substitutes to avoid such a deprivation. This paper adopts a conservative approach in setting the deprivation cutoff $\underline{SP}$ and requires an individual not to perform *any* of the concrete social activities. Intuitively, this indicator for DSP seeks to ensure that social participation is not achieved through any of an ideally wide range of concrete social activities. Indeed, axiomatic research on measuring multidimensional poverty offers a well-known framework for addressing such problems. One procedure is to apply a so-called intersection-approach (Atkinson, 2003) to binary vari-

ables indicating whether or not a specific activity is performed, which is in fact a special case of the dual-cutoff counting approach (Alkire and Foster, 2011). More formally, a social activity j is considered to be performed if more than a critical amount of time, $\underline{a}_j$, is spent on it.[14] An overall social activity count can then be expressed as $ac_i = \sum \mathbb{1}(a_{ij} > \underline{a}_j)$, whereas deprivation in social participation is asserted if none of the social activities are carried out, i.e.

$$DSP_i = \mathbb{1}\big[0 = \sum \mathbb{1}(a_{ij} > \underline{a}_j)\big]. \tag{5}$$

Note that adopting an intersection approach does not require to specify particular weighting scheme (beyond the indicator selection) and in fact, even the summation in equation (5) is not necessary, see appendix A for more details. Moreover, this approach allows numerous refinements and modifications, whose exploration is however beyond the scope of this paper. In fact, the most suitable method may vary with the exact goal of the exercise (e.g., devising one comprehensive or a small set of complementary social indicators, studying deprivation in social participation alone or in the context of multidimensional poverty, etc.) and the data available.[15]

A third question is how to aggregate across individuals, which again depends on the purpose of the concrete exercise. When needed, the empirical illustration adopts a simple headcount ratio for expositional convenience, not as an implication of the capability approach. Indeed, the *share* of people who meet their friends or relatives less than monthly is already considered as a core indicator of the German reports on poverty and wealth (e.g.,

---

[14]Activity-specific cutoffs provide a degree of freedom in their specification to account for potentially different qualities or types of activities and to allow the inclusion of ordinal data. Note that in contrast to the literature on multidimensional poverty measurement, non-activity indicators do not immediately signal deprivation, which is why the $\underline{a}_j$ do not represent *deprivation* cutoffs. More generally, because concrete activities are substitutes for achievements in social participation, indicators of non-activity are highly complementary for asserting deprivation in social participation.

[15]Modifications may include different activity cutoffs $\underline{a}_j$ or overall activity count cutoffs (which is implicitly assumed $\underline{ac}_i = 0$ in equation 5). Refined methods could also explicitly exploit the quasi-count data nature of the social activities. Moreover, having detailed time-use survey data would permit entirely different methods, e.g., an aggregate achievement approach (Maasoumi and Lugo, 2008).

[Bundesregierung](), [2013](), p. 476). Note that being a member of the Alkire-Foster class of measures, the proposed measure satisfies the same axioms, see appendix A for more details.

2.4 Related Concepts

Section 2.1 suggests to understand social participation as an abstract activity that is performed in an immediate social context. This section briefly sketches how social participation connects with related concepts. These explanations are meant to be suggestive not definitive, as establishing the precise relationship goes well beyond the scope of this paper. The important aspect here is however that, by their nature, fundamentally distinct concepts are involved—and there is good reason to keep them separate, both conceptually and empirically. Only then an accurate operationalisation of the respective concepts can be made that finally allows a careful empirical analysis.

Social networks connect individuals and have been studied from different perspectives (e.g., [Ioannides and Loury](), [2004](), [Jackson](), [2011](), [Wrzus et al.](), [2013]()). Social participation may alter both the size and quality of social networks, whereas social networks, in turn, may shape the scope for social participation. While social networks as such escape any reasonable normative assessment, they provide the basis for other important concepts. While the different benefits from social networks were found to play an important role for the poor across the globe ([Narayan et al.](), [2000]()), research in this field is still plagued by severe conceptual vagueness and overlap.

It can, for instance, be argued that *affiliation*, which provides a sense of belonging and identity is an important functioning as well. Indeed, [Nussbaum]() ([2001]()) considers affiliation as one out of ten key functionings. However, she also subsumes various forms of social interactions, the social basis of self-respect, and non-humiliation under this umbrella. Clearly affiliation is closely related to social participation: socializing may result in important shared experiences and ultimately create a sense of belonging and affiliation, but not necessarily so.[16] Conversely, affiliation may continue to live on even if concrete social participation

---

[16]It is well known that affiliation (or group identity) does not require previous direct social contact and is in

with peers or family came to an end, e.g., due to migration. While social participation was previously described as an activity, affiliation is probably best conceived of as a state or condition, for which an individual's social network is a key factor. Whether and how exactly affiliation is relevant for a specific analysis depends on the specific research question at hand. A promising approach, e.g., for multidimensional poverty measurement, might be to complement indicators of deprivation in social participation with separate deprived-of-affiliation indicators. Being deprived in both aspects may then be understood as *social isolation*. Indeed, Zavaleta et al. (2017) suggest frequencies of social contact (among other items) to measure social isolation.

A similar argument can be made for *social support*, which is often partitioned into emotional and practical support. Its importance is emphasised in the social exclusion literature (Gordon et al., 2000), and the OECD (2011) suggests related indicators to measure social connections. While social support may represent a benefit arising from social relations, it may however also be viewed (i) to reflect affiliation or (ii) to contain aspects that actually refer to other functionings.[17] Specifically, economic and social security matter in and of themselves for human well-being (Wolff and de-Shalit, 2007, Stiglitz et al., 2009), and social support may provide services that could alternatively also be obtained through, e.g., insurance markets.

Social capital is another prominent concept that received lots of academic and public attention. Seminal sociological works have emphasised the thoroughgoing instrumental nature of social capital as a resource and its utilisation by individual members of a group (Bourdieu, 1986). Subsequently, social capital was extended to be a feature of communities, in particular by political scientists (Putnam, 1995), but also by economists (e.g., Knack and Keefer, 1997). For the present analysis it seems sufficient to conceive of social capital as stock, which resides in the totality of the individual social networks. Social participation, by contrast, can then also be thought of as an investment activity that helps to build social

---

fact choice-relevant; see, e.g., Tajfel and Turner (1979) or, more recently, Chen and Li (2009).

[17]Moreover, social support is a 'two-way street' since resource claims, expectation of support, and social norms may also complicate the way out of poverty (Narayan et al., 2000, pp. 55–57), see also Portes (1998, p. 16).

capital (Glaeser et al., 2002). Note however that the view presented in this paper challenges the approach of measuring human well-being using social capital indicators, e.g., using the 'trust' or 'fairness' questions, as suggested in Stiglitz et al. (2009), OECD (2011). Neither does social capital reflect social particpation in any direct way, nor is the intrinsic relevance of social capital obvious. Instead, most of the benefits arising from social capital seem to be of instrumental importance for other economic outcomes (e.g., lower crime rates or finding a job). More importantly, social capital is not an unambiguously desirable outcome, as already pointed out by Portes (1998) and more recently demonstrated by Satyanath et al. (2017).

3 Operationalisation

3.1 Data and Social Activities

This paper uses data from the German Socio-Economic Panel (SOEP) to illustrate an operationalisation of deprivation in social participation. The SOEP is a high-quality panel data set, which started in 1984 and provides detailed information on different domains of life.[18] The empirical analysis is based on respondents aged 18–75.

Social participation is understood as an abstract activity which can manifest itself in many different forms. First, note that this rules out related, but conceptually different indicators, including items on material deprivation or social support. Instead, the present paper suggests to mount the operationalisation on a comprehensive set of common activities and the frequency with which they are performed. Table 1 contains the social activities used for the present study along with the exact wording of the questions. Responses to these questions are usually recorded on 4-point scale (weekly, monthly, less than monthly, never). These items as such are not new and, in fact, are well established. They have been collected in the SOEP since the mid-1980s (though with some modifications over time), but are also included in many other surveys (e.g., PSE, HILDA). Moreover, recommendations about how to measure social connections frequently include direct indicators like these (Stiglitz et al.,

---

[18]The present paper uses the SOEP v32.1 (DOI:10.5684/soep.v32.1); for more details see Wagner et al. (2007).

[2009](#)). Figure [B.1](#) in the appendix shows the frequency distributions of the single social activities.

[Insert table 1 about here.]

One question that is not easy to answer is to what extent the sum of these activities actually covers all the social activities of the respondents (unless a more comprehensive time-use survey is also available). For the present analysis, it is of particular importance whether some common social activity is not covered at all. What can be said, however, is that in 2011, for instance, 68% of the respondents do at least one activity on a weekly basis, whereas around 88% do, at minimum, one activity either on a weekly or on a monthly basis (data not shown). While this evidence, of course, does not preclude further improvements in coverage, it does suggest that many important activities are already covered.

3.2 Deprivation Indicators

The present operationalisation relies on two separate deprivation indicators in order to allow more complex social deprivation patterns to be reflected as well. The first indicator is meant to capture deprivation from more intimate or private forms of social participation, which are often particularly faithful and sincere, and are frequently also characterised by high mutual expectations. This first indicator of deprivation in social participation, denoted $DSP1$, draws on (i) how often a person meets with friends, relatives, or neighbours, and (ii) how often a person helps out friends, relatives, or neighbours. $DSP1$ indicates an individual is deprived if both activities are performed, at most, 'less often.' This threshold for non-performance follows the German reports on poverty and wealth ([Bundesregierung](#), [2013](#), p. 476), where the share of people who meet their friends or relatives less than monthly serves as a core indicator of poverty. In terms of substance one can, moreover, argue that sustained intimate relations require at least monthly updates and, indeed, empirically *socialise* is the only activity with a left-skewed distribution and a mode of 'weekly', see figure [B.1](#). Finally, alternative plausible cutoffs for distinguishing performance and non-performance of an activity do not affect the results substantially, see table [B.1](#), [B.2](#).

