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Social capital, income inequality and the social gradient in self-rated health in Latin America: A fixed effects analysis

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ABSTRACT

Latin America is the most unequal region in the world. The current sustainable development agenda increased attention to health inequity and its determinants in the region. Our aim is to investigate the social gradient in health in Latin America and assess the effects of social capital and income inequality on it. We used cross-sectional data from the World Values Survey and the World Bank. Our sample included 10,426 respondents in eight Latin American countries. Self-rated health was used as the outcome. Education level was the socio-economic position indicator. We measured social capital by associational membership, civic participation, generalized trust, and neighborhood trust indicators at both individual and country levels. Income inequality was operationalized using the Gini index at country-level. We employed fixed effects logistic regressions and cross-level interactions to assess the impact of social capital and income inequality on the heath gradient, controlling for country heterogeneity. Education level was independently associated with self-rated health, representing a clear social gradient in health, favoring individuals in higher socioeconomic positions. Generalized and neighborhood trust at country-level moderated the effect on the association between socioeconomic position and health, yet favoring individuals in lower socioeconomic positions, especially in lower inequality countries, despite their lower individual social capital. Our findings suggest that collective rather than individual social capital can impact the social gradient in health in Latin America, explaining health inequalities.

1. Introduction

Socioeconomic inequality in Latin American countries (LAC) is the highest in the world (UNDP, 2010), and recently with the post-2015 sustainable development agenda, addressing health inequity in LAC has become a greater concern (Becerra-Posada, 2015). The Pan American Health Organization (PAHO) advocates health equity as essential to the sustainable development in the region and recommends universal access to health and universal health coverage along with health-in-all approach to tackle the issue (PAHO, 2014a, b). Additionally, in May 2016, PAHO launched a high-level commission on health inequity in the Americas, focusing on gathering evidence in the region aiming to propose targeted recommendations to address the problem (PAHO, 2016).

Despite improvements to the overall health in LAC in the past 30 years, resulting in a marked increase in life expectancy and a decline in child mortality, the unfair distribution of health between and within countries remained (Barreto et al., 2012; PAHO, 2012), independent of the indicator used to assess the social gradient: e.g., income (Belon et al., 2012; Restrepo-Mendez et al., 2015), education (Belon et al., 2012; Haeberer et al., 2015; Hertel-Fernandez et al., 2007), or ethnicity/skin color (Chiavegatto et al., 2014; Lima-Costa et al., 2015; Perreira and Telles, 2014). The analyses of several socioeconomic position (SEP) indicators reflects multiple mechanisms implicated in the power distribution and in the social stratification in the region, which are further influenced by broader contextual health determinants, such as social capital and income inequality.

In the past two decades LAC experienced steep economic growth, declining income inequality, and growing social investments (Tsounta & Osueke, 2014), yet little is known about the impact this development has had on the social gradient in health and the social capital's role. Additionally, the investigation of which sociodemographic groups are mostly affected by income inequality and social capital could assist in clarifying the mechanisms behind the social gradient in health (Subramanian and Kawachi, 2004).

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1.1. Aims

The overall aim of this study is to investigate the moderating effects of social capital and income inequality on the social gradient in self-rated health in LAC. Specific aims are: to verify the association between socioeconomic disparities and self-rated health, controlling for the country-level heterogeneity, and to address to what extent social capital (both individual and collective) and income inequality modifies this association.

1.2. Theoretical framework

In recent decades, social capital has often been debated when addressing health disparities within and between populations (Kawachi et al., 2008a). Here, we conceptualize social capital as both individual and collective assets (Kawachi et al., 2008a). This view accounts for differences in processes on each level and suggests that individuals can benefit from their own social capital as well as societies can profit from the collective surplus generated by the coordinated actions of its individuals.

According to Rostila's (2013) resource-based approach—which builds on several social capital theories (e.g., Bourdieu (1986); Coleman (1988); Portes (1998); Putnam (2000); Putnam et al. (1993); Szreter and Woolcock (2004)), social capital is generated in trustful and reciprocal social relations that result in social resources, for individuals and for societies. The sources of both individual and collective social capital are the same, but the resources generated and the mechanisms to health differ depending on them being individual or collective (Eriksson, 2010; Rostila, 2013). At individual-level those resources could be informational, emotional, instrumental or appraisal supports (Berkman and Glass, 2000). At collective-level (i.e. country-level in our paper), resources are non-exclusive and targeted to achieve a common goal (Putnam et al., 1993), and it could lead to instrumental returns, e.g. better government performance, or expressive returns, e.g. social inclusion (Rostila, 2013).

