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ORIGINAL ARTICLE

Beyond innumeracy: measuring public misperceptions about immigration

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Abstract
Public perceptions of immigration are often inaccurate, yet research lacks conceptual clarity and valid measurement of these misperceptions. Prior work focuses mainly on population innumeracy (misestimating immigrant shares) and cannot distinguish genuine misperceptions from mere guessing. We introduce a survey module that captures multiple dimensions of immigration-related perceptions alongside respondents' confidence in their estimates. Using population survey data from Switzerland, we develop confidence-weighted indicators that separate misperception from guessing. Although inaccurate perceptions are widespread across several immigration domains, they are less prevalent than often assumed; guessing accounts for a substantial share of observed inaccuracy. This measurement strategy enables more precise empirical tests of theories linking perceptions to political attitudes and behavior.

Keywords: Ethnicity and Nationalism; Measurement; Political Psychology; Public Opinion; misperception; immigration

1. Introduction

Immigration has become a focal point in political debates across liberal democracies, amid growing evidence that public perceptions of migration are frequently inaccurate and biased (Lutz and Bitschnau, 2023). Moreover, such *misperceptions* are widely regarded as influential in shaping attitudes and policy preferences: they are seen as harming open discourse, contributing to misguided policies, and straining inter-group relations (e.g., Semyonov *et al.*, 2008; Strabac, 2011; Blinder, 2015; Steele and Perkins, 2019; Alesina *et al.*, 2023). The underlying concern is that when large segments of the public hold inaccurate beliefs about immigrants, the consequences may be detrimental not only to their communities but also to the broader democratic fabric.

For decades, scholars have studied factual beliefs primarily through the lens of political knowledge, with research consistently showing that most citizens possess a limited understanding of political facts (Barabas *et al.*, 2014). Only in recent years have misperceptions—defined as incorrect beliefs based on misinformation—gained distinct attention, as their drivers and consequences go beyond a mere lack of knowledge. However, scholarly understanding of the nature and implications of public misperceptions remains limited. Existing research is fragmented and offers little consolidated insight, not least because of measurement problems that raise questions about the prevalence and significance of the phenomenon (e.g., Graham, 2023; Deutschmann, 2025). This has fueled an ongoing debate: Are misperceptions indeed a pervasive threat to democratic deliberation, or are they merely overrated and amplified by imprecise measurement?

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This article addresses the debate by tackling two key shortcomings in existing scholarship. First, much of the literature and many survey items focus exclusively on perceptions of the immigrant population share. This narrow scope limits gaining empirical insights and relies on a specific type of misperception that has already been problematized in the literature. Second, current survey instruments often fail to distinguish between genuine misperceptions (i.e., individuals hold incorrect beliefs) and what is better described as uninformed guessing. Such limitations in measurement validity may lead to considerably overestimating the prevalence of misperceptions and drawing misguided conclusions about both their drivers and consequences. The critical question that remains unanswered is: to what extent do standard survey measures capture genuine misperceptions rather than guesses? While recent studies have begun addressing this distinction by incorporating confidence levels (e.g., Pasek *et al.*, 2015; Guay, 2022; Graham, 2023; Deutschmann, 2025), prevailing methods rely on categorical thresholds and lack continuous, direct measures of misperceptions and guessing. Building on this foundation, our study advances the field by developing and validating scores of this kind, designed for flexible application across different topics. We illustrate the value of this approach by applying it to immigration, a politically salient issue characterized by especially widespread and impactful misperceptions.

In this article, we make three distinct contributions to address these challenges. First, we reflect on the conceptual and methodological difficulties involved in measuring misperceptions, highlighting the constraints of population innumeracy items and the importance of incorporating confidence levels into assessments of belief accuracy. Second, we introduce a novel survey module comprising eight issue-related items across four dimensions, which integrates respondent confidence to enable a more valid measurement of misperceptions that closely aligns with their definition. Third, we field this module in a large-N population survey in Switzerland—a country characterized by both a significant immigrant population and a long history of politicized immigration debates—and thereby provide insight into the nature of immigration misperceptions as well as in the utility of our approach.

2. Understanding misperceptions in empirical research

2.1. Definition and relevance of misperceptions

Perceptions of social and political phenomena represent the subjective dimension of how people make sense of their environment. In his seminal work on public opinion formation, Walter Lippmann (1997) argued that perceptions of social reality often diverge from the real world, emphasizing that imagined representations of the world are what shape human behavior. When perceptions are inaccurate, that is, they are obviously 'false or contradict the best available evidence' (Flynn *et al.*, 2017: 128), they are typically referred to as misperceptions. As a cognitive category *sui generis*, misperceptions should be distinguished from both ignorance and knowledge: the former refers to the absence of a belief about a certain issue, whereas the latter is the possession of a correct belief (Kuklinski *et al.*, 2000). Unlike ignorance, misperceptions are beliefs held firmly and with confidence, but unlike knowledge, they fail to reflect empirical reality.

In any case, they are a phenomenon of great normative and political importance. Normatively, the ideal of democracy depends on knowledgeable citizens who are capable of making well-reasoned decisions for the common good (Dahl, 1998). Democratic debates require a minimal level of agreement on facts and a shared sense of reality among citizens (Rekker, 2022). Misperceptions run counter to this ideal by weakening fact-based deliberation and making it difficult for evidence-based policy-making to prevail. They can distort opinions and preferences on critical issues, ranging from vaccination choices (Nyhan and Reifler, 2015) to political violence (Lees, 2022), and, unlike a simple lack of knowledge, are resistant to correction due to motivated reasoning (Kuklinski *et al.*, 2000).

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2.2. Studying misperceptions about immigration

Recent interest in misperceptions about immigration as a distinct form of cognition has given rise to a fragmented body of literature spanning many disciplines (for a recent overview, see Lutz and Bitschnau, 2023). Empirically, a range of phenomena is subsumed under the term, including inaccurate *images* of immigration (Blinder, 2015), causal misattributions (Wu, 2022), a lack of knowledge (Aalberg and Strabac, 2010), or, more specifically, mistaken perceptions of immigrant flows (e.g., Citrin and Sides, 2008; Herda, 2010). Regardless of the conceptualization, most studies rely on population surveys as their preferred tool for measuring public perceptions. They ask respondents to give estimates on immigration-related issues—exemplified by an item from the European Social Survey (ESS): 'Out of every 100 people living in [country], how many do you think were born outside [country]?' The accuracy of these estimates is then assessed by comparing them to official figures and classifying the degree of deviation on a discrete scale as correct, overestimation, or underestimation (Herda, 2013; Gorodzeisky and Semyonov, 2020). Alternatively, the extent of inaccuracy can be quantified on a continuous scale, either in absolute (i.e., percentage points) or relative (i.e., percentages) terms (Herda, 2010).

