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## **The cognitive side of intergroup contact:**

### **A test of the Cognitive Liberalization hypothesis in an Italian sample**

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## Introduction

Contemporary societies are in constant evolution. Since the 1990s, sociologists have studied the changes that the introduction of the World Wide Web, and all the consequences that followed, have brought to society. According to Manuel Castells, modern societies revolve around networks (Stella et al., 2018). The advent of the Internet has brought to the fragmentation of previous rigid social structures, where power and social dynamics were fixed and clear, in favour of more dynamic and flexible networks. Power is not concentrated in one hand, but divided between interconnected structures, hierarchically organised; economic production is spread all around the world; and most relevant for the present work, relationships do not follow uniform models anymore, but can be developed in multiple ways and contexts. Families and local communities are no more the only centre of social interaction, as social mobility, jobs in a globalised market, and social medias create new opportunities for intergroup contact. This can be a resource as much as a source of trouble, as predefined social schemes are not applicable anymore and people can be lost in such a complexity, having no point of reference to follow. Moreover, globalization, technology advances, the increased accessibility of international travels, and not least migration has made societies more diverse and multicultural (Christ & Kauff, 2019; Hong et al., 2016; Nguyet & Benet-Martinez, 2013).

On an individual level, this means that encounters with different cultures, habits, norms and values have become more and more frequent, if not inevitable (Boin et al., 2021; Bowman, 2014). These may bring negative effects, as much as positive ones. On the one hand, meeting someone new is scary, as the individual has to explore the unknown without being able to rely on their past experience. This may arise anxiety (Boin et al., 2021), feeling of discomfort (Allport, 1954), fear that one's identity is threatened (Lee et al., 2022), and the tension may eventually lead to conflict (Bowman, 2010; Whitt et al., 2001). On the other hand, plenty of research in different fields have shown positive effects of the encounter with diversity. For example, biculturalism, one of the possible outcomes of the process of

acculturation, has been shown to be associated with higher psychological and socio-cultural adjustment respect to the people who are related to only one culture (Nguyen & Benet-Martinez, 2013); diverse groups usually reach higher quality and more creative decisions (Hakstian et al., 2022; Meleady et al., 2019); and diversity in educational contexts has been associated with better academic outcomes, cognitive development, and civic engagement (Antonio et al., 2004; Bowman, 2010; Hodson et al., 2018). Thus, diversity can be a resource as much as a source of societal conflict, and finding positive ways to manage it on a societal level is paramount for functional societies (Boin et al., 2021; Christ & Kauff, 2019; Turner et al., 2020). To achieve this goal, interventions oriented to the promotion of positive intergroup contact could be a good tool. Indeed, already Allport (1954), the forefather of this field of study, suggested that intergroup contact could be an instrument to reach a tolerant society, and a literature review of hundreds of studies have found that intergroup contact consistently reduces prejudice, across different contexts and situations (Pettigrew & Tropp, 2006; Vezzali et al., 2021).

On a societal level, the benefits of intergroup contact, may go beyond the reduction of intergroup conflict. Indeed, recently Hodson and colleagues (2018) advanced the *cognitive liberalization hypothesis*, according to which intergroup contact may have a broader effect on cognition, as it trains the individual to be more flexible, open to different perspectives, and critical in his thinking, relying less on stereotypes. If this hypothesis is proven true, intergroup contact will be a key aspect to consider in the development of good citizens. Indeed, the complexities of contemporary societies go over their being multicultural, as it is endemic to their structure. Van Dijk, a sociologist that studied the changes of societies after the introduction of the Internet, has pointed out that modern societies are the result of a constant dialectic of opposites, resulting from the integration of online and offline worlds (Stella et al., 2018). He developed seven “laws of the Web” that highlight its dual nature; for example, the Web can promote socialization as much as isolation, as it draws a line between the ones that are “in” and the ones that are “out”; it can give access to infinite contents,

but as it is too much to handle as a person, it makes necessary the appeal to mediators, that are never neutral; it can promote the access to diversity, as it is reachable, but it can also push for uniformity, as profiling systems close individuals into “bubbles”. The Web can then be considered both an instrument to reach equality and a source of inequality, and the threshold between the two depends a lot on the individual capability to use it consciously. However, as the world “online” and “offline” cannot be separated, this complexity is reflected in the society. Thus, the individuals are required to be constantly critical and flexible to quickly adapt to the changes of the society, and live within its contradictions, recognizing them, without being overwhelmed by them. Simple, unilateral views, are not able to catch this complexity, and intergroup contact can help to overcome them. Indeed, the encounter with diversity allows individuals to recognise that the world is not “black or white”, learning to see the shades in between, and to develop more complex categorisations. To cite Bianco and Poggi (2021), “weaving together diversities is a source of stimuli to go beyond the contradictions of our time”.

Given the potential value of the topic, the present study has tested the cognitive liberalization hypothesis in an Italian sample. The first two chapters cover the theoretical background that sustain the hypothesis, while the third and fourth present the method and results of the study. In the fifth chapter, these latter are discussed, while in the final chapter the limits of the study, as much as the implications of its results for practical interventions, are presented.

## Intergroup contact theory

The publication of *The nature of prejudice* by Gordon Allport in 1954 signed the beginning of the study of the contact hypothesis, which states that interactions between members of different groups have a positive impact on prejudice. Since then, the idea has been widely tested and developed for more than 65 years all over the world, under different conditions, and with several populations (Hodson et al., 2018; Meleady et al., 2019), leading to the formulation of a theory, still underway, about how, when, and why there is an effect of intergroup contact on prejudice. In 2006, Pettigrew and Tropp conducted an extensive, meticulous review of 515 studies of direct intergroup contact, checking for the causal-sequence problem, publication bias, and research rigor (i.e., sample size, study design). Their results report a consistent medium effect of contact on prejudice in the hypothesized direction, with a higher effect size when the studies are conducted rigorously. Through the years, research has shown that not only face-to face but also indirect forms of contact, like knowing about the experience of another ingroup member (*extended contact*), media depictions (*vicarious contact*), and even thinking about encountering an outgroup member (*imagined contact*), can have an effect on prejudice too (Christ & Kauff, 2019; Hodson et al., 2018). However, for the purpose of this study, only direct, face-to-face contact will be taken into account in this literature review. Starting from the original formulation by Gordon Allport, the following paragraphs will present the main features of intergroup contact theory, with a special emphasis on the aspects more relevant to the present study.

### The process of categorization

Categories are the “organizational units” of human cognition: they allow a quick recognition of the given stimulus and guide the planning of future actions, lowering the cognitive load (Allport, 1954). Without them, knowledge and experience could not be possible, as every encounter would be considered unique and to be analysed anew. In other words, the

process of categorization gives stability to perceptions, allowing their identification based on a comparison with the key features of each category, and assimilating their differences to the cluster. To do so, the sensory data is selected, accentuated, and interpreted. When categories are based on the essential attributes of the items within the cluster, they are rational and functional; however, when they wrongly consider occasional attributes as necessary, that is they generalize to the whole cluster characteristics of one member, they become irrational and leave space for prejudice. Indeed, prejudice is a fixed attitude toward a category, linked to an overgeneralized belief, defined stereotype (Allport, 1954). Irrational categories are rigid and resistant to change, as they reject contradictory evidence, but are quite common as they allow the individual to have a simple and stable view of the world. Prejudice can thus be considered an act of cognition, which aims at avoiding uncertainty and ensuring a sense of security for the individual.

The process of categorization plays a fundamental role in intergroup contact, not only because, as just seen, it is linked to the generation of prejudices, but also because the distinction between ingroup and outgroup, and the recognition of oneself and the other as belonging to each category, depends on it (Hodson et al., 2018). Some studies have tried to understand what kind of cognitive representation of groups fosters the effect of intergroup contact, and different models have been proposed (Christ & Kauff, 2019). Pettigrew (1998) advanced an integrated model according to which different categorizations are necessary in different stages of the encounter with outgroup members to maximise the effect of contact. In the beginning, the group membership should not be salient to lower the anxiety that may arise from the encounter with the unknown; in later stages, on the contrary, the categorization should become evident, so that the positive feelings and impressions developed in the specific situation could be generalized. However, the maximum effect of intergroup contact is reached when there is a recategorization of the other as part of a common ingroup. Such conceptualization relies on a certain degree of flexibility of the categories, opposite to the rigid nature of the categories linked to prejudice, and involves continuously the process of



categorization.

The information presented above highlights the importance of cognitive processes, especially the one of categorization, in the prejudice phenomenon and in understanding the effect that contact has on it. However, it is important to notice that other processes, affective and behavioural in nature, are involved, and therefore the given explanation of prejudice is only partial (Hodson et al., 2018; Pettigrew, 1998).

### **Moderators and mediators of the effect of intergroup contact**

In *The nature of prejudice*, Allport (1954) already pointed out that not all kinds of intergroup contact are the same, and that future research should identify how different conditions modify its effect on prejudice. Allport himself advanced four features of contact that would make the optimal condition for contact to reduce intergroup prejudice, namely: equal status between the parts within the situation, cooperation between them, a common goal, and group norms or authorities that support equality and tolerance. The statement has robust support in the literature, as studies designed to meet these conditions have a higher effect size, on average, compared to the ones that did not take them into account (Pettigrew & Tropp, 2006). However, these conditions are not essential, but they only facilitate the reduction of prejudice. Indeed, an effect of intergroup contact can be detected also when the studies do not meet all the optimal conditions (Boin et al., 2021; Pettigrew, 1998).

Taking up Allport's call, researchers have examined the role played by several variables in the relation between intergroup contact and prejudice. Traditionally, most of the studies focused on the mediating role of affective processes, such as empathy, trust, intergroup anxiety and threat (see Boin et al., 2021 for a review); however, recently more attention has been drawn to some cognitive mechanisms, such as ingroup reappraisal and deprovincialization, that may mediate the relation (Boin et al., 2021; Hodson et al., 2018). Far from being an exhaustive presentation of all the mediators and moderators involved in

intergroup contact, the following paragraphs will describe more deeply some aspects that are more salient to the present research.

**Closeness and valence of contact.** The moderating role of the degree of closeness in the intergroup contact effect has been studied since the beginning. Indeed, Allport (1954) distinguished casual contact from acquaintances. He argued that the first one is more likely to increase prejudice, as it brings to the activation of stereotypes linked to the outgroup. Since the human mind tends to confirm its belief, negative aspects of the interaction will be more likely selected, thus enhancing prejudice. On the contrary, “the more sustained the acquaintance, the less the prejudice” (Allport, 1954, p.267). The possible reasons reported for this effect are the increased understanding and knowledge about the outgroup, and the greater familiarity with it derived from mere exposure. When such acquaintances take the form of intergroup friendships, they hold the greater effect on prejudice (Pettigrew & Tropp, 2006), but they can more simply be linked to the fact of living in the same neighbourhood or being co-workers.

