This preprint copy is an accepted manuscript of the paper published in the journal Museum Management and Curatorship. Please cite as:

Polino, C., Massarani, L. and Dawson, E. (2024). Social inequality determines science museum attendance in Latin America: A quantitative analysis of data from seven countries. *Museum Management and Curatorship, 1-19, online first.* https://doi.org/10.1080/09647775.2024.2357069

Social inequality determines science museums attendance in Latin America: a quantitative analysis of data from seven countries

Carmelo Polino a, Luisa Massarani b and Emily Dawson c

a. Department of Philosophy, University of Oviedo, Oviedo, Spain;
b. Brazil's Institute of Public Communication of Science and Technology; House of Oswaldo Cruz, Oswaldo Cruz Foundation, Rio de Janeiro, Brazil;
c. Department of Science & Technology Studies, University College London, London, UK

ABSTRACT

This paper examines cultural engagement with science in Latin America based on probabilistic models derived from quantitative data gathered on public perceptions of science. We explore the influence of social stratification and contextual factors -gender, age, education, socioeconomic level, and interest in science, among others- on visiting science museums in Argentina, Brazil, Chile, El Salvador, Mexico, Panama, and Paraguay. The data suggest that museum attendance is subject to the same social determinants affecting other cultural practices. The position individuals occupy in society mediates their opportunities and subjective dispositions. Cultural participation in science is stratified by social inequalities, marginalizing the most unprotected social classes: citizens with lower levels of education and income, the elderly, women, and people living outside large cities and urban areas. This evidence challenges the management and communication of science museums: Inequalities question participatory democracy efforts and transform cultural engagement into a matter of equity and social justice.

KEYWORDS

Science museums; social inequality; Latin America

Introduction

Cultural participation is a basic dimension of culture and contributes to the development of people and their integration into the society in which they live. Spaces of symbolic and social interaction such as museums, zoos, botanical gardens, aquariums, science centers, or natural parks are 'particularly dense learning environments with an abundance of spatially choreographed exhibits in a variety of presentation formats addressing a heterogeneity of visitors and steeped in rich emotional and social contexts' (Schwan, Grajal, and Lewalter 2014, 81). These spaces perform a significant function as agents of socialization and informal education and contribute to the expansion of science as part of the culture (DeWitt and Archer 2017; Falk, Dierking, and Foutz 2007; National Research Council 2009; Stocklmayer, Rennie, and Gilbert 2010).

The specific importance of research on cultural consumption and practices was highlighted early by the Latin American tradition of cultural studies due to its relevance for the understanding of social and political phenomena, the construction of collective identities and subjectivities, or the identification of the differences and inequalities that exist in society about the appropriation of culture (Catalán and Sunkel 1992; García Canclini 1991; 1999; Rosas Mantecón 2007; Sunkel 1999). Although at the regional level, the field of cultural studies is subject to the conditions of different academic and political traditions, there are clear lines of convergence. Among them, the fact of pointing out that these are sociocultural processes that involve the appropriation of goods and services, different practices, valuations, and uses of these products, as well as the link that citizens establish with tangible and intangible heritage, their cultural ties with the media and, more generally, their social and cultural practices in their free time (Quevedo 2007). Additionally, scholars from the region have extensively discussed the construction of new subjectivities, identity, power relations, globalization, technology, and the democratization of access to culture (García Canclini 2004; Mato and Maldonado 2007; Rosas Mantecón 2014).

Citizens ought to have the right to visit science museums and similar spaces to enjoy heritage and culture, learn, and connect socially. However, in previous studies on cultural participation, we have shown that there are social factors such as age, school education, or economic position, that determine the objective possibilities of participation and function as physical and symbolic access barriers to the assets of science as a form of culture for a significant part of the population of Latin America (Polino 2019, 2021). This evidence coincides with the increasingly widespread academic and political concerns about equitable access to science for non-dominant groups as motivators in the issue of science equity (Dawson 2019).

This paper is in line with previous empirical research on the conditions of cultural engagement with science in Latin America (Polino 2021), in this case focusing specifically on science museums, which have been the subject of public policies on science culture (Fernández Polcuch, Bello, and Massarani 2016). Regional museums are part of a huge ecosystem of science communication practices, where a multiplicity of experiences with knowledge and scientific-technological practices are offered to people, often within the framework of outreach and informal education programs.

Based on probabilistic models provided by surveys that collected data on public perception of science, we seek to demonstrate a common trend in the seven countries surveyed, where stratification and social inequality in cultural participation harm the most unprotected social classes: citizens with lower levels of education and income, the elderly, women, and

individuals living outside large cities and urban areas. The data demonstrate that structural inequalities limit the diffusion of the culture of science in society.

Background and conceptual framework

Scholars have acknowledged and documented how informal science education activities play key roles in science learning and complement formal education (Brown and Reiss 2004; Marandino 2009; Rennie 2014; Rennie and McClafferty 1996; Stocklmayer, Rennie, and Gilbert 2010). As the National Research Council (, 2) argued, 'designed spaces 2009 - including museums, science centers, zoos, aquariums, and environmental centers- can also support science learning. Rich with real-world phenomena, these are places where people can pursue and develop science interests, engage in science inquiry, and reflect on their experiences through sense-making conversations'. Recent empirical evidence, based on an international and cross-institutional perspective, demonstrated that visiting science museums and centers positively correlates with improved curiosity, knowledge, and understanding of science (Falk et al. 2016).1 Furthermore, sociological research on museums recognizes that 'these institutions, which frame and shape knowledge by their selections, embody the cultural logics that characterize our society and are essential to understanding people's lifestyles' (Hanquinet and Savage 2016, 196). Science museums play significant meta-functions (Achiam and Sølberg 2016) from a public-oriented perspective and influence public engagement in science. Thus, museums provide opportunities for science learning, especially to the underprivileged and/or those with lower levels of education. The extent to which those of lower status benefit from these opportunities is yet to be understood in Latin American contexts.

Science museums in Latin America

The first science museums in Latin America date back to the first half of the nineteenth century, with the creation of natural history museums -for instance, in Rio de Janeiro (Brazil, 1818), Buenos Aires (Argentina, 1826), and Santiago (Chile, 1830)- along with other spaces such as botanical and zoological gardens. They were not isolated efforts: Museums established communication networks among themselves, with their different audiences forming an international process characterized as the 'museum movement' (Lopes and Murriello 2005).

