

MEASURES OF SOCIO-ECONOMIC DISADVANTAGE AND LOW-PARTICIPATION NEIGHBOURHOODS - BRIEFING NOTE

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Executive Summary

BEST PRACTICE	FSM	
BEST PROXY	IMD	ACORN
ONLY FOR SPECIFIC SITUATIONS	POLAR TUNDRA	ABCS

Access and Participation Monitoring and Evaluation Team Recommendations

Eligibility for Free School Meals (FSM) is the most appropriate measure of socio-economic disadvantage to be used across the Access and Participation lifecycle. It has the strongest correlation with long-term low household income (income deprivation) and has the fewest false positives, positioning it as the most valid measure of socio-economic disadvantage. As an individual measure, it is the most appropriate measure to use when discussing students rather than cohorts.

Where possible, a basket of indicators (i.e. a combination of multiple measures) should be used to identify socio-economically disadvantaged students.

IMD (Index of Multiple Deprivation) and ACORN (A Classification of Residential Neighbourhoods) are the most effective area measures to use in conjunction with FSM. Both measures are moderately correlated to income deprivation. Additionally, these are the two area measures with the fewest false negatives/positives, establishing them as the most reliable proxies for socio-economic disadvantage among available area measures. IMD will be particularly useful for APP target setting as it is publicly available (ACORN is a commercial dataset).

POLAR (Participation Of Local Areas) and TUNDRA (Tracking Underrepresentation by Area) are only appropriate for identifying underrepresented students to work with at the Access stage. Both are measures of access to university and are not related to socio-economic status. Furthermore, given that they are measures of access to university, it is not appropriate to use POLAR or TUNDRA at other lifecycle stages.

ABCS (Associations Between Characteristics of Students) is not an appropriate measure to be considered as a proxy for socio-economic status. ABCS statistically model the success of students with intersecting characteristics at each lifecycle stage (except awarding). However, as the characteristics and data sets differ in each lifecycle stage, this renders ABCS as unsuitable for monitoring across the whole student journey. ABCS can be better applied to monitoring the performance of the university in comparison to the sector. Furthermore, it is advisable to intentionally consider intersections of characteristics instead of relying solely on ABCS quintiles, as it may be unclear which intersections are being referenced.

Introduction

The [Office for Students' \(OfS\) Access & Participation data](#) includes several measures related to, or used as proxies for, socio-economic disadvantage. The OfS previously expected Higher Education Institutions (HEIs) to use the most recent POLAR measure of low-participation neighbourhoods (POLAR4, for simplicity this report will refer to POLAR generally), but the [2023 guidance](#) allows HEIs to choose the most appropriate measure for their context.

The available measures are [POLAR](#), [TUNDRA](#), [ABCS](#), [IMD](#), and Eligibility for Free School Meals (FSM). [ACORN](#) is also included in this document because of its use throughout the sector and at the University of York. This document summarises the advantages and disadvantages, the validity and the most appropriate context for use of each measure based on evidence from the sector.

These measures are not interchangeable. Each measure uses different metrics and was designed for different purposes and uses different area sizes. This must be considered when deciding which are most useful for discussing the risks to equality of opportunity. In particular, POLAR and TUNDRA are measures of access to university, not socio-economic disadvantage. Likewise, the ABCS measure is not a measure of low socio-economic status, but a statistical model of the likelihood of a good outcome in each lifecycle stage for the intersections of demographic characteristics (e.g. gender, ethnicity, measures of socio-economic disadvantage, LPN (including POLAR and TUNDRA), etc).

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Area versus Individual Measures

POLAR, TUNDRA, ACORN and IMD are area measures, FSM is an individual measure and ABCS is a statistical model. As described by Gorard et al., area measures share similar validity issues: “precision will also be lower for indicators measured at the aggregate rather than the individual level” (p.104). As proxy socio-economic area measures, it's important to understand how effectively they measure socio-economic disadvantage.