Another important moderator is the valence of contact. Although the possible detrimental effects of intergroup contact had already been highlighted by Allport (1954), for a long time researchers have focused on positive contact, and only recently the effects of negative contact have started to be considered. In 2012, Barlow and colleagues advanced the hypothesis that the prejudice-enhancing effect of negative contact could be stronger than the prejudice-reducing effect of positive contact (*positive-negative contact asymmetry*). The authors moved their hypothesis from the observation that the more ethnically diverse an area is, the highest the levels of intergroup conflict; and that the general increase in intergroup contact, due to more diverse societies, did not reflect in a positive attitude change. From a theoretical perspective, the positive-negative contact asymmetry is sustained by the human tendency to give more importance to negative information, and by the facility with which negative impressions are generalized to the whole group, as category salience is higher in negative contacts compared to positive ones (Barlow et al., 2012). The results of the study

sustain the hypothesis. The researchers also found a moderate correlation between positive and negative contact, suggesting that the two may be two independent phenomena.

In 2021, Fuochi and colleagues proposed a different explanation, highlighting the importance of the interaction between valence and closeness of contact. In particular, the authors hypothesized that positive experiences are a better predictor of prejudice when intergroup contact is intimate, while negative experiences have a higher influence in the case of superficial contact. Intimate contact refers to contact experiences where there is a “relatively high degree of knowledge of the contact partner” (Fuochi et al., 2021, p.2), such as in friendships or repeated encounters due, for example, to a common workspace or activity; while superficial contact refers to encounters in which the other is not known, in absence of an underlying relationship (i.e., casual encounters). The theoretical background that sustains the hypothesis is that intimate contact is more relevant for the individual, and therefore the information conveyed in the interaction is elaborated in a deeper, systematic way (Eagly & Chaiken, 1993), thus being able to modify stereotypes. Moreover, as people need to belong and cherish their relationships, they are more comprehensive and empathic with their friends and acquaintances, thus being more prone to evaluate their interactions as positive (Fuochi et al., 2021). On the contrary, unknown outgroup members are not relevant to the self, thus the individual puts less effort into the cognitive elaboration of the information, relying on former schemes and beliefs, including stereotypes. The confirmation bias may then lead to judging the interaction as negative, thus reinforcing previous beliefs and enhancing prejudice. Positive superficial interaction, on the other hand, may not be relevant enough to change the stereotypes linked to the outgroup, as the individual is motivated to maintain ingroup distinctness (Fuochi et al., 2021). The results of the study sustain the hypothesis. It is worth noting that the conclusions of Fuochi and colleagues (2021) align with Allport’s original formulation, as their definitions of superficial and close relationships resemble the author’s distinction between casual contact and acquaintances.

**The role of perceived similarity.** To be distinct, two groups must, by definition, differ to some degree. According to Allport (1954), every known difference between two groups has to fall into one of the following types:

- J-curve of conformity behaviour: It refers to group characteristics that are shared among almost all the members of the ingroup, so that those who belong to outgroups cannot fit into the curve; a J-curve may decay over time if the ingroup members depart from conformity.
- Rare-zero differential: It refers to traits that are rare in one group, but completely absent in another one, so that the trait is often mistakenly considered by outgroups as essential for the first group.
- Overlapping normal curves of distribution: It refers to characteristics that are present with the same normal distribution in both groups, but with a mean difference. This latter may lead to the wrong conclusion that all the outgroup is lower/higher on the given trait, against the fact that the two curves are mostly overlapping.
- Categorical differential: It refers to traits that are present with different frequency among the two groups, but are uncommon in both.

However, what truly influences the outcome of the encounter between their members is not the real differences between two groups but how these differences are perceived (Allport, 1954). Indeed, the aforementioned cognitive process of decategorization, categorization and recategorization that underlies the contact effect (Pettigrew, 1998) shows how this perception of distance of the outgroup is changeable and central for the intergroup contact to be effective. The research on this topic has focused on three ways in which “perceived distance” can be conceptualized:

- Distance between the self and the encountered outgroup member: Previous research has shown that interpersonal closeness is cognitively conceptualized as an association

between the representation of the other and of the self (Hodson et al., 2018; Page-Gould et al., 2010). In intergroup relationships, such overlap has been hypothesized to be an important mediator for the generalization of the improved attitudes from the outgroup member towards the whole outgroup, as through the inclusion of the outgroup member met, the collective characteristics of the outgroup are adopted (*self-expansion*, Page-Gould et al., 2010). Therefore, as the effect on prejudice is maximised in the case of cross-group friendships (Pettigrew & Tropp, 2006), the smaller the distance perceived between oneself and the outgroup member, the stronger the effect of contact on prejudice (Boin et al., 2021).

- Distance between the outgroup member and the prototype of the outgroup: Another line of research focused on the moderating role played by the perceived representativeness of the encountered outgroup member, also known as prototypicality. In particular, this construct has been studied in relation to the generalization of the intergroup contact effects. According to the review made by Boin and colleagues (2021), when outgroup members are perceived as similar to their group prototype, the category salience increases, thus making easier the generalization of the attitudes from the individual to the group as a whole. However, the encounter with atypical outgroup members can activate more elaborated systems of information processing, thus promoting a detachment from the stereotypes linked to the outgroup. Therefore, representative and non-representative members may activate different processes and constitute two different pathways to the reduction of prejudice.
- Distance between the two groups: Finally, it is also important to consider the degree to which the outgroup as a whole is perceived as similar to the ingroup. Allport (1954) called this dimension “social distance” and stated that, when an outgroup is perceived as having a small social distance from one’s ingroup, such outgroup is considered as a *reference group* for the individual. Personal attitudes are influenced by the reference group, as individuals tend to align themselves to it, and are typical of the

relation between a minority and the correspondent majority. However, through the years research on the topic has revealed a more complex picture, with two opposing hypotheses. Following the distinctiveness threat literature, high similarity between ingroup and outgroup challenges group identities, thus leading to intergroup conflict in the attempt to differentiate oneself from the other (Lee et al., 2022). Conversely, based on similarity attraction, low social distance helps to overcome differences and promote positive intergroup contact, as people are attracted by what is familiar (Lee et al., 2022). Although the topic requires some further investigation, it seems clear however that the perceived distance between the ingroup and the outgroup plays an important moderating role in the intergroup contact effect.

The three conceptualizations are interrelated, and the final intergroup contact effect on prejudice is the result of their interaction (Boin et al., 2021; Meleady et al., 2019). To summarize and clarify these findings, Meleady and colleagues (2019) advance the idea of using the concept of *semantic distance*, suggesting that the degree of perceived similarity reflects the distance between the two concepts in the semantic network: the more similar they are, the closer in the network, the higher their influence upon each other. Therefore, a change in attitude towards an outgroup member would generalize to the whole group if there is a low semantic distance between the outgroup member and the outgroup prototype; positive attitudes towards an outgroup would generalize to other outgroups that are near in the network; and stereotypes, linked to the categories embedded in the semantic network, will be more challenged under high semantic distance between the encountered outgroup member and the outgroup stereotype. Taken together, these results may suggest that intergroup contact can be facilitated by more or less prototypical members according to the semantic distance between the two groups.

**Individual differences.** The idea that individual differences can affect psychological processes and intergroup contact is not new. Already Allport (1954) noticed that the effect of the encounter between the members of two groups can have different outcomes

according to some personal characteristics, like personality traits or the reliance on simple structures. Individual differences have been analysed in the contact literature from several points of view, testing their role as both predictors and moderators of the contact-prejudice relation. More recently, it has been hypothesised that contact may also have an influence on some personal characteristics (Turner et al., 2020). In the following paragraphs, two constructs in particular will be taken into consideration and described in detail, namely personal need for structure and social dominance orientation.

***Personal need for structure.*** Personal need for structure (PNS) is a dispositional motivation to cognitively represent the world in a simple and structured way, and it varies meaningfully across individuals (Neuberg & Newsom, 1993). People high in PNS see the world through schemes, prototypes and scripts derived from simplified and overgeneralized previous experiences, and they rarely change them in light of new information to keep these representations stable. The construct is conceptualized as a system-wide chronic motive, thus although the desire for simple structures is generally stable, an individual high in PNS could prefer more complex structures in specific situations, if doing so would allow a simplification of the overall cognitive organization and effort (Neuberg & Newsom, 1993). Moreover, some researchers (Hess, 2001; Hess et al., 2012) have detected a change in PNS with ageing, showing that the construct may not be as stable as it was first conceptualized. The previous description of the PNS clearly shows its link to the natural categorization process widely discussed above. Therefore, it is not surprising that PNS is a strong predictor of stereotyping (Newheiser & Dovidio, 2012) and consequently of prejudice (Neuberg & Newsom, 1993). The concept of PNS also resembles some of the characteristics of the “prejudice-prone personality” described by Allport (1954) characterized by a need for definiteness, intolerance of ambiguity, and preference for a structured world.

Other authors have also studied if there are additional pathways through which the desire for structure influences the contact-prejudice relation. Several studies on the topic have been done on the Need for cognitive closure (NFC), a construct that is closely related

to the personal need for structure (Neuberg et al., 1997) and that shares its same origins in the theory of lay epistemic (Kruglanski et al., 1997). Although not completely overlapping, the two were “developed to assess the very same concept” (Kruglanski et al., 1997, p.1006), which is the motivation to avoid ambiguity through quick, easily accessible answers; thus, the findings related to the need for cognitive closure can be seen as plausibly valid also for PNS. In this regard, some findings have shown that individuals high in NFC, although less likely to engage in intergroup contact, benefit more from positive interactions, showing more prejudice reduction (Roets et al., 2015). Moreover, it has also been hypothesized that the need for cognitive closure itself may be reduced by intergroup contact (Hodson et al., 2018).

***Social dominance orientation.*** Social dominance orientation (SDO) refers to the degree to which each individual values intergroup inequality and supports hierarchically organized relationships between groups, regardless of the position held by the individual (Sidanius & Pratto, 2001b). The concept is part of the social dominance theory, which states that all human societies are organised according to three hierarchical systems based, respectively, on age, gender, and an arbitrary set of social distinctions (Sidanius & Pratto, 2001a). The first two systems are quite stable and universal, while the third one is flexible and sensible to the particular context, so that across time and space different aspects become salient in the definition of groups’ boundaries and their hierarchy (i.e., race, nationality, social class, religion). In 2015, Ho and colleagues suggested a distinction between two components of SDO: dominance (SDO-D) and anti-egalitarianism (SDO-E). The first one is characterized by overt support of oppression and active involvement in aggressive intergroup behaviours to maintain the oppressive hierarchy; the second one refers to a more subtle form of support related to the endorsement of hierarchy-enhancing legitimizing myths (i.e., ideologies, values, beliefs) that maintain the different access to power and resources for different groups (Aiello et al., 2019; Ho et al., 2015). People high in SDO often avoid intergroup interactions and show high levels of prejudice towards outgroups, especially if considered subordinated or in direct competition (Aiello et al., 2019; Turner et al., 2020). However, SDO also has a moderating



effect on the contact-prejudice relation, as similarly to the need for cognitive closure, there is a greater prejudice reduction due to intergroup contact in case of individuals that are more oriented towards hierarchy and inequality (Hodson et al., 2018; Turner et al., 2020). Finally, several studies found lower levels of SDO following extended intergroup contact (Meleady et al., 2020; Turner et al., 2020), showing the multifaceted nature of the relationship between SDO, intergroup contact, and prejudice.