In the first decades of the twentieth century, Latin American science museums began a slow transition from museology-oriented to the past towards one more oriented to the present. They began to be more committed to showing contemporary science and enhancing knowledge, coinciding with what some authors denominate the second phase in the science museums' evolution -see Schiele (2014), following Hudson (1988) and Danilov (1982). This framework allowed practitioners, educators, and scientists to consider museums as instruments for educative renewal (Cazelli, Marandino, and Stuart 2003; Marandino 2009). The emphasis on education would represent a transition between the second and the third-generation museum paradigm (Friedman 2010).

Later, in the 1970s and 1980s, a movement emerged simultaneously in several countries, which continued in the 1990s and 2000s. It consisted of incorporating interactivity into museum proposals following the models from the San Francisco Exploratorium (United States), the Palais de la Découverte, and the Parc de La Villette in Paris (France). The Museo Tecnológico of Mexico City (1970), the Museu de Ciência e Tecnologia of Salvador (Brazil, 1978), Ciência Viva of Río de Janeiro (Brazil, 1982), the Museo

de la Ciencia of Bogotá (Colombia, 1984), or the Museo Participativo de Ciencias of Buenos Aires (Argentina, 1988) are among the first interactive museums. Gradually, museums began to stop reproducing models and instead generate their own with international projection. Despite having been inspired by the North American and European traditions, the Latin American interactive centers developed their own identities incorporating national and local cultural values and practices -see Briseño-Garzón and Anderson (2012); Achiam 2012 - including museums, science centers, zoos, aquariums, and environmental centers- can also support science learning. Rich with real-world phenomena, these are places where people can pursue and develop science interests, engage in science inquiry, and reflect on their experiences through sense-making conversations'. Recent empirical evidence, based on an international and cross-institutional perspective, demonstrated that visiting science museums and centers positively correlates with improved curiosity, knowledge, and understanding of science (Falk et al. 3 and Marandino (2019) -as happened with traditional museums of natural history (see Lopes and Podgorny 2000).

By the end of the century, science museums had multiplied in Latin America (Friedman 2010), and, although with differences between countries, it was possible to identify the changes detected early on by Alonso Fernández (1993) for the 'new museology': Greater awareness of the anthropological and sociological context where museums are built; more information, communication, and relationships with the public; promotion of pedagogical and technological means; the confirmation of a break with statism and the emergence of a new vision of cultural dynamics; and the transition to living and participatory museums as cultural meeting places. The last mapping of science museums in Latin America identifies 1,900 science spaces: 448 provided detailed information to be included in the 2023 regional guide of science museums (Massarani et al. 2023).

Museums and cultural participation

Associated with changes to museological practice in Latin America, we note feelings of belonging amongst the public: science museums more closely linked to the local territory are also potentially more capable of attracting the local population, reinforcing opportunities for cultural participation in science. However, in Latin America -as in other parts of the world- science museums are not visited by people from all parts of society, yet many of these spaces offer free entrance. Research suggests these partial patterns of participation are influenced by many issues. These issues include the lack of museums in some geographical regions and the ignorance of their existence, or the deficiency of interest and the difficulties generated by the lack of symbolic skills that allow a satisfactory appropriation of these spaces (DeWitt and Archer 2017; Feder et al. 2009).2 In other cases, barriers to participation are associated with the impact of paying the cost of a ticket, or with the opportunities to move, or have free time and leisure, asymmetrically distributed in the social space. To understand how social position affects museum participation, research on museum audiences combining socio-demographic characteristics with motivations and interests became essential (Dawson and Jensen 2011; Falk and Dierking 1992). As Kirchberg (2016, 238) indicates, 'a differentiation of social forces in, from and to the museum, into structural constraints and agency-producing effects, is, however, a simplifying dichotomy. These two poles are dependent on each other and complementary'.

Surveys of public perceptions of science indicate that the percentage of the population not visiting science museums is high throughout Latin America, compared to the UK (BEIS 2020), the US (NSF 2020), China (CRISP 2018), and Canada (Council of Canadian

Academies 2014). The surveys also show that countries across the region differ little from each other. On average, less than fifteen percent of the surveyed population stated that they had visited an S&T museum at least once during the interview year (see Table A1 Appendix).

Social exclusion in access to science museums is a relevant policy problem for science communication and is increasingly concerned with social inclusion (Coffee 2008; Dawson 2014; Humm, Schrögel, and LeBmöllmann 2020; Rocha et al.). Participation in museum visiting is not only important for access to scientific knowledge but also as part of governance and co-production of knowledge strategies, involving both participation and citizen science initiatives. Therefore, 'if we believe that out-of-school science 2020 learning provides valuable educational, cultural, social, and political opportunities, then we must take questions of equity seriously' (Dawson 2017, 539).

Inequality and social justice in cultural participation

Latin America is a large, diverse, and unequal region, with high social vulnerability and structural poverty, where growth cycles have alternated with economic and political crises (OECD 2019). It seems to be true that, even considering the differences between countries, there was a reduction in absolute income poverty and some progress in education, health, and infrastructure over recent decades. Nonetheless, the evidence also suggests that inequality is greater now than three decades ago (Alvarado and Gasparini 2015). Social inequality is a multidimensional phenomenon that exceeds the economy (Jelin, Motta, and Costa 2018; López-Roldán and Fachelli 2021) and has specific manifestations in the field of culture (Gayo 2016; Romeu Aldaya 2018). The sources of cultural inequality between social classes and social status are multiple and interact with each other in complex ways (Bennett et al. 2009; Chang and Goldthorpe 2007). As a result, limited regional access to science museums -and other science spaces- cannot be unpinned from a broader framework of restricted cultural consumption affected by different social determinants (see Gayo et al. 2011; OEI 2014; Rosas Mantecón 2017; Sunkel 1999).

International research on science communication, cultural engagement with science, and informal science learning demonstrate how these practices are marked by multiple and intersecting privileges and inequalities (Canfield et al. 2020; Dawson 2019; Finlay et al. 2021). Those cultural practices seeking to mediate between S&T and the public are so marked by structural inequalities is particularly striking because, in most cases, most S&T institutions and practitioners involved in such work are trying *not* to exclude people. On the contrary, science museums around the world advertise their commitments to social inclusion and the notion of science 'for all'. How can we understand how such exclusive patterns of participation play out in different countries, or how they are reproduced? Therefore, this study investigates how museum attendance is influenced by social stratification factors.

