Mapping Community, Social, and Economic risks to investigate the association with school violence and bullying in Italy

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This document is the author's post-print version, incorporating any revisions agreed during the peer-review process. Some differences between the published version and this version may remain and you are advised to consult the published version if you wish to cite from it. TITLE: Mapping Community, Social, and Economic risks to investigate the association with school violence and bullying in Italy.

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Abstract

Background: School violence and bullying are a pandemic issue. The academic literature underlined the need to investigate social-contextual risk factors. The United Nations called for more comprehensive and disaggregated data to inform prevention strategies. Objective: The present study comprises a set of secondary analyses on Italian data from the International Civic and Citizenship Study 2016. We adopted an innovative 'bottom-up' approach to identify the level of disaggregation for national data. The researchers focused on community, social, and economic risk indicators at school-level, and investigated whether it was possible to aggregate schools in different classes, depending on their risk profile. Participants and settings: Analyses were implemented on a nationally representative sample of 170 Principals of lower secondary schools, 2,527 teachers and 3,766 students at grade 8. Methods and Analyses: A Latent Class Analyses was conducted on risk indicators and four classes of risk were identified: No Risk, Community Risk, Socio-economic Risk, Multi-Risk (entropy=.786). No significant differences were found across classes in relation to urban/rural location, school size, and geographical macro-partition. On the contrary, significant differences emerged when considering teachers' perception of bullying, social problem, and students' behavior at school. Furthermore significant differences were found for the quality of relationship with teachers as reported by students.

Conclusions: results a) suggested a potential gradient of increasing risk moving across the classes; b) provided a contribution to address the gap in the investigation of contextual factors and bullying; c) offered a new lens to tailor interventions to prevent school violence and bullying.

Keywords: School Violence; Bullying; Risk Factors; Latent Class Analysis; International Civic and Citizenship Study (ICCS); International Association for the Evaluation of Educational Achievement (IEA)

Highlights:

- Secondary analyses were run on Italian International Civic and Citizenship Study data
- The study focused on school-level community, social, and economic risk indicators
- A Latent Class Analyses on risk indicators identified four classes of risk
- A significant relationship among classes of risk and school violence emerged
- Results suggested a gradient of increasing risk from No Risk to Multi-Risk classes

Introduction

Two hundred and forty-six million. This is the most up-to-date estimate of the number of children and adolescents suffering some form of violence and bullying in school worldwide (UNESCO, 2017). Considering bullying alone, one in every three students identifies themselves as a victim (UNICEF, 2017). This indicates a pandemic phenomenon that has a massive economic impact (e.g. Pereznieto, Harper, Clench, & Coarasa, 2010). For instance, in Australia, it has been estimated that the cost associated with bullying and various forms of violence is AUS \$525 million, to which an additional AUS \$1.8 billion is necessitated in order to accommodate the long-term impact such behaviors have on productivity, health, and community (Alannah and Madeline Foundation, 2018). Similarly alarming estimates have been provided in the US (US \$600 million; Planty, Langton, & Hendrix, 2019), in the UK (£17.9 million a year; Brimblecombea, Knappa, Takizawa, & Arseneault, 2017), and in low and middle-income countries (US \$17 billion USD; RTI International, 2015). However, school violence costs are not just economic, but also health-, social-, and education-related. Indeed, school violence, in all its forms, has been associated with detrimental consequences over time for both victims and perpetrators. In particular, the relation between victimization and students' health and wellbeing has been largely demonstrated, with victims more frequently reporting physical symptoms (e.g., Gini, Pozzoli, Lenzi, & Vieno, 2014; Waasdorp, Mehari, Milam, & Bradshaw, 2019), and weaker psychological and emotional wellbeing (e.g., Östberg, Modin, & Låftman, 2018; Thomas, et al., 2016). In addition, there are associations with self-harming (e.g., Esposito, Bacchini, & Affuso, 2019), post-traumatic stress disorder (e.g., Nielsen, Tangen, Idsoe, Matthiesen, & Magerøy, 2015), mental health problems (e.g., Duru & Balkis, 2018; Kaspar, 2013), and depression and suicidal thoughts/ideation/attempts (e.g., Barzilay et al., 2017; Brunstein Klomek et al., 2019; Ford, King, Priest, & Kavanagh, 2017; Koyanagi et al., 2019). Bullying

is associated with a higher engagement in antisocial and deviant conduct in adulthood, and poor socio-economic outcomes (e.g., Ttofi, Farrington, & Lösel, 2012; Wolke, Copeland, Angold, & Costello, 2013). School violence and bullying has also been associated with poorer school attendance (e.g., Feldman et al., 2014), lower attainment and achievement (e.g., Clemmensen et al., 2020; Hammig, & Jozkowski, 2013), premature drop-out, as well as under-representation of girls in education (UNESCO, 2017), and a lower likelihood to progress to higher and further education (UNESCO, 2017; 2019),

From this brief overview, it is evident that without urgently tackling school violence and bullying, the possibility of fulfilling key Sustainable Development Goals (SDG) - as outlined in the 2030 Agenda (UN, 2016) - will be significantly jeopardized (UNESCO, 2017; 2019). The 2030 Agenda is a plan of action aiming to promote prosperity in the world, and comprises 17 core goals, including: *'Ensure healthy lives and promote well-being for all at all ages*' (SDG3); *'Ensure inclusive and quality education for all and promote lifelong learning*' (SDG4); *'Achieve gender equality and empower all women and girls*' (SDG5); *'Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels*' (SDG16). Eradicating school violence and bullying is pertinent for addressing each of these goals.

