Social distancing and social contact before COVID-19

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Abstract:

Subsequent to the arrival of SARS-CoV-2 and emergence of COVID-19, policy to limit the further spread has focused on increasing distance between individuals when interacting, termed social distancing, and limiting the frequency of interaction by preventing non-essential and large-scale social gatherings. This work offers cross-cultural insight into social distancing and social interactions in the pre-pandemic period. Combining unique data on frequency of contact, religious service attendance and preferred interpersonal distance in 20 countries, this work considers variation in the extent to which social distance was already practiced without official recommendations and underscores notable cross-cultural variation in the extent to which social interaction occurred. Results suggest that policy intervention should emphasise certain behavioural changes based on pre-existing context-specific patterns of interaction and interpersonal distance rather than a one-size-fits-all approach.

Keywords: Interpersonal distance, Social distance, Social interaction, SARS-CoV-2, COVID-19, Coronavirus

Introduction

Interpersonal distance and social contact are core features of social interaction AND pathogen vectors, providing a bridge and an opportunity for transmission. As a result, public health interventions (e.g., social distancing, limits on social contact) that limit the spread of SARS-CoV-2 also impact long-standing socio-cultural practice. We employ pre-pandemic cross-cultural data to assess how more than 20 countries navigated social interaction before the current pandemic, focusing on two dimensions: *interpersonal distance* and *social contact*.

Interpersonal distance captures preferences in terms of physical spacing when interacting with others. Variation has been observed between countries (1) (2), by gender (3) (4) and by age (3) (5). Situational logics are key and notable variation is observed within a given context depending on the type of interaction, distinguishing those with close ties from strangers and acquaintances (1).

Social contact refers to the frequency and nature of social interactions. As with interpersonal distance, notable variation in the timing and extent of social contacts has been observed (6). Variation by gender and socioeconomic characteristics are notable (7) with implications of disease transmission (8) (9). Large gatherings, particularly religious services, are important forms of social interaction and have secondary implications for health and wellbeing (10).

Patterns of pre-pandemic interpersonal distance, religious-service attendance and frequency of social contact across relationship categories