We draw on theories of social reproduction based on the work of Bourdieu to understand how social inequality structures cultural practices (Bennett et al. 2009; Bourdieu 1984; 1993). Bourdieu's work focused predominantly on how educational and cultural practices were stratified by social class in France (Bourdieu 1984). Working with the concepts of capital, field, and habitus, Bourdieu argued that cultural practices are as hierarchical as economic practices and work to maintain established structural inequalities of privilege and disadvantage in our societies (Bourdieu and Wacquant 1992). From this perspective, our attitudes towards a science museum are likely to be patterned by our

previous experiences and social class. Bourdieu's idea of cultural capital – a person's knowledge, familiarity, and competency within cultural fields that allows them to generate value through participation – enables us to trace how advantages can be accrued or lost through engagement with specific fields (such as science museums) depending on our orientation (or habitus) to that field (Bourdieu and Darbel 1991; Skeggs 2004). In terms of cultural engagement with science, therefore, valuable forms of capital, including scientific knowledge, skills, social networks, and interests, could be generated through museum visits if we are socialized to navigate such spaces successfully (Dawson 2019).

Given our focus on science museums in this paper, we also draw on cultural consumption scholarship, in particular, the concepts of 'structural homology' and 'omnivorousness'. Structural homology, mainly developed from Bourdieu's work, assumes a very close relationship between social class and cultural consumption. That is, our social class determines our cultural practices, thus the more dominant social classes consume high-status forms of culture and reject the rest. The idea of cultural omnivorousness suggests instead that dominant social classes consume high and low-status cultural practices, thereby accruing privilege, while minoritized social classes are limited to consuming only low-status forms of culture (Peterson 1992).

Scholars trying to understand social reproduction through patterns of cultural consumption have drawn on Bourdieu's work, and his idea of cultural capital, to explore beyond social class and further afield than France. Notably, implicit in both theories of cultural consumption is the underlying concept of cultural value in terms of 'highbrow' and 'lowbrow' cultural practices, or, as Miles and Gibson (2016) put it, the idea of 'cultural orthodoxy'. In other words, regardless of how they are consumed, certain patterns of cultural participation are more valued, have higher status, and generate more benefits for participants than others. Furthermore, for both perspectives on cultural consumption, dominant social groups 'win', that is, they are best positioned to generate more cultural capital. The question then becomes, in different national contexts, which of these perspectives on cultural consumption is more useful? Or even, whether Eurocentric patterns of cultural orthodoxy apply at all to other geopolitical contexts. In Latin America, for instance, Gayo (2016) and Méndez (2016) have argued that underlying Eurocentric distinctions between high-status and low-status cultural practices do not map directly onto cultural engagement patterns. Nonetheless, as we explore in this paper, there may be forms of cultural participation, exclusion, value, and oppression that are specific to Latin American nations, and/or traces of Eurocentric cultural orthodoxy and value systems may remain.

We must take seriously the many questions posed by trying to understand cultural engagement with science in terms of social justice. Issues of social justice are inevitably multi-dimensional, in flux, and context-dependent (Fraser 2003; Young 1990).3 Thus, while patterns of participation in science-related cultural practices vary within and between national contexts, around the world, access to cultural engagement with science appears resoundingly hierarchical -those with more economic, political, educational, and cultural advantages are more likely to participate (Dawson 2019; NSF 2012; OECD 2012). The resulting forms of exclusion, oppression, and disadvantage emerge at the intersections of different social positions and different experiences of structural inequality and, understandably, vary from one context to the next.

Materials and methods

Our research question is as follows: What factors better predict attendance at science museums in Latin America? Our interest is to model to what extent access to science museums depends on gender, age, education, economic level, interest in science, and other factors in seven Latin American countries. We use logistic regression as a statistical analysis technique since it functionally relates a dichotomous variable with a set of independent variables. The analysis estimates how likely an event is, defined by the dependent variable based on a set of predictors or forecast variables (Harrell, 2015). In other words, we seek to understand how standard socio-demographic variables, and contextual factors (independent variables), make attending to science museums (dependent variable) possible.

We based our analysis on the information from 18,957 surveys of public perceptions of science applied to representative samples of the population of seven Latin American countries that we aggregated into a common dataset (see Table A1 Appendix): Argentina (2015), Brazil (2015), Chile (2016), El Salvador (2018), Mexico (2015), Panama (2017) and Paraguay (2016). The dataset is posted at the Open Science Framework (OSF): https://osf.io/qf924/. We were interested in knowing each effect of a group of independent variables (gender, age, education, etc.), keeping all the other constants, on museum attendance (dependent variable).

We tested several regression methods (input of variables in the block, method of successive steps -step-wise- etc.), and we elaborated different models (model 1 to model 6), depending on the type and number of the variables used, observing how the models fit better or worse depending on the inclusion or deletion of the variables. In other words, how they improved or lost effectiveness in their explanatory capacity. For example, when we left out the variable 'interest in S&T issues', the models fit less well, that is, they have less explanatory power (see Table A2 Appendix).

We used the variables of education and socioeconomic level separately in some models. In these cases, interest in S&T issues became more relevant. However, in the models where we included the education and socioeconomic level unified in an aggregate index (as a proxy of social class position), these were more important than interest, at least for some population segments. This shows that for many people, the probability of attending museums is more determined by social class stratification than by their interest in visiting them.

We calculated with these models the possibilities of people attending S&T museums based on different factors, grouping education and socioeconomic level, defining a variable that we call social position. This practice rule assesses the cumulative effect of two variables that, although not linearly associated, have a considerable statistical interaction (.550 gamma).

The final model includes the following variables:

Gender

A dichotomous variable in which we studied the probability of women attending museums compared to men.5

Age

This variable grouped the population into five segments: 15–29 years old; 30–44 years old; 45–54 years old; 55–64 years old; and over 65 years old.

Social class position
This is a typological index that jointly considers the educational level and the socioeconomic level (SEL). We elaborated it with five segments that define different positions in society: basic education and low SEL (group 1); basic education and medium or high SEL; secondary education and low SEL (group 2); secondary education and medium SEL (group 3); secondary education and high SEL; and higher education and low SEL (group 4); higher education and medium or high SEL (group 5). Thus, the social class position is close to the concept of social status. In a general sense, in sociological research, status is recognized, or perceived, as prestige given to a certain social class position. In a limited sense, status is occupational prestige.6

Territory
It is a variable that distinguishes between populations that live in large cities or regions with a higher population density and those that live in medium or small cities or areas with low population density.

Interest in S&T
It is an ordinal index based on three indicators of declared interest in topics of science and technology, medicine and health, and environment and ecology, grouping people with high, medium, or low levels of interest.

Science news
It is an ordinal variable that measures the habit of reading science news in newspapers, discriminating individuals with zero, low, medium, and high levels of science content consumption.