Scholars and professionals have been, and are still, devoting rigorous efforts in designing, testing, implementing, and evaluating intervention and prevention programs to address this global issue (e.g., Gaffney, Farrington, & Ttofi, 2019; Gaffney, Ttofi, & Farrington, 2019). Having a valid and comprehensive theory of school bullying and violence is highly relevant to understand the role of proximal and distal socio-ecological factors, since this would help in defining a theory of change and promoting more effective interventions and policies. However, despite a wide literature on school bullying, there is a paucity of

studies examining the potential role of economic and community factors, which may interact with micro-contextual factors - such as family and school quality of relationships - in fostering or hindering the phenomenon (Chaux, Molano, Podlesky. 2009). Academic literature has recently stressed the relevance of, and need to adopt a social-ecological perspective to the investigation of bullying and school violence, to foster preventive measures taking into account and addressing contextual risk factors (Espelage, 2014; Taliaferro, Doty, Gower, Querna, & Rovito, 2020).

Furthermore, the UN Secretary-General has underlined how "accurate, reliable, comprehensive and disaggregated data on the prevalence, nature and causes of bullying is critical to inform effective responses. (...) Children's experiences of being bullied occur within the context of wider economic and social inequalities. (...) The analysis of disaggregated data is thus crucial to inform prevention strategies" (UN, 2018, p.13). Indeed, it is often suggested that, at least in relation to the educational context, national average scores might mask extremely diverse intra-national realities, and while they are informative for broad comparisons across countries, such comparisons could be misleading when used for orienting and guiding government policies (e.g., Ballas et al., 2012; Hippe et al., 2018).

The present study responds to this call for disaggregating national data. The authors accessed data on school violence and bullying in an Italian nationally representative sample included in the International Civic and Citizenship Study 2016 (ICCS 2016), an international survey investigating civics and citizenship knowledge, attitudes, and behaviors in grade 8 students, coordinated by the International Association for the Evaluation of Educational Achievement (IEA)¹. Similar to many other international surveys, one of the main aims of the ICCS is to provide cross-national comparisons; hence, nationally aggregate estimates for the variables under study are produced. However, individual countries might further investigate their national data for socio-political and educational purposes. In this study, we employed a

'bottom-up" approach to define the unit of aggregation/disaggregation for national data. In particular, we focused on risk factors (i.e., community, social, and economic deprivation) at school-level, and investigated whether it was possible to identify specific schools' risk profiles - namely their composite level of exposure to the aforementioned sources of deprivation, independently from their geographical proximity - and use those profiles as the unit of disaggregation for the national data. Hence, the researchers tested whether the school violence and bullying reported by teachers and students were differently associated with specific profiles. Such a methodology has relevant implications for interventions, since understanding different typologies of risk would in turn help to better structure and define prevention strategies; as people and contexts are unique and responses to treatment vary greatly, interventions and treatment should reflect this. Hence, understanding the specific risk profile for school violence and bullying will result in the possibility of defining grouptailored intervention, based on the schools' profile.

Rationale of the study

Research on school violence and bullying has largely supported the adoption of a social-ecological theory (Bronfenbrenner, 1979; Espelage, & Swearer, 2010; Hong & Espelage, 2012; National Academies of Sciences, Engineering, and Medicine, 2016; Swearer & Hymel, 2015). This is important to ensure an in-depth understanding of potential determinants, protective, and risk factors not only at the individual or proximal levels (i.e. family and school contexts), but also at distal levels. This would allow considering whether and how meso-, exo-, or macro-factors - such as community, socio-economic and cultural factors - may interact with proximal variables to explain bullying (e.g., Álvarez-García, García, & Núñez, 2015; Hong & Espelage, 2012). Psychological research on school violence and bullying has devoted a great effort in investigating the characteristics of the individuals involved in the phenomenon (e.g., Hansen, Steenberg, Palic, & Elklit, 2012; Kljakovic, &

Hunt, 2016) and their micro-systems, including family (e.g., Nocentini, Fiorentini, Di Paola, & Menesini, 2019) and school (e.g.. Saarento, Garandeau, & Salmivalli, 2015). On the contrary, less attention has been generally paid to broader contexts (Azeredo, Rinaldi, de Moraes, Levy, & Menezes, 2015), namely exo- and macro-systems. Studies investigating the impact of the socio-characteristics of the area within which the school is based are particularly scarce and generally focussed on cultural norms, community norms, and beliefs (Bacchini, Esposito, & Affuso, 2009; Hong & Espelage, 2012; National Academies of Sciences, Engineering, and Medicine, 2016). Indeed, as Espelage (2014) claimed, while the impact of social-environmental context on individuals' externalising behaviour has been explored and supported in the literature, the impact of the community surrounding the school on bullying has been largely overlooked, and this is a gap to be addressed.