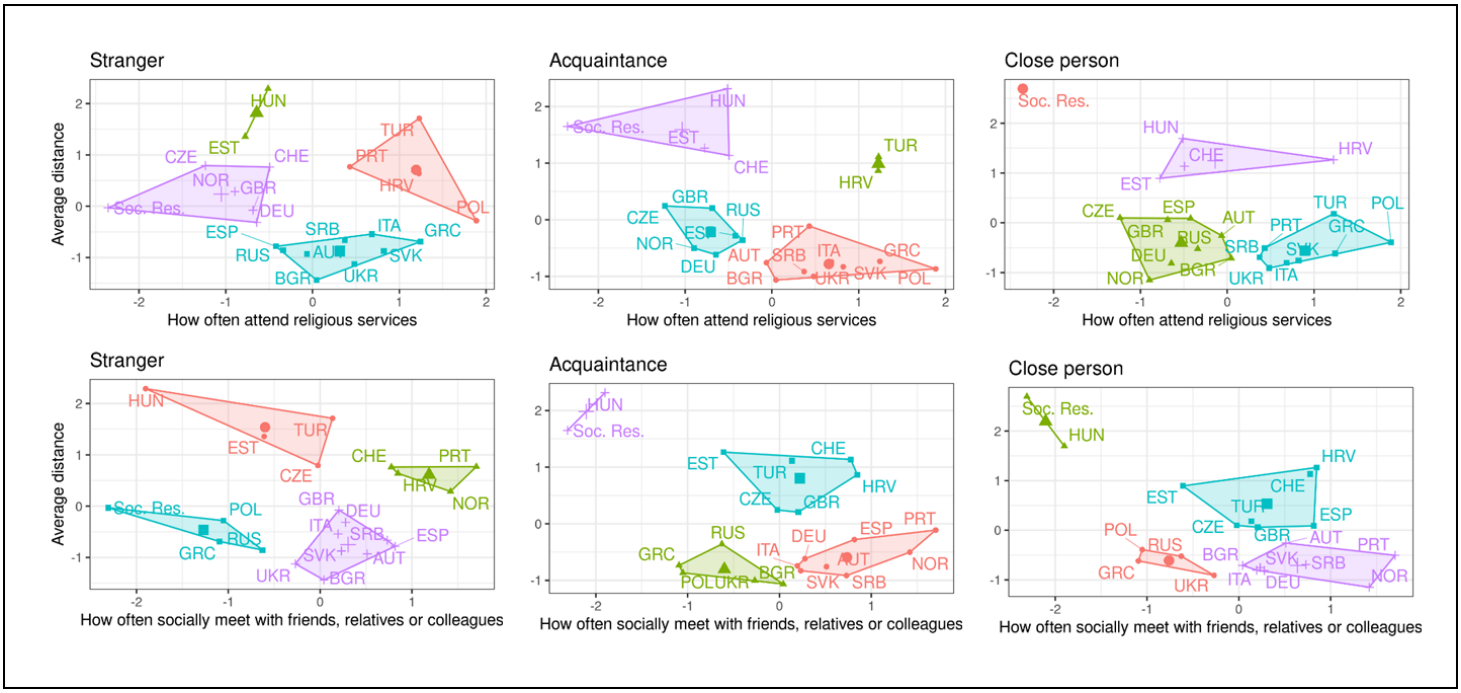
Figure 1 shows pre-pandemic estimates of social contact, religious service attendance and average preferred interpersonal distance by country. Consistent with other work (1), interpersonal distance declines notably when the interaction includes people with stronger social ties, therefore the analyses were performed separately for strangers, acquaintances and friends. For comparative purposes, we also included the hypothetical context labelled "Soc. Res.", which is defined as the absence of religious gatherings, infrequent social contact (i.e., once a month or less) and 100cm social distancing, which conforms with the World Health Organization's (WHO) suggested guidelines (11).

As illustrated in Figure 1, Hungary, Turkey, Estonia, Czech Republic, Portugal, Norway, Croatia, Great Britain, Germany and Switzerland report a preferred distance near or in excess of WHO guidelines for interactions with strangers. For acquaintances, only Hungary and Estonia prefer 100cm+ on average. Most counties prefer distances below 100cm on average in all situations.

Patterns of religious service attendance reveal the multidimensionality of behaviour. Some countries that report, on average, greater interpersonal distance as preferable (e.g., Turkey, Portugal, Croatia) are also among the most frequent attenders of religious services. Only Hungary situates itself nearer to a socially restrictive context in terms of both interpersonal distance and attendance of religious services. Of note, countries that

prefer closer interpersonal distance, regardless of category (e.g., Greece, Russia and Poland) are notably infrequent in terms of social contact.

Figure 1: Relationships between social contact, religious service attendance and interpersonal distance



The clustered scatter plots show pre-pandemic comparisons of social contact, religious service attendance and interpersonal distance (preferred distance from strangers, acquaintances and close friends). The scale is standardized and reports z-scores for the measures on the y-axis and x-axis. On both axes, higher values indicate greater interpersonal distance and more frequent social interaction. A hypothetical context, labelled "Soc. Res.", indicates a socially restricted context with average interpersonal distance maintained in accordance with WHO recommendations (100cm) and limited social contact (meeting friends once a month and no religious service attendance). Similar groupings of countries are encircled and highlighted in the same colour.

Clusters of pre-pandemic interpersonal distance, religious-service attendance and frequency of social contact

Figure 2 reports kmeans cluster analysis that includes social interaction (religious service attendance and frequency of social contact) and all dimensions of preferred interpersonal distance – stranger acquaintance, close tie). Three categories emerge.

The cluster analysis across included countries reveals three distinct categories. First, we find a group of countries reflect *limited protection* in that, without clear advice on social distancing and limits to social contact, there is a natural tendency toward close and frequent contact. Italy, Bulgaria, Serbia, Ukraine, Slovakia and Greece are exemplary. In these cases, social distancing and limitations on social contact would entail a relatively more significant socio-behavioural shift.