Based on this, immigration appears not only especially prone to misperceptions but also consequential (Lutz and Bitschnau, 2023), with such misperceptions found across countries and demographic groups (Alesina *et al.*, 2023). Yet, at the same time, some authors contend that their frequency may be markedly overestimated (e.g., Graham, 2023; Deutschmann, 2025). What is more, perceptions about immigration are often not only inaccurate but also characterized by a clear *negativity bias*. This means that immigrants are, on average, perceived as more violent, uneducated, or culturally distant than empirical evidence suggests (Lutz and Bitschnau, 2023). The bias entrenched here is widely believed to stem from politically motivated reasoning (Taber and Lodge, 2006; Kahan, 2016; Klintman, 2019), which itself is largely driven by ideological predispositions and preexisting sentiments. This is also why many misperceptions seem hardwired—people refuse to accept the *real* figure because doing so would trigger cognitive dissonance (Rolfe *et al.*, 2018; Hopkins *et al.*, 2019; Jørgensen and Osmundsen, 2022). This applies to individuals from different political camps (Washburn and Skitka, 2018; Lind *et al.*, 2022), although information treatments may still influence people's attitudes and preferences (e.g., Grigorieff *et al.*, 2020; Haaland and Roth, 2020; Carnahan *et al.*, 2021). Making sense of these inconclusive findings on the frequency and nature of misperceptions requires an adequate conceptual understanding and valid empirical measurement. But despite notable advances, the field remains *in statu nascendi*, and its progress is hampered by conceptual and methodological shortcomings. In the following, we elaborate on two of these shortcomings that we deem to be of particular relevance.

2.3. The dominance of population innumeracy

The first shortcoming concerns the fact that, though a wide and growing range of misperceptions about immigration has been documented, most empirical research focuses on population innumeracy, which can be defined as the tendency to overestimate the share of immigrants within a population (e.g., Sides and Citrin, 2007; Citrin and Sides, 2008; Herda, 2010; Strabac, 2011; Gorodzeisky and Semyonov, 2020). For several reasons, this focus is hardly surprising. First, the concept of innumeracy is well-established in the study of perceptions of minorities (Nadeau *et al.*, 1993) and has served as a foundational entry point for research on misperceptions about immigration as well. Also, the conceptual simplicity of estimating the number of immigrants lends itself well to representation as a percentage of the resident population. Not to forget the fact that immigration population figures are easily available, allowing researchers to evaluate the accuracy of survey responses and to make comparisons across space and over time. All these features have made population innumeracy the preferred (and sometimes only relevant) metric for studying misperceptions about immigration and a mainstay in social science research.

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That said, there are evident limitations both in the narrowness of this focus and in the specific type of misperception it captures. To begin with, immigration is a multifaceted phenomenon, and individuals hold a range of associations and beliefs about it. Against this backdrop, a single item cannot adequately represent the full spectrum of public perceptions. Rather, the emphasis on population innumeracy puts aside other important aspects, such as the composition of the immigrant population or the drivers and consequences of immigration—all of which have been shown to play a key role in immigration politics (e.g., Blinder, 2015; Herda, 2015).

A second problem concerns methodological doubts about whether population innumeracy is simply a manifestation of a broader cognitive innumeracy bias, i.e., the difficulty many people have in accurately processing numerical information and concepts related to statistics and probability (Paulos, 1988). If this is indeed the case, misperceptions about immigration may primarily result from a general tendency to overestimate minority group sizes, rooted in difficulties with estimation tasks and a clear cognitive bias toward central values when judging proportions (e.g., Nadeau *et al.*, 1993; Lawrence and Sides, 2014; Landy *et al.*, 2018; Guay *et al.*, 2025). This bias tends to be stronger when the benchmark value is small. It is therefore especially relevant for immigration-related items, as the overall population share of most immigrant groups is low, and certain consequences of immigration occur rarely—a fact exemplified in a U.S. study measuring perceptions of the share of refugees (0.06%) and their likelihood of committing and being convicted of terrorism (0.00074%) (Thorson and Abdelaaty, 2023). A complementary issue is the underestimation of large numbers, such as when respondents are prompted to estimate the absolute number of successful asylum seekers (Guenther, 2024). And finally, the way items are worded may also contribute to bias: many surveys, most notably the ESS, ask respondents how many out of 100 residents in their country they believe to be immigrants. This format may itself inflate misperceptions due to the 1-in-X bias (Dickson *et al.*, 2024), a pattern confirmed in our analysis (see pretest report in Appendix I).

Defining which threshold qualifies an estimate as accurate (i.e., no longer a misperception) is another key challenge. An estimate that is close to the real value would be considered accurate even if the two are not identical. In previous empirical research, this notion of *closeness* has been operationalized either as absolute deviation, such as 1 or 5 percentage points (e.g., Herda, 2010, 2013; Deutschmann, 2025), or in relative terms, such as one-fifth below or above the real value (e.g., Gorodzeisky and Semyonov, 2020). Yet while this dichotomization of accuracy may facilitate empirical assessment, any threshold is necessarily arbitrary and thus leads to non-generalizable conclusions. This problem is compounded by the fact that, in some cases, larger deviations from the real value are possible than in others (e.g., when this value is 10% instead of 50%). More broadly, since people may both underestimate or overestimate the official value, these strategies reduce information and overlook the inherent directionality and gradation of misperceptions.

2.4. Misperceptions or bad guessing?

As a second shortcoming of current research, we identify a lack of measurement validity arising from the failure to distinguish between genuine misperceptions—cases in which individuals hold incorrect beliefs—and uninformedness, which refers to a state in which individuals do not know what to believe but still give an incorrect answer (Kuklinski *et al.*, 2000). In most studies on immigration misperceptions, survey respondents are asked to give a numerical estimate but not asked how confident they are that this estimate matches reality. As a result, researchers cannot properly determine whether responses are rooted in beliefs or instead represent on-the-spot judgments that are elicited by the question posed and betray little else than simple guessing (Zaller, 1992; Pasek *et al.*, 2015). This means that the most common approach conflates two fundamentally distinct phenomena. It also ignores that these phenomena carry different psychological and epistemological implications: someone who gives an inaccurate response without believing in it may be more open to correction, for instance, than someone who does (Li and Wagner, 2020). Because of this striking mismatch between

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conceptualization and measurement, many studies may have prematurely treated incorrect estimates as misperceptions.

A central reason why this distinction between misperceptions and incorrect guessing has not been dealt with yet may lie in the literature's focus on knowledge and its interpretation of wrong answers as *prima facie* evidence for a lack of such knowledge (Bartels, 1996). In addition to this, empirically distinguishing the two phenomena is a difficult undertaking and requires complex survey designs that are more costly and time-consuming to implement (Lindgren *et al.*, 2022). Consequently, most research on immigration misperceptions is unable to validly measure its outcome of interest.