Data from the International Civic and Citizenship Education Study 2016 (ICCS, 2016) offered a valuable opportunity to address this void. The ICCS is an international survey that examines the ways in which young people are prepared to undertake their roles as citizens in a range of countries. It tests students' knowledge and understanding of civics and citizenship, as well as their attitudes, perceptions, and activities related to civics and citizenship in 24 countries across the world. In order to collect comprehensive information on the various contexts where students study and live, and on the variables that can potentially influence young people's understandings about their roles as citizens, questionnaires were administered to Principals, teachers, and students (Schulz, Ainley, Fraillon, Losito, & Agrusti, 2016). The Principal and teachers provided specific information on the school, including details about community, social and economic characteristics of the area where the school is located. Furthermore, Principal, teachers, and students provided information about prevalence and experience of school violence and bullying. Hence, ICCS 2016 offers the ideal opportunity to

investigate whether composite profiles of community, social, and economic characteristics are associated with violent and aggressive behavior in schools.

We focused on Italian data as internal disparities have been widely identified within Italy, not just in relation to education but also more broadly to most socio-economic indicators (Hippe et al., 2018; OECD, 2016). When considering educational achievement and outcomes, it has been noted that despite the continuous effort of EU Member States, there are still large inequalities, not only across macro-regions and Member States, but also at national sub-regions level (Ballas et al., 2012). Indeed, intra-national differences have been reported to be oftentimes stronger than inter-national ones, and 'continuing to ignore the nature and extent of intranational disparities will merely perpetuate and extend the inequalities they enshrine' (Ballas et al., 2012, p.57). In Italy, national data are generally disaggregated for macro-geographical partitions, with results historically and almost invariably showing Southern Regions and Islands to be the most deprived and disadvantaged areas (see also Putnam, 1993). The Italian National ICCS 2016 report explored intra-national differences in school violence and bullying based on the traditional geographical partitions, finding only marginal (if any,) differences (INVALSI, 2017). However, considering the complexity of school violence, the authors believe that the usual geographical partitions should be integrated with a more flexible and dynamic approach to data disaggregation. As suggested by Agnew (2013), regions are usually considered as defined spatial entities, characterized by distinctive physical and cultural element, but rather, they should be conceived as more nuanced and fluid. 'Regions as geographical units with which to define the contexts of study of a wide range of social structures and processes are therefore important both implicitly and explicitly' (Agnew, 2013, p.8). However, they could be also alternatively defined and outlined as communities, as geo-political territories, as geographical networks, or as regional societies (Agnew, 2013); and each one of these characterizations is valid and might be

specifically relevant depending on the phenomenon under study. In the present contribution, the authors adopted an 'inductive approach' in drawing risk maps, and we focus on shared community, social, and economic risk characteristics, rather than relying on traditional macro-geographical partitions.

Method

Sample

The data collection of ICCS 2016 was conducted between October 2015 and June 2016 in 24 countries across Europe (n = 16), Latin America (n = 5) and Asia (n = 3), comprising more than 94,000 students in their eight years of schooling in 3,800 schools (Schulz, Ainley et al., 2018). Students in grade 8 who are approximately 14 years of age were sampled (for Italy, 3rd year of lower secondary school). Where the average age of students in the 8th grade was below 13.5 years of age, students at grade 9 were considered. Moreover, the teachers involved in the survey taught regular school subjects to students enrolled in the country's target grade at each sampled school.

The school samples were designed as stratified two-stage cluster samples. At the first stage, schools were randomly selected – in each of the strata² – with probability proportional to the number of 8th grade students enrolled in each school. At the second stage, an intact classroom (in some cases, two classrooms) of grade 8 was sampled. A sample of 15 teachers meeting the above criteria from each sampled school was **randomly** selected. Italy participated with a sample of 170 lower secondary schools, with 170 head teachers, 2,527 teachers, and 3,766 grade 8 students. The acceptance of the project by the sampled schools was very favourable, with almost 100% of the selected schools providing approval, thus ensuring 100% coverage of the sample. As a result, the sample is representative - both at national and macro geographical level (i.e., North West, North East, Centre, South, South Islands) - of the overall nationwide population of approximately 550,000 students. Further

details about sampling procedure and missing data treatment are available in the ICCS 2016 technical report (Schulz, Carstens, Losito, & Fraillon, 2018).

Instruments

In the ICCS 2016, data were gathered through the three following instruments: (1) a school questionnaire; (2) a teacher questionnaire; and (3) a student questionnaire.