Only 13% of FSM eligible students are in POLAR quintile 1 (the most disadvantaged) and conversely, only 10% of POLAR quintile 1 students are eligible for FSM (Atherton et al., 2019, p.8). This demonstrates the lack of relationship between FSM and POLAR quintile 1. POLAR is a measure of access to university at an area level rather than a measure of socio-economic status. This is further discussed by Boliver et al. (2022):

*“POLAR and TUNDRA are poor proxies for socio-economic disadvantage at the individual level. Both the POLAR and TUNDRA quintile 1 categories fail to capture a considerable 70 percent of pupils who were Ever FSM (false negatives), and around 60 percent of POLAR and TUNDRA quintile 1 individuals were not Ever FSM (possible false positives).”
(Boliver et al., 2022, p363-365)*

[Appendix A](#) includes Figure 4 from the same paper showing the overlap between FSM and different area measures.

Analysis of Measures

As there is little overlap between POLAR quintile 1 and FSM, it is unsurprising that their correlation to household income (HHI) differs. FSM strongly correlates with permanent income deprivation, and POLAR and TUNDRA have a weak correlation (Jerrim, 2021). Jerrim investigated the measures of socio-economic disadvantage and the results are recorded in [Table 1](#).

A false negative describes when a disadvantaged student is not captured in the data set. The table includes the percentage of the least advantaged students not captured by the measure.

- For example, this could be students that are eligible for FSM but do not claim their entitlement.
- Similarly this may be students from low-income households who rent in a POLAR quintile 3 or above area.

A false positive is when advantaged students are unintentionally captured by the measure. The table includes the percentage of students recorded as disadvantaged when they are not.

- These may be students that live in rural areas with low average participation in higher education but have high-income households and other strong indicators of attending higher education.

False negatives and positives are explained further in Boliver et al. (2022). A visual representation of this explanation (Figure 1 in Boliver et al., 2022) is included in [Appendix B](#).

For a representative measure of socio-economic disadvantage, we would expect a strong correlation (above 0.6) between the measure and low household income, and small percentages of false positives/negatives. As you can see from [Table 1](#), FSM best fits this definition.

Table 1: Analysis of measures of socio-economic disadvantage and LPN (Jerrim, 2021)
(Correlation is calculated with the lowest 20% of permanent income/income deprivation)

Measure	Measure Type	Intended Use	Correlation with Perm. income	Correlation with Perm. income deprivation	False Negatives	False Positives
POLAR	Area ~ 5,550 -7,500 individuals	Access to HE	0.38 (weak)	0.22 (weak)	39%	48%
TUNDRA	Area ~ 5,550 -7,500 individuals	Access to HE	0.3 (moderate/weak)	0.17 (weak)	52%	42%
IMD	Area ~1,500 individuals	Deprivation	0.48 (moderate)	0.47 (moderate)	27%	30%
ACORN	Area	Commerical	0.54 (moderate)	0.56 (moderate)	24%	31%
FSM	Individual	Household Income	0.44 (moderate)	0.68 (strong)	26%	20%

Previously when measures of socio-economic disadvantage were selected it was a “trade-off between validity, reliability and availability” (Atherton et al., 2019, p.13). As a result, proxy areas measures were heavily

relied upon. Now FSM is available to the sector, it is possible and practical to use this more reliable and valid measure to best support socio-economically disadvantaged students.

Summary of Measures

POLAR Low-Participation Neighbourhoods (LPN)		Measure Type:	Area (MSOA - Middle layer super output areas)
% of False Positives	48%	% of False Negatives	39%
Advantages:		Disadvantages:	
<ul style="list-style-type: none"> • Consistent categorisation. • Has been the most available measure for several years. • Predicts affluence well, i.e a student in quintile 5 is likely to come from a household with wealth. • Open data source provided by the OfS. 		<ul style="list-style-type: none"> • Assumes an individual has the modal characteristics of the people in the area they live (up to 7,500 people). • Underestimates the probability that certain characteristics (renters, students with young mothers, London-based/ rural students, BAME students) will impact student academic journey. This is described as bias (Jerrim, 2021). • Overestimates educational achievement and underestimates educational inequality. • High false positives and negatives and low correlation to income deprivation. • A substantial minority of the wealthiest students live in Q1 (Gorard et al., 2019). • POLAR Q1 contains many high socio-economic occupations, roughly 1 in 3, and long-time unemployed often fall into Q3 (Harrison & McCaig, 2015). • <i>“Universities can report positive changes in recruitment from LPNs without seeing any significant difference in the actual situations of the young people entering by other measures such as social class or family income”</i> (Harrison & McCaig, 2015, p.812). 	
Most appropriate for for:		Avoid when:	
<ul style="list-style-type: none"> • Targeting schools/cohorts for access/outreach work. • Funding/policy level monitoring. • Addressing underrepresentation, not socio-economic disadvantage i.e. identifying areas to target outreach work with schools. 		<ul style="list-style-type: none"> • Discussing socio-economic status. • Analysing non-access lifecycle stages. • Considering intersections between ethnicity and socio-economic disadvantage. • Identifying rural or London-based cohorts. • Making individual decisions. 	