In contrast, the second indicator seeks to reveal non-participation in the wider public, of-

17

ten also taking place with rather casual acquaintances and in the customary social activities of the society. While activities in this group may well generate a sense of belonging through shared experience, they often remain interpersonally shallow and non-binding. Ideally, this second deprivation in social participation indicator, $DSP2$, would rely on all remaining activities enumerated in Table 1. However, for two activities, sports and arts, it is not entirely clear to what extent they are actually performed in a social context, because, e.g., solo activities like jogging are also quite common. Therefore, the subsequent analysis employs two variants of the second deprivation indicator, one without sports and arts activities ($DSP2A$) and one including both activities ($DSP2B$). Both $DSP2$ indicators signal a deprivation if all included activities are 'never' performed. Technically, this threshold is a lower bound and is therefore the least contestable. Robustness checks in table B.1, B.2, moreover, indicate similar findings for the threshold 'less often.' Since the social activity questions are not asked on a yearly basis and, moreover, not all questions are always asked simultaneously, the indicators can only be calculated for selected years.[19]

It is important to note that setting a deprivation cutoff like 'never participating in any activity' is a *normative decision*, which is inevitably part of the analysis of poverty and deprivation. The capability approach is distinctly aware of this issue and requires such normative decisions be clearly exposed (e.g., Sen, 1999b, p. 75). Moreover, public debate should contribute to a decision like this as well, and it certainly is not the scientist on his or her own who needs only to apply the 'right' method. That said, a natural starting point to set a deprivation cutoff is, e.g., the most conservative approach, which requires all activities to be performed 'never.' The final cutoff may however not only be modified through public debate (e.g., Sen 1999b, ch. 6 or Sen 1999a), but also depends on the concrete exercise at hand (e.g., a long-run comparison over time, a cross-country comparison, or a multidimensional poverty analysis). As usual with potentially critical decisions in empirical analysis, the robustness of key results should be routinely checked.

The subsequent section compares deprivation in social participation measures with in-

---

[19]More specifically, $DSP1$ and $DSP2A$ can be compiled for 1992, 1994, 1996, 1997, 1999, 2001, 2005, 2007, 2009, 2011, and 2015. Instead, $DSP2B$ can only be calculated from 2001 onwards.

come poverty and material deprivation. The income poverty measure is based on the monthly net household income and is adjusted using the modified OECD-equivalence scale, and deflated using a consumer price index with 2011 being the base year.[20] The poverty line is set using the official threshold, i.e. 60% of the median income. Additionally, a material deprivation index is compiled, whose items are however only occasionally collected in the SOEP.[21] Moreover, the material deprivation index adopts the concept of 'enforced lack' (Mack and Lansley, 1985), i.e. a deprivation is only assigned if non-consumption of an item is reported to be for 'financial reasons.' Technically, a dual-cutoff counting approach (Alkire and Foster, 2011) with equal weights is adopted. By no means is this the only way to compile such an index, but it comprises important special cases and is a well-documented and understood method. For $k \in [26, 54]$ (which represent percentages of the maximum possible deprivations) interesting and useful headcount ratios emerge, as DSP and poverty rates then are of similar magnitude, which facilitates the concurrence analysis (see also B.2 of the appendix).

[Insert figure 1 about here.]

Finally, Figure 1 provides a first idea on incidences of the different poverty and deprivation measures. A first observation is that deprivation in more private or intimate activities, according to $DSP1$, is with 5% less widespread than deprivation in more public and common activities, whether measured using $DSP2A$ (11%) or $DSP2B$ (8%).[22] The official income

---

[20]The analysis uses the generated variables provided by the SOEP group, which entail some data cleaning and consistency checks.

[21]Specifically, the index draws on the following questions: the household has a colour television; the household has a telephone; the household has internet access; the household has a car; the flat is located in a building that is in good condition; the building is located in a good neighbourhood; I have put some money aside for emergencies; I take a vacation away from home for at least one week every year; I invite friends over for dinner at least once a month; I eat a hot meal with meat, fish, or poultry at least every other day; furniture that is worn out but can still be used is replaced by new furniture. The index is calculated for 2005, 2007, and 2011, where all the previous items are collected simultaneously.

[22]To observe a higher headcount ratio for the deprivation measure that does not include sports and arts ($DSP2A$) is not surprising since $DSP2B$ is more demanding in the sense that it additionally requires that there is never participation in arts and sports.

poverty measure, which uses 60% of median income as the cutoff implies a poverty rate of almost 15%, whereas applying stricter cutoffs, i.e. 50% or 40% sharply reduces the headcount ratio to 8% and to 3%. Likewise the material deprivation index finds almost 14% are deprived at a cutoff of 27% of all possible deprivations, which also decreases substantially for stricter cutoffs ($k = 36, 45$) to 9% and 4.5% respectively.

4 Empirical Performance

4.1 Descriptive Analyses

Table 2 contains socio-economic characteristics by deprivation status for all DSP-indicator variables. Two observations are salient: First, each socio-economic variable relates in the same way to each DSP indicator. Unemployed persons, for instance, are excessively represented in each deprivation indicator. These differences are, for most variables, more pronounced in terms of $DSP2$-indicators than in terms of $DSP1$ indicators, suggesting the more intimate and private social activities to be less subject to socio-economic factors. Importantly, this finding also holds for income, income poverty, and the (uncensored) material deprivation count. Average equivalence income, for instance, is approximately one third lower for $DSP2$-deprived individuals.

A second important observation is that the age-group dummies suggest a life-cycle pattern, as deprivation in social participation is more common among older persons. Specifically, individuals aged 45 and below are less frequently deprived, whereas individuals aged 46 and above are more frequently deprived. In fact, the difference in the population shares between deprived and non-deprived increases with age (irrespective of the deprivation indicator). Naturally, conclusions based on a descriptive analysis like this must be treated with caution, since confounding factors may well drive some of the findings.

[Insert table 2 about here.]

4.2 Concurrence Analyses of Deprivations

An instructive exercise for analysing deprivation indicators is to examine to what extent the different measures agree on the individuals deemed deprived. Table 3(a) shows estimates of the population shares for the three social deprivation indices and for income poverty with different cutoffs, namely 40, 50, and 60% of the net household equivalent income. Essentially, Table 3 is a numerical representation of Venn diagrams in which one parameter (the poverty cutoff) is varied. Table 3(a) reveals a remarkably large population share to be only income poor and the overlap with social deprivation to be rather small. Specifically, around 11% of the population are income poor (at the 60% cutoff) but not deprived according to the activity index. In contrast, the population share that is income poor and deprived according to the $DSP2$-indicators is only 2.9–3.4% and according to the $DSP1$-indicator less than 1.3%. Moreover, applying a stricter income-poverty cutoff may give reason to expect a higher concurrence. However, Table 3 reveals that while shares for income-only poor and both poor and deprived decrease with a stricter cutoff, the previous result does not change substantially. In fact, the share of individuals who are both income poor and deprived in social participation relative to all income poor remains a fairly constant 20–24% (for the $DSP1$ indicator this share is around 9–10%).

Table 3(b) performs the same exercise for the material deprivation index. The observed pattern turns out to be quite similar, since most materially deprived persons are not deprived in social participation (at least 66%), i.e. at most a third of materially deprived persons are also deprived in social participation. This finding holds independently of the chosen poverty cutoff for both DSP indicators and is even more pronounced for the $DPS2$ indicators. Conversely, there is also a significant share of the population who are only deprived in social participation: 3–8% depending on measure and cutoff.

[Insert table 3 about here.]

Table 4 turns to the overlap of the DSP indicators and reveals that the more complex situation of not participating in customary activities, but spending time with friends or neighbours seems in fact to be quite common. Specifically, 74.6% ($=\frac{0.0595}{0.0595+0.0203}$) of those persons who are deprived according to the $DSP2B$ indicator are not deprived of more private and

intimate relations ($DSP1$). In absolute terms 5.95% of the population are deprived of the common social life but not of social relations in general, and about 2% report alarmingly low social participation as they are deprived according to both DSP indicators. On the other hand, around about 60% who are deprived in $DSP1$ are not deprived according to $DSP2B$. Note that qualitatively similar results emerge, when using alternative thresholds for non-performance of an activity (see table B.1).

[Insert table 4 about here.]

In sum, the previously presented evidence suggests, first, that in some cases low income and material deprivation seem to translate into DSP, but also that other mechanisms seem to result in DSP—beyond a lack of resources. Accordingly, DSP measures that exclusively rely on resources would only identify a subset of DSP. Moreover, DSP is not only conceptually but also empirically distinct from income poverty and material deprivation: the large extent to which different people are identified as deprived supports this conclusion. Finally, the overlap of DSP indicators shows that both indicators capture related—but distinct and non-redundant—aspects of social participation.

4.3 Regression Analyses

Using conventional regressions techniques, this section explores determinants of social activities and deprivation in social participation, as well as the the link between deprivation in social participation indicators and life satisfaction. Results are best viewed as conditional correlations, rather than causal effects, which are sufficient for assessing the validity of the proposed measures. All models are estimated using linear fixed effects and include control variables for regions and years, as well as a constant. Tables 5 and 6 contain the results for single activities and the deprivation indicators. In general, results are in line with intuition, but some findings are of particular interest.

First, income, modelled as log-income to allow for a decreasing marginal effect, affects most activities as expected. Specifically, income increases the activities labelled 'cinema', 'culture', 'socialise', and 'sports', but not 'attending church', 'volunteer work', or 'helping out friends and neighbours'. These single effects of income also converge into a significantly

lower chance of being deprived in social participation. Unlike income, unemployment increases some activities, but decreases others, whereas there is clear-cut influence on either deprivation indicator.[23]

The presence of children decreases almost all activities, except volunteer activities and attending church, which are expanded. Together, these effects tend to result in deprivation in $DSP1$ and $DSP2$. Offsetting effects in different activities may drive the latter finding too, which then again may simply reflect changing behavioural patterns due to changed life conditions. Finally, comparing the broader pattern of $DSP1$ and $DSP2$ reveals the life-cycle pattern observed earlier for the $DSP2$ indicators is largely replaced by a stronger dependence on socio-economic factors. Public participation activities, therefore, seem to be driven more by socio-economic characteristics and events (children, employment, or health), whereas engaging in intimate social relations seem to follow a more genuine life-cycle pattern.

[Insert table 5 about here.]

[Insert table 6 about here.]