(1) The *school questionnaire* (approx. 30 minutes long) required school Principal to provide information on the characteristics of the school, the school culture and climate, and how civic and citizenship education was provided at school. Community, Social and Economic risk indicators at school level were defined and computed as follow:

Community risk indicator was defined using question 11 of the school questionnaire (Köhler, Weber, Brese, Schulz, & Carstens, 2018), asking the Principal to report whether a list of ten resources (e.g., public library, cinema, sport facilities) were available in the community area surrounding the school. Responses were coded as 0 if available, and 1 if not available, and were summed up to compute a community risk indicator, so that higher scores corresponded to a greater community risk (i.e., more deprived). The reliability coefficient for this indicator in the Italian sample was alpha = .70 (Schulz et al, 2018).

- *Social risk indicator* was defined using question 12 of the school questionnaire (Köhler et al., 2018), requiring the Principal to rate (on a scale from 1 = 'To a large extent' to 4 = 'Not at all') the extent to which a list of twelve issues (e.g., ethnic conflict, youth gangs, drug abuse) represented a source of social tension in the school area. Responses were reversed and averaged to compute a social risk indicator, so that higher scores corresponded to a greater social risk. In the ICCS 2016 technical report, a confirmatory factor model positing three oblique factors is presented (Schulz et al, 2018): perception of social tension (alpha=.84 in the Italian sample), perception of poverty (alpha=.84 in the Italian sample), and perception of crime (alpha=.86 in the Italian sample). In order to keep our model as parsimonious as possible, and considering that the factorial solution positing a second order factor is statistically equivalent to the one with three oblique factors model, we used a single aggregated indicator for Social Risk.

- *Economic risk indicator* was defined using question 21b of the school questionnaire (Köhler et al., 2018), asking the Principal to rate on a scale from 1 = 0 to 10%' to 4 = more than 50%' the percentage of students in the school coming from an economically disadvantaged home. Hence, even for this single-item indicator higher scores corresponded to greater economic risk.

(2) The *teacher questionnaire* (approx. 30 minutes long) was also completed, asking respondents about their perception of civic and citizenship education within their schools. It also asked them to provide information about the organisation and culture of their school, as well as their teaching assignments and background. In the present study, the following indicators were considered: a) perception of bullying at school was assessed using 8 items describing bullying situations, and asking teachers to rate how frequently (on a scale from 1=Never to 4=More than 5 times a month) each of those situations occurred over the course of the school year. The reliability coefficient for the Italian sample was alpha=.81; b) perception of social problem at school was assessed using 9 items describing antisocial behaviors, and asking teachers to rate how frequently (on a scale from 1=Never to 4=Very Often) each of those behaviors occured. The reliability coefficient for the Italian sample was alpha=.70; c) perception of students' behavior at school, assessed using 6 items describing six type of behaviors, and asking the teachers to rate how many of their students (on a scale from 1=All or nearly all" to 4=" None or hardly any") engage in those behaviours. The reliability coefficient for the Italian sample was alpha=.87.

A *student questionnaire* (approx 30-40 minutes long) gathered data on students' perceptions about civics and citizenship, and information about individual student's

background. In the present study, the following indicators were considered: a) experiences of physical and verbal abuse at school was assessed using 6 items describing situations of physical and/or verbal abuse, and asking the students to rate how frequently (on a scale from 1=not at all to 4=five times or more) they have experience each of them over the past three months. The reliability coefficient for the Italian sample was alpha=.70; b) perception of student-teacher relations at school was assessed by 5 items describing positive relationship with teachers, and asking students to rate their level of agreement with each of them (on a scale from 1=strongly agree to 4=strongly disagree). The reliability coefficient in the Italian sample was alpha=.79; c) perceptions of student interaction at school was assessed by 3 items describing positive relationship with peers and asking students to rate their level of agreement with each of agreement with them (on a scale from 1=strongly agree to 4=strongly agree to 4=strongly disagree). The reliability coefficient in the Italian sample was alpha=.79; c) perceptions of student interaction at school was assessed by 3 items describing positive relationship with peers and asking students to rate their level of agreement with them (on a scale from 1=strongly agree to 4=strongly disagree). The reliability coefficient in the Italian sample was alpha=.72.

Further details about items, measures, and missing data treatment are reported in the ICCS2016 Technical Report (Schulz et al., 2016). All the tools are available in the ICCS 2016 User Guide (Köhler et al., 2018).