Social capital—at both individual and collective—is further differentiated as structural or cognitive. Structural social capital refers to the basis and composition of and the participation in networks and institutions, while cognitive social capital refers to perceptions of norms, values, and attitudes such as trust and reciprocity (Harpham et al., 2002; Krishna and Shrader, 2000). While Putnam (2000) and Putnam et al. (1993) conceptualized social capital based on the strong and positive association between structural and cognitive factors, others found no correlation (Lindström, 2004). It is argued that structural and cognitive dimensions have their own independent pathways to health (Giordano and Lindstrom, 2010; Rostila, 2013), through for instance social support (Berkman and Glass, 2000) and psychosocial mechanisms (Marmot, 2006; Wilkinson and Pickett, 2009), respectively.

In general, both collective and individual social capitals are consistently associated with better health outcomes in high-income countries (Kawachi et al., 2008b). Studies about social capital and health in LAC are relatively scarce (Pattussi et al., 2006), yet higher social capital seems to relate with better health outcomes in the region (Hurtado et al., 2011; Kripper and Sapag, 2009; Pattussi et al., 2016; Sapag and Kawachi, 2010). The question is if social capital benefits individuals equally within a society and also between societies.

A possible hypothesis is that SEP affects social capital's effects on health (Uphoff et al., 2013). Considering the SEP effects on health as a result of the "status syndrome", in which the relative disadvantages and social comparisons generate long-term stress (Marmot, 2006; Wilkinson and Pickett, 2009), social capital could for instance help individuals to mitigate that stress, through different social resources (Uphoff et al., 2013; Wilkinson and Marmot, 2003). Some studies suggested this buffering effect of social capital on the social gradient in health (Gorman and Sivaganesan, 2007; Uphoff et al., 2013), while most of the evidence supported a dependency relationship between economic, cultural and social capitals, i.e. individuals in higher SEP have higher individual social capital (Ahnquist et al., 2012; Bourdieu, 1986; Uphoff et al., 2013). Furthermore, in high collective social capital settings, lower individual social capital was found to be even more deleterious to health than in less affluent settings (Campos-Matos et al., 2016; Uphoff et al., 2013).

Social capital effects on health are also assumed to be dependent of the income inequality levels (Islam et al., 2006; Kawachi et al., 2008b; Szreter and Woolcock, 2004). A systematic review suggested that social capital have a greater impact on health where inequality is higher (Islam et al., 2006), where the provision of safety nets is lower and the social capital relevance possibly greater (Kawachi et al., 2008b). Several mechanisms have been proposed to explain the association between income inequality and health: (i) based on neo-materialistic interpretations in which the societal provision of and individual access to material resources explains the association (Lynch, 2000); (ii) through the stress of social comparisons of a severe "status syndrome" in a society marked by pronounced social stratification (Marmot, 2006; Wilkinson and Pickett, 2009) and; (iii) by eroding social capital, leading to social exclusion, social isolation and hostility (Kawachi et al., 1997; Wilkinson, 1996). Although these mechanisms are proposed as independent and incompatible, according to Szreter and Woolcock (2004) social capital bridge these arguments, integrating state and civil society; neo-materialistic and psychosocial interpretations.

2. Methods

2.1. Study population

We used cross-sectional data from publicly available sources, i.e. from the World Values Survey (WVS)—wave 6 (2010–2014)—and from the World Bank world development indicators database. WVS conducted population surveys, in a stratified probabilistic sample of adults (18 + years), including rural and urban areas, using a common domiciliary face-to-face questionnaire, in the countries' native language. Individual data weights were applied aiming at better representative samples of the adult population in each country, and sampling and survey procedures were consistent among countries included in the study (WVS, 2016).

The WVS collected data in the following countries in LAC between 2010 and 2014: Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru and Uruguay. We removed respondents if they had missing data on the outcome (n = 14). Our sample, thus, included 10,426 respondents in 8 countries.

2.2. Measures

The outcome variable, self-rated health (SRH) was measured using the WVS question "All in all, how would you describe your state of health these days?" which had 4 possible answers: poor, fair, good or very good. We dichotomized the variable into "poor" (poor or fair) and "good" (good or very good), in accordance with previous studies (Kawachi et al., 2008b). The outcome of interest is good SRH. SRH is a validated measure of objective health, consistently associated with overall mortality and morbidity (DeSalvo et al., 2006; Theme et al., 2008).