TUNDRA Low-Participation Neighbourhoods (LPN)		Measure Type:	Area (MSOA - Middle layer super output areas)
% of False Positives	42%	% of False Negatives	52%
Advantages:		Disadvantages:	
<ul style="list-style-type: none"> • Only considers state school students (POLAR includes all students, which can inflate participation rates in areas with high proportions of private school students). • Tracks students from KS4 to HE (POLAR measures students at 18year olds only). • Open data source provided by the OfS. 		<ul style="list-style-type: none"> • High false positives/negatives and low correlation to low household income. • Assumes an individual has the modal characteristics of the people in the area they live (up to 7,500 people). • As a statistically similar measure to POLAR, it has the same bias issues. • Available for England only. 	
Most appropriate for:		Avoid when:	
<ul style="list-style-type: none"> • Targeting schools/cohorts for access/outreach work. • Sector level monitoring. 		<ul style="list-style-type: none"> • Discussing socio-economic status. • Analysing non-access lifecycle stages. • Considering intersections between ethnicity and socio-economic disadvantage. • Identifying rural or London-based cohorts. • Making individual decisions. 	

IMD Area measure of 'deprivation'		Measure Type:	Area (LSOA - Lower layer super output areas)
% of False Positives	30%	% of False Negatives	27%
Advantages:		Disadvantages:	
<ul style="list-style-type: none"> • Uses seven weighted data sets to create more complex deciles. • Smaller area size than POLAR/TUNDRA (around 1500 people) which makes the measure more specific. • Open data source provided by the OfS. 		<ul style="list-style-type: none"> • Available for England only, but equivalents are available for Scotland and Wales (SIMD and WIMD). • Can still obscure individual/family situations. • Bias exists in the measure; it is particularly poor for large rural areas, BAME students and renters. 	
Most appropriate for:		Avoid when:	
<ul style="list-style-type: none"> • Using alongside FSM as part of a basket of indicators. • Using as a longitudinal measure of socio-economic disadvantage in the OfS data set for target setting. • Identifying risks in the EORR. 		<ul style="list-style-type: none"> • Discussing the UK as a whole; it is necessary to then include SIMD and WIMD. • Making individual decisions. 	

ACORN Geodemographic commercial area measure		Measure Type:	Area (Postcode)
% of False Positives	31%	% of False Negatives	24%
Advantages:		Disadvantages:	
<ul style="list-style-type: none"> • Smallest area size (10-15 households). • Highest area measure correlation with low household income. • The categories use area and lifestyle survey questions to establish a more complex understanding of circumstances. 		<ul style="list-style-type: none"> • Have to pay for measure - i.e. not publically available/accessible. • Opaque methodology. • Categorical data, not ordinal. • Categorises about half (48%) of the population as disadvantaged - categories 4 and 5. 	
Most appropriate for:		Avoid when:	
<ul style="list-style-type: none"> • A proxy for FSM when the data is not available (Jerrim, 2021). 		<ul style="list-style-type: none"> • APP reporting/target setting as the OfS requires open source data. 	