By now, overall life satisfaction is a widely accepted measure of subjective well-being. Since social participation is a valued functioning, deprivation in social participation is expected to reduce life satisfaction sharply. Note that for higher levels of participation one may expect smaller or even negative effects on life satisfaction. Since deprivation indicators by nature focus on critically low achievements, increases should however unambiguously increase life satisfaction. To this end a conventional linear life satisfaction model is estimated, which controls for fixed effects and the usual socio-economic variables. Table 7 contains the results. First, as expected, both DSP indicators reduce life satisfaction significantly. Moreover, the $DSP1$ indicator seems to have the more detrimental effect (the $DSP2$ coefficients amount to approximately 70% of the $DSP1$ coefficients). Second, the combined effect of DSP indicators results in psychological distress similar to that of unemployment, thereby documenting their economic significance. Third, the effects associated with the DSP indicators hardly vary after adding important potentially related control variables such as income

---

[23]This may result from (i) offsetting effects of single activities, (ii) the focus on particularly low activity levels in combination leaving little variation for the estimation, (iii) an endogeneity bias, or a combination thereof.

and employment status. While a more careful analysis of the causal impact is left for future research, this finding already suggests the effect of the *DSP* indicators to be rather independent from income and unemployment, which is also supported by the concurrence analysis in the case of income poverty. Finally, robustness checks with alternative cutoffs for non-performance suggest qualitatively similar findings, see table B.2 and quantitatively coefficients change in the expected direction, e.g., restricting the *DSP*1 indicator to 'never' meeting one's friends reduces life satisfaction even stronger.

[Insert table 7 about here.]

5 Discussion

5.1 Validity of Indicators

Evaluating the validity of a measure looks into whether the proposed measure accurately reflects what it is supposed to.[24] A vital precondition is a sufficiently definite construct to be measured. DSP seeks to identify critically low levels in *social participation* and is established if an individual is observed not to participate in any of the enumerated concrete social activities (see section 2). Indeed, the construct's elements (i.e. social activities) contrast with both non-social activities (like house production) and other aspects related to social networks (e.g., a sense of belonging). Additionally, the construct of DSP itself is also clearly distinguished from, and yet related to, income poverty and material deprivation (both of which are located in the resource space). Finally, DSP is a relational concept in the sense that it refers to the society an individual is actually living in.

First one may ask whether all aspects of the theoretical construct are captured (sometimes called 'content validity'). In this respect, the validity of the suggested measures crucially hinges upon whether all social activities relevant for the society under study are really captured. Only then can simultaneous non-participation in all activities be confidently interpreted as DSP. If, however, important activities were disregarded, the indicators would

---

[24]The concept of a measure's validity, as used in this paper, can be traced back to research in psychology (e.g., Cronbach and Meehl, 1955, Campbell and Fiske, 1959).

systematically overlook a customary way to achieve social participation and therefore erroneously report deprivation. As noted above, about 88% of the individuals participated in at least one of the activities at least monthly, which is already indicative of considerable coverage. However, complementary research may deliberately assess social participation patterns and suggest refinements in terms of the most common activities.

A second question is whether the measures under study empirically relate to adjacent concepts as theoretically expected (sometimes called 'construct validity'). In this regard, the concurrence analysis demonstrates that DSP is neither equal to income poverty nor to material deprivation ('discriminant validity'), which is backed by the conceptual considerations. Nonetheless these concepts are, however, also theoretically related as income and goods or services are often important means for achieving social participation. As theoretically expected, the regression analyses find low income and material deprivation to be positively associated with DSP. Hence the conditional correlations from regression analyses lend further support to this nexus. Moreover, life-cycle patterns of social participation prove consistent with previous research on life-cycle pattern of social networks. Importantly, as theoretically expected, DSP also results in a significant loss of life satisfaction, which can be interpreted as predictive or concurrent validity.

Finally, note that both indicators aim to measure complementary aspects of DSP, namely private and intimate versus wider public participation. This feature is also supported by the results, as the $DSP2$ indicator seems to be systematically more closely tied to socio-economic factors and life-course developments. Additionally, the concurrence analysis also points to distinct and non-redundant aspects of social participation that are captured. In sum, the previous considerations justify confidence in the validity of the proposed measures.

5.2 Preference or Deprivation?

A notorious intricacy in the measurement of poverty and deprivation is that an observed outcome, even though adverse, could also represent a preference and not a severe deprivation. A similar objection can also be raised for single social activities like, e.g., frequently attend-

ing the opera or the theatre.[25] In view of this concern, the suggested approach widens the informational basis of deprivation assessment (as ideally all customary activities are considered), and, in fact, allows different preferences for means to achieve social participation (as concrete social activities are considered to be substitutes). Effectively, the present approach seeks to lift the identification of deprivation from the resource space into the functioning space, where, according to the capability approach, normative assessments can take place.[26]

While the principle concern about freely chosen low achievements does not vanish, it seems however less detrimental to deprivation measurement. Choosing specific activities (say going to the opera versus going to the stadium) certainly is subject to preferences. Achieving the functioning itself is less so, as it is an object of valuation—an end in itself and not the specific means to achieve it. Valuation is best viewed as a reflective activity that may go well beyond the current circumstances. This means that not choosing a certain functioning does not imply its non-valuation, since choice, like desire, involves "considerations of 'feasibility' and of 'practical possibility'" (e.g., Sen, 1985, p. 15). Importantly, there is a large body of empirical evidence suggesting that across the world essentially the same functionings are valued (see, e.g., the overview in Alkire, 2008). Moreover, the capability approach does indeed entail a universal claim regarding the valuation of functionings and capabilities (e.g., for the freedom aspect of the capability see Sen, 1999b, pp.244–246).

Indeed, some empirical applications of deprivation indicators work convincingly well without relying on any counterfactual information (i.e. the availability of a non-chosen functioning vector). The application of malnutrition indicators illustrates this point very clearly: its force rests partly on the fact that most people do value being well-nourished

---

[25]To distinguish preference and deprivation in the "consensual approach" to poverty, Mack and Lansley (1985) propose relying on the so-called 'enforced lack' question; for critiques see, e.g., Piachaud (1987), McKay (2004). See, e.g., Burchardt and LeGrand (2002) for a related approach. Moreover, e.g., Platt (2009) found that individuals do indeed have different patterns of social participation.

[26]The degree to which this is successful essentially hinges upon the validity of the measurement; in particular whether all relevant activities are covered. In fact, since the activities are given empirically, it can be seen as the task of the researcher to process this information and reformulate it in the functioning space in such a way that, in the course of a public debate, a normative assessment can be reached.

and therefore seek to achieve it, and partly on the cogency of the deprivation cutoff. Even though, strictly speaking, discriminating between a fasting and starving person (assuming similar nutritional achievements) requires knowledge about the different underlying capability sets (see section 2.1). Likewise, falling short of a 'good' or 'decent' level of social participation is one thing, falling short of any is another. Thus lifting the identification of deprivation in social participation from the resource space into the functioning space, when complemented by a cogent deprivation cutoff, seems to attenuate the 'preference concern' for low social participation. Additionally, the presented life satisfaction analysis precisely indicates that DSP *does* hurt and therefore empirically supports the interpretation of DSP as deprivation.[27] While occasional deliberately chosen low achievements cannot be entirely ruled out, in many instances the acuteness of a deprivation gives point to such a measure.

Note that a discussion of additional aspects can be found in the working paper version of this manuscript including the role of unobserved heterogeneity, the feasibility of cross-country comparisons, and the indicators' suitability as a social indicator. For instance, the proposed deprivation indicators are argued to fulfil common requirements (e.g., Atkinson et al., 2002, pp.20–23), i.e. they (i) measure outcomes, (ii) identify the essence of a problem, (iii) have a clear and accepted interpretation, (iv) an acceptable burden for respondents, and are (v) responsive to policy interventions.

6   Concluding Remarks

Why should one measure deprivation in social participation and embark on its in-depth analysis? First, there is already a broad consensus that social participation is an important activity. Indeed, this paper emphasises that social participation is not only of instrumental relevance but also intrinsically important. Consequently, social participation can be conceived of as a constituent, but so far neglected dimension of human well-being. Second, particularly with its focus on *deprivation* in social participation, the measurement reveals

---

[27]Note, however, that deprivation indicators that do not reduce life satisfaction fail to imply non-deprivation, since individuals may ultimately adapt to entrenched deprivation.

a normative force, and its analysis emerges as imperative. Specifically, improvements in respective social indicators, like a simple deprivation rate for instance, can be expected to be widely met with approval. Achievements in health or education are already routinely examined, and *low* achievements in these dimensions are already often a concern for policymaker—whether coupled with other deprivations or not, and irrespective the reason. Additionally, the present paper also provides evidence that deprivation in social participation is highly relevant for subjective well-being, meaning that people do suffer from this deprivation.

Third, the present paper argues that DSP is relatively straightforward to operationalise, drawing on established survey instruments. While identifying relevant customary activities is essentially an empirical question, collecting information on these activities and processing it such that it can be interpreted as a functioning achievement are more technical challenges. Setting the deprivation cutoff is, finally, a normative question, requiring, among other things, a public debate. In sum, the presented evidence suggests that measurement of deprivation in social participation is both feasible and valid. Fourth, the conceptual integration and chosen level of abstraction offers a coherent and compact underlying construct. Together with a feasible measurement this significantly facilitates an empirical analysis with related concepts like material deprivation, monetary poverty, social capital, or social cohesion. For instance, the link with labour market participation or health impairments can be subjected to empirical scrutiny, rather than being stipulated in the course of measurement.

Fifth, indicators like the suggested DSP are intrinsically important outcome variables, where both design and complementary evidence support the interpretation as deprivation rather than preference. Thus DSP indicators not only immediately reflect the essence of the problem and have normative force, they also directly document that barriers which prevent individuals from social participation *do* exist. This is vital because some problems, which are more difficult to grasp in the first place, like the now-famous glass ceiling for professional achievements of women, only receive attention after being corroborated by a substantial body of empirical evidence. Otherwise, problems like these tend to be ignored or even denied—by policymakers and academics alike. Exposing these walls of glass,

which prevent individuals' social participation, may involve rather diverse and possibly subtle mechanisms. Relevant mechanisms may range from deliberate discrimination, by law or by skin colour, to the debarring effect of prices, to more subtle channels like shying away to avoid stigmatisation. Therefore, a careful analysis becomes even more important to provide grounded advice for policymakers. Future research may probe and refine the coverage of customary activities and the accuracy of the response scale of the employed survey items using time-use modules, the experience sampling method, or the day reconstruction method. Additionally, future research is also needed to explore the role of virtual social activities for deprivation measurement and to examine both the determinants and the persistence of deprivation in social participation. Moreover, measures for different countries are to be devised and applied in order to investigate the possibility of cross-country comparisons. Finally, the performance of DSP measures may also be explored in analyses of social exclusion and multidimensional poverty.