### **Outcomes of intergroup contact**

As the previous paragraphs show, intergroup contact has several, interrelated effects, that do not stop to the contact situation, but progressively generalize. Early research has mostly focused on attitudes; however, several references to the significant effects of intergroup contact over other psychological dimensions can be found in the literature (Hodson et al., 2018). To better understand these effects, they have been classified into primary, secondary, and tertiary transfer (Boin et al., 2021; Hodson et al., 2018; Meleady et al., 2019). *Primary transfer effect* refers to the generalization of the attitudes towards a specific outgroup member to their whole group following intergroup contact, and it might be linked to a change in the cognitive representation of the group; evidence in support of this generalization has been found for direct and indirect, as well as positive and negative contact (Boin et al., 2021; Meleady et al., 2019). *Secondary transfer effect* relates to the diffusion of the new attitude to other outgroups that were not involved in the contact situation; cross-sectional and longitudinal evidence of this effect has been found for direct, extended, and imagined contact, mostly positive in valence (Boin et al., 2021; Hodson et al., 2018). Finally, under *tertiary transfer effect* are gathered all the changes, cognitive in nature, that could be registered following intergroup contact, like increased productivity, problem-solving, creativity, social competence, and self-esteem, just to cite a few (Boin et al., 2021; Meleady et al., 2019). These effects have been studied separately for a long time, but only recently it has been hypothesized that they all reflect a more general process of cognitive liberalization, that will

be further analysed in the next chapter (Hodson et al., 2018).

It is important to notice that primary and secondary transfer effects have not only been sustained by an impressive amount of studies (Boin et al., 2021; Pettigrew & Tropp, 2006; Vezzali et al., 2021), but they have also been directly registered in natural settings following interventions based on intergroup contact. Indeed, intergroup contact theory has been successfully applied to overcome several situations of intergroup conflict, from its lightest manifestation (i.e., prejudice, stereotyping) to more severe forms (i.e., discrimination, segregation), until genocide, with different target groups, situations, and in several countries around the world (Al Ramiah & Hewstone, 2013; Boin et al., 2021; Pettigrew & Tropp, 2006). In particular, intergroup contact has been proven to be effective in reducing the psychological conflict that perdures after violent conflicts, and that often constitutes the seed for future conflict along with other economic, political and historical factors (Al Ramiah & Hewstone, 2013). Thus, interventions based on intergroup contact theory can be considered also as preventive against future conflict. Clearly, these have to be well designed, following, if possible, the optimal conditions highlighted by Allport (1954), and are not exempt from possible iatrogenic effects and unintended consequences. However, taken together these evidences highlight the potential of intergroup contact to intervene on several social issues.

## **Final remarks**

This chapter outlined the main features of intergroup contact theory, with a special focus on its cognitive aspects. The centrality of the process of categorization has been highlighted multiple times and discussed from several points of view. To summarize them, it may be said that stable categories with rigid boundaries predict higher prejudice (Sidanius & Pratto, 2001a), while flexible categories, able to change in light of new information and according to the context, are linked to less prejudicial attitudes as they do not rely on stereotypes (Allport, 1954). Indeed, rigid categories are strictly related to stereotypes (Allport, 1954) and a higher personal need for structure (Neuberg & Newsom, 1993), while flexible

categories facilitate the process of categorization, decategorization and recategorization that underlies the intergroup contact effect (Pettigrew, 1998). Moreover, cognitive flexibility is considered to be an outcome of intergroup contact (Hodson et al., 2018). It is important to notice that flexible categories do have boundaries, as by definition intergroup contact involves two separate parties; however, these are seen as permeable and in constant evolution. Such conceptualization implies that the definition of ingroups and outgroups is not straightforward, as it depends on the features of the categories beheld by the involved individuals and the specific situational triggers.

Congruently, Allport (1954) pointed out that “each person is uniquely organised” (p.40), as in a mobile society both the definition of who belongs to a group and the choice of one’s own memberships rely partly on the individual. The recent debate on the right to vote for second-generation immigrants in Italy exemplifies the matter, as the people in favour and against the law apply different inclusion criteria regarding who can be considered Italian. Moreover, ingroup memberships can change across time and space, both due to the different salience that groups have for the individual in different moments, and as a reflex of wider changes and differences on the societal level. For instance, one may think of how it has changed the role played by race or skin colour in the definition of group boundaries in the last century. According to Allport (1954), multiple memberships, even partially contradictory between each other, are possible, as “only approximate conformity is demanded within any system of group norms”(p.40). The author advanced the idea of concentric loyalties, according to which a person belongs to several groups nested together, from one’s family to their neighbourhood, their city and so on. These memberships may be more or less salient to the individual, and usually, the wider circle regards one’s nationality. However, Allport (1954) advanced the idea of promoting a sense of belonging to humanity as the outermost circle, so that intergroup contact would always have a common anchor to facilitate the encounter. In the same way in which an Italian and a German can be both European, even keeping their differences, and this common membership can facilitate their

encounter, so any intergroup contact can benefit from a common feeling of belonging to humankind. Once again, the key aspect is the individual perception of who belongs to the ingroup and who to the outgroup (Allport, 1954; Hodson et al., 2018). For this reason, in the present research, it was left to the participants to define their own outgroups, in order to ensure that the given answers actually referred to intergroup contacts. Indeed, choosing specific outgroups was seen as a risk of referring to groups that were considered by some participants as ingroups, thus invalidating the research.

## Cognitive Liberalization

As previously mentioned, the present chapter will present the cognitive liberalization hypothesis developed by Hodson and colleagues (2018), according to which intergroup contact can shape human cognition, promoting a more open and flexible mindset. Despite being one of the most recent developments in the theory of intergroup contact that has just begun to be tested, the hypothesis finds support in Allport's pioneering work. Indeed, in *The nature of prejudice* (1954), he stated that "a person's prejudice is unlikely to be merely a specific attitude toward a specific group; it is more likely to be a reflection of his whole habit of thinking about the world he lives in" (p.175). In other words, the process that underlies the formation of prejudiced attitudes might be more important than their specific content. This same idea is one of the theoretical pillars of the cognitive liberalization hypothesis. Indeed, Hodson et al. (2018) noticed that most of the research on intergroup contact regards the affective component of prejudice and that, when taking into consideration its cognitive component, the studies focused on factors such as the knowledge of the outgroups, thus putting a focus on the content more than on the process in action. The authors thus invited intergroup contact researchers to reconsider the role played by cognitive processes, stating that intergroup contact might be more influential on how people think rather than what they think. According to Meleady and colleagues (2019), cognitive processes can change because the brain, in the same way as a muscle, can be trained to think differently. Following this metaphor, intergroup contact would be one of the toughest, but most effective exercises, to train flexible thinking and an open mindset.

According to the cognitive liberalization hypothesis, the effect of intergroup contact on cognitive processes is not limited to attitudes and prejudice, but it has a general impact on the whole cognition (Hodson et al., 2018). Indeed, intergroup contact would have a "broadening" effect on the mind as it allows the individual to encounter and even clash with diversity, exploring new points of view, thus challenging previous worldviews and embracing more

nuanced perspectives. Such cognitive expansion would make the cognitive structure less rigid and dogmatic, and promote more systematic thinking, as in the intergroup encounters the individual experiences the limits of simplistic heuristics and stereotypes. As previously seen, the more different the outgroup member is from the expectancies (i.e., outgroup prototype) of the individual, the greater the effect (Meleady et al., 2019). These changes allow an overall cognitive growth that can be seen in other contexts, like improvements in problem-solving, creativity, and cognitive flexibility (Hodson et al., 2018). The authors compare the effects of intergroup contact to liberal education, as they claim that both equip the individual to deal with future challenges and exert their influence through different pathways.

To the present day, few studies have tested the cognitive liberalization hypothesis indirectly, taking it as a theoretical reference (i.e., Bagci et al., 2019; Meleady et al., 2019), while none to our knowledge have tried to directly test it by measuring cognitive liberalization. However, this is a fertile and extremely valuable field of research, since, if validated, it would make intergroup contact a precious tool for the development of the society as a whole, both on an individual and social level. Since 1991, Van Dijk has studied the changes that technological advancement has brought to society. In his reflection, the introduction of the Internet has made modern societies dual in nature, in which opposites coexist: the network is one, worldwide, but it is made by singular units; it is inclusive as it is open to everyone, but it isolates the ones that cannot access it; it allows to reach all information available, but its overwhelming quantity makes necessary the reliance on a mediator, that is never neutral (Stella et al., 2018). These characteristics leave a lot of autonomy and responsibility on the individual, who has to learn how to navigate this complexity. In this task, intergroup contact might become a valuable instrument as it allows you to embrace a multifaceted worldview, shows that everything is not so straightforward, and teaches you how to deal with new and often apparently contradictory information. Well-oriented citizens are then more able to contribute to society, thus allowing progress on a societal level.

In the following paragraphs, the evidence in support of the cognitive liberalization

hypothesis will first be presented, followed by a description of the constructs that were chosen to measure it in the present work.

### **The roots of the cognitive liberalization hypothesis**

The cognitive liberalization hypothesis moves from results found in different fields of research. Within the intergroup contact theory, Hodson and colleagues (2018) took into consideration three aspects that highlight the “cognitive nature of contact experience”(p.526): the centrality role of the process of categorization, which has been discussed widely in the previous chapter; the effect of indirect contact; and the multiple outcomes of intergroup contact. By definition, indirect contact does not involve a direct experience with the outgroup, but it has an effect on outgroup attitudes the same. This effect is mediated, in extended contact, by a change in the perceived norms of the ingroup, while it might be due to higher exposure, familiarity, and better knowledge of the outgroup in vicarious contact. In both cases, the effect is due to a change in the outgroup representation (Hodson et al., 2018). The authors also argue that the multiplicity of the effects of intergroup contact and their ability to generalize, all point towards a deeper change that is not related to the specific content, but to the general processes that underlie all of them. Therefore, the multiple outcomes of intergroup contact would be just different forms of expression of the same effect on a procedural level.