We used education as a SEP indicator, as it reflects long-term influences of early life circumstances and also adulthood resources, for instance income and employment (Galobardes et al., 2006). Education level was categorized as lower (up to incomplete secondary school), middle (complete secondary school) and higher (higher education, incomplete and complete).

Social capital was measured at individual and collective levels. We selected 43 questions from the WVS that we judged relevant to the social capital concept based on the literature and according to the structural and cognitive social capital constructs (see Table 1). We

Table 1
Selected WVS questions and constructed variables, according to structural and cognitive dimensions.

Social Capital	WVS Questions	Variable
Structural		
Informal associations	Friends are important in life	*If friends are important and also a frequent source of information (at least monthly)*
	Friends are source of information	
Associational membership	Active, inactive or not a member in the following voluntary organizations: • Church/religious • Sport/recreational • Art/music/educational • Labor Union • Political party • Environmental • Professional • Humanitarian/charitable • Consumer • Self-help/mutual aid group • Other	*Have been an active member in at least one of those voluntary organization*
Civic participation	• Signed a petition • Joined in boycotts • Attended peaceful demonstrations/ environmental demonstrations • Joined strikes	*Have participated in at least one of those civic activities*
Cognitive		
Generalized trust	Most people can be trusted	*Trust most people*
Neighborhood trust	Trust people in the neighborhood	*Trust completely or somewhat people in the neighborhood*
Institutionalized trust	Confidence in the following institutions: • The churches • The armed forces • The press • Television • Labor unions • The police • The courts • The government • Political parties • Parliament • The Civil service • Universities • Major Companies • Banks • Environmental organizations • Women's organizations • Charitable/humanitarian organizations • The United Nations	*Trust at least 10 out of 18 listed institutions*
Corruption	• Never justified to claim government benefits to which you are not entitled • Never justified to avoid a fare on public transport • Never justified to cheat on taxes • Never justified to accept a bribe	*Always unjustified to act corruptly*
Safety	Feel secure in the neighborhood	*Feel very or quite secure in the neighborhood*

collapsed these 43 questions into 8 theoretically relevant variables. In order to reduce that number further we performed a PCA. We used an oblique rotation, allowing theoretical correlation between the components and applied factor loadings of 0.3 or greater for the cut-off point to keep items in the analysis. Items with high factor loadings in two or more components were dropped. Accordingly, we kept 4 variables in the principal component analysis: generalized trust and neighborhood trust as cognitive social capital indicators and associational membership and civic participation as structural ones (see table 1A of the appendix). We used those 4 variables in the study as individual-level social capital indicators and we aggregated them at country-level using their means per country to get the collective measures.

We used the Gini index, a commonly used socioeconomic inequality indicator. The World Bank's Gini index estimations are based on the household income distribution. The values range from 0 to 100, where 0 equals perfect equality and 100 complete inequality. The Gini index here used is based on market income (before taxes and benefits), which disregards government income redistribution efforts, which are relatively small in LAC (Lopez and Perry, 2008). To account for the period effect, we used mean Gini index in years 2000/2001 to 2013/2014, depending on data availability.

At individual-level we also included sociodemographic variables—conceptualized as confounders—from the WVS, such as sex (male and female), age (categorical: 18–34 years, 35–64 years and 65 or more years), marital status (dichotomized: living without a partner, i.e. separated, divorced, widow or single; or living with a partner, i.e. married or living together), and income level (categorical, based on self-reported household income on a subjective scale from 1 to 10, in which respondents rated their household income in relation to other households in their country). We grouped the answers into 5 categories, each covering 2 points in the scale (category 1 = answer alternatives 1 + 2; category 2 = answer alternatives 3 + 4; etc.).

2.3. Statistics

The analyses applied fixed effects logistic regression to control for unobserved country-specific heterogeneity. Fixed effects models provide correct estimates of associations since it assumes, in contrast with least square regression models, that residuals correlate within the area-level, i.e. observations are not independent. Additionally, we used cluster robust standard errors. Even though we were interested in the effects of level 2 variables (e.g. contextual social capital and inequality) on level 1 outcome, the small sample size in level 2 (n = 8) would determine biased estimations in a multilevel model. Thus, we used cross-level interaction terms to assess the moderating effect of the context to the phenomena (Terraneo, 2015).