References

Alkire, S. (2007). 'The missing dimensions of poverty data: Introduction to the special issue', *Oxford Development Studies*, vol. 35(4), pp. 347–359, doi:10.1080/13600810701701863.

Alkire, S. (2008). 'Choosing dimensions: The capability approach and multidimensional poverty', in (N. Kakwani and J. Silber, eds.), *The Many Dimensions of Poverty*, pp. 89–119, chap. 6, New York, N.Y: palgrave macmillan.

Alkire, S. (2009). 'The capability approach as a development paradigm?', in (E. Chiappero-Martinetti, ed.), *Debating Global Society: Reach and Limits of the Capability Approach*, pp. 31–60, chap. 1, Fondazione Giangiacomo Feltrinelli.

Alkire, S. and Foster, J. (2011). 'Counting and multidimensional poverty measurement', *Journal of Public Economics*, vol. 95(7-8), pp. 476–487, doi:10.1016/j.jpubeco.2010.11.006.

Alkire, S., Foster, J., Seth, S., Santos, M., Roche, J. and Ballón, P. (2015). *Multidimensional*

Poverty Measurement and Analysis: A Counting Approach, Oxford: Oxford University Press, ISBN 9780199689491.

Atkinson, A. (1998). 'Social exclusion, poverty and unemployment', in (A. Atkinson and J. Hills, eds.), *Exclusion, Employment and Opportunity*, pp. 9–24, 4, casepaper 1, London: Centre for Analysis of Social Exclusion.

Atkinson, A.B. (2003). 'Multidimensional deprivation: Contrasting social welfare and counting approaches', *Journal of Economic Inequality*, vol. 1(1), pp. 51–65, doi:10.1023/A:1023903525276.

Atkinson, T., Cantillon, B., Marlier, E. and Nolan, B. (2002). *Social Indicators: The EU and Social Inclusion*, Oxford: Oxford University Press, ISBN 0199253498.

Barnes, M. (2002). 'Social exclusion and the life course', in (M. Barnes, C. Heady, S. Middleton, J. Miller, F. Papadopoulos, G. Room and P. Tsakloglou, eds.), *Poverty and Social Exclusion in Europe*, pp. 1–23, chap. 1, Northhampton: Edward Elgar.

Bauernschuster, S., Falck, O. and Woessmann, L. (2014). 'Surfing alone? The internet and social capital: Evidence from an unforeseeable technological mistake', *Journal of Public Economics*, vol. 117(C), pp. 73–89, doi:10.1016/j.jpubeco.2014.05.

Bossert, W., Chakravarty, S.R. and D'Ambrosio, C. (2013). 'Multidimensional poverty and material deprivation with discrete data', *Review of Income and Wealth*, vol. 59(1), pp. 29–43, doi:10.1111/j.1475-4991.2012.00519.x.

Bourdieu, P. (1986). 'The forms of capital', in (J. G. Richardson, ed.), *Handbook of Theory and Research for the Sociology of Education*, pp. 46–58, chap. 2, Greenwood Publishing Group.

Bundesregierung (2013). 'Lebenslagen in Deutschland.', Bundesministerium für Arbeit und Soziales (BMAS), Bonn.

Burchardt, T. (2000). 'Social exclusion: concepts and evidence', in (D. Gordon and P. Townsend, eds.), *Breadline Europe*, pp. 385–405, chap. 16, Bristol: The Policy Press.

Burchardt, T. and LeGrand, J. (2002). 'Constraint and opportunity: Identifying voluntary non-employment', Centre for Analysis of Social Exclusion (CASE), London School of Economics, London.

Burchardt, T., LeGrand, J. and Piachaud, D. (2002). 'Degrees of exclusion: Developing a dynamic, multidimensional measure', in (J. Hills, J. LeGrand and D. Piachaud, eds.), *Understanding Social Exclusion*, pp. 30–43, chap. 3, Oxford: Oxford University Press.

Campbell, D.T. and Fiske, D.W. (1959). 'Convergent and discriminant validation by the multitrait-multimethod matrix', *Psychological Bulletin*, vol. 56(2), pp. 81–105, ISSN 0033-2909.

Chen, Y. and Li, S.X. (2009). 'Group identity and social preferences', *American Economic Review*, vol. 99(1), pp. 431–57, doi:10.1257/aer.99.1.431.

Clark, A.E. and Oswald, A.J. (1994). 'Unhappiness and unemployment', *Economic Journal*, vol. 104(424), pp. 648–659, doi:10.2307/2234639.

Comim, F. (2008). 'Measuring capabilities', in (F. Comim, M. Qizilbash and S. Alkire, eds.), *The Capability Approach: Concepts, Measures and Applications*, pp. 157–200, chap. 6, Cambridge: Cambridge University Press.

Cronbach, L.J. and Meehl, P.E. (1955). 'Construct validity in psychological tests.', *Psychological Bulletin*, vol. 52(4), pp. 281–302, doi:10.1037/h0040957.

Dotter, C. and Klasen, S. (2014). 'The multidimensional poverty index: Achievements, conceptual and empirical issues', UNDP Human Development Report Office, New York.

Durlauf, S.N. (2002). 'On the empirics of social capital', *Economic Journal*, vol. 112(483), pp. 459–479, doi:10.1111/1468-0297.00079.

Evans, P. (2002). 'Collective capabilities, culture, and amartya sen's development as freedom', *Studies in Comparative International Development*, vol. 37(2), pp. 54–60, ISSN 1936-6167, doi:10.1007/BF02686261.

Glaeser, E.L., Laibson, D. and Sacerdote, B. (2002). 'An economic approach to social capital', *Economic Journal*, vol. 112(483), pp. 437–458, doi:10.1111/1468-0297.00078.

Gordon, D., Levitas, R., Pantazis, C., Patsios, D., Payne, S., Townsend, P., Adelman, L., Ashworth, K., Middleton, S., Bradshaw, J. and Williams, J. (2000). *Poverty and Social Exclusion in Britain*, Joseph Rowntree Foundation, ISBN 1859350593.

D. Gordon and C. Pantazis, eds. (1997). *Breadline Britain in the 1990s*, Bristol, England: Summerleaze House Books.

Ibrahim, S.S. (2006). 'From individual to collective capabilities: The capability approach as a conceptual framework for self-help', *Annual Review of Sociology*, vol. 7(3), pp. 1–24, doi:10.1080/14649880600815982.

Ioannides, Y.M. and Loury, L.D. (2004). 'Job information networks, neighborhood effects, and inequality', *Journal of Economic Literature*, vol. 42(4), pp. 1056–1093, doi:10.1257/0022051043004595.

Jackson, M.O. (2011). 'An overview of social networks and economic applications', in (J. Benhabib, A. Bisin and M. O. Jackson, eds.), *Handbook of Social Economics*, pp. 511–585, 1A, chap. 12, Elsevier, doi:10.1016/b978-0-444-53187-2.00012-7.

Kahneman, D. and Krueger, A.B. (2006). 'Developments in the measurement of subjective well-being', *Journal of Economic Perspectives*, vol. 20(1), pp. 3–24, doi:10.1257/089533006776526030.

Klasen, S. (2001). 'Social exclusion, children and education. implications of a rights-based approach', *European Societies*, vol. 3(4), pp. 413–445, doi:10.1080/14616690120112208.

Knack, S. and Keefer, P. (1997). 'Does social capital have an economic payoff? A cross-country investigation', *The Quarterly Journal of Economics*, vol. 112(4), pp. 1251–1288.

Kunze, L. and Suppa, N. (2017). 'Bowling alone or bowling at all? The effect of unemployment on social participation', *Journal of Economic Behavior & Organization*, vol. 133, pp. 213–235, doi:10.1016/j.jebo.2016.11.012.

Levitas, R. (2006). 'The concept and measurement of social exclusion', in (C. Pantazis, D. Gordon and R. Levitas, eds.), *Poverty and Social Exclusion in Britain*, pp. 123–160, chap. 5, The Policy Press.

Lupton, R. and Power, A. (2002). 'Social exclusion and neighbourhoods', in (J. Hills, J. LeGrand and D. Piachaud, eds.), *Understanding Social Exclusion*, pp. 118–140, chap. 8, Oxford: Oxford Univ. Press.

Maasoumi, E. and Lugo, M.A. (2008). 'The information basis of multivariate poverty assesments', in (N. Kakwani and J. Silber, eds.), *Quantitative Approaches to Multidimensional Poverty Measurement*, pp. 1–29, chap. 1, New York: palgrave macmillan, ISBN 978-0-230-00489-4.

Mack, J. and Lansley, S. (1985). *Poor Britain*, London: G. Allen & Unwin.

McKay, S. (2004). 'Poverty or preference: what do 'consensual deprivation indicators' really mean?', *Fiscal Studies*, vol. 25(2), pp. 201–223, doi:10.1111/j.1475-5890.2004.tb00102.x.

Mood, C. and Jonsson, J.O. (2016). 'The social consequences of poverty: An empirical test on longitudinal data', *Social Indicators Research*, vol. 127(2), pp. 633–652, doi:10.1007/s11205-015-0983-9.

Narayan, D., Patel, R., Schafft, K., Rademacher, A. and Koch-Schulte, S. (2000). *Can Anyone Hear Us?: Voices of the Poor*, Oxford: Oxford Univ. Press, ISBN 0195216016.

Nolan, B. and Whelan, C.T. (2010). 'Using non-monetary deprivation indicators to analyse poverty and social exclusion in rich counties: Lessons from Europe?', *Journal of Policy Analysis and Management*, vol. 29(2), pp. 305–325, doi:10.1002/pam.20493.