3. Improving the measurement of immigration misperceptions

3.1. Survey battery of perception items

To further advance the study of immigration misperceptions, we present a survey module designed to overcome the shortcomings discussed above. First, we address the limitations of relying on population innumeracy as the primary measure for studying misperceptions. Then, we introduce a battery of eight perception items covering four distinct dimensions of immigration. Employing multiple items is a well-established approach for measuring political knowledge (Delli Carpini and Keeter, 1996), and we apply the same logic here to obtain a comprehensive and reliable assessment of immigration misperceptions.

In developing the survey battery, we carefully considered three core elements: the underlying concept of each item, the benchmark value needed to assess accuracy, and the measurement scale for capturing perceptions. These elements guided the construction process of our battery to make sure that it validly and reliably captures immigration misperceptions. First, we selected aspects of immigration that are broadly comprehensible to the general public and likely to shape perceptions of the issue. This ensured that respondents were likely to have prior exposure to the subject. Without this grounding, responses would have reflected not actual beliefs but statistical artefacts arising from proxy reasoning, off-topic inferences, or on-the-spot guesses.

Second, we prioritized items that could be benchmarked against official and undisputed statistical data. At the same time, we crafted the item wordings so that they can be easily understood, are free of technical language, and accessible to respondents without any specialized knowledge—an especially important consideration in the context of immigration, where public understanding and official definitions often diverge.

Third, we chose a gradual response scale—specifically, percentage estimates ranging from 0–100—because it reflects how people typically perceive social realities: as matters of degree rather than binary facts. This scale provides more information by capturing both the magnitude and direction of perceptual inaccuracies. Such variation is key for distinguishing between systematic misperceptions and random errors. At the same time, we avoided items with extremely high or low benchmark values, as these are known to inflate measurement error due to cognitive biases and general innumeracy. By using a balanced range of official values across items, we aimed to minimize such bias and ensure that observed deviations mirror genuine misperceptions rather than scale-induced distortions.

Finally, we sought conceptual and methodological balance across the battery. It comprises eight items covering four key dimensions of immigration: demographics, culture, economy, and security. The first dimension covers perceptions of the immigrant population as a whole, while the latter three reflect three threat dimensions identified as central to the formation of immigration misperceptions (Lutz and Bitschnau, 2023). Within each dimension, we selected two complementary items that vary in cognitive difficulty and connotation, striking a balance between positively and negatively framed content. This allowed us to capture the multidimensional nature of immigration misperceptions and reduced the risk that results were driven by the peculiarities of single items or dimensions.

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Within our first dimension, we asked respondents to estimate both the population share of immigrants and the share of refugees among recently arrived immigrants. While the former is the most common question to measure immigration misperceptions, it is also the least specific and allows for comparisons with existing surveys. Several studies have indicated that the Swiss public tends to overestimate the share of their immigrant population, albeit to a lesser extent than respondents in other countries (e.g., Citrin and Sides, 2008; IPSOS, 2018). The second item focused on refugees as a crucial immigrant group that often dominates public attention. We thus combined a rather general question about the immigrant stock with a more specific one about recent immigrant flows.

The cultural aspect of immigration constitutes the second dimension of our survey battery. Despite its central role in immigration politics, operationalizing this dimension is challenging. We made an effort to this end by asking respondents about two immigrant groups that are frequently evaluated in terms of their cultural proximity (or perceived lack thereof) to Swiss citizens: foreigners who are Muslims—a highly migranticized and politically salient religious minority—and immigrants who hold citizenship from an EU member state. These items complement each other in that Muslims are often thought of as culturally distant, while EU immigrants are generally regarded as culturally close. In the Swiss context, both have been at the center of high-profile campaigns and referendums over the years (e.g., Dolezal *et al.*, 2010; Armingeon and Lutz, 2021), which increases the likelihood that people hold firm beliefs about them.

To capture the economic dimension, we asked respondents to estimate the unemployment rate among foreigners and the proportion of recent immigrant arrivals holding a tertiary degree. Both items pertain to the perceived economic impact of immigrants on their host country and address the widespread belief that most are poorly educated and reliant on welfare (e.g., Cengiz and Eklund Karlsson, 2021; Alesina *et al.*, 2023). As with the cultural dimension above, the items are complementary and encompass both a negative condition (being unemployed) and a positive attribute (being educated).

Finally, we included two security-related items on immigrant crime and undocumented immigration, both of which are great public concerns (e.g., Mudde, 2010). Specifically, we asked for the proportion of foreigners among those convicted of a crime and that of immigrants without valid residence permits among all foreign residents.[1] Both items reflect the perception that immigrants pose a threat to society and undermine public safety. In this case, the complementarity of the items relates to their frequency: while undocumented immigrants are a small minority, a majority of those convicted of a crime is non-Swiss. This pattern—immigrants usually entering through legal channels but being disproportionately represented in crime statistics—is consistent across many host societies (Marie and Pinotti, 2024).

All items were measured as perceptions on a 0–100 percent scale, which simplified the estimation task for respondents, ensured comparability across items, and helped avoid the 1-in-X bias (Dickson *et al.*, 2024).[2] Official benchmark values were taken from the most recent available data of the Swiss Federal Statistical Office (see Appendix I) and range from 4 percent (unemployment and undocumented immigrants) to 66 percent (EU immigrants). This avoids extreme values while maintaining a balanced distribution across the response scale, thus enabling us to assess both the accuracy of perceptions and the direction of any deviation.

[1]Note that the high share of crimes committed by foreigners in Switzerland is frequently cited and highlights the country's outlier status in this regard (Fasani *et al.*, 2019).

[2]For six of the eight items, the response scale represents the percentage of the immigrant population: P(Trait/Immigrant). Two items deviate from this by using the inverse conditional probability—the overall immigrant population share and the proportion of immigrant share among all criminal offenders. In the latter case, the more intuitive alternative, expressing the share of criminals as a percentage of the immigrant population, would have yielded a very low benchmark value. It is plausible that this inverse conditional structure introduces cognitive difficulty and may negatively affect response accuracy (Gigerenzer and Hoffrage, 1995), particularly for the crime item, given its less intuitive base rate compared to the population share.

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3.2. Complementary confidence measures

After constructing this battery, we had to address the challenge of distinguishing between respondents who provide inaccurate responses because of misinformation and those who are simply uninformed.[3] To achieve this, we complemented the above perception items with a measure capturing the extent to which respondents are confident in their estimates.[4] This approach builds on prior studies that measure confidence or certainty regarding perceptions in other issue areas (e.g., Pasek *et al.*, 2015; Carlson and Hill, 2022; Guay, 2022; Graham, 2023) to assess whether individuals genuinely hold beliefs in falsehoods or not.[5] Combined with inaccuracy, it enabled us to categorize survey responses into distinct cognitive outcomes (Table 1). Specifically, we distinguished between two types of inaccurate perceptions: those held with high confidence, which we refer to as misperceptions, and those with low or no confidence, which can be considered tantamount to bad guesses. Misperceptions reflect distorted perceptions that are often rooted in motivated reasoning, whereas guessing represents more random, ad hoc responses that draw little, if at all, on prior beliefs. The corresponding types of accurate perceptions are those held with high confidence, which we call knowledge, and those held with low or no confidence, which are essentially good guesses.