We present country-level and individual-level descriptive statistics separately. At country-level, we present indicators aggregated per countries as percentages, and overall means and standard deviations. We assessed the relationship between variables using pairwise Spearman correlations. At individual-level, we present the individual-level variables distribution by SRH status and crude fixed effect estimations of the association between each variable and good SRH.

In the multivariate analysis, we first fitted model 1 with individual-level characteristics to investigate the association between education and health, adjusted to the other sociodemographic variables. In model 2 we further assessed the individual-level social capital effects on that association. We conducted an effect modification analysis in model 3, to investigate synergism between individual social capital and education level. In models 4a to 4d we included cross-level interaction terms between education and each collective social capital indicator to investigate if and how those indicators moderate the association between education level and health. In models 5a to 5d, we included income inequality in a three-way interaction term between education, each collective social capital indicator and Gini index, to estimate the impact of contextual inequality on the model.

We present the fixed effects results as odds ratios (OR) with 95% confidence intervals (CI). Model fit was assessed by Bayesian information criteria (BIC). We used Stata Version 14 (StataCorp. College Station, TX, USA) for the analysis.

Table 2
Distribution of country-level variables: percentages and standard deviations.

	N	Good SRH (%)	Lower education (%)	Gini index	Associational membership (%)	Civic participation (%)	Generalized trust (%)	Neighborhood trust (%)
Argentina	1024	74.02	30,35	51,06	32.32	32.71	23.11	71.44
Brazil	1485	70.51	45,30	59,33	60.94	52.12	6.58	54.27
Chile	999	72.77	24,41	55,22	46.75	39.04	12.78	66.29
Colombia	1511	76.11	30,69	58,68	65.59	42.09	4.13	50.43
Ecuador	1202	74.04	42,32	56,38	23.29	19.97	7.17	48.96
Mexico	1999	72.74	32,21	51,87	56.28	32.67	12.43	48.40
Peru	1207	54.27	26,28	50,93	38.36	37.28	8.21	33.42
Uruguay	999	80.48	56,05	44,39	27.13	33.13	15.27	69.29
Total	10,426	71.79	35,69	53.85	46.36	36.53	10.65	53.84
(SD)		(6.86)	(9,44)	(4.43)	(15.04)	(8.76)	(5.38)	(11.25)

SRH = self-rated health; SD = standard deviation.

3. Results

The number of individuals per country varied from 1999 in Mexico to 999 in Chile and Uruguay. In all countries, except Peru, the proportion of respondents reporting good SRH was in the interval between 70 and 80%. In Peru, however, the share was only 54%. Gini index mean was above 50, a marker of high inequality levels in the region (Table 2). Most of the pairwise correlations between country-level variables are statistically insignificant due to the small sample size at country-level (n = 8). Yet, generalized trust is negatively correlated with Gini index while associational membership is positively correlated with Gini index (see table 2A of the appendix).

Overall, at individual-level, for both education and income indicators, there was a trend in the good SRH distribution, where the good SRH proportion increased as education and income levels increased (Table 3). More males (75%) reported good SRH compared to females (69%). As age increased, good SRH decreased. A higher proportion of people living alone when compared to living with a partner rated their health as good or very good (not statistically significant in the adjusted model). Individuals with the highest education level and in the youngest age category had the highest odds ratios for good SRH, with all other sociodemographic variables presenting strong and statistically significant crude associations. Individuals with high individual social capital reported good SRH more frequently than those with low levels (Table 3). Crude ORs showed a positive and statistically significant association between all social capital indicators and good SRH. Generalized trust presented the highest odds of good SRH and associational membership the lowest.

In the multivariate analysis, individuals on the middle and highest education levels presented higher odds of good or very good SRH when compared to individuals with lower education (Table 4). The crude SRH advantage for the higher educated group decreased after adjusting to other sociodemographic variables (model 1), indicating age, gender and income effects on health. Among respondents on the highest education level, there was a modest impact of individual social capital (model 2) on the association between education level and good SRH.

Even though the individual social capital impact on the association between education level and good SRH was small, we conducted an effect modification analysis considering the significant differences on the social capital distribution according to education level (Table 3A of the Appendix). Interaction terms between education and individual-level social capital indicators were all insignificant, reflecting a lack of synergism between education and individual-level social capital on health (Table 4A of the Appendix).