Nussbaum, M.C. (2001). 'Symposium on amartya sen's philosophy: Adaptive preferences and women's options', *Economics and Philosophy*, vol. 17, pp. 67–88, ISSN 0266-2671.

OECD (2011). *How's Life? Measuring Well-being*, OECD Better Life Initiative, Paris: OECD Publishing, ISBN 9789264111615.

Piachaud, D. (1987). 'Problems in the definition and measurement of poverty', *Journal of Social Policy*, vol. 16(2), pp. 147–164, doi:10.1017/S0047279400020353.

Platt, L. (2009). 'Social activity, social isolation and ethnicity', *The Sociological Review*, vol. 57(4), pp. 670–702, doi:10.1111/j.1467-954X.2009.01867.x.

Portes, A. (1998). 'Social capital: Its origins and applications in modern sociology', *Annual Review of Sociology*, vol. 24, pp. 1–24, doi:10.1146/annurev.soc.24.1.1.

Putnam, R.D. (1995). 'Bowling alone: America's declining social capital', *Journal of Democracy*, vol. 6(1), pp. 65–78, doi:10.1353/jod.1995.0002.

Robeyns, I. (2006). 'The Capability Approach in Practice', *The Journal of Political Philosophy*, vol. 14(3), pp. 351–376, ISSN 0963-8016, doi:10.1111/j.1467-9760.2006.00263.x.

Robeyns, I. (2011). 'The capability approach', in (E. N. Zalta, ed.), *The Stanford Encyclopedia of Philosophy*, Metaphysics Research Lab, Stanford University.

Robeyns, I. (2017). *Wellbeing, Freedom and Social Justice: The Capability Approach Re-Examined*, Open Book Publishers, ISBN 978-1-78374-421-3.

Robinson, P. and Oppenheim, C. (1998). 'Social exclusion indicators: A submission to the social exclusion unit', Institute for Public Policy Research, London.

Room, G. (1999). 'Social exclusion, solidarity and the challenge of globalization', *International Journal of Social Welfare*, vol. 8, pp. 166–174, doi:10.1111/1468-2397.00080.

Satyanath, S., Voigtländer, N. and Voth, H.J. (2017). 'Bowling for fascism: Social capital and the rise of the Nazi party', *Journal of Political Economy*, vol. 125(2), pp. 478–526, doi:10.1086/690949.

Sen, A.K. (1976). 'Poverty: An ordinal approach to measurement', *Econometrica*, vol. 44, pp. 219–231, doi:10.2307/1912718.

Sen, A.K. (1980). 'Equality of what?', in (S. M. McMurrin, ed.), *The Tanner Lecture on Human Values*, pp. 195–220, vol. 1, Stanford University: Cambridge University Press, ISBN 9780521176415.

Sen, A.K. (1983). 'Poor, relatively speaking', *Oxford Economic Papers*, vol. 35(2), pp. 153–169, doi:10.1093/oxfordjournals.oep.a041587.

Sen, A.K. (1985). *Commodities and Capabilities*, New Delhi: North-Holland Publishing, 12 edn., ISBN 0195650387.

Sen, A.K. (1992). *Inequality Reexamined*, Russell Sage Foundation book, New York: Russell Sage Foundation, 3 edn., ISBN 0674452569.

Sen, A.K. (1993). 'Markets and freedoms: Achievements and limitations of the market mechanism in promoting individual freedoms', *Oxford Economics Papers*, vol. 45, pp. 519–541.

Sen, A.K. (1999a). 'Democracy as a universal value', *Journal of Democracy*, vol. 10(3), pp. 3–17.

Sen, A.K. (1999b). *Development as Freedom*, Oxford: Oxford University Press, ISBN 978-0-19-289330-7.

Sen, A.K. (2000). *Social exclusion: Concept, application, and scrutiny*, vol. No. 1 of *Social development papers*, Manila: Asian Development Bank, ISBN 971-561-274-1.

Sen, A.K. (2002a). *Opportunities and freedoms*, chap. 20, Cambridge, Massachusetts: Harvard University Press, ISBN 0674013514, pp. 583–622.

Sen, A.K. (2002b). 'Response to commentaries', *Studies in Comparative International Development*, vol. 37(2), pp. 78–86, ISSN 0039-3606, doi:10.1007/BF02686264.

Sen, A.K. (2004). 'Elements of a theory of human rights', *Philosophy & Public Affairs*, vol. 32(4), pp. 315–356, doi:10.1111/j.1088-4963.2004.00017.x.

Sen, A.K. (2005). 'Human rights and capabilities', *Journal of Human Development and Capabilities*, vol. 6(2), pp. 151–166, doi:10.1080/14649880500120491.

Stiglitz, J.E., Sen, A.K. and Fitoussi, J.P. (2009). 'Report by the commission on the measurement of economic performance and social progress', Commission on the Measurement of Economic Performance and Social Progress.

Tajfel, H. and Turner, J. (1979). 'Group identity and social preferences', in (W. G. Austin and S. Worchel, eds.), *The Social Psychology of Intergroup Relations*, pp. 33–47, Monteray: Brooks / Cole.

Townsend, P. (1979). *Poverty in the United Kingdom: A Survey of Household Resources and Standards of Living*, University of California Press, ISBN 9780520039766.

Wagner, G.G., Frick, J.R. and Schupp, J. (2007). 'The German Socio-Economic Panel Study (SOEP): Scope, Evolution and Enhancements', *Schmollers Jahrbuch*, vol. 127(1), pp. 139–169.

Whelan, C.T. and Maître, B. (2010). 'Welfare Regime and Social Class Variation in Poverty and Economic Vulnerability in Europe: an analysis of EU-SILC', *Journal of European Social Policy*, vol. 20(4), pp. 316–332, read.

Winkelmann, L. and Winkelmann, R. (1998). 'Why are the unemployed so unhappy? evidence from panel data', *Economica*, vol. 65(257), pp. 1–15, ISSN 1468-0335, doi:10.1111/1468-0335.00111.

Winkelmann, R. (2009). 'Unemployment, social capital, and subjective well-being', *Journal of Happiness Studies*, vol. 10(4), pp. 421–430, doi:10.1007/s10902-008-9097-2.

Wolff, J. and de-Shalit, A. (2007). *Disadvantage*, Oxford Political Theory, Oxford: Oxford University Press, ISBN 9780199278268.

Wrzus, C., Hänel, M., Wagner, J. and Neyer, F.J. (2013). 'Social network changes and life events across the life span: A meta-analysis.', *Psychological Bulletin*, vol. 139(1), pp. 53–80, doi:10.1037/a0028601.

Zavaleta, D. (2007). 'The Ability to go about Without Shame: A Proposal for Internationally Comparable Indicators of Shame and Humiliation', *Oxford Development Studies*, vol. 35(4), pp. 405–430, doi:10.1080/13600810701701905.

Zavaleta, D., Samuel, K. and Mills, C.T. (2017). 'Measures of social isolation', *Social Indicator Research*, vol. 131(1), pp. 367–391, ISSN 1573-0921, doi:10.1007/s11205-016-1252-2.

A   The dual-cutoff counting approach

This section briefly introduces the dual-cutoff counting approach of (Alkire and Foster, 2011) to measure multidimensional poverty, see also Alkire et al. (2015, ch. 5). The motivation for this section is to illuminate the relation between the proposed measure of deprivation in social participation (DSP) and the more general counting framework.

Let $x_{id} \in \mathscr{R}^+$ be the achievement of individual $i = 1, \ldots, N$ in a particular dimension of human well-being $d = 1, \ldots, D$ (e.g., health or education). A deprivation for dimension d is assigned, whenever an individual's achievement in that dimension, x_{id} is falling short the normative deprivation threshold $\bar{z}_d$. Let $w_d > 0$ be the weight (or deprivation value) of dimension d, with $\sum_d w_d = 1$. The weighted deprivation count is obtained for each individual as $c_i = \sum_d \mathbb{I}(x_{id} < \bar{z}_d)$, where $\mathbb{I}(\cdot)$ is the indicator function. Following Sen (1976) identification and aggregation step of poverty measurement can be distinguished. In the present case, the identification function defines an individual to be poor whenever its weighted deprivation count exceeds the cross-dimensional poverty cutoff or, more formally, $\rho_i(k) = \mathbb{I}(c_i > k)$. The so-called censored deprivation count, $c_i(k) = c_i \rho_i(k)$, retains only the deprivation information of the poor. To obtain a measure of poverty for the entire society, one has to aggregate across individuals. One way is to simply count the number of poor and normalise the count with population number. This so-called headcount ratio is defined as $H = \frac{1}{N} \sum_j \rho_i(k)$. One drawback of this measure is that it is unresponsive to changes in the situation of the poor as long as they do not cross the poverty cutoff. Therefore, Alkire and Foster (2011) propose the so-called adjusted headcount ratio, which is the average of the censored deprivation count, i.e. $M_0 = \frac{1}{N} \sum_i c_i(k)$. The adjusted headcount ratio can also be obtained through $M_0 = H \times A$, where $A = \frac{1}{q} \sum c_i(k)$ is the average deprivation among the poor (the intensity) and q is the number of the poor.

A popular choice for the poverty cutoff is the so-called union-approach (Atkinson, 2003) which identifies an individual as poor whenever *any* deprivation is observed, i.e. $c_i > 0$. The polar approach is to require an individual to be deprived in *every* indicator for being considered as poor. This so-called intersection approach is implemented using of poverty cutoff of $k = 1$ (the maximum possible deprivation). Note, however, that both approaches

can also be implemented without relying on a deprivation count and thus weights. Specifically, an individual i is poor according to the union approach if $x_{id} < \bar{z}_d \ \exists d$ and according to the intersection approach if $x_{id} < \bar{z}_d \ \forall d$. An implication of the intersection-approach is that simple and adjusted headcount are equal (since $A = 1$). While many measures of multidimensional poverty rely on the union approach (Alkire et al., 2015, ch. 3.6), applications in practice often use an intermediate level of 20–40% of the maximal possible deprivation.