These categories are ideal types, as many responses fall somewhere between them and should therefore be viewed as *partially informed*. This, in turn, implies that misperceptions are best understood as a matter of degree: the greater one's confidence in an inaccurate response, the stronger the misperception. This conceptualization has the advantage of avoiding arbitrary cutoffs—commonly used in earlier studies employing confidence measures—to classify responses as misperceptions or guesses. Instead, it treats inaccuracy and confidence as continuous and distinct, meaning that giving an inaccurate response and expressing confidence in it are necessary and jointly sufficient conditions for holding a misperception (Goertz, 2006). This allows for a closer alignment between the empirical measurement of misperceptions and its theoretical foundation.

Applying this logic to our empirical data, we calculated a *misperception score* by multiplying the degree of inaccuracy by the level of confidence. The former is the number of percentage points by which an estimate deviates from the corresponding benchmark value, while the latter is first recorded on a scale from 0 (no confidence at all) to 10 (complete confidence), and then rescaled to 0–1. By multiplying these two variables, we ensured that the misperception label is limited to cases where both conditions—inaccuracy and confidence—are met. This yields a single metric that directly indicates the degree of misperceptions at the individual level.

In the same way, we calculated a *guessing score* by multiplying the degree of inaccuracy by the lack of confidence, effectively inverting the confidence scale. As an alternative, we also calculated normalized scores that account for the varying scales of our items. This was done by dividing the inaccuracy by the maximum possible error—defined as distance to 0 for underestimates and to 100 for overestimates. Both of these operationalizations entail some trade-offs: while the raw score may inflate misperceptions for items with rather large numerical ranges, the normalized score may understate

[3]Note that one can be misinformed even in the absence of exposure to misinformation (i.e., inaccurate information that is shared).

[4]Alternative empirical strategies to improve the operationalization of misperceptions in surveys, as proposed in the literature, include open-ended responses, a *Don't know* option, and correction experiments (Lindgren *et al.*, 2022). Still, each of these comes with considerable limitations. Open-ended questions are well suited for eliciting simple factual statements but are ill-equipped to capture estimates on a continuous scale. The use of a *Don't know* option may lead to more selection bias (Mondak and Creel Davis, 2001; Lee and Matsuo, 2018), as certain respondents might disproportionately opt out. And correction experiments, while valuable for assessing the malleability of beliefs, do not directly indicate whether respondents hold those beliefs with confidence. In light of these constraints, we have opted to use confidence measures as a more direct and scalable method.

[5]These studies differ in important ways from our design. While Guay (2022) and Pasek *et al.* (2015) apply an arbitrary threshold on confidence measures to classify responses as either misperceptions or ignorance, Carlson and Hill (2022) focus on probabilistic beliefs about political views rather than the factual beliefs that are central to our study.

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Table 1. Typology of cognitive outcomes for accuracy and confidence

	Confidence	No Confidence
Accuracy	**Knowledge** (informed)	**Good guess** (uninformed)
Inaccuracy	**Misperception** (misinformed)	**Bad guess** (uninformed)

differences by overcorrecting for scale variation. We decided to adopt the raw score as our main measure due to its better theoretical alignment and intuitive interpretability, while the normalized score served as a robustness check. These measures can be formalized as follows:

$$\text{Misperception}_{\text{raw}} = \frac{1}{8}\sum_{i=1}^{8}\left(\left|\text{Perceived Value}_i - \text{Actual Value}_i\right| \times \text{Confidence}_i\right)$$

$$\text{Guessing}_{\text{raw}} = \frac{1}{8}\sum_{i=1}^{8}\left(\left|\text{Perceived Value}_i - \text{Actual Value}_i\right| \times \left(1 - \text{Confidence}_i\right)\right)$$

$$\text{Max Error}_i = \begin{cases} \text{Actual Value}_i & \text{if } (\text{Perceived Value}_i - \text{Actual Value}_i) < 0 \\ 100 - \text{Actual Value}_i, & \text{otherwise} \end{cases}$$

$$\text{Misperception}_{\text{norm}} = \frac{1}{8}\sum_{i=1}^{8}\left(\frac{\left|\text{Perceived Value}_i - \text{Actual Value}_i\right|}{\text{Max Error}_i} \times \textit{Confidence}_i\right)$$

$$\text{Guessing}_{\text{norm}} = \frac{1}{8}\sum_{i=1}^{8}\left(\frac{\left|\text{Perceived Value}_i - \text{Actual Value}_i\right|}{\text{Max Error}_i} \times \left(1 - \text{Confidence}_i\right)\right)$$

Calculating scores in this way enabled validation through the analysis of response patterns across items and by benchmarking individual items against other issue-specific perceptions. Since misperceptions are primarily motivated beliefs, we expected to observe consistent patterns of inaccuracy and bias. In contrast, guessing—lacking motivational structure—should produce more random variations.

4. Results

This section presents the results of our survey module, which was fielded as part of the 2023 MOSAiCH survey.[6] This high-quality population survey is conducted biennially in the three main languages of Switzerland (German, French, and Italian), using a push-to-web mixed-mode design that encourages online participation while also accommodating paper-based responses.[7] The 2023 edition provides a sample size of $N = 3{,}204$ and includes a wide range of variables (see Appendix I as well as Stähli *et al.*, 2023).[8] Our module underwent rigorous quantitative cognitive testing to guarantee that all its items were clearly understood and that respondents could give valid and reliable

[6]The fieldwork was conducted between 17 February 2023 and 11 July 2023.

[7]Although the online survey mode theoretically allows respondents to consult external sources, we did not implement technical restrictions to prevent this. However, several factors suggest that such lookup behavior did not meaningfully affect our findings. First, there is no difference in confidence levels between the survey modes (online vs. paper; $t = 1.21$, $p = 0.23$), and greater accuracy among respondents in the paper mode ($t = -5.01$, $p < 0.001$). This pattern runs counter to the expectation that online respondents may have searched for information, which should have made them both more accurate and more confident. Second, extensive pre-testing provided no indication that respondents were consulting online sources. Third, most figures we asked for are not easily accessible via simple online searches, something that has likely changed since our survey was fielded due to the proliferation of LLM chatbots.

[8]The misperception module has been included in the second part of the survey where only around two thirds of the initial respondents participated, reducing the number of valid interviews to $N = 2{,}119$.

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answers. In the following presentation of our empirical analysis, we proceed in three steps. First, we present key results from our survey and examine what specific insights they offer. Second, we conduct tests to assess the validity of our approach of distinguishing between misperceptions and bad guesses. And third, we compare our measures with alternative approaches for distinguishing between confident and unconfident beliefs.