Cultural engagement
It is an ordinal index variable that groups the people who stated visits to art museums, zoo-aquariums, or environmental parks during the survey year, distinguishing the individuals with zero, medium and high levels of cultural engagement.

Results
The global goodness of fit of the final regression model (Model 6) is acceptable. The Omnibus Test of Model Coefficients indicates it is statistically significant compared to the null model (chi-square (17) = 3571.29 / $p < 0.001$). The Model 6 deviance (−2 Log likelihood = 11515.18) is also the smallest compared to the other plausible models. The Hosmer-Lemeshow Test reveals a good fit (chi-square = 8.108 / p-value = .423). Also, the model explains 31% of the variance (R2 of Nagelkerke .313) in science museum attendance in Latin America (Table A2 Appendix). Besides, it has a sensitivity or ability to predict the cases that present the characteristic (having visited a museum) close to 30%, and high specificity, or ability to correctly discriminate those who did not visit museums (96.3%). It means the model is a fitting guide to understanding what variables effectively intervene in visiting science museums at a regional level although it does not have a high predictive capacity. We would require other contextual variables not available to go further in the explanation of cultural participation. Additionally, all the variables also make a statistically significant contribution to the final logistic regression model (Table A2 Appendix). They show that when we evaluate the probability of attending a science museum, asymmetries emerge

between social groups. The frequency distribution of the bivariate relationships among variables (for instance, visits to science museums according to education), anticipated these differences between social groups (see Table A1 Appendix).

Visits to museums are closely associated with other cultural and heritage participation in science and technology. Thus, it is understandable that cultural engagement (attendance at art museums, zoos, aquariums, and environmental parks) is the variable that most contribute to the final probabilistic regression model. A person who does not have a certain level of cultural engagement has almost zero probability of going to science museums. The inclusion of this variable notably improves the regression models' predictive capacity (Table A2 Appendix). However, we must consider that visiting all these spaces is closely linked to the social class position. Education and socioeconomic level largely influence attending these places in all the countries surveyed (Polino 2021).

The most relevant characteristic revealed by data in the regression models is precisely the systematic impact of social class position -measured by school capital and socioeconomic level- on leisure and free time opportunities related to museum heritage. Participation in science museums increases systematically with social class: a person with higher education and a medium or high SEL is two times more likely to attend a museum than those with basic education and a low SEL. In turn, a person with secondary education and a medium SEL has fifty six percent more opportunities to visit a museum than those with an elementary education and a low SEL. Also, individuals with a medium level of education and high SEL have eighty percent more possibilities of attending a science museum than people with a basic education and low SEL (Table A2 Appendix).

People's interest in S&T topics, including medicine, health, and the environment, also impacts museum visits. People interested are up to fifty percent more likely to visit museums than those with little or no interest. However, there is also a systematic and close association between interest in S&T and sociodemographic variables, mainly education or income. Other variables, like age and, depending on the context, gender may also affect interest. This outcome is in line with other empirical results at the country level in Latin America that found an interest in S&T was closely related to social class -see Polino (2019, 2021). These finding also echoes empirical research in other geographical contexts -see Bauer (2012) for Europe; Besley (2018) for the United States; or Liu, Tang, and Bauer (2012) for China.

Closely associated with the interest, science news consumption is another significant predictor of visits to science museums. Individuals with high levels of newspaper reading also have eighty percent more chances of attending a science museum than people who do not read scientific news in the media. In turn, someone with an average habit of reading science news in the press is almost fifty percent more likely to attend a museum than uninformed people (Table A2 Appendix).

Age is also a significant variable with systematic influence, conditioning attendance at science museums: visits are less frequent and more likely as they increase. From 55 to 60 years old, people have significantly fewer opportunities to go to museums than youth and young adult groups in society.

The territory also has effects on cultural participation. Visits to museums are less frequent in areas with low population density, confirming that geographical location impacts cultural consumption opportunities. This result reflects the high regional concentration of science museums in the capitals or main cities. Depending on the area of

residence -which may vary between countries and within each country- citizens will have greater or lesser opportunities to access information and scientific knowledge.

Even if general data do not show differences in participation between women and men (Table A1 Appendix), the final regression model shows that, although not pronounced, they do exist. In this sense, it is relevant to highlight that the fewer opportunities for women to attend a science museum are more accentuated in women with low socioeconomic and educational capital. This gender bias in cultural consumption is another example of the structural asymmetries that affect economic progression, participation, and other rights of women in society (Table A2 Appendix).

Discussion

We estimated the probability of attending science museums in Latin America using logistic regression modeling. Under the premise that in the social sciences, the importance of a model is more associated with its theoretical validity than with its predictive capacity, our intention was not to predict cultural behavior but rather to understand how sociological conditioning factors operate today in a region burdened by social inequality.

There are multiple ways in which people search for information and relate to science. Personal interest and information consumption mediate visits to science museums. Also, attending museums is closely associated with cultural participation in other areas of S&T, such as visits to art museums, zoos, aquariums, or natural parks. All these factors are mutually reinforcing conditioning access and cultural participation in science museums.
It is important to integrate analyses of social class more broadly with an understanding of intersecting structural inequalities, as well as people's experiences of, and attitudes towards, science museums. Given the data available for the analysis we have presented here, we suggest further research is necessary to take more variables -such as questions of ethnicity- into account. Despite these limitations, the results of our analysis highlight the importance of social stratification as a source of cultural inequality. Social stratification influences the opportunities individuals have in cultural consumption and participation.

Access to museums differs according to different social groups, showing the persistence of different access patterns across different countries (Dawson 2019; OECD 2012). Our analysis suggests social stratification continues to dominate the logic of the social structure -which implies unequal opportunities for individuals and social groups– and is at the base of the struggle and social resistance that explains the conflict between classes and groups of society.

Relationships between social position (social class or status) and cultural consumption are not linear or mechanical determinants. But, drawing on our analysis & and the theories of Bourdieu (1984) attention to science, interest in S&T issues, and cultural participation in science museums are dispositions that, acquired through education and dependent on social capital, are largely explained by the position of individuals in the structure of society. People from the more dominant, advantaged social classes are more likely to visit science museums.

That social class had such a strong influence on science museum participation in our analysis contributes to the discussion concerning science cultural consumption and participation meaningful in the light of two dominant paradigms in cultural sociology: the 'structural homology thesis' and the 'omnivorous thesis'. The first one, mainly derived from Pierre Bourdieu's sociology, assumes a very close correspondence between social class and cultural consumption. Social origin determines cultural needs (i.e., 'dominant classes' would

consume high-status culture and reject the rest). The second one, credited to Peterson (1992), postulates privileged social class consumption is more diversified and includes 'highbrow' as well as popular, or 'lowbrow', tastes, and practices.