In Figs. 1 and 2 we present the average marginal effects for interaction between education and country-level associational membership, civic participation, generalized trust and neighborhood trust, having upper education level as the reference group (Table 5 of the Appendix). The average marginal effect is the amount of change in the outcome probability following changes in the exposure levels, in our case the interaction. We did not identify any significant moderating effect for associational membership and civic participation (Fig. 1). Trust at country-level moderated the association between education and health, in a way that the higher the trust levels in a country, the greater the odds of lower educated individuals to report good SRH (Fig. 2). Generalized trust had a greater impact on the social gradient in health when compared to neighborhood trust.

Additionally, we investigated the income inequality influence on the effect of collective social capital indicators on the health gradient using a three-way interaction term between education, each social capital indicator and income inequality (we dichotomized the mean Gini index as high and low, based on the median, to better illustrate the effect), using upper education level and high inequality countries as the reference groups. Interaction was positive and statistically significant in the case of lower income inequality group, generalized trust and lower education level. In lower income inequality countries, the higher the generalized trust, the greater the odds of lower educated individuals to report good SRH. Further three-way interaction terms were used to assess the effect of income inequality together with neighborhood trust, associational membership and civic participation at country-level, but they were not statistically significant (Table 5).

4. Discussion

Our main objective in this paper was two-sided: first to investigate the socioeconomic disparities on health in LAC and second to analyze the impact of social capital—both cognitive and structural at individual and collective levels,—on that health gradient, considering the inequality intensity in the country. As anticipated, our findings suggest a strong educational gradient in health in the region, reflecting the large socioeconomic differences that are pervasive in the region (Hoffman and Centeno, 2003). Also, generalized trust and neighborhood trust at country-level have a moderating effect on the association between SEP and health, favoring individuals in lower SEP despite their own individual social capital level, especially in lower inequality countries.

4.1. The social gradient in health

Health and especially its distribution across society are both a prerequisite and an indicator of sustainable development progress (SDSN, 2014). In accordance, our findings provide pertinent evidence about the social gradient in health in LAC and further relate to recent efforts to monitor and gather evidence about health inequity in the region, locally (Guerra et al., 2016) and regionally (PAHO, 2016).

4.2. Collective social capital and the health gradient

The suggested effect of collective social capital at country-level on

Table 3
Distribution of sociodemographic and individual-level social capital indicators by self rated health: crude odds ratios with 95% confidence intervals.

	N	Good SRH (%)	Crude OR	95% CI
Sociodemographics				
Education				
Lower	3647	58.82	1	
Middle	4435	76.64	2.65	2.40–2.94
Upper	2117	86.11	5.14	4.45–5.94
Missing	227			
Income				
1	2009	60.48	1	
2	2684	68.18	1.59	1.39–1.81
3	3644	75.99	2.55	2.23–2.90
4	1529	80.77	3.14	2.66–3.71
5	270	83.70	3.68	2.62–5.18
Missing	290			
Sex				
Female	5487	68.58	1	
Male	4939	75.36	1.42	1.30–1.55
Missing	0			
Age				
15–34	4335	82.79	5.92	5.11–6.86
35–64	4981	67.40	2.39	2.09–2.74
65 +	1110	48.56	1	
Missing	0			
Marital status				
Living alone	4282	73.42	1	
Living with partner	6133	70.67	0.87	0.79–0.95
Missing	11			
Social capital				
Associational membership				
No	5593	70.43	1	
Yes	4833	73.37	1.17	1.07–1.28
Missing	0			
Civic participation				
No	6617	70.47	1	
Yes	3809	74.09	1.24	1.13–1.36
Missing	0			
Generalized trust				
No	9145	70.77	1	
Yes	1082	79.76	1.60	1.37–1.87
Missing	199			
Neighborhood trust				
No	4786	68.72	1	
Yes	5567	74.42	1.20	1.10–1.31
Missing	73			

Country fixed effects omitted in the output.

the social gradient in health, support the notion that social capital is a public non-exclusive good with a spill-over effect that could reach even those not socially active in society or those in the bottom of the social ladder (Kawachi and Berkman, 2000; Putnam, 2000). In fact, our findings suggest that individuals in lower SEP benefit even more of higher social capital at country-level than higher SEP individuals, despite their own trust and participation levels.