Eligibility for Free School Meals (FSM) Individual measure		Measure Type:	Individual
% of False Positives	20%	% of False Negatives	26%
Advantages:		Disadvantages:	
<ul style="list-style-type: none"> • FSM eligibility is verified at school level: high validity/reliability. • Demonstrated difference in educational outcomes at KS4 (8 GCSE grades (Ilie et al., 2017)). • Low false positives and negatives and high correlation to income deprivation • Relevant as a measure throughout HE lifecycle. • Lowest bias of measures, fairly represents a range of characteristics. • Sutton Trust called for this to be used by (and made available to) HEIs (Jerrim, 2021) • "FSM is a single measure that captures a multidimensional group of pupils from a range of backgrounds" (Ilie et al., 2017, p.264). 		<ul style="list-style-type: none"> • Blunt measure: the cut-off is a hard line and is set quite low resulting in high numbers of near misses. • Only includes those who are eligible <i>and</i> who claim FSM. This may not capture those who choose not to claim their entitlement due to personal, dietary or religious reasons. • Only the two most recent years of FSM data is available to HEIs. • Does not capture the 'working poor'. 	
Most appropriate for:		Avoid when:	
<ul style="list-style-type: none"> • Individual context decisions. • Using EverFSM (were students eligible at any point), not just a single point in time. 		<ul style="list-style-type: none"> • Differentiating between middle and high-income students. 	

ABCS* Intersectional statistical measure	Measure Type:	Composite, intersectional
Advantages:	Disadvantages:	
<ul style="list-style-type: none"> • Considers intersections of characteristics at each outcome level. 	<ul style="list-style-type: none"> • Different students will fall into different quartiles across the lifecycle stages. • There is no consideration of age or disability in the intersectional calculations at access level (Table 2). • Different characteristics and data sets are used at different lifecycle stages. • Does not measure socio-economic disadvantage, uses existing A&P measures (some of which also are not measures of socio-economic disadvantage e.g. POLAR and TUNDRA). • Not available for the awarding stage, a particular area of focus for the University of York. 	
Most appropriate for:	Avoid when:	
<ul style="list-style-type: none"> • Understanding intersectional trends at sector level using the documentation, rather than the quintiles. 	<ul style="list-style-type: none"> • Comparing across lifecycle stages. • Discussing socio-economic disadvantage. 	

(*false negatives/positives are not included for ABCS because the paper predates their use)

Table 2: Characteristics included in statistical modelling for ABCS lifecycle stages

The table reflects the language the OfS uses at each stage. The OfS refers to Gender in the Access documentation and Sex in the remaining lifecycle stages.

	Access	Continuation FT	Continuation PT	Completion FT	Completion PT	Progression FT	Progression PT
Ethnicity	■	■	■	■	■	■	■
FSM	■	■	■	■	■	■	■
Gender	■						
Sex		■	■	■	■	■	■
IMD	■	■	■	■	■	■	■
IDACI	■	■	■	■	■	■	■
TUNDRA	■	■	■	■	■	■	■
Age		■	■	■	■	■	■
Care Experience		■	■	■	■	■	■
Disability		■	■	■	■	■	■
NS-SEC		■	■	■	■	■	■
Parental HE		■	■	■	■	■	■
Local/Distance Learner		■	■	■	■	■	■
Adult HE Quintile		■	■	■	■	■	■
TOTAL	6	12	8	11	8	12	8

References

- Atherton, D. G., Boffey, D. R., & Kazim, T. (2019). *POLAR Opposite: How the targeting of learners for widening access to HE work could be improved*.
<https://www.suttontrust.com/wp-content/uploads/2021/05/Measuring-Disadvantage-Report.pdf>
- Boliver, V., Gorard, S., & Siddiqui, N. (2022). Who counts as socioeconomically disadvantaged for the purposes of widening access to higher education? *British Journal of Sociology of Education*, 43(3), 349–374.
<https://doi.org/10.1080/01425692.2021.2017852>
- Gorard, S., Boliver, V., Siddiqui, N., & Banerjee, P. (2019). Which are the most suitable contextual indicators for use in widening participation to HE? *Research Papers in Education*, 34(1), 99–129. <https://doi.org/10.1080/02671522.2017.1402083>
- Harrison, N., & McCaig, C. (2015). An ecological fallacy in higher education policy: The use, overuse and misuse of 'low participation neighbourhoods'. *Journal of Further and Higher Education*, 39(6), 793–817.
<https://doi.org/10.1080/0309877X.2013.858681>
- Ilie, S., Sutherland, A., & Vignoles, A. (2017). Revisiting free school meal eligibility as a proxy for pupil socio-economic deprivation. *British Educational Research Journal*, 43(2), 253–274. <https://doi.org/10.1002/berj.3260>
- Jerrim, J. (2021). *Measuring Disadvantage* (pp. 1–13) [Research Brief]. The Sutton Trust.
<https://www.suttontrust.com/wp-content/uploads/2021/05/Measuring-Disadvantage-Report.pdf>