Hodson and his colleagues (2018) also gathered some pieces of evidence in support of the cognitive liberalization hypothesis from lines of research not strictly related to intergroup contact, but that have studied the effects of the encounter with “diversity”. These stem from educational, political, and cultural psychology, and they all stress the enrichment that exposure to new norms and ideas can have on the individual. They will now be presented in detail.

**Biculturalism.** Biculturalism is defined by Schwartz et al. (2017) as “an umbrella term to refer to any case in which a person endorses at least one heritage culture and at least

one receiving culture” (p.30). First studied with migrants as a target population, the term is now more general and takes into consideration also international students, ethnic minorities, mixed-ethnic individuals, or people who are in a relationship with someone of different culture (Nguyen & Benet-Martinez, 2013). Biculturalism is one of the possible outcomes of the process of acculturation, in which an individual finds a personal balance between their culture of origin and a new culture, endorsing some features of one, and some of the other (Nguyen & Benet-Martinez, 2013). This multiplicity of identification has several benefits for the individual (Hong et al., 2016). Indeed, a review of the literature (Nguyen & Benet-Martinez, 2013) found a significant, strong and positive association between biculturalism and both psychological and socio-cultural adjustment, where the former refers to general well-being (i.e., life satisfaction, positive affect, self-esteem) and the latter to behavioural competence (i.e., academic achievement, career success, social skills). The effect was only moderated by the two involved cultures, while age, gender, and the percentage of migrants in the receiving country had no influence. This result shows that the “encounter” with diversity, in terms of different values, norms, and behaviours, might be a resource for individual development, but that the extent of its effect depends on the specific cultures involved. Being constantly held between two cultures, however, is not without risk, and can have several negative effects, such as stress, isolation, identity confusion, low self-esteem, and increased substance abuse, among others (Hong et al., 2016; Nguyen & Benet-Martinez, 2013).

More relevant for the cognitive liberalization hypothesis, on a cognitive level biculturalism is linked with greater flexibility (Nguyen & Benet-Martinez, 2013), creativity (Hodson et al., 2018; Hong et al., 2016), and more complex representations and attitudes (Benet-Martinez et al., 2006; Nguyen & Benet-Martinez, 2013). In particular, bicultural individuals seem to have multifaced cultural representations, in which several components are interconnected and selectively activated according to the specific situation (Benet-Martinez et al., 2006). Indeed, according to the dynamic constructivist approach, biculturals chose to apply different meaning systems to match the social situation in which they are involved; a process



called *cultural frame switching* (CFS, Benet-Martinez et al., 2006). They intrinsically learn multiple perspectives, and thus indirectly the relativism of each cultural system. The complex cultural representations are believed to be the result of multiple experiences with ambiguous, intricate, cultural situations that enhance systematic processing (Benet-Martinez et al., 2006). In fact, they are not due to mere exposure, because otherwise, bicultural individuals should have more complex representations only of the heritage culture as, compared to mono-cultural individuals, they are exposed less to the receiving culture. On the contrary, they have a deep and nuanced knowledge of both. Interestingly, biculturals that perceive their cultures as dissociated and difficult to integrate, handle better challenging cultural situations and have more complex cultural representations (Benet-Martinez et al., 2006), similar to the enhancing effect that high semantic distance has for cognitive liberalization (Meleady et al., 2019). In both situations, two cognitive representations that should be close are distant, and they stimulate cognitive development. However, biculturalism's effect on cognition is hypothesised to be limited to the cultural domain (Benet-Martinez et al., 2006), while the cognitive liberalization hypothesis, as seen above, points to a broader effect. Nonetheless, taken together, these results support that intergroup contact with culturally diverse outgroups might, in the long term, enhance systematic thinking and the endorsement of more flexible, nuanced categories. Indeed, also Benet-Martinez and colleagues (2006) opened up to the possibility that biculturals' more complex thinking could be learned by mono-cultural individuals through a "daily immersion into multicultural environment"(p.401).

**Group decision-making.** Several studies have highlighted the positive effect that diversity has on group decision-making. Research has focused primarily on mixed-ethnicity groups, and has found that they usually reach higher quality decisions because they approach the problem in a more systematic way, rejecting simple solutions and engaging in rich discussions that allow them to consider multiple perspectives (Hakstian et al., 2022; Hodson et al., 2018; Meleady et al., 2019). For example, in a study conducted by Antonio and colleagues (2004), White college students were asked to express their opinions on one

social issue, before and after having a group discussion about it. In each group, a collaborator, who could be either Black or White, expressed the same opinion in the discussion phase. The results showed that participants valued the contribution of the collaborator as more enriching when it was Black, and they expressed more articulated opinions after the discussion, integrating multiple perspectives, only when the collaborator stated a different opinion from the majority, regardless of their race. Moreover, the effect held also when the participants were asked to express their opinion on a second issue, which was not discussed in the group. Noteworthy, the authors found that participants who already had previous contact with people from different cultures and nationalities showed more complex, multi-faced thinking.

Evidence has been gathered also in other domains, such as in the legal field. More in detail, multiple studies have used the mock jury paradigm to establish whether and how the decision-making process is affected by the racial composition of the group. Sommers (2006) in an influential study found that diverse juries (four White participants and two Black participants) were more cautious about pleading the defendant guilty in the pre-deliberation verdict, and discussed the case longer, bringing more arguments and making fewer factual errors, compared to homogeneous juries (all White jurors). Interestingly, the additional information in the first condition was not only due to the minority, but also the majority brought more accurate reflections, showing an overall systematic analysis of the data presented by the whole group. It has to be noted, however, that a recent study (Hakstian et al., 2022) did not replicate the results of Sommer (2006)'s one, except for the fact that juries that initially held different opinions deliberated for longer.

The two studies presented, although calling on different theoretical concepts (minority influence and avoidance of groupthink on one side; informational diversity and prejudice avoidance on the other), explain the effect of the diverse composition on group decision-making in a similar way. Indeed, both stress that the introduction of a new point of view, that is a minority in the group, beyond concretely bringing new information to the discussion,

increases divergent thinking as it breaks the majority unanimity, engaging them in more systemic thinking (Antonio et al., 2004; Sommers, 2006). Evidence of this effect can be found also in ecological studies, as a report by McKinsey and Company (2015) found that companies with diverse leadership teams have better financial performance with increased profitability (Hunt et al., 2015).

It has to be noticed, though, that the value of diversity in group decision-making is still a debated topic in literature. Whereas some agree on the positive effect of diversity because groups benefit from the varied expertise of their members, thus being more creative and innovative (Hakstian et al., 2022; Manata, 2021; Sommers, 1996); others, on the basis of similarity-attraction and social identity theories, argue that diverse groups might suffer from enhanced interpersonal conflict, bad communication, decreased trust, and lack of cohesion and moral (Manata, 2021; Sommers, 1996; Zhang et al., 2007). In the attempt to match these results, researchers have studied the effect of possible moderators of the relation, from the type of task (Sommers, 1996) to the presence of relationship conflict (Manata, 2021), but no consensus has been reached yet. However, taken together, these results show how contact with different others can, under some conditions, enhance systematic thinking and help read a problem from different perspectives, thus producing more thoughtful decisions.

**Diversity in educational contexts.** Diversity in schools has been studied in relation to a variety of variables, from racial bias to academic outcomes, cognitive development, intercultural competence, openness to diversity and challenge, and civic engagement (Antonio et al., 2004; Bowman, 2010; Hodson et al., 2018; Roksa et al., 2017; Shim & Perez, 2017; Schwarzenhal et al., 2019). This interest is due to increasingly mixed societies, which, on one hand, make classrooms more and more diverse, on the other hand, challenge schools to prepare future citizens to deal with cultural differences (Bowman, 2010; Shim & Perez, 2017, Schwarzenhal et al., 2019). Moreover, schools are important developmental contexts, which makes them the ideal place to work on seeing differences as opportunities rather than threats, as the shift involves cognitive processes, norms, attitudes, and behaviours. Overall,

research shows that diversity experiences in educational contexts have a positive effect on a varied range of outcomes (Roksa et al., 2017), but not without exceptions, as “heterogeneity comes with some tensions and challenges” (Bowman, 2010, p.4).

Focusing on cognitive development, meaning *how* rather than *what* people think, a review of studies on college diversity experiences (Bowman, 2010) found a general positive relationship between the two, whose effect size changed based on several factors, namely how the diversity experience was conceptualized, on which cognitive outcome the study focused, and the implemented study design. More in detail, the study found that the experience of informal interactions between diverse peers has a greater effect than the overall proportion of ethnically diverse students in the school (*structural diversity*) and the degree to which diversity is treated in classrooms as coursework or in workshops (*classroom diversity*). The author interprets the result as evidence that structural diversity is a necessary, but not sufficient condition, as it does not directly foster intergroup interactions (groups can remain separated), and that classroom diversity, as it focuses on imparting knowledge, does not engage the students in direct experiences of diversity. This latter consideration is in line with Hodson et al. (2018)’s hypothesis that the effect of intergroup contact on processes, rather than content, might be the key to fostering more positive relationships with outgroups. Moreover, the study found a greater effect of diverse experiences on *cognitive tendencies*, meaning a preference for some types of thinking, like need for cognition, attributional complexity and disposition towards critical thinking, rather than *cognitive skills*, such as problem-solving and critical thinking. The theoretical framework that sustains the role of diverse experiences as cognitive boosters, first delineated by Gurin and colleagues (2002), refers to the classic theories of cognitive development (i.e., Piaget, 1985), according to which cognitive growth requires disequilibrium. The interaction with diverse peers gives the individual new information that cannot be processed by previous scripts, thus engaging the mind in more effortful thought, and giving it the opportunity to grow (Bowman, 2010; Roksa et al., 2017)

Similarly to what happened for intergroup contact theory, research on the effects

of diversity experiences on cognitive development has mostly focused on positive and neutral interaction. However, a recent longitudinal study (Roksa et al., 2017) on college students found that negative experiences with different others also influence cognition. The researchers studied the effect of positive and negative experiences that students had during four years of college over need for cognition and critical thinking, controlling for their initial level at college entry. Regarding need for cognition, the results show that positive interactions have a positive effect and negative interactions have an influence in the opposite direction. Interestingly, there is an effect of the interaction between the two, so that when individuals have a lot of positive experiences, negative ones do not have a significant effect on need for cognition; on the contrary, when positive interactions are lower, negative interactions have a stronger effect on the outcome variable. Moreover, White participants benefit more from positive interactions compared to the participants of other ethnicities, while there is no difference between the two for negative interactions. This result might be explained considering that, for a minority, contact with the majority is more frequent, thus less cognitively stimulating, and that the majority might be taken as a reference group (Allport, 1954), meaning that it could be seen by the individual not as different from themselves as an external person would say. Critical thinking, on the other hand, was influenced only by negative interactions, with no moderation by other variables, and less compared with need for cognition. This result is in line with the aforementioned review (Bowman, 2010) that showed that diverse experiences have a higher impact on cognitive tendencies compared to cognitive skills. Overall, these results call for interventions to actively facilitate positive interactions between diverse groups in schools (Roksa et al., 2017), for example improving the school climate, that has been shown to play a crucial role in intercultural development (Shim & Perez, 2017; Schwarzenhal et al., 2019)

For the more limited purposes of this research, however, this field of research sustains that intergroup contact can be a “workout” for the brain, reducing general reliance on simplistic heuristic thinking, and fostering cognitive growth (Hodson, 2018).