These methods were developed to measure poverty multidimensionally based on several deprivation indicators. The present paper instead seeks to measure a *single deprivation* (in social participation) based on several social activity indicators using the same techniques. More specifically, the proposed approach to measure DSP first counts all the performed social activities and then assigns a deprivation in social participation if an individual is found to participate *none* of them (i.e. a single social activity would render them non-deprived). Bypassing the activity count, one can also define $DSP_i = 1$ if $a_{ij} \leqslant \underline{a}_j \ \forall j$ and $DSP_i = 0$ otherwise. The notation in equation (5), however, better parallels the well-known Alkire-Foster method and, thereby, also emphasises the existence of a second cutoff which is subject to a normative decision. Aggregation across individuals finally results in the headcount ratio of DSP, which equals the adjusted headcount ratio as an intersection approach is used.

As the proposed measure for DSP is a member of the Alkire-Foster class of measures, it complies with the same axioms. Especially, four of these properties may shed further light on performance and behaviour of the proposed measure.[28] First, the *poverty focus* axiom requires the poverty measure not to change if achievements of non-poor individuals further improve, whereas the *deprivation focus* axiom requires the identification function to remain unchanged if non-deprived achievements further improve. For the intersection-approach poverty focus implies deprivation focus (Alkire and Foster, 2011, p. 481). Applied to DSP these axioms require the measure to remain unchanged if, e.g., an individual expands its level of activity j from say 'monthly' to 'weekly', or if an individual quits a particular social

---

[28]Further axioms include symmetry, replication invariance, scale invariance, weak deprivation rearrangement, dimensional monotonicity, non-triviality, and normalisation, see Alkire et al. (2015, ch. 3.6 and 5) for more details.

activity entirely—as long as it is exercising at least one of the other activities.

Population *subgroup decomposability* is highly relevant in practice as it connects poverty levels of subgroups with the overall level of poverty. More specifically, overall poverty is a population-share weighted sum of subgroup poverty levels, where subgroups could be sub-national regions or ethnic groups. More formally, let N_ℓ and M_0^ℓ be population and adjusted headcount ratio for subgroup ℓ, respectively, then one can express the overall adjusted headcount as $M_0 = \sum_\ell \frac{N_\ell}{N} M_0^\ell$. Table A.1 applies such a decomposition for the subnational regions of Germany. Note that totals shown in the last row equal the numbers reported in figure 1.

Finally, a practice-oriented property of the Alkire-Foster method is its applicability to ordinal achievement data, which reduces data demands substantially as cardinality is not vital for its measurement. In poverty measurement this allows, for instance, to rely on a so-called 'sanitation ladder' or 'drinking water ladder'. On the other hand, measuring DSP as proposed in this paper does not require exact hours of exercise for every social activity. Instead, ordinal categories like 'weekly', 'monthly', or 'never' are sufficient.

Question	Variable
Going to cultural events (such as concerts, theatre, lectures, etc.)	culture
Going to the movies, pop music concerts, dancing, disco, sports events	cinema
Doing sports yourself	sports
Artistic or musical activities (playing music/singing, dancing, acting, painting, photography)	art
Meeting with friends, relatives, or neighbours	socialise
Helping out friends, relatives, or neighbours	helping
Volunteer work in clubs or social services	volunteer
Involvement in a citizens' group, political party, local government	initiative
Attending church, religious events	church

Notes: Responses are recorded on a 4-point scale and labelled as 'at least once a week', 'at least once a month', 'less often', and 'never'.

Table 2: Socio-Economic Variables by Deprivation Status

	DSP1		DSP2A		DSP2B	
	=0	=1	=0	=1	=0	=1
<25	0.13	0.05	0.14	0.04	0.13	0.04
26-35	0.19	0.10	0.20	0.14	0.17	0.13
36-45	0.22	0.17	0.22	0.19	0.23	0.18
46-55	0.19	0.21	0.19	0.22	0.20	0.22
56-65	0.15	0.22	0.15	0.22	0.15	0.22
65+	0.11	0.24	0.11	0.18	0.13	0.21
mar., living together	0.62	0.63	0.62	0.67	0.61	0.64
sep. or div.	0.09	0.13	0.09	0.13	0.10	0.15
unmarried	0.25	0.16	0.26	0.12	0.26	0.14
widowed	0.04	0.08	0.03	0.07	0.03	0.07
1-pers.	0.11	0.15	0.11	0.13	0.12	0.15
couple w. child.	0.30	0.35	0.29	0.33	0.31	0.34
single parent	0.06	0.07	0.06	0.07	0.07	0.08
couple no child.	0.49	0.37	0.50	0.41	0.48	0.39
other	0.03	0.05	0.03	0.05	0.02	0.04
years of education	12.00	11.21	12.13	10.62	12.42	10.56
full-time	0.44	0.32	0.45	0.32	0.43	0.27
part-time	0.12	0.08	0.12	0.08	0.13	0.08
training	0.03	0.01	0.03	0.01	0.03	0.01
precarious	0.04	0.03	0.04	0.03	0.05	0.04
out of labour force	0.31	0.48	0.30	0.44	0.31	0.47
unemployed	0.06	0.09	0.05	0.13	0.05	0.14
pov40	0.03	0.06	0.02	0.06	0.02	0.08
pov50	0.06	0.13	0.05	0.15	0.06	0.18
pov60	0.12	0.22	0.11	0.26	0.11	0.32
pov70	0.20	0.32	0.18	0.39	0.19	0.45
neteqinc	1465.68	1255.45	1502.98	1076.71	1654.75	1104.46
md. count	18.82	30.37	18.22	29.41	18.39	31.04
md. count (el)	7.61	13.99	7.02	15.75	7.17	17.04
Observations	184046	9477	171148	21198	118793	9991

Notes: Data from SOEP v32.1 (all available waves, see fn. 19), calculation use sampling weights.

Table 3: Concurrence of Deprivation in Social Participation with Other Measures

	DSP1			DSP2A			DSP2B		
(a) with income poverty measures									
poverty cutoff	40%	50%	60%	40%	50%	60%	40%	50%	60%
neither dep.	0.921*	0.877*	0.822*	0.867*	0.831*	0.786*	0.894*	0.856*	0.808*
only I-dep.	0.029*	0.073*	0.128*	0.025*	0.062*	0.107*	0.026*	0.064*	0.113*
only SP-dep	0.047*	0.042*	0.037*	0.100*	0.089*	0.073*	0.073*	0.063*	0.051*
both dep.	0.003*	0.008*	0.013*	0.007*	0.019*	0.034*	0.007*	0.016*	0.029*
both dep./I-dep.	0.098	0.095	0.089	0.228	0.236	0.244	0.201	0.204	0.203
both dep./SP-dep.	0.064	0.154	0.253	0.069	0.177	0.320	0.082	0.207	0.362
(b) with material deprivation indices									
k-cutoff	27%	36%	45%	27%	36%	45%	27%	36%	45%
neither dep.	0.821*	0.872*	0.913*	0.783*	0.828*	0.864*	0.804*	0.852*	0.889*
only MD-dep.	0.129*	0.078*	0.037*	0.109*	0.064*	0.029*	0.116*	0.069*	0.031*
only SP-dep	0.035*	0.039*	0.043*	0.073*	0.083*	0.092*	0.051*	0.060*	0.067*
both dep.	0.015*	0.010*	0.007*	0.035*	0.025*	0.015*	0.029*	0.020*	0.013*
both dep./MD-dep.	0.102	0.118	0.149	0.241	0.277	0.345	0.197	0.225	0.293
both dep./SP-dep.	0.295	0.211	0.132	0.323	0.228	0.141	0.359	0.252	0.163

Notes: Data from SOEP v32.1 (wave 2011); calculations use sampling weights; individuals can be only income-deprived (I-dep.), only social participation-deprived (SP-dep.), or materially deprived (MD-dep.); indicated levels of significance are [+] $p < 0.05$, [*] $p < 0.01$.

Figure 1: Headcount Ratios for Different Poverty and Deprivation Measures
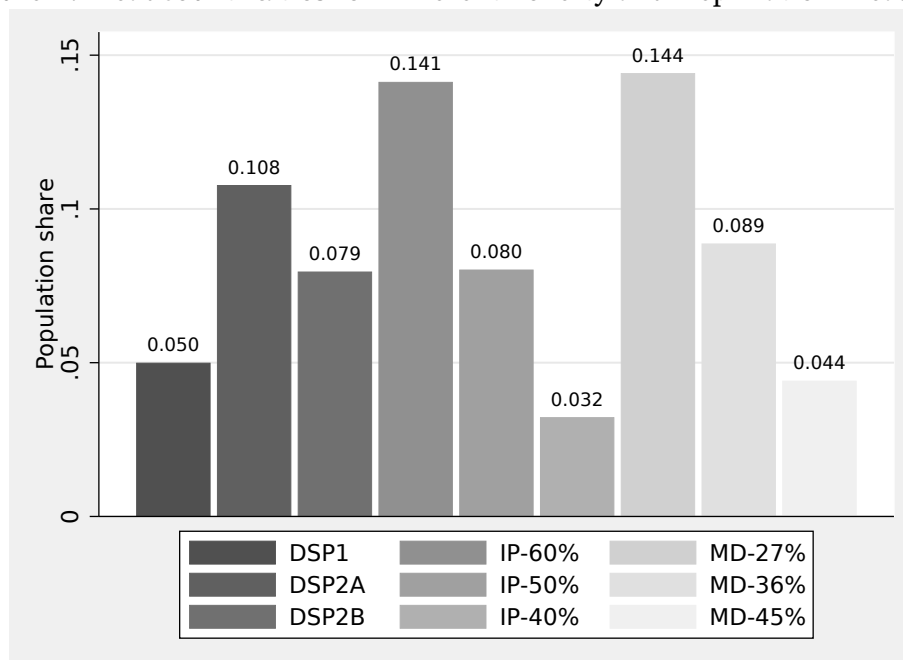
Notes: Data from SOEP v32.1 (wave 2011); calculations use sampling weights. For cutoffs for deprivation in social participation (DSP) see text; income poverty (IP) for poverty lines at 60%, 50%, and 40% of the median income; material deprivation (MD) indices for k-cutoffs of 27%, 36%, and 45% of maximal possible deprivation.