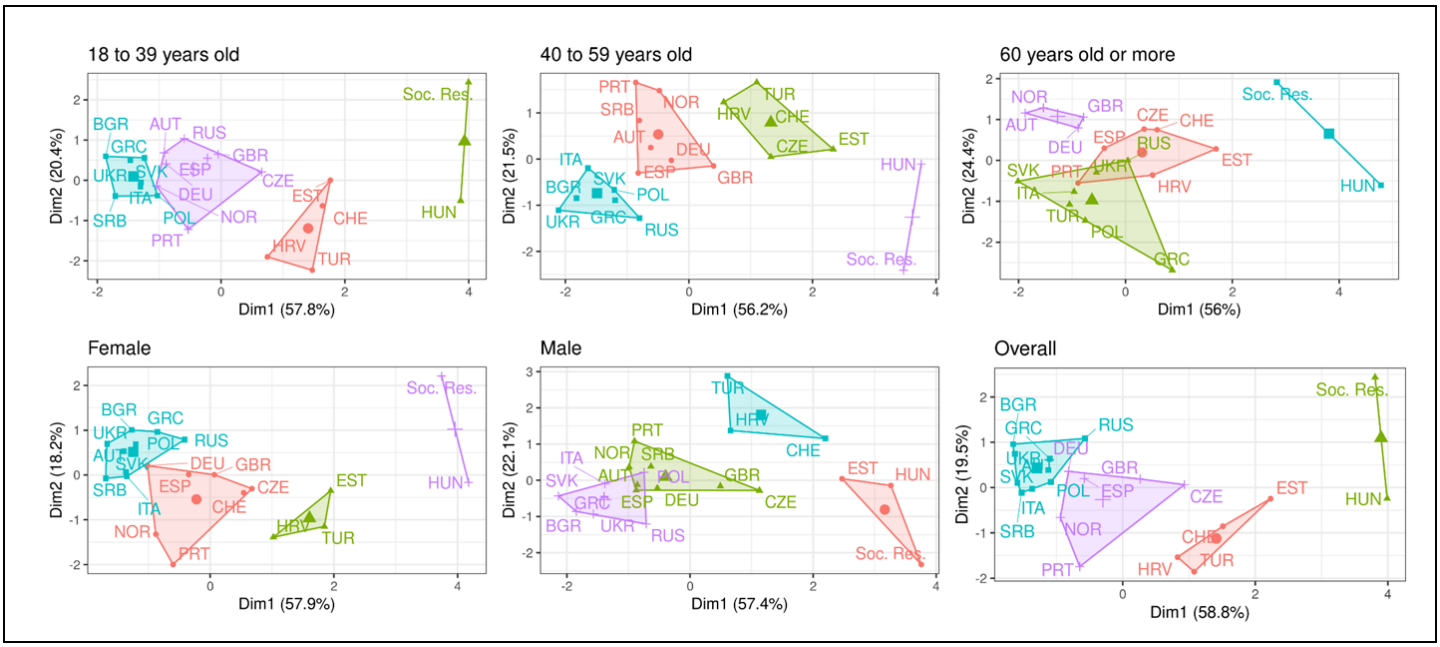
Second, we have countries that cluster somewhat closer to a recommended, socially restrictive context, but are far from overlapping, These contexts offer *mixed protection*. This cluster includes large countries like Spain, Great Britain and Germany and contrasting patterns. For example, religious service attendance is infrequent (e.g., Spain, Great Britain), but preferred social distance is relatively close. These contexts would be best served by targeted policy interventions that emphasise country-specific areas of concern, which could focus on social distance or social contact/gatherings or a more nuanced variation.