**Creativity.** The relation between diversity and creativity has already started to be outlined in the previous paragraphs. Indeed, as already mentioned, bicultural individuals are more creative (Hong et al., 2016) and diverse groups produce more creative ideas (Hakstian et al., 2022; Sommers, 1996). Moreover, higher creativity has also been found as a result of a prejudice-reduction intervention in schools that involved the students in ethnically heterogeneous (vs homogeneous) work groups (Groyecka-Bernard et al., 2021). The common element seems to be the inhibition of stereotypical thinking, induced by the encounter with diversity, that allows to “think outside the box”, in a more flexible way, a key feature of creativity (Groyecka-Bernard et al., 2021; Hodson et al., 2018). A recent study (Groyecka-Bernard et al., 2021) has also suggested that the relation could be bidirectional, meaning that creativity could lessen prejudice and foster more positive intergroup interactions, but the results obtained are not yet sufficient to support the hypothesis.

Positive intergroup contact effect and creativity share many commonalities in regard of their underlying cognitive processes. According to Amabile, as reported by Kerr (2009), the mental operations involved in the creative process are “the capacity to break a perceptual or cognitive set in order to see or think about things in a new way; the capacity to suspend judgment; and the ability to embrace complexities” (p.255). In the same way, as seen above, intergroup contact to be effective requires seeing the outgroup member in a new way, overcoming stereotypes and eventually recategorizing them as a common ingroup; it requires the acknowledgement that one’s perspective is only partial and consequently the momentaneous suspension of judgment to understand the one of the other; and finally the rejection of prefixed schemes and stereotypes makes one’s worldview more complex and effortful to navigate. Moreover, counter-stereotypical content fosters creativity (Groyecka-Bernard et al., 2021; Hodson et al., 2018), like tertiary transfer effect is hypothesised to thrive when the outgroup member is not prototypical (Meleady et al., 2019). Therefore, there are reasons to hypothesise that intergroup contact may lead to greater creativity. However, no study, to our knowledge, has ever studied the two variables together. It is also

important to notice that the field of study on creativity suffers from an elusive definition of the construct, as only in 2009 sixty different definitions could be found in literature (Kerr, 2009). These sometimes refer to a person's characteristics, sometimes to a product, and sometimes to a process, with different specifics for each. In the operationalization of creativity, they have often been fused, so that a person's creativity was judged by how creative was something they created, and the results were taken to make inferences about the underlying cognitive processes. However, these aspects are not always linked, as for example creativity instruments sensible to the underlying cognitive processes are not able to predict future creative behaviour (Kerr, 2009). Therefore, future research should try to focus on the component of interest and see whether and how it is linked to the encounter with diversity.

Altogether, the evidence presented in the previous paragraphs sustains, on a theoretical level, the cognitive liberalization hypothesis. However, in order to be tested, it needs to be sustained by empirical data. For this reason, its operationalization will be treated next.

### **Cognitive liberalization operationalization**

Cognitive liberalization is a process that occurs over time and on a cognitive level, thus it is difficult to measure it directly. However, as it is hypothesised to have a broad effect on the mind, it could be detected by looking at the variation of several related constructs: if all contemporary change due to intergroup contact, it might be assumed that a cognitive liberalization process has happened. As no validated measure of cognitive liberalization has been found in the literature, in the present research some constructs have been selected so that, taken together, they could be representative of the cognitive liberalization process as described by Hodson and colleagues (2018). These will now be described in detail, highlighting for each their link to the cognitive liberalization hypothesis.

**Langer mindfulness.** The term *mindfulness* is usually used to refer to a psychological state of awareness, centred on the present, that promotes non-judgemental acceptance

of one's experiences. This type of mindfulness focuses on self-perception, it is strictly linked to the practice of meditation, and it finds its roots in the Eastern cultural and philosophical traditions (Pagnini et al., 2018; Pirson et al., 2018). In the psychological literature, however, the term is also linked to another concept, referred to as Langer mindfulness, Langerian mindfulness or socio-cognitive mindfulness; this second conceptualization is the one of interest for the present study. Langerian mindfulness is defined as an active state of mind, in which the individual pays attention to novelty around them (Langer, 2009). The concept is strictly related to the external, social context in which the individual lives, as to be mindful, the person has to be able to perceive the differences in contexts across both time and space (Pagnini et al., 2018; Pirson et al., 2018). This approach to experience implies the reliance on flexible categories, that are constantly updated by new information: the individual still relies on cognitive schemes, but "they guide rather than govern our behavior" (Langer, 2009, p.619). A mindful mindset manifest itself in greater cognitive flexibility, presence and involvement in the situation (*engagement*), interest in exploring new perspectives (*novelty seeking*), and engagement in creative activities (*novelty producing*) (Pagnini et al., 2018; Pirson et al., 2018). Regarding long-term outcomes, Langer mindfulness has also been linked to improvements in several cognitive processes, such as creativity, attention, memory and problem-solving, and to overall physical and psychological well-being (Langer, 2009; Pirson et al., 2018). Opposed to mindfulness there is the concept of mindlessness, an inactive state of mind in which the individual rigidly relies on previous categorizations (Langer, 2009; Pagnini et al., 2018; Pirson et al., 2018). These categories are often outdated and do not reflect the surrounding social and physical world, but the individual takes them for granted and uses them automatically, without recognising the contextual differences. Therefore, mindless people do not question themselves about under which conditions the information that they have acquired is true, while, on the other hand, mindful people learn "probable truths" (Langer, 2009), aware that theirs is only one of many perspectives.

Several parallels can be drawn with intergroup contact theory. If, on one hand, the



characteristics of mindlessness resemble the way in which rigid categories are linked to higher prejudice; on the other hand, the openness to several points of view and the recognition of the limitedness of one's perspective, typical of a mindful state, recall the effects of intergroup contact. Therefore, it is likely that intergroup contact could foster mindfulness as, in the encounter with diversity, the individual is brought to question their previous beliefs, making them aware of their mindlessness. Moreover, Langer mindfulness can be considered an indicator of cognitive liberalization as both conceptualization revolve around openness to experience (Hodson et al., 2018; Pagnini et al., 2018)

**Personal growth.** The positive effects of diversity in educational contexts have already been previously summarised. Taken together, these results speak for a general positive effect on development of the encounter with diversity in crucial years for individual growth. Another line of research sustains this statement, and generalises it to the whole life-span. Indeed, according to the self-expansion model (Aron & Aron, 1986), individuals have a basic motivation to meet and construct close interpersonal relationships with others in order to gain new resources and learn perspectives that can enhance their self-efficacy (Dys-Steenbergen et al., 2016; Paolini et al., 2016). This happens through a process of inclusion of the other in the self-representation, which as seen above underlies close relationships. The wider the range of resources and the knowledge possessed by the individual, the higher the chance that they would be able to achieve future goals. Thus, when the self-expansion motif is high, the dissimilar other becomes a particularly interesting partner (Paolini et al., 2016). The strength of this motif, however, changes through time as people alternate periods of self-expansion, where they are willing to change and grow, to periods in which needs of self-consistency prevail, and they look for stability in similar others (Dys-Steenbergen et al., 2016).

Research has shown that the relation between intergroup contact and the self-expansion motif is bidirectional. Moreover, in a study that promoted intergroup interaction, Dys-Steenbergen and colleagues (2016) found that the effect of self-expansion on the perception

of self-growth was mediated by the perception of quality and closeness of the interaction. Thus, there are reasons to believe that intergroup contact could influence overall personal growth, identified by Ryff (1989) as one of the dimensions of psychological wellbeing. Worth notice, her conceptualization of psychological wellbeing is the result of a review on the literature about positive psychological functioning, and moves from the Greek concept of *eudaimonia*, meaning “the feelings accompanying behaviour in the direction of, and consistent with, one’s true potential” (Waterman, 1984 in Ryff, 1989, p. 1070). Personal growth is thus defined as a feeling of continuous development in which the person is open to the unknown as, through new experiences, they is able to grow and self-expand.

**Curiosity.** Curiosity has been studied in psychological literature for over a century. In such a long period, researchers have developed different theories and definitions about the concept. As a common basis, curiosity is seen as the desire and pursuit to explore and learn about the unknown, allowing the individual to potentially discover new, precious information for their survival and growth (Kashdan et al., 2018). However, apart from this aspect, researchers have studied curiosity as both a general and domain-specific construct; considering it in some cases a personality trait, and in others a human motive; and as a construct with a variable number of components. For the purpose of this study, two works are of particular interest: the development of the five-dimensional curiosity scale by Kashdan and colleagues (2018) and the conceptualization of social curiosity by Renner (2006).

The first one was developed as an attempted to summarize the various perspectives present in literature on the topic. Guided by both theory and data analysis, the researchers found five interrelated, but separate dimensions that describe different facets of curiosity: Joyous exploration, Deprivation sensitivity, Stress tolerance, Social curiosity, and Thrill Seeking. In particular, joyous exploration and stress tolerance are the most relevant for intergroup contact. Indeed, the first one resembles the naïve concept of curiosity, thus referring to an interest towards new information and experiences, being motivated by self-expansion over security (Kashdan et al., 2018), and, as seen above, self-expansion is strictly related to in-

tergroup contact. On the other hand, stress tolerance refers to the perception of being able to cope with the negative emotions (i.e., anxiety) that inevitably arise in the encounter with the unknown. This ability is fundamental in order for intergroup contact to have a positive effect (Boin et al., 2021; Pettigrew & Tropp 2006), and its absence may inhibit other motions towards the exploration of diversity. Moreover, both joyous exploration and stress tolerance are considered by Kashdan and colleagues (2018) to be “essential in acquiring the psychological benefits of experiencing intrigue and taking the step to explore and discover” (p.138), as they have been linked, among others, to greater flexibility, openness, and emotional stability. Therefore, they might be key aspects of the process of cognitive liberalization.