We begin our analysis by presenting our findings on immigration misperceptions, focusing on their two constituent components: inaccuracy and confidence. Figure 1 reveals substantial variation in public perceptions of our eight immigration items. These divergent views mirror the polarization of the issue. Comparing the mean and median estimates with the official values provides a first idea of how accurate the perceptions of our respondents are. For the overall population share of immigrants, both mean and median estimates closely align with the official value, suggesting that the Swiss public has on average an accurate sense of immigration levels.[9] For all other items, perceptions tend to either overestimate or underestimate the best available empirical evidence. Regarding the demographic composition of immigrants, we observe an expected pattern: respondents overestimate the shares of refugees, Muslims, and the undocumented (groups perceived as threatening) but underestimate the shares of EU citizens and graduates, who are generally viewed more favorably. Most respondents believe that only a minority of immigrants come from Europe, whereas in reality, a large majority are EU nationals. The share of refugees among new immigrants is overestimated by a factor of five, while the proportion of immigrants with a tertiary degree is underestimated by nearly half. Further, respondents overestimate the unemployment rate of immigrants, but underestimate their involvement in crime—which contradicts our expectation. Crime is, in fact, the only item on which perceptions tend to be more positive than reality warrants. Finally, we note that higher official values are mostly underestimated, and lower ones overestimated, possibly reflecting a general cognitive innumeracy bias unrelated to immigration. This points to the importance of employing a diverse range of perception items.

While the average deviations from the official values are rather small for most survey items, individual estimates exhibit significant variation in inaccuracy (Figure 2). The steeper the slope, the more accurate the estimates. Some items, such as the share of immigrants, the immigrant unemployment rate, and the share of undocumented immigrants tend to cluster closely around the benchmark, with most estimates deviating by less than 10 percentage points. In visible contrast, estimates for the shares of Muslims, EU citizens, and convicted criminals show much wider dispersion. The average deviation from the official values ranges from 1.6 percentage points for the share of immigrants to 25.4 percentage points for the share of refugees.

Interestingly, respondents generally exhibit low confidence in their estimates. Except for the immigrant share and the share of EU citizens, a plurality of respondents selected the lowest confidence level, which indicates no confidence at all. This lack of confidence was especially pronounced for the item on undocumented immigrants (mean: 2.70), reflecting the obvious difficulty in obtaining reliable data on this group. By contrast, respondents expressed comparatively high confidence levels with regard to the immigrant share (mean: 4.15), most likely because it is a frequent topic in public discourse. For all items, very few respondents reported being fully confident, which is hardly surprising given the challenge of providing precise estimates. Additionally, the middle confidence level was the second most commonly selected, suggesting that many respondents hold a moderate degree of confidence.

Next, we examine the bivariate relationship between the inaccuracy of respondents' perceptions and their confidence levels. Though there is a slight positive association overall, this pattern is not consistent across all items (Appendix II: Figures A7 and A8).[10] This indicates that those with accurate perceptions do not necessarily exhibit higher confidence due to a better grasp of reality, nor do

[9] The main difference between the mean and the median is that the latter is robust to outliers.

[10] Aggregated across the eight items, the correlation between inaccuracy and confidence is $r = 0.05$ and $\rho = 0.004$.

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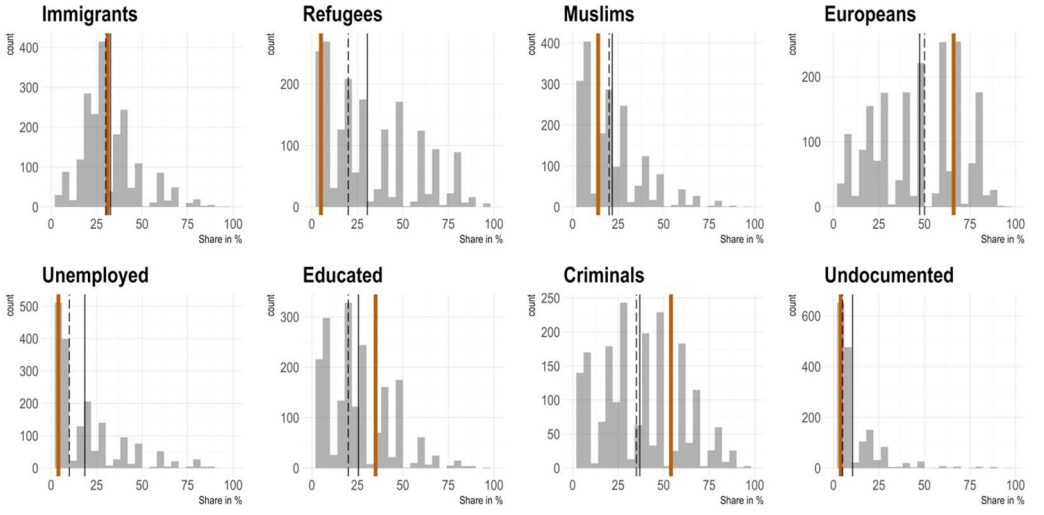


Figure 1. Histograms of immigration perceptions.
Note: Histograms of immigration perceptions with the official value (brown line) and summary statistics of perceptions (black lines: mean as solid line, median as dashed line). All perception items are measured on a 0–100 scale (percentages). For the detailed question wording and the benchmark values, see Appendix I.