Our examination suggests that cultural homology, rather than omnivorousness, characterizes cultural engagement with science museums in the Latin American countries whose data we analyzed. This finding builds on the research of Gayo (2016) and Méndez (2016) on cultural omnivorousness and social stratification in Latin American cultural studies, which troubled the underlying Eurocentric distinction between 'highbrow' and 'lowbrow' consumption. Our analysis suggests instead that Eurocentric orthodoxies of cultural value *were* reproduced in the seven Latin American countries whose data we analyzed concerning science museum participation (Miles and Gibson 2016). We found that educational capital (measured according to the education level achieved) and socioeconomic position, when combined as measures of social class position, were the two key factors that determined access to science museums as part of cultural consumption. In all seven countries whose data we analyzed, these factors produce systematic effects, indicating that attendance to science museums grows with increasing education and wealth. This suggests that cultural orthodoxies of 'high' and 'low' cultural consumption reflected classed cultural hierarchies found in other countries, not least Europe and North America, appear to be present in Latin America when it comes to science museum participation (Dawson 2019; OECD 2012; National Research Council 2009).

Our analysis indicates that the cultural field of science reproduces the structures and consequences of inequality in Latin America. Social stratification determines differentiated patterns of cultural participation and has a marked influence on the conditions of access to museums and the objective possibilities of appropriation of the goods of science as culture. Building on theories of social justice and cultural engagement with science, we agree that it is crucial to reframe exclusion from science museums as structural, rather than as the result of behavioral and attitudinal deficits on the part of 'non-visitors' (Dawson 2019). As our analysis shows, exclusion from science museums is strongly determined by social class position. In this sense, the exclusion is structural. Framing exclusion as the fault of the excluded is not only a misrepresentation of the available research evidence but is also profoundly unjust, reproducing as it does racist, classed, sexist, and other discriminatory assumptions about whose culture counts (Miles and Gibson 2016; Yosso 2005). Indeed, as the analysis of data from seven different Latin American countries presented in this paper has shown, the relationships between social position and attitudes are structural, and far more complex than a simplistic 'double deficit' view of exclusion suggests.

Limitations

Our study is limited since we were unable to work with all the variables that could affect consumption and cultural participation. For instance, we did not analyze the influence of the profession or economic activity of respondents in the occupational structure. Thus, we could have investigated the impact of status as an occupational prestige and, in this way, participation meaningful in the light of two dominant paradigms in cultural sociology: the 'structural homology thesis' and the 'omnivorous thesis'. The first one, mainly derived from Pierre Bourdieu's sociology, assumes a very close correspondence between social class and cultural consumption. Social origin determines cultural needs (i.e., 'dominant classes' would consume high-status culture and reject the rest). The second one, credited to Peterson (11

determine its place with the effects of education and social class. Also, we were not able to include other related social capital variables. We know, for instance, that ethnicity intersects with the social class position in many ways in the seven countries whose data we have analyzed. Research has shown how ethnicity and racist structural inequalities play key roles in attitudes towards, access to, and experiences of science museums around the world in multiple and complex ways, including socio-political histories of colonialism (Abungu 2019; Dawson 2019; Fisher, Anila, and Moore 2017; Nagam, Lane, and Tamati- Quennell 2020). These limitations have a double origin in our study. On the one hand, the perception surveys across the seven countries studied collected relatively few sociodemographic and contextual classification variables. On the other hand, since it is only possible to use the same variables or, at least, those that allow a legitimate comparison between countries we were further limited in the variables available for the analysis.

Conclusion

Museums play significant roles in the co-construction of science and culture in our societies. Museums are important actors in the social history of science communication and continue to support informal science education and science communication today. They mediate between citizens, institutions, science, heritage, and the treatment of cultural objects (Achiam and Marandino 2014; Falk and Dierking 2012; Hetland, Pierroux, and Esborg 2020). As a result, museums can be seen as integral to the civic culture of science (Schiele 2014). However, despite substantial efforts to increase interest and participation, particularly among historically marginalized social groups, access remains uneven (Dawson 2019; DeWitt and Archer 2017). The data provided by public perception surveys and analyzed here reflects the difficulties of participation and, for some individuals, their exclusion from a substantive part of culture and science. It challenged communication museum management and the inclusion of citizens in the culture of science. The challenge is to reach audiences that are objectively far from the culture of science. It is necessary for a better understanding – differentiated by social groups -of the physical, symbolic, and/ or economic barriers that affect consumption and cultural participation to make museums' management decisions based on evidence.

In Latin America, as elsewhere, limited access to museums is a problem of equity and social justice (Dawson 2017, 2019). Social inequality harms the most vulnerable people in our societies. Such inequalities in cultural participation also highlight the structural limitations of practice and policy designed to support cultural engagement with science and participatory democracy strategies. Taking social justice seriously into account will require renewed theoretical frameworks and empirical research that includes a broader range of factors (gender biases, occupational prestige, ethnicity, perspectives about decolonization, etc.), along with more inclusive awareness and participatory activities.

Notes

1. The research project included museums from Australia, Belgium, Canada, Colombia, England (UK), Finland, Mexico, Norway, Portugal, the USA, Singapore, Sweden, and Taiwan (see Falk et al. 2016).
2. Bourdieu (1984) postulates that the cognitive structures that people create to know and recognize the social world are incorporated social structures. In that sense, it is less likely for dominated classes to discover their objective interests and to produce and impose the problems under their needs.

3. Neill (2006) argues that museums' relationship with society must incorporate a theory of justice into museum epistemology. According to this author, even though museums cannot contribute to reducing social inequalities in the wider society, they must diminish inequalities in the cultural sector.
4. In practice, it means that most people with basic education belong to the segment of low socioeconomic level (SEL). In contrast, most people with higher education have a medium or high socioeconomic position. In the same way, there are comparatively few people with higher education and a low SEL, just as there are also few who have basic education and belong to the better-positioned socioeconomic segment of society.
5. The surveys we worked with collected gender data in a binary way. We note therefore that data about transgendered people were absent from the surveys and, as a result, our analysis.
6. Sociology studies status as a property that orders occupations and professions based on the prestige given to them. According to Chang and Goldthorpe (2007), higher, equal, or lower positions reflect evaluations of social 'honorability', and, in this sense, they form the hierarchies of status.