Appendix A - Venn diagrams showing bivariate relationships between EverFSM and area-level and school-level measures of disadvantage

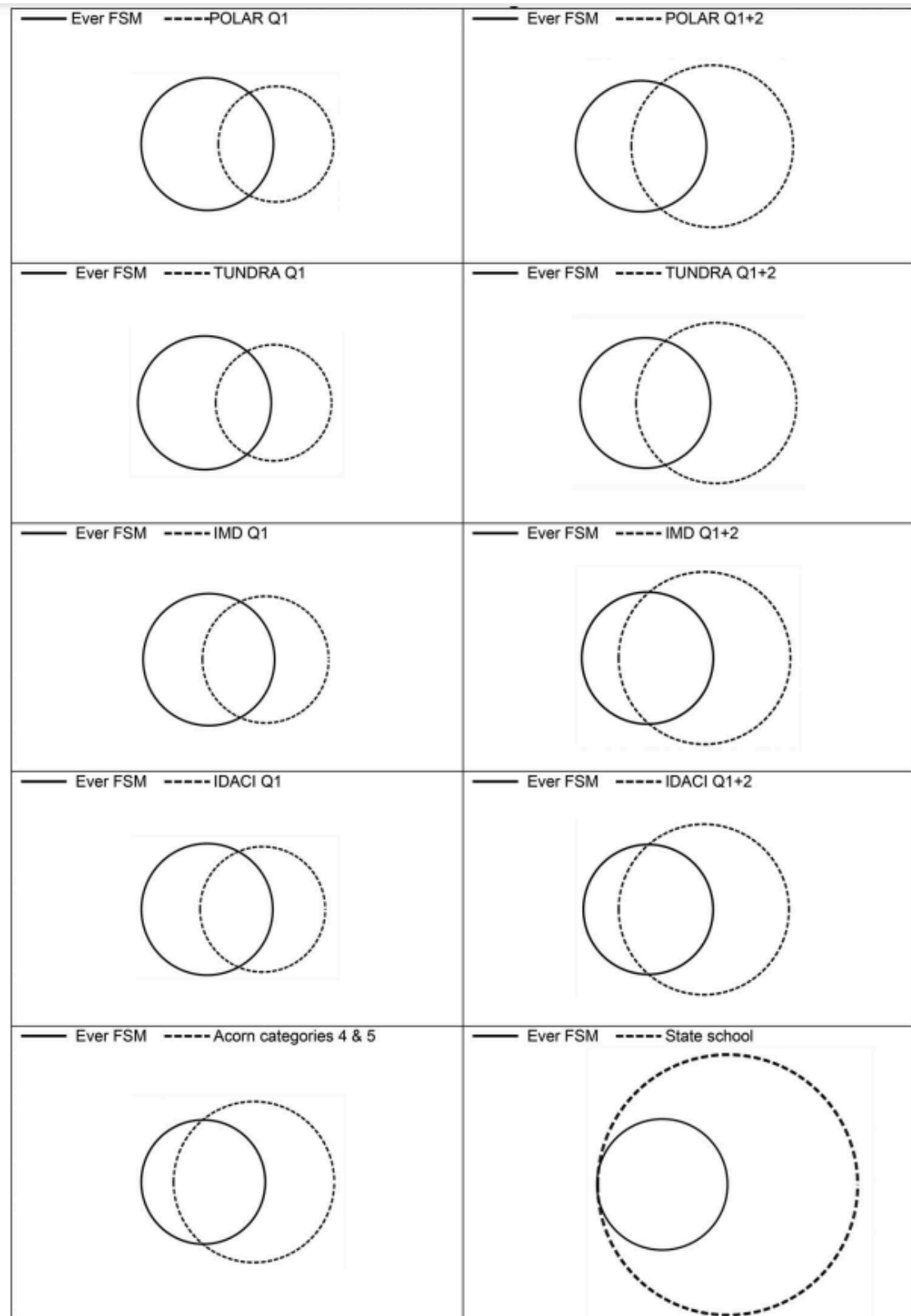


Figure 4 from Boliver et al. (2022), p.368

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Appendix B - Venn diagrams showing illustrative combinations of rates of false negatives and false positives