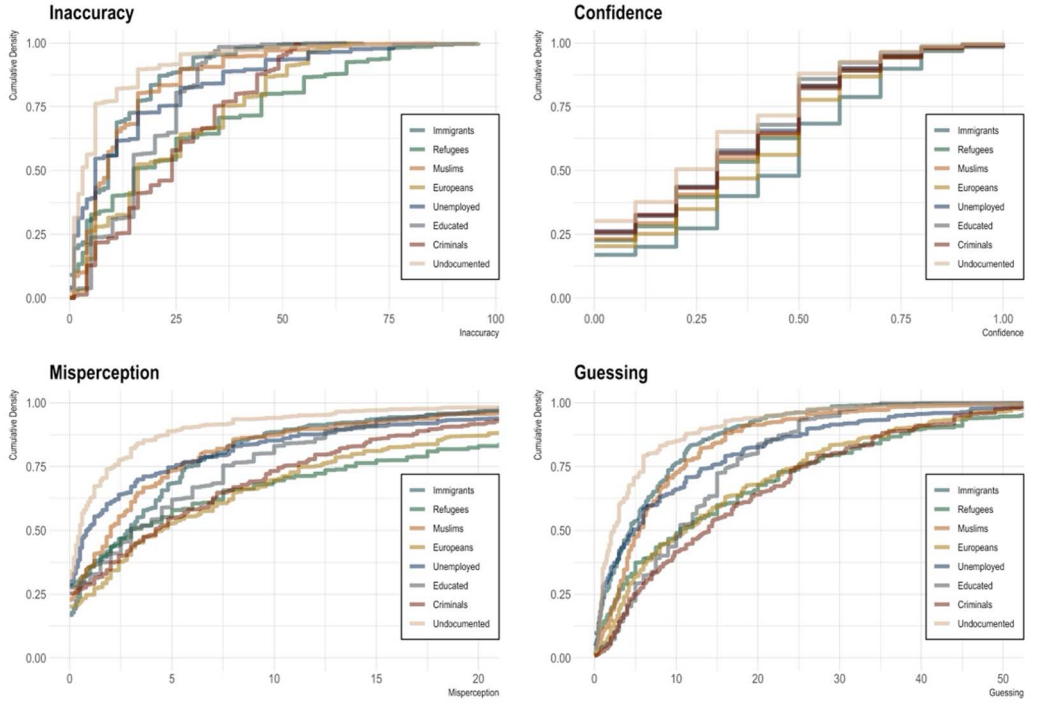


Figure 2. Density plots of immigration perceptions.
Note: Cumulative density plots (CDP) of immigration perceptions. Inaccuracy means the deviation from the official value in percentage points. Confidence indicates how confident respondents are about their estimates on a scale from 0 (no confidence) to 1 (full confidence). Misperception is calculated as the product of inaccuracy and confidence, whereas Guessing is the product of inaccuracy and lack of confidence. The *x*-axes of Misperception and Guessing are truncated to focus on the area of substantive data for improved visibility. See also Appendix II for item-specific histograms of the variables (Figures A1–A4), simple density plots (Figure A5), and CDPs with the normalized scores (Figure A6).

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those with inaccurate views display higher confidence due to motivated reasoning. Instead, the bivariate distribution reveals no clear clustering of perceptions combining both high inaccuracy and high confidence, supporting the notion that misperceptions exist along a continuum.

Inaccuracy and confidence are then combined multiplicatively to derive misperception scores, whereas guessing scores are calculated by multiplying inaccuracy by lack of confidence (Figures 2 and 3). The distribution of misperception scores is notably left-skewed, reflecting low confidence levels. Significant variation exists across items; for example, the average misperception of the share of refugees is around four times greater than that of undocumented immigrants. The mean score for all items is around five, which means that respondents deviate by an average of 5 percentage points when fully confident, or 10 percentage points when only moderately confident. A similar pattern emerges for guessing, though the overall level of guessing is much higher, averaging about twice the magnitude of misperceptions. This suggests that most inaccurate perceptions stem from guessing rather than from firmly held beliefs, which corroborates the assumption that most traditional measures tend to overestimate the prevalence of misperceptions by failing to account for confidence. A parallel comparison of perceptions in terms of accuracy, through scores of knowledge and good guessing (Appendix II: Figure A10), provides even more evidence for the predominance of guessing and reveals an inverse ranking of the perception items, with a higher misperception score corresponding to lower knowledge.

To validate our confidence-weighted misperception scores, we conduct a one-dimensional latent trait analysis of inaccuracy and confidence (Lee and Matsuo, 2018). This approach models both components across items as a function of a latent trait, while accounting for item difficulty and response consistency (Appendix II: Table A2). The results reveal strong one-dimensional structures for both inaccuracy and confidence, with factor loadings ranging from 0.73 to 0.97 for inaccuracy and 0.85 to 0.96 for confidence, as well as substantial proportions of explained variance (81% and 86%, respectively). This confirms that inaccuracy and confidence vary across individuals and items in a systematic fashion, lending support to our conceptualization of misperceptions as confidence-weighted inaccuracies.

We next assess the discriminant validity of our measurement—specifically, its capacity to distinguish misperceptions from guessing. Discriminant validity refers to the extent to which empirically observed patterns align with conceptual distinctions. The first implication of our approach is that misperceptions, being rooted in motivated reasoning, should show patterns consistent with systematic bias (i.e., strong cross-item correlations), but guessing should reflect the random nature of uninformed responses (i.e., weaker cross-item correlations). The second implication is that misperceptions should be meaningfully associated with immigration attitudes, whereas guessing should not.

To test the first implication, we compare the correlations between item-level misperception scores, and those between guessing scores. The resulting correlation matrices reveal moderately positive associations between all misperception scores, while the correlations between guessing scores are systematically lower and often even close to zero (Appendix II: Figure A11). This is in line with our expectations and bolsters the notion that the two constructs capture distinct types of perceptions. In addition, a direct correlation test between the aggregated misperception and guessing scores across all items yields a modest negative coefficient ($r = -0.21$, $\rho = -0.26$). The non-zero negative correlation suggests some overlap—attributable to moderately confident respondents contributing to both scores—but still underscores the discriminant validity of our approach.

Next, we examine the association between misperception and guessing scores on the one hand and the immigration attitudes of our respondents on the other. If our measures effectively distinguish between these two types, we should observe distinct patterns of association: misperceptions should align more strongly with anti-immigration attitudes,[11] while guessing should show a weaker

[11]Some researchers have argued that immigration misperceptions, such as overestimating the immigrant share in the population, shape attitudes and preferences by heightening perceptions of threat (Semyonov *et al.*, 2004; Alba *et al.*, 2005). Yet,

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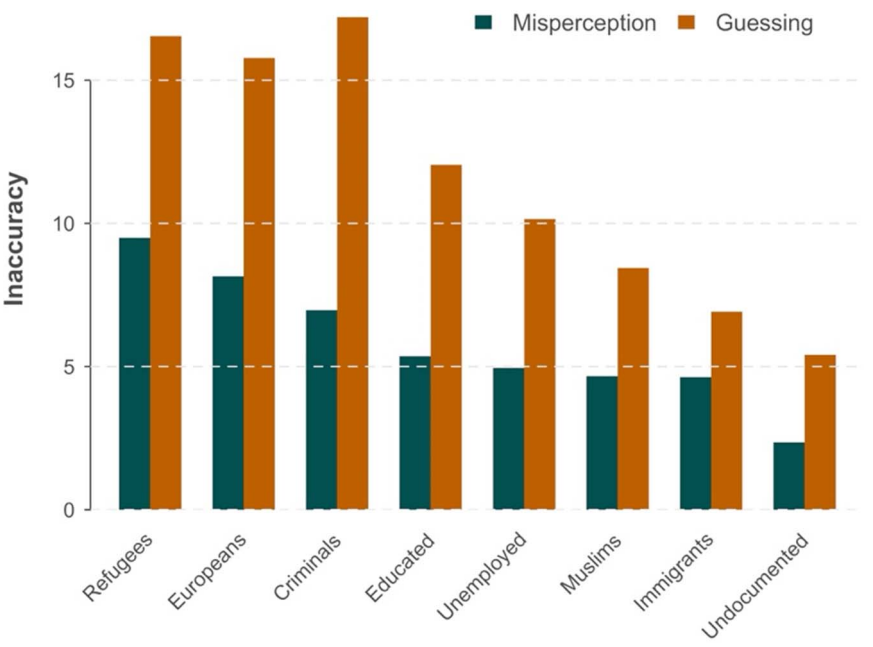