Acknowledgments
We thank the ministries, national agencies, and the Network of Science and Technology Indicators (RICYT) for providing access to the data collected in surveys on public perception surveys of science and technology.

Disclosure statement
No potential conflict of interest was reported by the authors.

Ethical statement
This research is based on the analysis of secondary data gathered by the national agencies responsible for science and technology in Argentina, Brazil, Chile, Mexico, El Salvador, Panama, and Paraguay, under the legislation in force in each country for the collection of information from public opinion polls. This type of social research respects the anonymity of the participants under statistical secrecy laws. It usually also includes different ways of applying the principles of informed consent criteria (information, comprehension, and voluntariness) defined by the Belmont Report on the ethical principles and guidelines for behavioral research. Also, the dataset we integrated for the analysis, has no personal information or contact details about the respondents, contributing to guaranteeing their rights to anonymity and privacy.

Notes on contributors
Carmelo Polino is an Assistant Professor in the Department of Philosophy at the University of Oviedo (Spain). He is also an associated researcher to the Centro Redes (Buenos Aires, Argentina). He holds a PhD in Social Studies of Science, and his main research interests are public understanding of science, STS studies, philosophy of science, and sociology of science communication. E-mail: polinocarmelo@uniovi.es.
Luisa Massarani has a Ph.D. in Science Education, Management, and Diffusion from the Federal University of Rio de Janeiro (UFRJ), is a Coordinator of the Brazil's Institute of Public Communication of Science and Technology and researcher at House of Oswaldo Cruz, Oswaldo Cruz Foundation; CNPq productivity grant; FAPERJ Scientist of Our State grant;

Honorary Research Associate, Department of Science and Technology Studies, University College London; Coordinator of SciDev.Net for Latin American and the Caribbean. E-mail: luisa.massarani@fiocruz.br.

Emily Dawson is an Associate Professor at the Department of Science and Technology Studies, University College London. Her research explores how people learn and engage with science, with an emphasis on inclusion and social justice. She focuses on how we can understand and transform patterns of advantage and disadvantage caused by structural inequalities, such as racism, sexism, class discrimination, ableism, and their intersections. E-mail: sts@ucl.ac.uk.

ORCID
Carmelo Polino http://orcid.org/0000-0003-1789-8024
Luisa Massarani luisa.massarani@fiocruz.brhttp://orcid.org/0000-0002-5710-7242
Emily Dawson . http://orcid.org/0000-0001-7152-6032

References

Abungu, A. G. 2019. “Museums: Geopolitics, Decolonisation, Globalization and Migration.” *Museum International* 71 (1-2): 62–71. https://doi.org/10.1080/13500775.2019.1638030
Achiam, M., and M. Marandino. 2014. “A Framework for Understanding the Conditions of Science Representation and Dissemination in Museums.” *Museum Management and Curatorship* 29 (1): 66–82. https://doi.org/10.1080/09647775.2013.869855
Achiam, M., and M. Marandino. 2019. “Intended and Realized Educational Messages of Dioramas – An International Comparison.” In *Natural History Dioramas – Traditional Exhibits for Current Educational Themes*, edited by A. Scheersoi, and S. D. Tunnicliffe, 131–145. New York: Springer.
Achiam, M., and J. Sølberg. 2016. “Nine Meta-Functions for Science Museums and Science Centres.” *Museum Management and Curatorship* 32 (2): 123–143. https://doi.org/10.1080/09647775.2016.1266282.
Alonso Fernández, L. 1993. *Museología: Introducción a la teoría y práctica del museo*. Madrid: Itsmo.
Alvarado, F., and L. Gasparini. 2015. “Recent Trends in Inequality and Poverty in Developing Countries.” In *Handbook of Income Distribution*, edited by A. Atkinson, and F. Bourguignon, 697–805. Ámsterdam: Elsevier.
Bauer, M. W. 2012. “The Changing Culture of Science Across Old Europe, 1989 to 2005.” In *The Culture of Science*, edited by M. W. Bauer, R. Shukla, and N. Allum, 92–109. London/New York: Routledge.
BEIS. 2020. “Public Attitudes to Science 2019.” Research Paper Number 2020/012. London: Department for Business, Energy and Industrial Strategy.
Bennett, T., M. Savage, E. B. Silva, A. Warde, M. Gayo, and D. Wright. 2009. *Culture, Class, Distinction*. London/New York: Routledge.
Besley, J. 2018. “The National Science Foundation’s Science and Technology Survey and Support for Science Funding, 2006-2014.” *Public Understanding of Science* 27 (1): 94–109. https://doi.org/10. 1177/0963662516649803
Bourdieu, P. 1984. *Distinction: A Social Critique of the Judgement of Taste*. London: Routledge.
Bourdieu, P. 1993. *The Field of Cultural Production*. Cambridge: Polity Press.

Bourdieu, P., and A. Darbel. 1991. *The Love of Art: European art Museums and Their Public*. Oxford: Polity Press.
Bourdieu, P., and L. Wacquant. 1992. *An Invitation to Reflexive Sociology*. Chicago: University of Chicago Press.