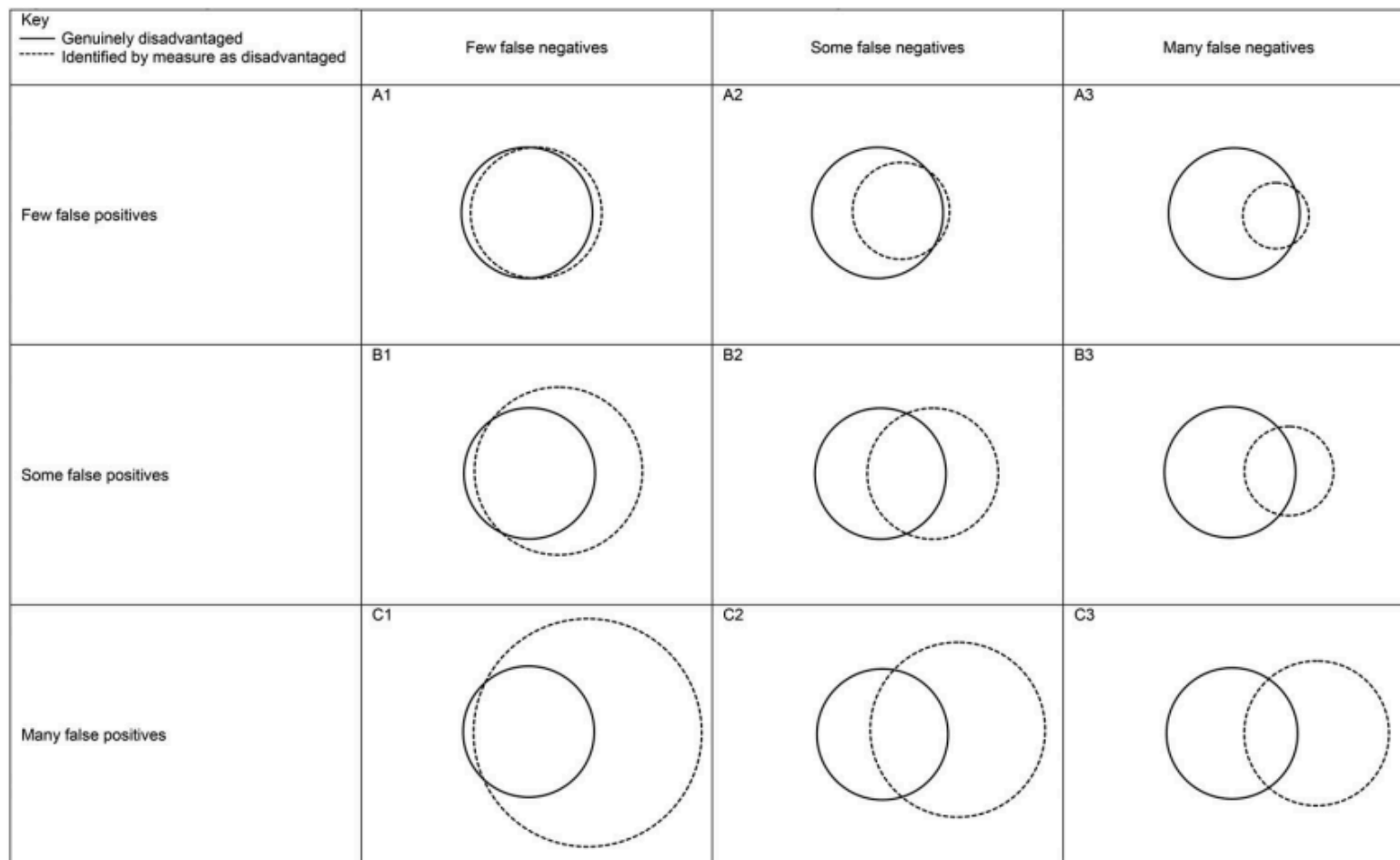


Figure 1 from Boliver et al. (2022), p.352

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