Applying Rostila's resource-based approach to social capital, material and immaterial social resources at country-level could explain the links between collective social capital and the social gradient in health. Possibly structural returns at country-level—e.g. functioning democracies and social inclusion—would address multiple social and health needs. Those resources could be especially significant for individuals in lower SEP, who are in a vulnerable position (Frohlich and Potvin,

Table 4
Fixed effects logistic regression models of good self-rated health: odds ratios with 95% confidence intervals.

	Model 1 Sociodemographics OR (95% CI)	Model 2 Individual social capital OR (95% CI)
Education level		
Lower	1	1
Middle	1.90 (1.60–2.26)	1.92 (1.62–2.29)
Upper	3.44 (2.56–4.64)	3.27 (2.40–4.45)
Social capital		
Associational membership		1.18 (1.07–1.31)
Civic participation		0.99 (0.86–1.15)
Generalized trust		1.37 (1.16–1.61)
Neighborhood trust		1.29 (1.20–1.38)
Constant	0.69	0.52
Observations	9911	9659
Pseudo R2	0.12	0.12
Log likelihood	−5181.78	−5026.41
BIC	10427.98	10117.05

Models adjusted for sex, age, marital status and income.
Country fixed effects omitted in the output.

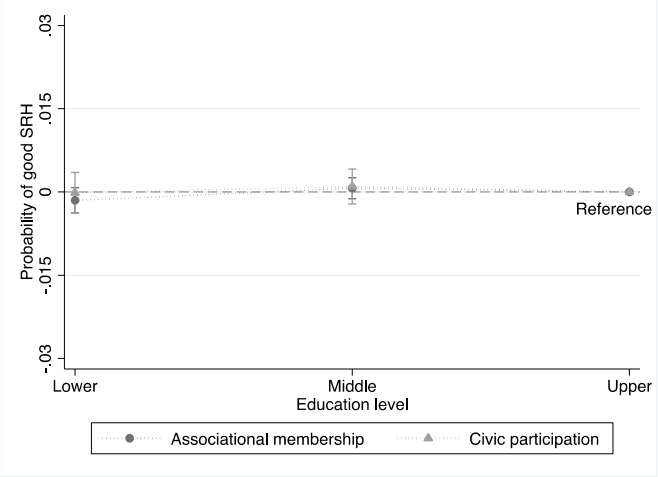

Fig. 1. Average marginal effects and 95% CI for the interaction between associational membership and civic participation at country-level and education level.

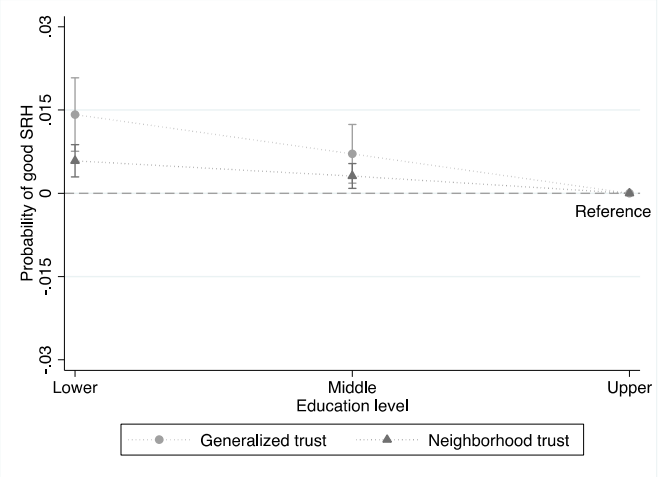

Fig. 2. Average marginal effects and 95% CI for the interaction between generalized trust and neighborhood trust at country-level and education level.

Table 5
Fixed effects logistic regressions models of good self-rated health with three-way interactions: odds ratios with 95% confidence intervals.