Plan of analyses

A Latent Class Analyses (LCA) was implemented in Mplus (Muthén & Muthén, 1998-2011) on these three risk indicators, in order to explore whether schools could be clustered based on their risk profile. LCA is a finite mixture modelling technique aiming to 'uncover unobserved heterogeneity in a population and to find substantively meaningful groups of people that are similar in their responses to measured variables' (Nylund, Asparounhov, & Muthén, 2007, p. 536). In evaluating the final number of classes, the following indices were considered: the Bayesian Information Criterion (BIC; Schwartz, 1978), the Lo-Mendel-Rubin Likelihood Ratio Test (LMR-LRT; Lo, Mendell, & Rubin, 2001), and the Bootstrap Likelihood Ratio Test (BLRT; Feng & McCulloch, 1996). In particular, the model with the lowest BIC is considered to provide the best fit to the data; both LMR-LRT and BLRT compare neighboring class models (i.e., the model with *k*-1 classes against the model with *k* classes) providing an associated p-value – if the k classes model is not associated to a significant improvement of the fit, the k-1 classes model can be considered the best one. It has been proved that the BLRT is the most reliable and accurate index to determine the number of classes and outperform all the other indices in almost any condition, and in addition, it does not suffer from unstable fluctuation in the significance level as the LMR-LRT (Nylund et al., 2007). Hence although BIC, LMR-LRT, and BLRT will all be reported in the following analyses for completeness, the latter index will mainly drive the identification of the number of classes. Further to these indices, the accuracy of the classification will be taken into account, by examining the entropy level, ranging from 0 to 1, that following indications in the literature will be considered high for an average level of .80 (Clark & Muthén, 2009). Missing data were treated with the default Full Information Maximum Likelihood (FIML) option.

Lastly, the validity of the final LCA solution will be investigated relying on a multiinformant analytical strategy, and exploring through a set of Chi-Square tests and ANOVAs, whether different risks profiles were differently associated with further characteristic of the school (macro-geographical area, urban/rural, school size, as reported by the school Principal) and with school violence and bullying as reported by teachers and by students.

Results

The Community Risk indicator ranged from 0 to 9, with an average value of 3.34 (*s.d.* = 2.20), and data were missing in 7 cases. The social risk indicator ranged from 1 to 3.58 with an average value of 1.89 (*s.d.* = .54), and data were missing in 7 cases. Finally, the economic risk indicator had an average value of 2.34 (*s.d.* = 1.05), and data were missing in

16 cases. Hence Latent Class Analysis was implemented on 163 schools and results are presented in Table 1.

Table 1. About here

The LMR-LRT test did not provide a univocal indication; the p value was not significant when moving from the 2-Classes to the 3-Classes solution, but it was significant when moving from the 3-Classes solution to the 4-Classes solution. Indeed, this potential criticism of the LMR-LRT was highlighted by Nylund and colleague, who also reported that its application has been limited and not strongly supported in the literature (2007). On the contrary, the BLRT provided clearer results pointing to the 4-classes, with a p value of 1 associated to the 5-classes model. In addition, the entropy for the 4-Classes solution is .786, estimating the average value of .80 indicating a satisfactorily high level.

The final 4-Classes solution is presented in Figure 1, where community, social, and economical risks have been previously standardized for easier readability. The four classes show significant differences in their levels in the risk indicators included (community risk: $F_{3,159} = 57.67$, p < .001; social risk: $F_{3,159} = 34.54$, p < .001; economic risk: $F_{3,150} = 42.73$, p < .001). The final classes can be characterized as follow:

The first class is labelled *No Risk Class*. It comprises 78 schools characterized by low community, economic and social risk. Hence these schools share a context that offer many resources, marginally affected by social tensions, and generally wealthy.

The second class is labelled *Community Risk Class*. It comprises 23 schools characterized by high community risk, low social risk and medium-low economic risk. Hence

these school share a context that is quite deprived, but marginally affected by social tensions, and on average wealthy.

The third class is labelled *Socio-Economic Risk Class*. It comprises 55 schools characterized by low community risk, medium-high social risk, and high economic risk. Hence these schools share a context that is not deprived, but is nonetheless affected by social tensions to some extent, and by economic disadvantage.

The fourth class is labelled *Multi Risk Class*. It comprises 7 schools characterized by high community, social, and economic risk. Hence these schools share a context that is highly deprived, affected relevant social tensions and strong economic disadvantage.

The four classes did not significantly differ in relation to urban/rural location ($\chi^2 = 2.557$, df = 3, p = .465), school size [either when considered as number of students ($F_{3,156} = .156$; p = 9.25) or as a categorical variable (classes: 1-300, 301-600, 601-900, more than 900; $\chi^2 = 9.787$, df = 9, p = .368), to the traditional geographical macro-partition (i.e., North-West, North-East, Centre, South, South Islands: $\chi^2 = 19.792$, df = 12, p = .071)]. Conversely, significant differences emerged when considering:

- Teachers' perception of bullying at school ($F_{3, 2213} = 9.442$; p < .001), with worst perception in the Multi Risk Class ($\bar{x} = 50.21$, s.d = 9.10), while the other three classes did not differ from each other ($\bar{x}_{No Risk} = 46.13$, s.d = 8.27; $\bar{x}_{Community Risk} = 44.83$, s.d = 8.66; $\bar{x}_{Socio-economic risk} = 46.29$, s.d = 9.05)

- Teachers' perception of social problems at school ($F_{3, 2218} = 19.115$; p < .001). In particular it did not differ between No Risk ($\bar{x} = 44.34$, *s.d.* = 8.67) and Community Risk Classes ($\bar{x} = 43.86$, *s.d.* = 9.36), but the latter are different from the perception in the socio-economic risk Class ($\bar{x} = 45.85$, *s.d.* = 8.57), that in turn is different from the one in the Multi Risk Class ($\bar{x} = 50.74$, *s.d.* = 10.70).