Figure 3. Average misperception and guessing by item.
Note: Bar plot with average misperception and guessing scores for each item in descending order. See also Figure A9 in Appendix II for a comparison based on normalized scores.

or entirely negligible association. Figure 4 illustrates this pattern, showing that respondents with stronger anti-immigration attitudes indeed exhibit higher misperception scores.[12] The increase is particularly steep among those holding the most negative views on immigration, while guessing scores remain relatively stable across the attitude spectrum. This lends further support to the idea that only misperceptions are ideologically structured. A formal statistical test confirms this interpretation: misperceptions and anti-immigration attitudes are significantly and positively correlated ($\rho = 0.18, p < 0.001$), while this relationship is much weaker between guessing and anti-immigration attitudes ($\rho = 0.05, p = 0.02$).

To further probe the validity of our distinction, we test another implication derived from the literature: if misperceptions are not random but reflect motivated reasoning, confidence in these beliefs should be associated with a negativity bias. That is, confident respondents should not only show anti-immigration attitudes but report negative perceptions of immigrants. To examine this, we analyze the relationship between confidence and *directional inaccuracy*—that is, whether our respondents underestimate positive attributes or overestimate negative ones. The results (Appendix II: Figure A8) reveal a clear pattern: while confidence is not significantly associated with the magnitude of inaccuracy, it remains positively correlated with negative directional inaccuracy. This suggests that

this argument does not extend to guessing, since the absence of a formed belief cannot influence attitudes. This implies that, regardless of the causal direction, we should expect to observe a positive association between negative immigration attitudes and misperceptions, but not with guessing.

[12]In the MOSAiCH, anti-immigration attitudes are measured through a five-item battery. Respondents were asked: 'How much do you agree or disagree with each of the following statements? Immigrants increase crime rates; Immigrants are generally good for [COUNTRY'S] economy; Immigrants take jobs away from people born in [COUNTRY]; Immigrants improve [COUNTRY'S] society by bringing new ideas and cultures; People born in [COUNTRY] should be given preference over immigrants when it comes to jobs, housing, or health care.' Each item was rated on a five-point Likert scale (i.e., Strongly agree; Agree; Neither agree nor disagree; Disagree; Strongly disagree). Based on these responses, we calculate a continuous anti-immigration score ranging from 0 to 20, which we subsequently rescale to a 0 to 1 range for ease of interpretation.

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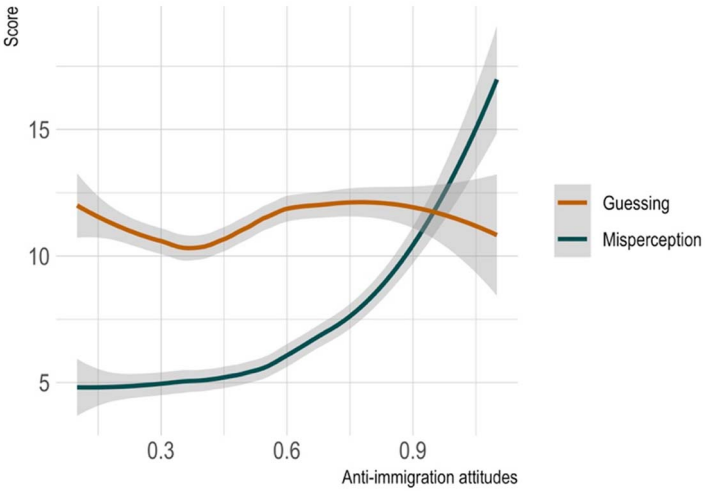


Figure 4. Association of guessing and misperceptions with anti-immigration attitudes.
Note: Bivariate association between anti-immigration attitudes and guessing and misperception based on locally estimated scatterplot smoother (LOESS) curves. Shaded areas represent 95% confidence intervals. See also Figure A13 in Appendix II for normalized scores.

confident respondents are likelier to hold negative and often incorrect beliefs about immigration. Again, this aligns well with our distinction between misperceptions and guessing, and supports using confidence-based measures.

To further reinforce the validity and robustness of our findings, we conduct several sensitivity analyses using the normalized scores for misperceptions and guessing (Appendix II: Figures A9, A12, and A13). Normalization rescales these scores to a common range of zero to one; a technique that makes it possible to assess whether our results are sensitive to the original scaling. Although slight shifts in the level of misperception and guessing occur between the items due to different scales of deviant perceptions, the overall relative magnitude and their patterns of correlation with immigration attitudes remain largely unchanged. These results align with those derived from raw scores and offer further evidence that our misperception and guessing measures represent distinct and robust constructs.

As a final step of our analysis, we re-examine our confidence measures and compare them with two alternative strategies for distinguishing respondents with low versus high confidence in their estimates. First, a decomposition analysis of our composite scores assesses the relative contribution of confidence to misperceptions (Appendix II: Figure A14). Strikingly, confidence contributes twice as much to misperceptions as inaccuracy. In contrast, guessing is driven equally by low confidence and inaccurate perceptions. This underscores the relevance of including confidence—not only to differentiate misperceptions from guessing, but also to quantify the extent of misperceptions. Our analysis further uncovers remarkable gender differences: women exhibit markedly lower accuracy and confidence than men, resulting in lower misperception scores but higher guessing scores on average (Appendix II: Figure A18). This pattern implies that men's overconfidence contributes more to misperceptions, while women's lower confidence corresponds with fewer misperceptions but increased guessing.

Second, we consider two notable proxy measures of confidence and validate them against the measures from our survey module. One proxy, proposed by Deutschmann (2025), draws on the psychology of numbers by using rounded estimates as an indicator of low confidence levels, assuming that rounders are uninformed and non-rounders either informed or misinformed. Testing this assumption with our data, we find that although rounders tend to have somewhat more inaccurate perceptions on average, rounding appears to be unrelated to their confidence (correlation near zero).

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Furthermore, comparing rounders and non-rounders via a correlation matrix of perception items and exploring their association with immigration attitudes (as done previously) reveals no evidence that incorrect non-rounders follow specific motivations when giving estimates (Appendix II: Figures A15 and A16). Rather, it shows that while non-rounders may be more accurate on average, they are not necessarily more prone to holding misperceptions.

Another proxy for confidence proposed in the literature is response latency—the time respondents take to answer a survey question. The rationale is that confidently held beliefs, based on information stored in memory, are more readily accessible and therefore require less time to report (Lee and Matsuo, 2018). Contrary to this assumption, our analysis points to a distinctly positive association between confidence and response time across all eight items (Appendix II: Figure A17). Consequently, longer response time does not serve as a viable proxy for low confidence and is ineffective for distinguishing misperceptions from bad guesses. Both rounding and response latency likely reflect psychological factors beyond mere confidence levels. As such, directly measuring confidence remains the most robust empirical approach.