	Model 5a	Model 5b	Model 5c	Model 5d
	Associational membership	Civic participation	Generalized trust	Neighborhood trust
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Three-way interactions				
Education SC indicator*Gini index*				
Lower education* SC indicator *Gini index	0.97 (0.95–0.99)	0.85 (0.76–0.94)	1.17 (1.07–1.27)	1.06 (1.02–1.10)
Middle education* SC indicator *Gini index	0.99 (0.97–1.02)	0.87 (0.79–0.96)	1.08 (1.00–1.17)	1.02 (0.98–1.06)
Upper education* SC indicator *Gini index	1.00	1.00	1.00	1.00
Constant	1.16 (0.71–1.90)	1.17 (0.76–1.79)	1.17 (0.78–1.75)	0.77 (0.47–1.24)
Observations	9659	9659	9659	9659
Pseudo R2	0.12	0.12	0.12	0.12
Log likelihood	−5014.26	−5015.65	−5005.84	−5005.86
BIC	10331.32	10334.10	10314.47	10314.52

2008), e.g. the development of political rights in the region following the re-democratization process (Casas-Zamora et al., 2011) or the pro-poor investments in Argentina after the economic crisis (Khamis, 2005).

Cognitive social capital, both individual and especially collective, rather than structural is strongly associated with SRH. Several other studies found similar results (Islam et al., 2006; Kawachi et al., 2008b), also in LAC (Hurtado et al., 2011; Sapag and Kawachi, 2010). Trust facilitates the reciprocal exchange of social resources and also generates those resources (Rostila, 2013) for instance through collective action (Eriksson, 2010) and better government performance (Putnam et al., 1993). Furthermore, higher trust levels in a community are suggested to influence health through its association with lower levels of social stress. Since individuals in lower SEP are greatly exposed to social stress (Marmot, 2006), higher trust levels are expected to have a greater impact on their health, acting as a buffer (Uphoff et al., 2013; Wilkinson and Marmot, 2003).

Particularly, generalized trust at country-level affected the social gradient in health to a greater extent than neighborhood trust, which could be linked to the concepts of thin and thick trust and their respective relation with bridging—i.e., formal social interactions with weak ties—and bonding social capital—i.e., informal social networks with strong ties (Putnam, 2000; Szreter and Woolcock, 2004). In the case of bonding social capital, direct effects of trust and participation and their unfolding social resources are limited to the network capabilities and confined to a group—which is usually homophilic—while in bridging social capital those effects and resources are more comprehensive and widespread (Coleman, 1988; Lin, 2001; McPherson et al., 2001).

Yet, among studies about who benefits mostly from higher collective social capital, several focused on individual-level social capital rather than on SEP with most findings favoring individuals with higher social capital levels (Campos-Matos et al., 2016; Mansyur et al., 2008; Poortinga, 2006; Subramanian et al., 2002). Using education as the SEP indicator, Elgar et al. (2011) found no moderating effect of social capital at country-level on the social gradient in health in 50 countries in the world, including LAC. Elgar's global sample might have attenuated the effects of relevant country-level determinants such as geographical, cultural or political factors that were better captured by a more homogenous LAC sample.

4.3. Individual social capital and the health gradient

In our study, individual-level social capital was consistently associated with good SRH, even though we found it to have no effect on the social gradient in health. The positive association between individual-level social capital and health was previously demonstrated in the region with similar findings (Hurtado et al., 2011; Kripper and Sapag, 2009; Sapag and Kawachi, 2010). Additionally, individual social capital followed the social gradient in ours and also in previous studies (Eriksson et al., 2010; Ziersch, 2005), following Bourdieu's (1986) view that other forms of capital—i.e., economic and cultural—are necessary to access social capital.

However, regarding the individual-level social capital effect on the health gradient, previous studies have shown contradictory findings: in Europe, studies were not able to establish a significant effect, while in other settings (e.g. US, UK, China) there has either been a dependency or a buffer relationship between social capital and SEP (Uphoff et al., 2013). The contextual inequality levels (Islam et al., 2006), the analysis level (e.g. community, national or cross-country samples) and the different social capital indicators—i.e., explicit bonding, bridging and linking indicators—might explain the conflicting results (Harpham et al., 2002; Uphoff et al., 2013), particularly regarding cultural and socioeconomic differences in the social participation norms (De Silva et al., 2007).

4.4. Collective social capital, income inequality and the health gradient

The combination of the two contextual exposures—lower income inequality and high trust—resulted in a higher probability of good SRH for individuals in lower SEP. Since more egalitarian societies have higher social capital stocks (Wilkinson, 1996), and both low income inequality and high collective social capital are associated with better health outcomes (Kawachi et al., 2008b; Wilkinson and Pickett, 2006), these findings were not unexpected. Still, the greater benefit for individuals in lower SEP has not been consistently demonstrated before (Subramanian and Kawachi, 2004).