- Teachers' perception of students behavior at school ($F_{3,2226} = 19.222$; p < .001). In particular, the best perception is noted in the No Risk Class ($\bar{x} = 51.20$, s.d. = 9.43), which significantly differs from all the other classes. Furthermore, Community Risk class ($\bar{x} = 49.45$, s.d. = 9.81) and Socio-Economic Risk class ($\bar{x} = 48.89$, s.d. = 9.92) do not differ from each other, but are significantly different from the Multi Risk Class ($\bar{x} = 44.36$, s.d. = 11.89), where the worst level is reported.

No significant differences were found among the four classes in relation to students' experiences of physical and verbal abuse at school ($F_{3,3275} = .564$; p = .638), and in relation to the reported perception of student interaction ($F_{3,3272} = 2.198$; p = .086). On the contrary, students in the Multi Risk Class the reported a significantly worse perception of student-teacher relations at school ($F_{3,3273} = 5.334$; p < .001) than the students in the other Classes, which did not significantly differ from each other ($\bar{x}_{Multi Risk} = 1.71$, *s.d.* = .47; against $\bar{x}_{No Risk} = 1.89$, *s.d.* = .54; $\bar{x}_{Community Risk} = 1.84$, *s.d.* = .54; $\bar{x}_{Socio-economic Risk} = 1.84$, *s.d.* = .53). These results are summarized in Table 2.

Table 2. About here

Discussion

The UN Secretary-General recently claimed that 'education plays a vital role in preventing violence, both within schools and in the wider community. A safe school promotes respect for human rights and a culture of peace and non-violence, which are essential both for children's wellbeing and to provide the best environment for learning. But schools often reflect wider cultures of violence within the community' (UN, 2018, p.8). Following this significant consideration, this contribution aimed to explore the perception of school violence and bullying phenomena in relation to community, social, and economic risk indicators in the area where schools are based. This was anticipated to provide a twofold contribution to the literature. On one hand, it was addressing the gap in the knowledge about the potential relevance of risk factors in the broader school context in relation to violence and bullying. On the other hand, it was offering a new lens to design tailored interventions aimed at preventing and reducing school violence and bullying.

Secondary analyses were conducted on Italian national representative ICCS2016 data (Köhler et al., 2018; Schulz et al., 2016) to map schools' risk profiles, disregarding their geographical location. International surveys provided a precious opportunity for cross-national comparisons; however, it has also been acknowledged that average national data might indeed mask significant intra-national differences (Ballas et al., 2012). This is particularly true in Italy where, for historical and sociological reasons, a high level of internal inequality is generally recorded, particularly between the North and the South of the country in several socio-demographic, economic, and wellbeing indicators (e.g., Putnam, 1993). As a result, Italian national statistics are generally disaggregated to compare indicators across the traditional macro-geographical partitions. Notwithstanding the absolute relevance of the geographical definition of territorial regions, it was anticipated that when looking at complex phenomena such as school violence and bullying, a more dynamic and contextual approach to data mapping might be more informative for defining tailored interventions and policies.

Findings from the present study offer support to our expectations. We attempted to define the unit of disaggregation for national data based on schools' shared composite risk. A Latent Class Analysis was conducted on indicators of community, social, and economic risk of the school area as reported by the Principal. This type of analysis show four risk profiles, according to which data could be disaggregated. In particular, there are two extreme, opposite

classes: the largest one (No Risk, 48%) – although not comprising the absolute majority of the schools – including schools sharing a low risk in all the included indicators, and the smallest one (Multi Risk, 4%) including schools sharing high risk in all of them. Furthermore, there are then two intermediate specular classes. One class (Community Risk, 14%) comprises schools whose Principal mainly reported a community risk, due to the lack of cultural and leisure infrastructures in the school area, not associated to either economic deprivation nor social tensions. The other class (Socio-Economic Risk, 34%) comprises schools in areas where economic deprivation and social tensions are prevalent, in the face of the availability of cultural and leisure infrastructures.

Hence, the first key finding of this study is that it is possible to outline a geography of risk that may integrate the traditional map of country geography. In this 'map', the boundaries are drawn based on the complexity of the profile in multiple indicators. This geography is fluid, disregards spatial proximity, and presents itself as a useful lens to analyze school violence and bullying. Indeed, results from further analyses seem to suggest that at least to a certain extent, a gradient of increasing risk could be identified moving from the No Risk, to the Community, Socio-economic and Multi-Risk classes.

While the significant difference between teachers' perceptions in No Risk and Multi Risk classes - with the former always being associated with the most favorable view, and the latter with the most negative one - was easily predictable (although still necessary to inform tailored intervention), the emergent picture for the other two classes is particularly interesting. When considering teachers' perceptions specifically about bullying, Community and Socio-economic risk classes do not differ from the No-Risk class. However, when considering the perception of broader social problems in schools, only Community risk class remain analogous to No Risk Class, with Socio-economic Risk class associated with worse perception. Furthermore, when considering the perception of general students' behavior Community and Socio-economic risk classes do not differ from each other, and both are associated with perceptions worse than the No-Risk Class.