Table 4: Concurrence Among Deprivations in Social Participation

	neither deprived	only $DSP1$-deprived	only $DSP2B$-deprived	both deprived
<25	0.11	0.04	0.04	0.03
26-35	0.18	0.10	0.21	0.12
36-45	0.26	0.22	0.22	0.16
46-55	0.20	0.22	0.20	0.23
56-65	0.13	0.19	0.17	0.22
65+	0.12	0.24	0.15	0.26
years of education	12.64	11.97	10.71	10.60
full-time	0.42	0.34	0.30	0.20
part-time	0.16	0.11	0.09	0.06
training	0.02	0.01	0.01	0.01
precarious	0.06	0.04	0.06	0.05
out of labour force	0.30	0.41	0.40	0.53
unemployed	0.04	0.09	0.14	0.15
pov60	0.12	0.19	0.38	0.43
neteqinc	1686.08	1580.79	1091.40	1077.09
md. count	13.97	21.14	21.40	31.25
md. count (el)	5.09	8.61	11.62	17.62
Obs.	23604	761	1658	519
pop. share	0.891	0.0296	0.0595	0.0203

Notes: Data from SOEP v32.1 (wave 2011), calculations use sampling weights; income concept is net equivalent income.

Table 5: Regression Results—Part A

	(1) Cinema	(2) Culture	(3) Volunteer	(4) Church	(5) Socialise	(6) Helping
sep. or div.	0.162*	0.0671*	-0.0202	-0.0341*	0.0368$^+$	0.0215
	(11.88)	(6.05)	(-1.37)	(-2.91)	(2.49)	(1.56)
unmarried	0.368*	0.154*	0.0430*	-0.0237$^+$	0.0652*	0.00981
	(27.15)	(14.22)	(2.89)	(-2.14)	(5.13)	(0.73)
widowed	0.107*	0.0968*	0.000548	0.0984*	0.170*	0.105*
	(5.20)	(5.17)	(0.02)	(4.77)	(6.67)	(3.84)
1 child	-0.109*	-0.0710*	-0.00296	0.0317*	-0.0737*	-0.0550*
	(-15.49)	(-12.28)	(-0.36)	(5.32)	(-10.52)	(-7.38)
2 child.	-0.130*	-0.0914*	0.0415*	0.0936*	-0.102*	-0.0775*
	(-14.36)	(-12.43)	(3.72)	(11.28)	(-10.90)	(-8.02)
3+ child	-0.140*	-0.106*	0.0821*	0.120*	-0.130*	-0.111*
	(-9.63)	(-9.15)	(4.54)	(8.73)	(-8.68)	(-7.21)
26-35	-0.232*	0.0134	0.0153	-0.0314*	0.000393	0.0732*
	(-20.99)	(1.49)	(1.29)	(-3.57)	(0.04)	(6.28)
36-45	-0.195*	0.0473*	0.149*	0.0211	-0.0205	0.103*
	(-13.36)	(3.90)	(9.12)	(1.71)	(-1.40)	(6.50)
46-55	-0.178*	0.0496*	0.168*	0.0189	-0.0188	0.126*
	(-10.13)	(3.36)	(8.41)	(1.25)	(-1.03)	(6.33)
56-65	-0.128*	0.0524*	0.147*	0.00871	0.0496$^+$	0.184*
	(-6.12)	(2.96)	(6.14)	(0.48)	(2.20)	(7.56)
65+	-0.0517$^+$	0.0549*	0.121*	0.00462	0.107*	0.141*
	(-2.09)	(2.60)	(4.28)	(0.21)	(3.93)	(4.79)
ln(income)	0.0683*	0.0557*	-0.00144	0.00193	0.0446*	-0.00465
	(9.91)	(9.32)	(-0.17)	(0.31)	(5.91)	(-0.58)
part-time	0.0308*	0.0190*	0.0680*	0.0525*	0.0302*	0.0687*
	(3.68)	(2.64)	(6.39)	(6.82)	(3.44)	(7.21)
training	0.0879*	-0.0193	0.00855	0.0386*	0.0539*	-0.0407*
	(6.04)	(-1.52)	(0.58)	(3.60)	(4.18)	(-2.63)
precarious	0.0270$^+$	0.0214$^+$	0.134*	0.0417*	0.0829*	0.139*
	(2.52)	(2.28)	(9.17)	(4.16)	(7.25)	(10.96)
out of labour force	-0.0198*	-0.00521	0.0502*	0.0318*	0.0775*	0.0753*
	(-2.72)	(-0.84)	(5.64)	(5.00)	(9.97)	(8.82)
unemployed	-0.0253*	-0.0175$^+$	0.0321*	0.0182$^+$	0.0786*	0.101*
	(-2.74)	(-2.26)	(3.30)	(2.31)	(7.34)	(9.16)
Obs.	183208	183378	182998	183260	183388	183217
Ind.	56695	56691	56656	56680	56717	56693

Notes: Data from SOEP v32.1 (all available waves, see fn. 19), all underlying models fitted using linear fixed effects estimator, all models additionally include year dummies and a constant, indicated levels of significance are $^+$ $p < 0.05$, * $p < 0.01$.

Table 6: Regression Results—Part B

	(1) Initiative	(2) Art	(3) Sports	(4) DSP2A	(5) DSP2B	(6) DSP1
sep. or div.	-0.0113	0.0405[+]	0.0311	-0.00731	-0.000342	-0.00389
	(-1.53)	(1.99)	(1.50)	(-1.25)	(-0.05)	(-0.98)
unmarried	0.0145[+]	0.0290	0.225*	-0.0243*	-0.00796	0.00306
	(2.09)	(1.35)	(11.33)	(-5.60)	(-1.72)	(1.06)
widowed	0.00502	0.0296	0.105*	-0.0320*	-0.0175	-0.00663
	(0.37)	(0.93)	(3.12)	(-2.76)	(-1.32)	(-0.80)
1 child	-0.00720	-0.0365*	-0.0907*	0.0111*	0.00606[+]	0.00752*
	(-1.83)	(-3.27)	(-8.47)	(4.12)	(2.03)	(3.95)
2 child.	0.00128	-0.0416*	-0.0965*	0.00965*	0.00644	0.00709*
	(0.24)	(-2.79)	(-6.78)	(2.78)	(1.60)	(2.91)
3+ child	-0.00283	-0.0533[+]	-0.0730*	0.00627	0.000216	0.00462
	(-0.35)	(-2.48)	(-3.45)	(0.99)	(0.03)	(1.16)
26-35	0.0105[+]	-0.0296	-0.00660	0.0000897	-0.000707	-0.0134*
	(2.04)	(-1.65)	(-0.43)	(0.03)	(-0.17)	(-5.55)
36-45	0.0434*	0.0167	0.0704*	-0.0188*	-0.0174*	-0.0271*
	(5.92)	(0.69)	(3.28)	(-3.39)	(-2.75)	(-6.94)
46-55	0.0507*	0.0476	0.0681*	-0.0144[+]	-0.0189[+]	-0.0342*
	(5.31)	(1.62)	(2.61)	(-2.02)	(-2.40)	(-6.57)
56-65	0.0395*	0.0833[+]	0.0864*	-0.0200[+]	-0.0215[+]	-0.0438*
	(3.37)	(2.40)	(2.78)	(-2.24)	(-2.17)	(-6.51)
65+	0.0282[+]	0.0673	0.109*	-0.0259[+]	-0.0217	-0.0390*
	(2.02)	(1.66)	(2.95)	(-2.40)	(-1.81)	(-4.66)
ln(income)	-0.00474	0.0201	0.0667*	-0.0241*	-0.0204*	-0.00734*
	(-1.08)	(1.80)	(6.36)	(-8.54)	(-6.68)	(-3.23)
part-time	0.00768	0.0302[+]	0.0667*	-0.00900*	-0.00432	-0.00357
	(1.55)	(2.24)	(4.93)	(-2.70)	(-1.23)	(-1.49)
training	-0.00918	0.00566	0.0207	-0.00351	-0.00441	-0.000297
	(-1.55)	(0.24)	(1.01)	(-0.93)	(-0.98)	(-0.10)
precarious	0.0117	0.0741*	0.0952*	0.00432	0.00350	-0.00541
	(1.71)	(4.41)	(5.32)	(0.98)	(0.72)	(-1.74)
out of labour force	0.00255	0.0859*	0.0625*	0.0137*	0.00844[+]	0.00190
	(0.60)	(7.08)	(5.45)	(4.42)	(2.40)	(0.84)
unemployed	-0.00144	0.0474*	0.0505*	0.00713	-0.00919	-0.00608[+]
	(-0.31)	(3.13)	(3.75)	(1.50)	(-1.51)	(-1.97)
Obs.	182723	122264	182818	181861	121110	182878
Ind.	56639	50084	56665	56553	49914	56670

Notes: Data from SOEP v32.1 (all available waves, see fn. 19), all underlying models fitted using linear fixed effects estimator, all models additionally include year dummies and a constant, indicated levels of significance are [+] $p < 0.05$, * $p < 0.01$.

Table 7: Life Satisfaction Regressions

	(1)	(2)	(3)
DSP1	-0.347*	-0.333*	-0.334*
	(-10.20)	(-9.87)	(-9.99)
DSP2B	-0.245*	-0.233*	-0.225*
	(-7.77)	(-7.47)	(-7.27)
ln(income)			0.326*
			(14.74)
part-time			-0.00378
			(-0.16)
training			0.0940^+
			(2.16)
precarious			-0.121*
			(-3.82)
out of labour force			-0.0165
			(-0.72)
unemployed			-0.566*
			(-15.73)
Obs.	118418	118418	118418
Ind.	48801	48801	48801

Notes: Data from SOEP v32.1 (waves 2001, 2005, 2007, 2009, 2011, 2015). The dependent variable is life satisfaction, recorded on a 10-point scale. All models are estimated using linear fixed effects and models (2) and (3) include control variables for age groups, marital status, number of children, regions, years, and a constant. The reference group for employment status is full-time employment; standard errors are clustered on the individual level; t-values are in parentheses, indicated levels of significance are $^+$ for $p < 0.05$, * for $p < 0.01$.