Briseño-Garzón, A., and D. Anderson. 2012. "A Review of Latin American Perspectives on Museums and Museums Learning." *Museum Management and Curatorship* 27 (2): 161–177. https://doi.org/ 10.1080/09647775.2012.674321
Brown, M., and M. Reiss, eds. 2004. *Learning Science Outside the Classroom*. London: Routledge.
Canfield, K. N., S. Menezes, S. B. Matsuda, A. Moore, A. N. Mosley Austin, B. M. Dewsbury, M. I. Feliú- Mójer, et al. 2020. "Science Communication Demands a Critical Approach That Centers Inclusion, Equity, and Intersectionality." *Frontiers in Communication* 5 (2). https://doi.org/10.3389/fcomm. 2020.00002.
Catalán, C., and G. Sunkel. 1992. *Algunas tendencias en el consumo de bienes culturales en América Latina*. Santiago: Flacso.
Cazelli, S., M. Marandino, and D. Stuart. 2003. "Educação e Comunicação Em Museus de Ciências: Aspectos Históricos, Pesquisa e Prática." In *Educação e Museu: A Construção Social Do Caráter Educativo Dos Museus de Ciências*, edited by G. Gouvêa, 83–106. Rio de Janeiro: Editora Access.
Chang, T. W., and D. Goldthorpe. 2007. "Class and Status: The Conceptual Distinction and its Empirical Relevance." *American Sociological Review* 72 (4): 512–532. https://doi.org/10.1177/ 000312240707200402.
Coffee, K. 2008. "Cultural Inclusion, Exclusion, and the Formative Role of Museums." *Museum Management and Curatorship* 23 (3): 261–279. https://doi.org/10.1080/09647770802234078
Council of Canadian Academies. 2014. *Science Culture: Where Canada Stands*. Ottawa: Council of Canadian Academies.
CRISP. 2018. *Main Findings from the Survey of Public Understanding of Science in China, 2018*. Beijing: China Research Institute for Science Popularization.
Danilov, V. 1982. *Science and Technology Centers*. Massachusetts: MIT Press.
Dawson, E. 2014. "Equity in Informal Science Education: Developing an Access and Equity Framework for Science Museums and Science Centres." *Studies in Science Education* 50 (2): 209–247.
Dawson, E. 2017. "Social Justice and Out-of-School Science Learning: Exploring Equity in Science Television, Science Clubs and Maker Spaces." *Science Education* 101: 539–547.
Dawson, E. 2019. *Equity, Exclusion and Everyday Science Learning. The Experiences of Minoritised Groups*. London: Routledge.
Dawson, E., and E. Jensen. 2011. "Towards a Contextual Turn in Visitor Studies: Evaluating Visitor Segmentation and Identity-Related Motivations." *Visitor Studies* 14 (2): 127–140. https://doi.org/ 10.1080/10645578.2011.608001
DeWitt, J., and L. Archer. 2017. "Participation in Informal Science Learning Experiences: The Rich Get Richer?" *International Journal of Science Education, Part B: Communication and Public Engagement* 7 (4): 356–373. https://doi.org/10.1080/21548455.2017.1360531
Falk, J. H., and L. D. Dierking. 1992. *The Museum Experience*. Washington, DC: Whalesback Books.
Falk, J. H., and L. D. Dierking. 2012. *The Museum Experience Revisited*. London: Routledge.

Falk, J. H., L. D. Dierking, and S. Foutz. 2007. *In Principle, in Practice*. Lanham: Altamira Press.
Falk, J., L. Dierking, L. Prendergast Swanger, N. Staus, M. Back, C. Barriault, C. Catalao, et al. 2016. "Correlating Science Center Use with Adult Science Literacy: An International, Cross-Institutional Study." *Science Education* 100 (5): 849–876. https://doi.org/10.1002/sce.21225
Feder, M. A., A. W. Shouse, B. Lewenstein, and P. Bell. 2009. *Learning Science in Informal Environments: People, Places, and Pursuits*. Washington, DC: National Academy Press.
Fernández Polcuch, E., A. Bello, and L. Massarani. 2016. *Políticas Públicas e Instrumentos Para El Desarrollo de La Cultura Científica En América Latina*. Montevideo: LATU, UNESCO, RedPOP.
Finlay, S. M., S. Raman, E. Rasekoala, V. Mignan, E. Dawson, L. Neeley, and L. A. Orthia. 2021. "From the Margins to the Mainstream: Deconstructing Science Communication as a White, Western Paradigm." *Journal of Science Communication* 20 (01): C02–C12. https://doi.org/10.22323/2. 20010302.
Fisher, D., S. Anila, and P. Moore. 2017. "Coming Together to Address Systemic Racism in Museums." *Curator: The Museum Journal* 60 (1): 20–31.
Fraser, N. 2003. "Social Justice in the Age of Identity Politics: Redistribution, Recognition, and Participation." In *Redistribution Or Recognition?*, edited by N. Fraser, and A. Honneth, 3–67. London: Verso.
Briseño-Garzón, A., and D. Anderson. 15
Friedman, A. 2010. "The Evolution of the Science Museum." *Physics Today* 63 (10): 45–51. https://doi. org/10.1063/1.3502548
García Canclini, N. 1991. "Los estudios culturales de los 80 a los 90: perspectivas antropológicas y sociológicas en América Latina." *Iztapalapa. Revista de Ciencias Sociales y Humanidades* 11 (24): 9–26.
García Canclini, N. 1999. "El consumo cultural: una propuesta teórica." En *El consumo cultural en América Latina. Construcción teórica y líneas de investigación*, edited by G. Sunkel (Coord.), 72–95. Bogotá: Convenio Andrés Bello.
García Canclini, N. 2004. *Diferentes, desiguales y desconectados. Mapas de la interculturalidad*. Barcelona: Gedisa.
Gayo, M. 2016. "A Critique of Omnivore: From the Origen of the Idea Omnivorousness to the Latin American Experience." In *Routledge International Handbook of the Sociology of Art and Culture*, edited by L. Hanquinet, and M. Savage, 104–115. London/New York: Routledge.
Gayo, M. N., M. L. Méndez, R. Radakovich, and A. Wortman. 2011. *Consumo cultural y desigualdad de clase, género y edad: un estudio comparada en Argentina, Chile y Uruguay*. Madrid: Fundación Carolina.
Hanquinet, L., and M. Savage, eds. 2016. *Routledge International Handbook of the Sociology of Art and Culture*. London/New York: Routledge.
Harrell, F. E. 2015. *Regression Modeling Strategies with Applications to Linear Models, Logistic and Ordinal Regression*. New York: Springer.
Hetland, P., P. Pierroux, and L. Esborg. 2020. *A History of Participation in Museums and Archives*. London/New York: Routledge.
Hudson, K. 1988. *Museums of Influence*. Cambridge: Cambridge University Press.
Humm, C., P. Schrögel, and A. LeBmöllmann. 2020. "Feeling Left out: Underserved Audiences in Science Communication." *Media and Communication* 8 (1): 164–176. https://doi.org/10.17645/ mac.v8i1.2480
Jelin, E., R. Motta, and S. Costa, eds. 2018. *Global Entangled Inequalities. Conceptual Debate and Evidence from Latin America*. London/New York: Routledge.