In a systematic review, covering OECD countries, findings suggested social capital to be more relevant in explaining area-level health variations in more unequal settings (Islam et al., 2006). Our study, thus, supports the above-mentioned findings, up until a certain level. Perhaps in extremely high inequality levels (like the ones we found in the higher income inequality group of our sample), social capital loses relative importance in relation to the health gradient. In such very unequal settings, the social resources might not suffice to counteract the negative social stratification effects. Future studies could clarify the nature of the association between inequality levels and the social capital relevance to health outcomes—e.g. linear with a threshold or perhaps U shaped.

We also consider the synergistic effect of trust and income inequality on the health gradient to represent or mediate the broader social, economic and political context effects. For instance, LAC experienced a decline in income inequality in recent years, due in part to economic growth, but mainly to public policies and social investments (Tsounta & Osueke, 2014). Following Szreter's and Woolcock's (2004)

view on social capital—fitting different and complementary roles in the relationship between health, society and state—future research could explicitly model the effect of such policies on social capital and on the social gradient in health.

4.5. Implications

This study's findings suggest that policies within LAC need to consider collective social capital in their policy-making processes as it has potential to influence health inequality within these very unequal societies. While social capital and inequality are considered to be interrelated (Kawachi et al., 1997; Wilkinson, 1996), strategies that affect social capital are not all dependent on income equality. Some strategies are rather based on other equality dimensions, for instance the consolidation of democracy in the region that further enable access to power and to social resources for vulnerable groups, or measures to counteract corruption that shift the focus and resources from private to collective goals. For instance, Uruguay—the only full democracy in the region (The Economist Intelligence Unit, 2017)—has focused on innovative social policies focusing on health system reforms, investments on education, labor market reforms and cash transfers, among other initiatives targeting the most vulnerable populations (Ture, 2015), presenting now the highest social inclusion levels in Latin America (Tummino and Bintrim, 2016).

4.6. Methodological considerations

The use of fixed effects instead of multilevel modeling seems a satisfactory alternative and an efficient recourse in our case of small sample size at country-level (Terraneo, 2015). Even though fixed effects models do not provide estimation of the associations for level 2 variables, we consider the use of cross-level interactions to assess the moderating effect of contextual variables a methodological strength of our study.

Logistic regression reporting ORs was used critically in this cross sectional study, especially its interpretation. OR is the ratio of the outcome odds in the exposed and non-exposed groups and we are not suggesting that it stands for prevalence ratio. We acknowledge that ORs are probably an overestimation of prevalence ratios, considering our common outcome of interest. However according to several authors (Barr et al., 2016; Cook, 2002; Davies et al., 1998; Pearce, 2004) we believe this should not change the qualitative assessment of our findings.

Our study has some limitations. First, the distribution across education levels was not as expected considering other sources (The World Bank Group, 2017). In countries with lower inequality, lower educated individuals were over-represented while in higher inequality countries it was the opposite. Still, lower inequality countries had higher collective social capital, meaning that our findings are probably an underestimation of the suggested association, assuming lower SEP individuals to have lower individual social capital in all sampled countries.

Second, the cross-sectional design does not allow discussions regarding the direction of associations and causal inferences. This is especially relevant in the discussion about the social stratification process and social capital levels, in addition to the reverse causality issue from health to social position (Braveman and Gottlieb, 2014; Galama and van Kippersluis, 2013), to social participation (Sirven and Debrand, 2012), to trust (Giordano and Lindstrom, 2016) and to equality (Subramanian and Kawachi, 2004).

Third, the use of secondary data with indicators not designed to measure social capital was previously criticized (Harpham, 2008). Although we aimed to use a more comprehensive social capital measurement with precise bonding, bridging and linking indicators, the nature of questions in the WVS limited us. Additionally, since social participation is a culturally based process dependent on participation norms and societal structures in each context (De Silva et al., 2007; Sapag and Kawachi, 2010), the use of associational membership and civic participation in LAC might not have fully captured the social activities nature, especially the participation in informal networks.

5. Conclusion

In LAC, there is a clear social gradient in health, independent of country-level heterogeneity and individual-level social capital. Collective social capital at country-level—especially generalized trust—had a positive moderating effect on the health gradient, favoring the bottom of the social ladder, especially in lower income inequality countries in the region. Discrepancies in collective social capital could therefore explain health inequalities and indicate policy targets as we aim at reducing health inequalities.

Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.socscimed.2017.11.025.

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