Table A.1: Decomposition of Deprivation in Social Participation

State	DSP1	DSP2A	DSP2B	Population share
BW	0.041	0.077	0.052	0.125
BY	0.043	0.083	0.057	0.157
BE	0.050	0.115	0.085	0.035
BB	0.069	0.146	0.127	0.040
HB	0.059	0.115	0.077	0.007
HH	0.040	0.075	0.051	0.015
HE	0.047	0.099	0.067	0.071
MV	0.041	0.154	0.113	0.023
LS	0.051	0.107	0.079	0.093
NW	0.043	0.118	0.089	0.203
RP	0.057	0.126	0.100	0.047
SL	0.055	0.113	0.098	0.010
SN	0.051	0.134	0.103	0.064
ST	0.060	0.183	0.152	0.039
SH	0.044	0.103	0.077	0.035
TH	0.072	0.121	0.093	0.038
National	0.050	0.108	0.079	1.000

Notes: German states are Baden-Württemberg (BW), Bavaria (BY), Berlin (BE), Brandenburg (BB), Bremen (HB), Hamburg (HH), Hesse (HE), Mecklenburg-Western Pomerania (MV), Lower Saxony (LS), North Rhine-Westphalia (NW), Rhineland-Palatinate (RP), Saarland (SL), Saxony (SN), Saxony-Anhalt (ST), Schleswig-Holstein (SH), Thuringia (TH).

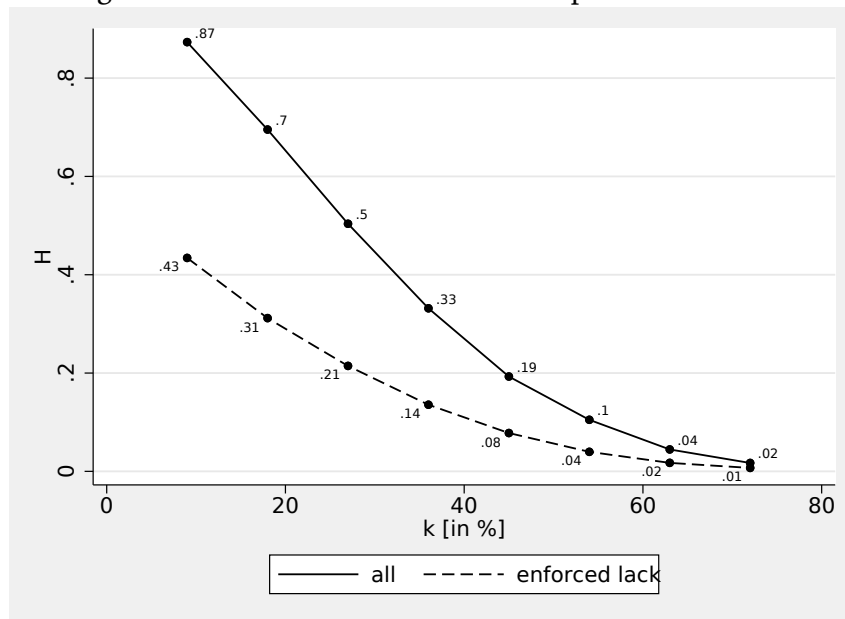# B   Additional results

Figure B.1: Frequency Distributions of Social Activities
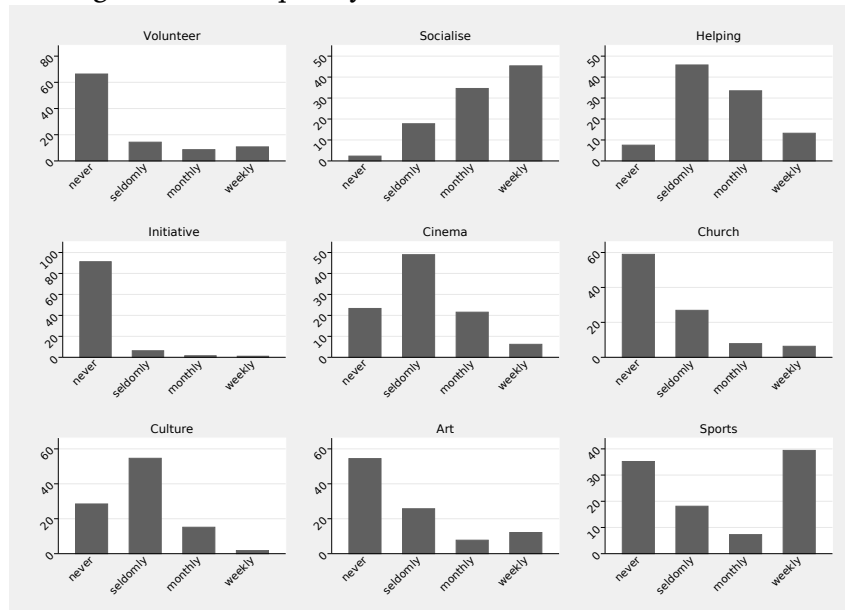
Notes: Data from SOEP v32.1 (wave 2011); calculations use sampling weights.

Figure B.2: Incidences of Material Deprivation Indices

Notes: Data from SOEP v32.1 (wave 2007); calculations use sampling weights; material deprivation indices are constructed using the Alkire-Foster method with equal weighting.

Table B.1: Overlap of Deprivation in Social Participation with Other Measures (Robustness)
(a) with income poverty measures

	DSP1			DSP2A			DSP2B		
poverty cutoff	40%	50%	60%	40%	50%	60%	40%	50%	60%
neither dep.	0.952*	0.906*	0.848*	0.490*	0.472*	0.448*	0.668*	0.643*	0.611*
only I-dep.	0.031*	0.077*	0.135*	0.012*	0.030*	0.054*	0.017*	0.042*	0.074*
only SP-dep	0.015*	0.014*	0.011*	0.478*	0.448*	0.411*	0.299*	0.276*	0.247*
both dep.	0.002*	0.003*	0.006*	0.021*	0.051*	0.087*	0.016*	0.039*	0.068*

(b) with material deprivation indices

	DSP1			DSP2A			DSP2B		
k-cutoff	27%	36%	45%	27%	36%	45%	27%	36%	45%
neither dep.	0.846*	0.900*	0.943*	0.453*	0.475*	0.490*	0.614*	0.645*	0.668*
only MD-dep.	0.137*	0.083*	0.040*	0.049*	0.027*	0.012*	0.071*	0.040*	0.017*
only SP-dep	0.010*	0.012*	0.013*	0.403*	0.437*	0.466*	0.241*	0.266*	0.288*
both dep.	0.007*	0.005*	0.004*	0.096*	0.062*	0.032*	0.074*	0.049*	0.027*

Notes: Data from SOEP v32.1 (wave 2011); underlying threshold for non-performance of single activities is 'never' for $DSP1$ (instead of 'less often'), and 'less often' for $DSP2A$ and $DSP2B$ (instead of 'never'). Calculations use sampling weights; individuals can be only income-deprived (I-dep.), only social participation-deprived (SP-dep.), or materially deprived (MD-dep.); indicated levels of significance are [+] $p < 0.05$, * $p < 0.01$.

Table B.2: Regression Results (Robustness)

	(1) DSP2A-R	(2) DSP2B-R	(3) DSP1-R	(4) LSAT
DSP1-R				-0.496*
				(-7.91)
DSP2B-R				-0.136*
				(-8.87)
sep. or div.	-0.0751*	-0.0303*	-0.00154	-0.111*
	(-8.53)	(-2.78)	(-0.70)	(-2.60)
unmarried	-0.179*	-0.0630*	0.00227	-0.147*
	(-21.05)	(-6.18)	(1.41)	(-4.30)
widowed	-0.0970*	-0.0744*	-0.00511	-0.400*
	(-7.16)	(-4.16)	(-1.17)	(-4.90)
1 child	0.0647*	0.0467*	0.000390	0.0588*
	(14.27)	(8.58)	(0.39)	(2.86)
2 child.	0.0558*	0.0389*	0.000597	0.0603$^+$
	(9.38)	(5.28)	(0.43)	(2.23)
3+ child	0.0422*	0.0448*	-0.00197	0.0955$^+$
	(4.60)	(3.92)	(-0.84)	(2.29)
26-35	0.0852*	0.0336*	-0.00415*	-0.0247
	(13.01)	(4.24)	(-3.06)	(-0.76)
36-45	0.0505*	-0.0101	-0.00862*	-0.00956
	(5.48)	(-0.86)	(-3.88)	(-0.21)
46-55	0.0474*	-0.0178	-0.00938*	-0.0349
	(4.21)	(-1.24)	(-3.15)	(-0.64)
56-65	0.0287$^+$	-0.0362$^+$	-0.0137*	0.0545
	(2.13)	(-2.10)	(-3.47)	(0.83)
65+	-0.00710	-0.0602*	-0.0102$^+$	0.0851
	(-0.45)	(-2.98)	(-2.10)	(1.11)
ln(income)	-0.0243*	-0.0186*	-0.00442*	0.327*
	(-5.41)	(-3.56)	(-3.25)	(14.79)
part-time	-0.0226*	-0.0202*	-0.00275$^+$	-0.00643
	(-3.99)	(-3.06)	(-2.15)	(-0.27)
training	-0.0352*	-0.0310*	0.0000807	0.0901$^+$
	(-4.31)	(-2.91)	(0.05)	(2.07)
precarious	-0.0315*	-0.0236*	-0.000819	-0.125*
	(-4.47)	(-2.99)	(-0.46)	(-3.95)
out of labour force	-0.0109$^+$	-0.0184*	0.00162	-0.0212
	(-2.35)	(-3.17)	(1.28)	(-0.93)
unemployed	0.00225	-0.0127	-0.00163	-0.564*
	(0.38)	(-1.47)	(-0.84)	(-15.68)
Obs.	181861	121110	182878	118418
Ind.	56553	49914	56670	48801

Notes: Data from SOEP v32.1. The underlying threshold for non-performance of single activities is 'never' for $DSP1$ (instead of 'less often'), and 'less often' for $DSP2A$ and $DSP2B$ (instead of 'never'). All models are estimated using linear fixed effects and contain the same controls as in the paper. The reference group for employment status is full-time employment; standard errors are clustered on the individual level; t-values are in parentheses, indicated levels of significance are $^+$ for $p < 0.05$, * for $p < 0.01$.