Third, we have countries which offer *relative protection* in that they cluster close to (and occasionally within) a "safe" hypothetical context practicing 1-metre social distancing, prohibiting religious gatherings and experiencing infrequent social contact. Turkey, Switzerland, Croatia and Estonia fall into this category. A fourth cluster, consisting only of Hungary, is closest to WHO guidelines on social distancing and limits on social contact/gathering without intervention. This is not to say that transmission of SARS-CoV-2 is unlikely or even less likely to occur in these contexts. Instead, the pattern suggests that conforming to socially restrictive guidelines would not imply as large a socio-behavioural shift.

Patterns by age and sex

The transmission of SARS-CoV-2 and the health consequences of COVID-19 vary by sex and age with men and older people disproportionately and negatively affected (12). Figure 2 underlines two patterns. First, there is some natural movement toward more social restriction as age increases. The overall pattern remains largely true for the older ages as well with some exceptions. For example, Turkey shifts further from social restriction as age increases, suggesting that those aged 60+ are relatively more socially active. Second, there is a clear pattern by sex with males gravitating toward a more socially restricted position. Estonia and Hungary, men share more with a context experiencing near-total social restriction than anywhere else.

Figure 2: Cluster analysis of social contact, religious service attendance and interpersonal distance by age, sex and overall



The cluster analysis shows pre-pandemic measures of social contact, religious service attendance and interpersonal distance (preferred distance from strangers, acquaintances and close friends) by age, sex and overall. To present the analysis, standardised cluster plots are used the report two scaled dimensions of the cluster analysis. The x-axis and y-axis indicate relative position on scales derived from first and second order dimensions in terms of the extent to which within-group variation is explained. A hypothetical context, labelled "Soc. Res.", indicates a socially restricted context with average interpersonal distance maintained in accordance with WHO recommendations (100cm) and limited social contact (meeting friends once a month and no religious service attendance), which was included in the estimation of the clusters. Similar groupings of countries are encircled and highlighted in the same colour.

Implications

Adapting to a post-pandemic "new normal" often requires deviating from life-long behavioural practices that govern how we socially interact. Policy interventions that ask for social distancing, prohibit religious gatherings and dictate infrequent social contact impact everyone, but not equally. Work on the spread of Ebola underscored the importance of socio-cultural behaviour for modelling the transmission (13). Some countries naturally engage in greater protective behaviour and would require relatively limited shifts in social behaviour due to SARS-CoV-2. The most obvious example is Hungary, where social distancing, social contact and religious gatherings are notably compatible with post-pandemic social restrictions. In other contexts, the opposite is true and limits on social distance and contact would entail a relatively large deviation from ongoing social practice. These less socially restrictive contexts, would plausibly benefit from greater supports that underscore how and when one should deviate from long-standing forms of socialising. Other contexts are mixed and one type of intervention (e.g., limits on social contacts) would require less adaptation relative to others (e.g., close

interpersonal distance with strangers). Next steps would be to consider the link between pre-pandemic social distance/contact for other demographic patterns such as re-infection rates, mortality, and long-term compliance with socially restrictive public health measures.

Materials and methods

Information on religious service attendance and frequency of social contact is recorded in the European Social Survey (ESS). The 9th and most recent wave (ESS9), collected in 2018, provides information for most countries (14). For countries that did not participate in ESS9, the most recent available wave was used: Spain (ESS8), Greece (ESS5), Croatia (ESS5), Portugal (ESS8), Russia (ESS8), Slovakia (ESS6), Turkey (ESS4), Ukraine (ESS6) (15). For religious service attendance, respondents can reply on a 7-point ordinal scale ranging from [1] "never" to [7] "once a week". Social interaction is recorded on a 7-point scale ranging from [1] "never" to [7] "every day". Responses of [1] "never" for religious services and [3] "once a month" of social interaction are considered analogous to limited social interaction and avoidance of large gatherings. Interpersonal distance for three types of social engagement – strangers, acquaintances, and people with whom one is close – is measured in centimetres and was collected in 2013 (for details of the method see (2)). Distances of 100 centimetres are considered compliant with WHO's suggested minimal separation of 1 metre (11) for effective social distancing.

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