5. Conclusion

Public misperceptions of immigration have attracted great attention in recent years, yet no consensus has emerged with regard to their prevalence or significance. This article addressed two conceptual and methodological shortcomings that have hindered the valid measurement of immigration misperceptions and slowed the advancement of the field. To this end, we introduced a new survey module that combines a multi-dimensional item battery with a confidence measure. While the former goes beyond the narrow topical focus on population innumeracy, the latter enables a theoretically consistent distinction between genuine misperceptions and inaccurate perceptions anchored in a lack of information. By implementing this module in a large-*N* population survey in Switzerland, we provide valuable and detailed insights into the subject matter.

Overall, we find that public perceptions of immigration are largely accurate at the aggregate level, albeit with a slight negativity bias. At the individual level, however, estimates often deviate significantly from official data, and most respondents report little to no confidence in their answers. What does this imply for measuring immigration misperceptions more generally? On the one hand, the large variation across perception items confirms that immigrant population innumeracy is not a representative proxy for all immigration misperceptions, and probably impacted by general innumeracy and the 1-in-X bias. Thus, relying on a single item—particularly the immigrant population share—to draw conclusions on public misperceptions is problematic. Our approach, which uses a multi-dimensional set of items presented more intuitively as percentages, helps mitigate this, and yields a more comprehensive understanding.

On the other hand, the fact that many respondents express low confidence in their inaccurate estimates supports the view that not all such responses should be classified as misperceptions; a significant share likely reflects bad guessing. This interpretation is further substantiated by examining their respective determinants: misperceptions, but not guesses, are associated with immigration attitudes. Taken together with the generally low confidence levels, this suggests that misperceptions are less frequent and pronounced than commonly assumed.

These findings make several important contributions to the literature. First, they provide a more refined understanding of misperceptions. Our analysis shows that genuine misperceptions are systematically biased and closely linked to political attitudes, whereas bad guessing tends to follow a random pattern. This underpins the argument that misperceptions are not merely random errors, but reflect deep-seated beliefs, selective information processing, and motivated reasoning. Moreover, our results suggest that misperceptions and guessing exist on a continuum, which means that individuals can be both partially misinformed and uninformed in their inaccurate perceptions.

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Second, they offer crucial insights into the prevalence of immigration misperceptions. Only about one-third of inaccurate survey responses should be interpreted as genuine misperceptions. While these may still pose a challenge to democratic discourse, their scale appears considerably smaller than previously assumed. A realistic understanding of both the nature and frequency of misperceptions is essential for assessing their attitudinal impact. In turn, a comprehensive account of the politics of immigration must consider misperceptions and uninformedness in like manner. The approach introduced in this article places earlier empirical research in a new light, suggesting that prior studies may have overstated the prevalence of misperceptions and, as a result, drawn biased conclusions about their causes and effects. All of this underlines the need to reassess existing evidence and adopt more sophisticated measurement strategies, particularly for questions for which evidence remains mixed or inconclusive.

Third, we contribute methodologically by introducing a novel tool for measuring misperceptions. The misperception and guessing scores enable an accurate distinction between genuine misperceptions and uninformed guessing. Most critically, this bridges the gap between conceptualizing misperceptions and empirically measuring them. Although our application focuses on immigration as an especially salient and politically charged issue, our approach is designed to be more broadly applicable. Because it relies on confidence-weighted scores, it can be flexibly employed across a range of issues, including climate change, public health, and income inequality. It thus carries the potential to advance research on factual beliefs far beyond the domain of immigration.

Fourth, our findings offer a more nuanced perspective on the accuracy of beliefs. Just as incorporating confidence levels reveals that a great many inaccurate responses arise not from firmly held perceptions, but from mere guessing, it also shows that some accurate responses are provided without confidence—suggesting they may reflect good guesses rather than actual knowledge. This distinction has important implications for interpreting high accuracy rates in survey data, as the prevalence of informed beliefs may in fact be overstated. Our approach allows us to isolate confidently accurate responses, thereby offering a more realistic assessment of what people know and what they do not. In this respect, it echoes and extends longstanding concerns about the innate fragility of public opinion (e.g., Converse, 1964; Graham, 2023). For research on citizen competence, political reasoning, and democratic accountability, it is of particular importance that misperceptions may be less widespread than previously assumed—but so too may be knowledge.

Finally, our findings bear relevance for policy interventions aimed at combating misperceptions. Since genuine misperceptions stem from motivated reasoning and are resistant to correction (misinformed individuals place strong confidence in their false beliefs), traditional approaches that rely solely on fact-based information treatments are unlikely to be effective. Instead, policymakers and educators may find success in adopting strategies that pivot on reducing overconfidence and promoting statistical literacy to mitigate misperceptions.

While our survey module marks a significant step forward in measuring immigration misperceptions, several important limitations remain. The confidence measure provides helpful insights for identifying misperceptions, but it is still far from perfect. For instance, it is unlikely to prevent *expressive responding*, and response behavior may vary due to overconfidence or divergent interpretations of the confidence scale (Pasek *et al.*, 2015). Furthermore, the measure presumes a basic understanding of probabilities; if this is lacking, answers may be distorted by general innumeracy. For these reasons, even respondents who report high confidence in their estimates may not be genuinely committed to them (Graham, 2023). To address these issues, future research could incorporate repeated measures or allow respondents to define confidence bands around their estimates, thereby embedding confidence more directly into the perception measures. Refined correction experiments represent another promising avenue: by exposing respondents to correct information and observing how they update their beliefs, researchers may be able to distinguish misperceptions from guessing, as the latter is expected to be more responsive to correction. Finally, this analysis is limited to Switzerland, a country not necessarily representative on a global scale. Extending these improved measurement

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tools to other settings would help strengthen the generalizability of our findings. We hope this study encourages further research that isolates genuine misperceptions from spurious ones.

Supplementary material. The supplementary material for this article can be found at https://doi.org/10.1017/psrm.2025.10055. To obtain replication material for this article, https://doi.org/10.7910/DVN/EPX9VY.

Data availability statement. The data underlying this study are available from FORS under restricted conditions. The replication code for the analyses runs on the original dataset, which can be obtained from FORS upon request.

Author contributions. Both authors jointly developed the project outline, designed the survey module, and conceptualized the ideas of the article. P. L. formulated the core arguments and conducted the empirical analysis. P. L. also wrote the first draft of the manuscript and implemented revisions. M. B. contributed through critical feedback, commenting, and substantial editing of the submitted version. Both authors approved the final version of the paper.

Competing interests statement. The authors declare no competing interests.

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