On the other hand, Renner (2006) has focused on curiosity in the social domain, highlighting its fundamental role for humans to understand how to behave in complex and constantly changing social environments. The construct has two subcomponents: *general social curiosity*, defined as “an interest in how other people behave, think, and feel”, and *covert social curiosity*, which refers to the use of strategies to gain information about others, but without directly interacting with them. The relevance of the former for intergroup contact is quite straightforward: on one hand, awareness of one’s social environment can help to avoid overgeneralizations and the reliance on stereotypes; on the other, interest towards different people can bring to direct encounters with outgroup members.

Both theories see curiosity as a quite stable trait, that could however be modulated by contextual factors. As reported by Gross et al. (2020), people show more interest towards topics that have a practical value. Thus, it might be hypothesised that experiences of the benefits of intergroup contact might foster curiosity towards outgroups, thus establishing a virtuous cycle.

**Deprovincialization.** Deprovincialization was already identified by Hodson and colleagues (2018) as a construct strictly related to the cognitive liberalization hypothesis. First proposed by Pettigrew (1998), deprovincialization refers to a perspective in which the individual recognises that the norms, attitudes and beliefs of their own ingroup are only one

of the possible ways to approach the world and show openness and curiosity towards “the way” of other groups and cultures. Therefore, deprovincialization implies two complementary processes, one of ingroup reappraisal, and one of widening of one’s social perceptions. Through the encounter with diversity, the person questions their cultural standards, previously taken for granted, and see things from different perspectives (Martinovic & Verkuyten, 2013). The process does not involve a devaluation of one’s own ingroup culture, but looking at it with a fresh, more nuanced perspective, so that groups’ cognitive representation becomes more complex, and cross-cutting memberships possible (Boin et al., 2021; Verkuyten et al., 2022). Thus, deprovincialization is compatible with national identification and does not require the endorsement of cultural relativism, as the individual belonging to the ingroup is not challenged nor denied (Verkuyten et al., 2022). The concept is operationalized through two, complementary scales, each of which taps into one of the two processes involved: the *Group Deprovincialization Scale* (GDS; Martinovic & Verkuyten, 2013), which measures the degree to which the individual (does not) take their ingroup norms as a standard frame to judge other cultures, and the *Cultural Deprovincialization Scale* (CDS; Boin et al., 2021), which measures the willingness to understand and accept them. Both are negatively associated with prejudice (Verkuyten et al., 2022).

Moreover, deprovincialization was found to be both influenced and influencing intergroup contact (Boin et al., 2021), so that positive contact is associated with higher deprovincialization, negative contact is associated with lower deprovincialization, and vice versa. It has thus been hypothesised that deprovincialization may play a mediating role in both primary and secondary transfer effect (Boin et al., 2021). Deprovincialization is also highly correlated with cognitive flexibility and openness to experience, while is negatively associated to SDO and PNS. Therefore, it’s implication in the cognitive liberalization process is more than plausible.

**Cognitive flexibility.** The importance of using flexible categorizations in defining ingroups and outgroups for intergroup contact to be effective has been highlighted multiple

times. Indeed, only such categories allow the process of categorization, decategorization and recategorization, which, according to Pettigrew (1998)'s conceptualization, constitutes the cognitive basis of the contact effect. Their formation requires both categorial and conceptual flexibility. The former refers to the ability to use different categorizational modes interchangeably (Maintenant & Bodi, 2022), while the latter refers to the adaptation of these multiple categorizations to the specific situation (Scheibling-seve et al., 2022). Thus, a person can be recognised as belonging to one or another category according to the context and the situation in which they are, without the two categorizations being in conflict. These two forms of flexibility are expressions of a more general concept of cognitive flexibility, a basic executive function involved in everyday life. Cognitive flexibility is essential for multiple activities, thus playing a key role for development, functional adaptation to the environment, social adjustment, and life satisfaction (Maintenant & Bodi, 2022). Being such a wide construct with many implications, several definitions of cognitive flexibility have been given in scientific literature, each focusing on different aspects of the construct. For the purpose of this study, cognitive flexibility is defined as the ability a) to analyse a given situation from different points of view, identifying the options and alternatives available; b) to represent it in multiple ways; and c) to use these multiple representations interchangeably (Clement, 2022; Maintenant & Bodi, 2022; Martin & Rubin, 1995; Scheibling-seve et al., 2022).

Cognitive flexibility is sensible to experience (Maintenant & Bodi, 2022), and cross-racial interactions in college have been found to be associated with higher cognitive flexibility (Hodson et al., 2018). Thus, it is plausible to hypothesise that intergroup contact could have an enhancing effect on the construct. Moreover, in the previous paragraphs, the link between cognitive flexibility and several concepts relevant for cognitive liberalization has been highlighted. To summarise them, the construct has been associated with higher creativity (Clement, 2022; Groyecka-Bernard et al., 2021), mindfulness (Pagnini et al., 2018; Pirson et al., 2018), curiosity (Kashdan et al., 2018), deprovincialization (Boin et al., 2021), and it has also been found to be higher in bicultural individuals (Nguyen & Benet-Martinez, 2013).

In addition, it is also linked to better problem-solving skills (Clement, 2022) and critical thinking (Scheibling-seve et al., 2022). Taken together, these results make of cognitive flexibility the ideal measure for cognitive liberalization.

**Openness to diversity.** The benefits of diversity in educational contexts have been outlined in an earlier section. Moreover, researchers stress that preparing students to interact across differences is a duty of higher education as it is an essential disposition to be good citizens in modern society, in light of the fact that globalization and technological development have made interactions with different others inevitable (Bowman, 2014; Shim & Perez, 2017). However, diversity inclusion remains a challenge for universities and a major reason for conflict (Whitt et al., 2001). Therefore, since the 1990s, several studies have tried to understand which factors allow one to benefit from the presence of different peers in college (i.e., Pascarella et al., 1996; Shim & Perez, 2017). The concept of *openness to diversity and challenge (ODC)* was developed within this framework to capture student’s orientation and appreciation of the interaction with culturally different others (Pascarella et al., 1996). The two notions of openness and challenge are conceptualised as two different facets of the same tendency towards diversity, since, being a novelty for the individual, diversity also represents inevitably a potential difficulty (Bowman, 2014). According to Bowman (2014), ODC is a form of openness to experience and can be detected in a variety of emotions, attitudes and behaviours.

Since its first conceptualization, researchers found that ODC is increased by several diversity experiences, from dedicated workshops to conversations on the topic with friends, from living in a pro-diversity climate on campus to directly interacting with outgroups (Bowman, 2014; Pascarella et al., 1996; Whitt et al., 2001). In particular, this latter was found to be the most effective as “positive intergroup contact increased ODC by prompting students to hear others’ voices and to consider viewpoints that were not aligned with their own” (Shim & Perez, 2017). A relation in the opposite direction was also found, so that students higher in ODC were more willing to interact with different others (Whitt et al.,

2001). Importantly, these relations held regardless of the initial attitude. In other words, these results point at the fact that openness to diversity and challenge is an attitude that can be strongly fostered by targeted interventions that promote intergroup contact (Whitt et al., 2001). Finally, ODC is related to constructs external to the cultural domain, as it is indirectly related to better academic performance and cognitive development (Bowman et al., 2014; Whitt et al., 2001), thus making it an important construct to consider in the test of the cognitive liberalization hypothesis.

**Pro-diversity beliefs.** Similar to what happened in educational studies, in organizational contexts the concept of *pro-diversity beliefs* was developed to try to understand the varied results about the positive effect of diversity in work groups (Kauff et al., 2019). Some preliminary results showed that the relation could be moderated by the degree to which people value diversity as a resource to enhance productivity and solve problems. The concept was then extended and studied as a relatively stable individual difference about the perceived utility of diversity for society at large. In 2019, Kauff and colleagues made an extensive review of the topic and proposed the following construct definition:

Pro-diversity beliefs are individual beliefs that ethnically heterogeneous group composition positively affects group functioning. Individuals holding pro-diversity beliefs generally assume that intragroup diversity facilitates achievement of group goals. On a societal level, pro-diversity beliefs characterize beliefs that the society benefits from ethnic and cultural diversity in achieving goals and solving tasks and problems. (p. 497)

In recent years, the concept has gained more and more attention and it has also been studied with reference to intergroup relations (Kauff et al., 2021). Although still in its infancy, research suggest a bidirectional relationship between intergroup contact and pro-diversity beliefs, being this latter associated with both previous experiences and the willingness to engage in new ones (Kauff et al., 2019). It has also been hypothesised that pro-diversity beliefs could play a moderating role for contact effect, with higher changes in

prejudice in people with low pro-diversity beliefs (Adesokan et al., 2011).

With reference to the cognitive liberalization hypothesis, several theoretical connections can be drawn with other related constructs. First, pro-diversity beliefs are linked to higher identification with diverse work groups (Kauff et al., 2019), thus they could play a role in the recategorization process as a common ingroup that is central to the contact effect. Second, pro-diversity beliefs lead the individual to favour intergroup encounters in the belief that these can positively affect groups, in a similar way in which the self-expansion motif operates on an individual level. Third, Kauff and colleagues (2021) proposed to consider pro-diversity beliefs “as proxy of a deprovincialization process”. Differently from the other constructs presented to measure cognitive liberalization, however, pro-diversity beliefs do not refer to processes or a peculiar state of mind, but to the content of individual beliefs. Therefore, the effect of intergroup contact on this variable might reflect another aspect of cognitive liberalization, linked to a questioning of one’s own system of beliefs, which in turn “provide impetus for mental change and the integration of new ideas” (Hodson et al., 2018, p.532).



## Method

### Purpose

In light of the literature presented above, this study aims to identify whether there is an effect of intergroup contact on human cognition. More specifically, the following hypotheses will be tested:

- H1: more positive intergroup contact experiences are expected to be related to higher cognitive liberalization;
- H2: conversely, more negative contact experiences are expected to be negatively related to cognitive liberalization;
- H3: cognitive liberalization is expected to have a mediating role in the relationship between intergroup contact and general outgroup attitudes;
- H4: the previous relations are expected to hold also taking into consideration two individual dispositions that have been proven to be strong predictors of outgroup prejudice, namely social dominance orientation (SDO - Sidanius & Pratto, 2001) and personal need for structure (PNS - Neuberg & Newsom, 1993).

Before testing these hypotheses, some preliminary analyses will be run to capture the characteristics of the sample. More in detail, reliability analyses will be done on each scale; one-sample t-tests will be carried out to check for floor or ceiling effects; independent-sample t-tests will be run to look for gender differences; paired-sample t-tests will be done to make a comparison between positive and negative contact. The relations between the variables will then be explored through correlation analysis and regression models.