Kirchberg, V. 2016. “Museum Sociology.” In *Routledge International Handbook of the Sociology of Art and Culture*, edited by L. Hanquinet, and M. Savage, 232–246. London/New York: Routledge.
Liu, X., S. K. Tang, and M. W. Bauer. 2012. “Comparing the Public Understanding of Science Across China and Europe.” In *The Culture of Science*, edited by M. W. Bauer, R. Shukla, and N. Allum, 139– 157. London/New York: Routledge.
Lopes, M., and S. Murriello. 2005. “Ciências e Educação Em Museus No Final Do Século XIX.” *História, Ciências, Saúde-Manguinhos* 12 (suppl): 13–30. https://doi.org/10.1590/S0104-59702005000 400002
Lopes, M., and I. Podgorny. 2000. “The Shaping of Latin American Museums of Natural History 1850- 1890.” *Osiris* 15 (1): 108–118. https://doi.org/10.1086/649321
López-Roldán, P., and S. Fachelli, eds. 2021. *Towards a Comparative Analysis of Social Inequalities Between Europe and Latin America*. New York: Springer.
Marandino, M. 2009. “Museus de Ciências, Coleções e Educação: Relações Necessárias.” *Museologia e Patrimônio* 2 (2): 1–12.
Massarani, L., L. Patiño-Barba, L. Amorim, and R. Arantes Reis, eds. 2023. *Guia de Centros e Museus de Ciência da América Latina e do Caribe*. Rio de Janeiro: Fiocruz, COC.
Mato, D., and F. Maldonado (Comp.). 2007. *Cultura y Transformaciones Sociales en Tiempos de Globalización. Perspectivas latinoamericanas*. Buenos Aires: CLACSO.
Méndez, M. 2016. “Contesting the Highbrow and Lowbrow Distinction: How Latin American Scholars Engage in Cross-Cultural Debates.” In *Routledge International Handbook of the Sociology of Art and Culture*, edited by L. Hanquinet, and M. Savage, 409–420. London/ New York: Routledge.
Miles, A., and L. Gibson. 2016. “Everyday Participation and Cultural Value.” *Cultural Trends* 25 (3): 151–157. https://doi.org/10.1080/09548963.2016.1204043.
Nagam, J., C. Lane, and M. Tamati-Quennell, eds. 2020. *Becoming Our Future: Global Indigenous Curatorial Practice*. Winnipeg: ARP Books.
National Research Council. 2009. *Learning Science in Informal Environments: People, Places, and Pursuits*. Washington, DC: The National Academies Press.
https://doi.org/10.17226/12190
Neill, M. 2006. “Essentialism, Adaptation and Justice: Towards a new Epistemology of Museums.” *Museum Management and Curatorship* 21 (2): 95–116.
https://doi.org/10.1080/0964777060030 2102
NSF. 2012. *Science and Engineering Indicators 2012*. Arlington: National Science Foundation.
NSF. 2020. *Science and Engineering Indicators 2020*. Arlington: National Science Foundation.
OECD. 2012. *Education at a Glance 2012*. OECD Indicators. Paris: OECD Publishing.
https://doi.org/10. 1787/eag-2012-en.
OECD. 2019. *Latin American Economic Outlook 2019: Development in Transition*. Paris: OECD Publishing. https://doi.org/10.1787/g2g9ff18-en.
OEI. 2014. *Encuesta Latinoamericana de Hábitos y Prácticas Culturales 2013*. Madrid: Organización de Estados Iberoamericanos.
Peterson, R. A. 1992. “Understanding Audience Segmentation: From Elite and Mass to Omnivore and Univore.” *Poetics* 21 (4): 243–258. https://doi.org/10.1016/0304-422X(92)90008-Q
Polino, C. 2019. “Públicos de la ciencia y desigualdad social en América Latina.” *JCOMAL* 02 (02), A05: 1–15. https://doi.org/10.22323/3.02020205.

Polino, C. 2021. “Praxeology and Social Asymmetry.” In *Pocket Science. The Praxeological Dimension of Scientific Culture*, edited by A. Muñoz van den Eynde and C. Polino, 58–69. Madrid: Ciemat
Quevedo, L. A. 2007. “Consumos y prácticas culturales en América Latina.” In *Cuadernos de Políticas Culturales. Sistemas de información e indicadores culturales*, 109–117. Buenos Aires: UNTREF.
Rennie, L. J. 2014. “Learning Science Outside of School.” In *Handbook of Research on Science Education*, edited by N. Lederman, and S. Abell, 120–144. New York: Routledge.
Rennie, L. J., and T. McClafferty. 1996. “Science Centres and Science Learning.” *Studies in Science Education* 27 (1): 53–98. https://doi.org/10.1080/03057269608560078
Rocha, J., L. Massarani, W. De Abreu, L. Inacio, and A. Molenzani. 2020. “Investigating Accessibility in Latin America Science Museums and Centers.” *Anais Da Academia Brasileira de Ciências* 92 (1). https://doi.org/10.1590/0001-3765202020191156.
Romeu Aldaya, V. L., ed. 2018. *Los “Rostros Invisibles” de La Desigualdad Social*. México: Universidad Iberoamericana.
Rosas Mantecón, A. 2007. “Barreras entre los museos y sus públicos en la Ciudad de México.” *Culturales* III: 5 (enero-junio): 79–104.
Rosas Mantecón, A. 2014. “Consumos culturales: públicos, mercados y políticas.” *Alteridades* 36: 23– 31.
Rosas Mantecón, A. 2017. “Públicos: historia y contemporaneidad.” En *Estudios sobre Públicos y Museos*, edited by L. Pérez Castellanos (Coord.), 22–38. México: Instituto Nacional de Antropología e Historia.
Schiele, B. 2014. “Science Museums and Centres: Evolution and Contemporary Trends.” In *Routledge Handbook of Public Communication of Science and Technology*, edited by M. Bucchi, and B. Trench, 40–57. London/New York: Routledge.
Schwan, S., A. Grajal, and D. Lewalter. 2014. “Understanding and Engagement in Places of Science Experience: Science Museums, Science Centers, Zoos and Aquariums.” *Educational Psychologist* 49 (2): 70–85. https://doi.org/10.1080/00461520.2014.917588
Skeggs, B. 2004. “Exchange, Value and Affect: Bourdieu and ‘the Self’.” *The Sociological Review* 52 (2_suppl): 75–95. https://doi.org/10.1111/j.1467-954X.2005.00525.x.
Stocklmayer, S. M., L. J. Rennie, and J. K. Gilbert. 2010. “The Roles of the Formal and Informal Sectors in the Provision of Effective Science Education.” *Studies in Science Education* 46 (1): 1–44. https:// doi.org/10.1080/03057260903562284.
Sunkel, G., coord. 1999. *El consumo cultural en América Latina. Construcción teórica y líneas de investigación*. Bogotá: Convenio Andrés Bello.
Yosso, T. J. 2005. “Whose Culture has Capital? A Critical Race Theory Discussion of Community Cultural Wealth.” *Race Ethnicity and Education* 8 (1): 69–91. https://doi.org/10.1080/ 1361332052000341006
Young, I. M. 1990. *Justice and the Politics of Difference*. Princeton: Princeton University Press.