On the one hand, data highlighted that Socio-economic Risk Class is characterized by a broader context of social problems, but is only marginally affecting individual students' behavior. This finding is in line with the literature stressing that socio-economic status and school bullying, as well as other forms of aggression more in general, are not directly associated. Such a relationship has instead been suggested to be indirect, through the mediation of a range of indicators including, among others, the child's home environment or the degree of social inequality that exists within society (Tippett & Wolke, 2014). On the other hand, findings also suggest that Community risk– (defined by the limited access to leisure and cultural resources in the school territory) might be moderated by other factors. Further study is necessary to explore whether characteristics related to the family or the broader students' social network might indeed counterbalance the absence of resources and activities available in the area.

Students' perception of their experience at school only marginally mirrored teachers' perceptions in the four classes. In particular, no significant differences emerged when asking about physical and verbal abuse. This result might suggest that, depending on the specific reference context, students may have a different perception of what abuse is, and to some extent, differently define and acknowledge what should be considered 'aggression'. The threshold between what is and what is not aggression might be higher in Multi-Risk schools than in the others. Three suggestions for explaining such discrepancies should be considered; Firstly, bullying (as reported by the teachers) and physical and verbal abuse (as reported by the students), **seem to be** two different phenomena, with different outcomes and risk factors constellations. Secondly, several studies suggested that students and school staff can differ in how they define school bullying and violence. Hence they will most likely have different

perceptions about frequency and severity of peer victimization (e.g., Bradshaw, Sawyer, & O'Brennan, 2007; Stockdale, Hangaduambo, Duys, Larson, & Sarvela, 2002). This indeed would explain the various result patterns evident for teachers and students. Thirdly, particularly in relation to bullying, it has been found that peer norms influence the perception of the prevalence of perpetration and victimization (e.g., Menesini, Palladino, Nocentini, 2015; Salmivalli & Voeten, 2004). It is then plausible to suggest that similar processes might also be applicable in relation to broader forms of school violence. Hence, in multi Risk school, peer abuse might be underestimated as a consequence of its acceptability as a social norm.

In sum, the second key finding of this study is that the suggested dynamic geography of risk has the potential of directing and promoting a tailored definition of the problem and in turn a clearer definition of prevention and intervention programs. In the literature on the effectiveness of anti-bullying interventions, only a few studies explored whether programs tended to benefit individuals with specific characteristics more than others (see Nocentini, Menesini, Pluess, 2019; Nocentini, Palladino Menesini, 2019). But, to the best of our knowledge, even fewer (if any) studies specifically focuses on the role of context characteristics in moderating the impact of any intervention, and even if they are addressing contextual and community problems, they are not focalized on the specific impact on bullying and school violence (Smith, 2019). Our findings suggest that Multi Risks schools need a tailored intervention, requiring a longer and more intense program than the no-risk schools where a universal level could be sufficient. Socio-economic risk schools could benefit from family interventions and community Risk schools might, on the contrary, particularly benefit from an intervention focused on empowering social networks, and promoting community aggregation and support. In line with this consideration, the level of schools risk defined by the dynamic interplay of social, community and economic risk should be assessed at the beginning of the school year and should be addressed in parallel to bullying and school violence prevention if we want to be more effective in our prevention efforts.

These findings have relevant implications for the definition and the evaluation of preventions strategies. In relation to the former, intervention targeting bullying and school violence would benefit from being tailored to the specific contextual school risk profile. As pertain to the latter, taking into account contextual risk factors at the initial stage of planning interventions might maximise their impact, by increasing the capability to reach every individuals. This indeed might explain and address, at least to some extent, the high variability of the estimations of effectiveness of prevention strategies. Future research at national level can evaluate implications of these findings, addressing whether these profiling approach is able to moderate the effectiveness of the interventions strategies. In particular, future studies should focus on investigating the potential interactions between the different levels of the ecological systems (Espelage, 2014; Taliaferro, Doty, Gower, Querna, & Rovito, 2020).

Furthermore, the analitical approach followed in this study has the potential to be replicated in other Coutries, allowing the identification of specific risks profiles. Information about Community, Social, and Economic could be analysed and combined to understand school violence and bullying, and to inform and benefit national policies and practices. The risks profiles identified in Italy might not necessarily be – and most likely are not expected to be - generalised to Countries with different cultural, historical, and social characteristics. But the analytical approach is replicable and the identification of Country-specific risk profiles may offer a valuable lens to tailoring and maximising the impact of intervention strategies. In the era of Big Data and International Surveys, this information migh indeed be relatively easily available and accessible, and might offer a great asset in the attempt of tackling the school violence phenomenon.