### Participants

The present study is based on a convenience sample of 204 participants that live in Italy and fluently speak Italian. The data collection started in December 2022 and ended

in January 2023, and it was based on snowball sampling, starting from the researchers' acquaintances. Figure 1 shows a summary of the descriptive characteristics of the sample. The age range goes from a minimum of 18 years old to a maximum of 68, with a mean of  $M=32.35$  and a standard deviation of  $sd= 13.09$ . Of the total sample, 70.10% (143) recognise themselves as females, 28.43% (58) as male, and two participants as neither of the two. As regard to the education level, 2.46% (5) finished middle school, 33.99% (69) has a high-school diploma, 37.93% (77) has a Bachelor's degree, and 25.62% (52) has a Master's or higher degree.

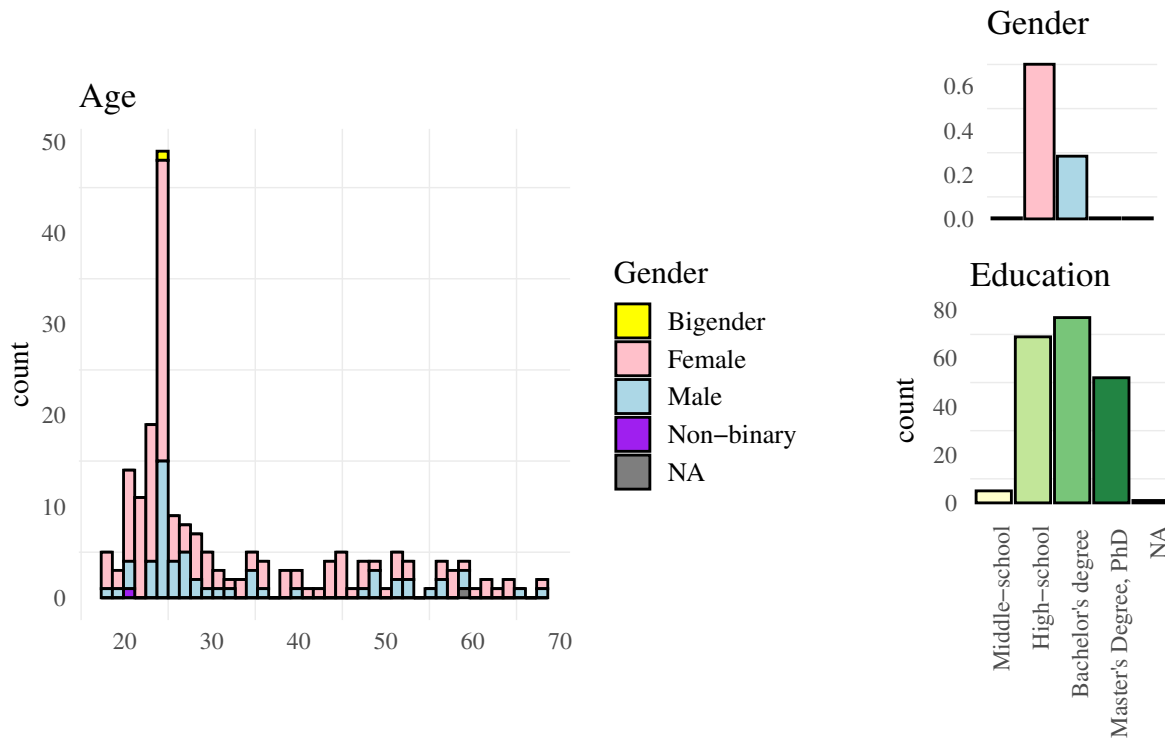


Figure 1. Sample's demographic characteristics

Accordingly, most of the sample have medium-high profile jobs. More in detail, participants' responses were divided into six categories based on a scale that takes into account several criteria, such as whether the job implies manual labor, the level of autonomy,

the degree of specialization, the required level of education, and the implied responsibilities. Jobs with higher codes imply better income and social status. Students, householders, and retirees have been considered as separate categories. Table 1 shows the sample’s employment distribution according to this scale.

Table 1

*Employment*

Category	Code	Freq.
Householder	0	3
Inferior-low (i.e., construction worker, warehouse worker)	1	1
Inferior-high (i.e., plumber, electrician)	2	4
Medium-low (i.e., shop keeper, nurse)	3	24
Medium-high (i.e., business owner, programmer)	4	43
Superior-low (i.e., entrepreneur, journalist)	5	25
Superior-high (i.e., lawyer, doctor)	6	5
Retiree	7	4
Student	9	83

**Measures**

The data collection was carried out with Google Forms, an online platform accessible both from computer and mobile devices. People were invited to participate in a research on the effect of their social relationships with significant outgroups on their behaviours and beliefs. Volunteer participation, anonymity, freedom to skip questions, freedom to withdraw from the survey, and lack of judgment over the given answers were all highlighted in the informed consent. The questionnaire was structured as follows. After asking for some general information, namely gender, age, education level, and employment status, participants were asked about their positive and negative experiences with intergroup contact. Then, a battery

of eight scales related to the construct of cognitive liberalization was administered, followed by a measure of general outgroup attitude. Finally, personal need for structure (PNS) and social dominance orientation (SDO), were evaluated as control variables. The specific scales used will now be described in detail.

**Intergroup contact.** Intergroup contact was assessed with a scale based on the one developed by Voci and Hewstone (2003), which has already been widely used and adapted several times (i.e., Fuochi et al., 2020; Meleady et al., 2020). Differently from previous studies, no specific outgroups were defined, but the participants were asked to answer thinking about people they knew that were different from them under one or more of the following aspects: nationality or national origin, skin color, religious beliefs, sexual orientation, political ideas or other dimensions relevant for the subject. The scale has two sections, one for positive contact and one for negative contact, each of which is made of 9 items that tackle both quantity and quality of contact. More in detail, items 1 and 2 explore the frequency of contact (Interaction) on a 5-point Likert scale (*0=Never, 1=Very rarely, 2=Sometimes, 3=Often, 4=Very Often*); item 3 captures the proportion of outgroup members in the participant's acquaintances on a 8-point Likert scale (*0=No one, 1=A small part, maximum 10%, 2=Some, around 20-30%, 3= A good part, around 40%, 4= Half, around 50%, 5=More than half, around 60%, 6=A big part, around 70-80%, 7=Almost all, over 90%*); items 4 to 7 measure four qualitative characteristics of the contact that have been proven to influence the effect of intergroup contact over outgroup attitudes (Boin et al., 2021) on a 5-points Likert scale, where higher scores denote, respectively, higher similarity between the outgroup members taken into consideration, higher prototypicality, higher resemblance with the self, and higher similarity between the considered outgroups; finally, items 8 and 9 evaluate the degree of closeness of the relationships, as the participant is asked with how many of the outgroup members they know they hold, respectively, an intimate/superficial relationship on a 5-point Likert scale (*0=No one, 1=A few, 2=Some, 3=Many, 4=A lot*). Examples of the items are: "How often do you interact with people which belong to other groups and

consider the experience positive/negative?”, “On average, the people you know who belong to other groups and of which you have a positive/negative opinion are: (*the participant is asked to mark a number between 0-very different and 4-very similar*)”. At the end of each section, the participants were asked to name the groups they thought about. The groups were then coded as follows:

1. Nationality, geographical origin, or ethnicity

1. Europe
2. Africa
3. Asia
4. Immigrants
5. Middle East
6. Latin America
7. Other (i.e., international students, second-generation immigrants, etc.)

2. Skin color

3. Religious beliefs

1. Muslims
2. Christians
3. Other (i.e., Buddhist, pagan, etc.)

4. LGBTQI+

1. Sexual orientation
2. Gender identity

5. Culture and politics

1. Political ideology
2. Lifestyle, cultural traditions, habits

3. Values and ideals (i.e., extremist, conformist, sexist, racist, etc.)
6. Socio-economic status (SES)
7. Age
8. Other (i.e., personality, colleagues, etc.)

**Langerian mindfulness.** Langerian Mindfulness was measured through the Italian version of the 21-item Langerian Mindfulness Scale (Pirson et al., 2012), validated by Pagnini and colleagues (2018). The items of the scale can be divided into four sub-dimensions, that together define the construct. These are: flexibility (i.e., “I can behave in many different ways for a given situation”), novelty seeking (i.e., “I like to be challenged intellectually”), novelty producing (i.e., “I try to think of new ways of doing things”) and engagement (i.e., “I get involved in almost everything I do”). The response scale ranged from *1=Strongly Disagree* to *7=Strongly agree* and, after reversing the scores of items 2, 5, 7, 8, 9, 15, 19, and 21, higher scores mean that the subject is open to new experiences, challenges, and changes.

**Personal growth.** To assess Personal Growth, that is the never-ending feeling of development and wish to fulfill one’s own potential, 6 items were selected from the homonymous subdimension of Ryff (1989)’s Psychological Well-being Scale, with reference to the Italian version of Ruini et al. (2003). The chosen items were the most linked to the construct of cognitive liberalization, and their response scale have been adapted from a 6-point to a 7-point Likert scale to be coherent with the other scales in the questionnaire. Items 1, 2 and 5 need to be reversed, so that higher scores imply a perception of constant improvement and desire of learning new things.

**Curiosity.** For the aim of this study, curiosity was conceptualized as the individual disposition to explore the unknown, challenge personal boundaries, and desire to learn new things, with special reference to social contexts. Therefore, three sub-scales were chosen to form a 17-items scale: Joyous Exploration and Stress Tolerance subscales from Kashdan and colleagues’ Five-Dimensional Curiosity Scale (2018), and General Social Curiosity subscale

from Renner (2006)'s Social Curiosity Scale. In particular, joyous exploration refers to one's internal motivation to seek novelty (example of item: "I am always looking for experiences that challenge how I think about myself and the world"), while stress tolerance reflects one's ability to deal with the difficulties that inevitably come along (example of item: "I cannot handle the stress that comes from entering uncertain situations")(Kashdan et. al, 2018). Stress tolerance subscale needs to be reversed (items from 6 to 10). General social curiosity, on the other hand, measures "an interest in how other people behave, think, and feel" (Renner, 2006, p.305), thus giving precious information about curiosity in social contexts, a dimension particularly relevant for this study (example of item: "I like to learn about the habits of others"). Participants were asked to mark on a 7-point Likert scale how much they felt that each item described themselves (*1=It doesn't describe me at all; 7=It describes me perfectly*). All items were translated into Italian by the researchers and an overall high score on the scale indicates greater curiosity.

**Cultural deprovincialization.** Cultural Deprovincialization is an attitude that brings the individual to see the world in a less ingroup-centric way, that is to say, contemplating more points of view, and embracing diversity. It was measured through the Cultural Deprovincialization Scale developed by Boin and colleagues (2020), a 6-item scale in which the participants were asked how much every item described them. Examples of items are: "Getting to know individuals from different cultures makes me feel more open toward other people"; "Participating in ethnic events from other cultures (travels, religious or non-religious celebrations) makes me feel uncomfortable and out of place (*reversed*)". Rankings were made on a 7-point Likert scale in which 1 means the lowest resemblance and 7 a very good description of the subject. Items 3, 4, and 6 have to be reverse-coded, so that higher scores mean higher cultural deprovincialization.