Despite the promising aspects of this approach, there are also limitations related to the fact that this dynamic geography is derived from Principals' reports. It is indeed plausible that Principals' and teachers' perception of students' bullying and social problems might be highly correlated. This might derive from a shared professional view of schools, families and the surrounding community. It would be hence relevant to include further sociological and economic indicators to improve the power of the school risk mapping. Furthermore, this study could not explore the interactions of risk factors at different levels of the ecological system, which could be highly informative, particularly in relation to understand buffering and moderating role of key dimensions across levels. Finally, while the present contribution was focused on one specific Country, additional insights could be derived from cross-national comparisons.

This contribution also offers several strengths among which a point of reflection about what the authors believe is one of the main challenges for future research on school violence and bullying. Indeed, on the one hand, the international agencies are underlining the need for comparable and disaggregated data (UN, 2018), however on the other, they are also highlighting the extreme variety of measures used in international surveys limiting the actual possibility of comparing prevalence and trends (UNICEF, 2016). In particular, there is an apparent disparity between international educational surveys and the academic literature that has over the years developed, tested, and validated reliable measures of bullying and school violence (e.g. Shiva Kumar et al., 2017; Vivolo-Kantor, Martell, Holland, & Westby, 2014). 'Healing this rift' would allow international agencies and academia to build beneficial collaborations, leading the way in monitoring the incidence of school violence and bullying, ensuring comparability, while also integrating and facilitating a more dynamic approach to data that acknowledges the fluidity of alternative mapping of boundaries. Indeed, "we should collectively invest in the plural of 'regional logics', tailoring usage to the problems at hand, rather than in a singular logic that simply replaces the romance of the nation-state with an equally simple and one-size-fits-all alternative geographical unit of account" (Agnew 2013, p.15).

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Footnotes

- IEA is an independent international cooperative of research institutions, governmental research agencies and scholars. The association has been active in the field of international comparative studies since the beginning of the 1960s.
- Each participating country decides whether and how to stratify its sample, in order to further investigate its national data for socio-political and educational purposes. In the Italian sample, explicit stratification was performed by geographic area (North West, North East, Centre, South, South Islands), for a total of five explicit strata; implicit stratification was applied by school type (public, private), for a total of two implicit strata.

Table 1. Latent Class Analysis results

Number of Classes	BIC	LMR	р	BLRT	р	Entropy
2 Classes	1429.657	-716.403	0.000	-716.403	0.000	0.801
3 Classes	1435.105	-689.360	0.0979	-689.360	0.030	0.755
4 Classes	1436.982	-681.896	0.0074	-681.896	0.000	0.786
5 Classes	1450.783	-672.647	0.7064	-672.647	1.000	0.769

Note: BIC = Bayesian Information Criterion; LMR = Lo-Mendel-Rubin Likelihood Ratio Test; BLRT = Bootstrap Likelihood Ratio Test

Table 2. Differences among Latent Classes among teachers' and students' bullying and school-violence related measure

	Latent Classes							
		N. D' 1	Community	Socio-economic		-		
Rater	Measure	NO RISK	Risk	Risk	Multi Risk	F	Р	
Teachers	Perception of bullying	46.13	44.83 (8.66) ^a	46.29 (9.05) ^a	50.21 (9.10) ^b	F _{3, 2213} =9.442	<.001	
		(8.27) ^a						
	Perception of social problems	44.34	43.86 (9.36) ^a	45.85 (8.57) ^b	50.74	F ₃ ,	<.001	
		(8.67) ^a			(10.70) ^c	₂₂₁₈ =19.115		

	Perception of students behavior	51.20	49.45 (9.81) ^b	48.89 (9.92) ^b	44.36	$F_{3,2226}=19.222$	<.001
		(9.43) ^a			(11.89) ^c		
Students	Experiences of physical and verbal	48.91	48.43 (9.23)	48.67 (9.65)	49.42 (9.01)	F _{3,3275} =.564	p=.638
	abuse	(9.46)					
	Quality of the relationship with	2.16 (.62)	2.09 (.60)	2.18 (.63)	2.20 (.66)	F _{3,3272} =2.198	p=.086
	peers						
	Quality of the relationship with	1.89 (.54) ^a	1.84 (.54) ^a	1.84 (.53) ^a	1.71 (.47) ^b	F _{3,3273} =5.334	p<.001
	teachers						

Notes. The standard deviation is reported in brackets. For each measure, different letters correspond to statistically significant differences.

Figures

Figure 1. Final Schools Latent Class Solution



Note: Com_risk=Community risk; Soc_risk=Social risk; Eco_risk=Economic risk; Socio-Eco Risk=Socio-Economic Risk Class; Multi

Risk= Multi Risk Class; No Risk = No Risk Class; Com Risk = Community Risk Class. In brackets it is reported the class size. For each risk

factor, different letters correspond to statistically significant differences (Community risk: $F_{3,159} = 57.67$, p < .001; Social risk: $F_{3,159} = 34.54$, p < .001; Economic risk: $F_{3,150} = 159.39$, p < .001). The figure includes standardized values for all variables. 3