**Group deprovincialization.** Group Deprovincialization is similar to cultural deprovincialization, but it refers to the perceived norms of the ingroup about diversity. More specifically, it tackles individual beliefs about their own culture in comparison to others. To

assess it, Martinovic and Verkuyten (2013)'s Deprovincialization Scale was adapted to suit every culture. An example of the adaptation is the following: "One should always try to adopt a broader perspective than only the Dutch perspective" (original item; Martinovic & Verkuyten, 2013) was changed into "One should try to adopt a broader perspective than only the one of their own country". Items were also translated in Italian by the researchers. The final scale counts 4 items with a 7-point Likert scale, on which the participants were asked to mark their level of agreement with the statement (*1=Completely disagree; 7= Completely Agree*). Higher scores stand for higher group deprovincialization.

**Cognitive flexibility.** Martin and Rubin (1995)'s scale was used to assess Cognitive Flexibility, defined as a person's capability to see alternative options in a given situation, willingness to adapt and ability to do so. The scale consists of 12 items, four of which are reversed (items 2, 3, 5 and 10), that were translated in Italian by the researchers. The response scale was adapted from a 6-point to 7-point Likert scale to conform with the rest of the scales. Participants were asked to express their agreement with the statements (*1= Highly disagree; 7= Highly agree*) and higher scores mean higher cognitive flexibility.

**Openness to diversity and challenge.** To assess cultural openness, appreciation of diversity and willingness to be challenged in one's own values and ideas, an adaptation of Pascarella and colleagues (1996)'s Openness to Diversity and Challenge Scale was used. As it was first developed for students in college, some minor changes were made to the items in order to remove the reference to educational contexts. For example, "Learning about people from different cultures is a very important part of my college education" (original item; Pascarella et al., 1996) was changed into "Learning about people from different cultures is a very important part of my personal life". For the same reason, an item ("The real value of a college education lies in being introduced to different values") was dropped. The final items were translated in Italian by the researchers. Every item was presented with a 7-point Likert scale, on which the participants marked their level of agreement (*1= I don't agree at all; 7= I completely agree*), so that higher scores indicate more openness.



**Pro-diversity beliefs.** Pro-diversity beliefs refer to beliefs about the value that diversity brings in a certain group. It alludes to the instrumental potential that diversity has to foster creativity and problem solving. To assess it, Kauff and colleagues (2019)'s Pro-Diversity Scale was used in an Italian version translated by the researchers. The scale consists of five items (i.e., "A society that is diverse functions better than one that is not diverse") at which the participants were asked to express their level of agreement. The response scale was changed from 5-point to 7-point Likert scale in order to adapt to the rest of the scales (*1= I don't agree at all; 7= I completely agree*); high scores mean higher pro-diversity beliefs.

**General outgroup attitudes.** To assess general outgroup attitudes, participants were asked to mark their attitudes towards 13 groups on a 7-point Likert scale with the following levels: *1=Very negative, 2=Negative, 3=Slightly negative, 4=Neutral, 5=Slightly positive, 6= Positive, 7=Very positive*. Based on previous literature, the analysed groups were: *immigrants from North Africa (i.e., Morocco, Algeria), immigrants from Center Africa (i.e., Nigeria, Congo), immigrants from Est-Europe (i.e., Romania, Moldova), immigrants from China, immigrants from South-East Asia (i.e., India, Pakistan), immigrants from South America (i.e., Brasil, Peru), Muslims, Hindu, people with a different age from yours (i.e., young, elders), people with different political ideas from yours, people with drug addiction, people with mental diseases, homeless people*.

**Personal need for structure.** To control for the personal predisposition to avoid new information and use simple mental representations of the world, Neuberg and Newsom (1993)'s Personal Need for Structure Scale was used. The scale includes 11 items at which participants were asked to express how much they agreed with the given statement (i.e., "It upsets me to go into a situation without knowing what I can expect from it") on a 7-point Likert scale from *1=Don't agree at all to 7=Completely agree*. The length of the response scale was adapted from the original 6-points to be in line with the other scales and the items were translated by the authors. Items 2, 5 and 10 have to be reversed so that higher scores

mean a higher motivation to structure the world in a simple way.

**Social dominance orientation.** To measure social dominance orientation, the 16-item scale developed by Ho and colleagues (2015) was used in the Italian version validated by Aiello et al. (2019). The scale has two sub-dimensions, namely Dominance and Anti-egalitarianism. The first one reflects the tendency to support overt oppression and dominant behaviours of one group over the other (i.e., “Some groups of people must be kept in their place”), while the second one refers to more subtle mechanisms that perpetrate intergroup inequalities, like hierarchy-enhancing ideologies (i.e., “We should not push for group equality”). Respondents were asked to mark their agreement with the statements on a 7-point Likert scale from *1=Strongly disagree* to *7=Strongly agree*, so that higher scores imply higher social dominance orientation. Items 4, 6, 8, 10, 12 and 14 have to be reversed.

The dataset was first cleaned and structured with both Microsoft Office Excel and R Studio, while all the analyses were made using R (Version 4.1.3; R Core Team, 2022) and the R-packages *cowplot* (Version 1.1.1; Wilke, 2020), *dplyr* (Version 1.1.2; Wickham et al., 2023), *ggplot2* (Version 3.4.2; Wickham, 2016), *gridExtra* (Version 2.3; Auguie, 2017), *kableExtra* (Version 1.3.4; Zhu, 2021), *knitr* (Version 1.42; Xie, 2015), *openxls* (Version 4.2.5; Schauburger & Walker, 2021), *papaja* (Version 0.1.1.9001; Aust & Barth, 2022), *psych* (Version 2.3.3; Revelle, 2023), *readxl* (Version 1.4.2; Wickham & Bryan, 2023), *rstatix* (Version 0.7.2; Kassambara, 2023), and *tinylab* (Version 0.2.3; Barth, 2022).

## Results

### Scales reliability

First of all, the Cronbach's alpha of all the scales was calculated to check for their internal consistency. Indeed, the Cronbach's alpha is an index based on the inter-correlation between the items of a scale, and it can be considered as a measure of how well the scale is measuring a certain construct - that is to say, its reliability. The index assumes values between 0 and 1, and a scale has a good internal consistency if it has a Cronbach's alpha higher than 0.70, while over 0.80 it is considered optimal. Table 2 shows the results of this preliminary analysis.

Table 2

#### *Scales' reliability*

Scale or Subscale	Nr. of items	Cronbach's Alpha
Positive interaction	2	0.84
Negative interaction	2	0.76
Langer mindfulness	21	0.83
Personal growth	6	0.70
Curiosity - overall	17	0.89
Curiosity - Joyous exploration	5	0.88
Curiosity - Stress tolerance	5	0.85
Curiosity - Social curiosity	7	0.94
Cultural deprovincialization	6	0.77
Group deprovincialization	4	0.89
Cognitive flexibility	12	0.78
Openness to diversity	7	0.91
Pro-diversity beliefs	5	0.90
General outgroup attitudes	13	0.92
Personal need for structure	11	0.81
Social dominance orientation	16	0.85

All the scales show a great internal consistency, with values that range between 0.70 (Personal growth) and 0.94 (General social curiosity). More specifically, the curiosity scale shows an optimal internal consistency both considering its overall score (0.89) and each of its subscale separately (Joyous exploration - 0.88; Stress tolerance - 0.85, General social curiosity - 0.94). Indeed, a principal component analysis clearly shows a three factor structure that matches the chosen subscales. These results sustain the use of the full scale as an overall measure of curiosity as much as the separate treatment of each subdimension on its own. As the scales have been proven to be reliable, for the following analyses it will be considered the aggregate score of the participants on each scale or subscale.

### **Means of the constructs**

To better understand the characteristics of the sample in relation to the variables of interest, a series of t-tests were done. First of all, the overall distribution of each construct was analysed through a one-sample t-test against the central point of the response scale. Together with the minimum, maximum, mean and standard deviation, the results of these analyses allow to understand if the sample is particularly high or low on a specific dimension, thus holding great importance for the future evaluation of the generalisability of the results of the study. Then, for the contact scale, a comparison between positive and negative contact was also made through a paired two-sample t-test in order to detect possible significant differences between the two.

Table 3 shows the results regarding quantity and quality of contact. The sample has on average more frequent positive than negative interactions with outgroup members, as positive contact is significantly higher than the central point of the scale, negative contact is significantly lower, and the difference between the two is significant as well. Indeed, the participants often have, on average, positive interactions (M= 2.87), while they very rarely report negative interactions (M= 1.39). Accordingly, there are in proportion more outgroup members in the acquaintances of whom the subjects have a good opinion compared to the

ones they dislike, even though separately they are both significantly less than half. On average, outgroup members are about 40% of all the people the participants have a good relationship with ( $M= 3.02$ ), while they are around 15% of the ones the subjects have a negative opinion about ( $M= 1.53$ ). Outgroup members are not systematically perceived as more similar or different between each other in both positive ( $M= 1.92$ ) and negative ( $M= 2.17$ ) contact considered separately, however interestingly they are considered significantly more different in positive than negative contact. In relation to semantic distance, outgroup members are perceived on average as representative of their group both in positive ( $M= 2.36$ ) and negative ( $M= 2.29$ ) contact, with no difference between the two. However, taking into consideration the perception of similarity with oneself, if in positive relationships the other is not regarded as either similar nor different ( $M= 2.05$ ), in negative relationships it is perceived as more different and the difference between the two is significant. Finally, there are no significant differences in the perception of similarity between outgroups, that is they are not regularly considered similar or different in both positive ( $M= 1.90$ ) and negative ( $M= 1.99$ ) contact, and there is no difference between the two. Regarding the degree of closeness, both positive and negative intimate contact are significantly lower than the central point, but the first one is significantly higher than the second one, as the participants reported to have between a few and some intimate positive relationships with outgroup members ( $M= 1.73$ ) and even less than a few intimate negative relationships ( $M= 0.95$ ). On the other hand, there are no significant differences in superficial contact, meaning that there are no significant differences between positive and negative contact and that both happen sometimes ( $M$  positive= 1.98,  $M$  negative = 1.98).

Table 3

*Positive and negative contact*

	Response scale	Positive					Negative					
		Min	Max	Mean	SD	Central Point diff.(sig.)	Min	Max	Mean	SD	Central Point diff.(sig.)	Pos-Neg diff. (sig.)
<b>Interaction</b>	0-4	0.5	4	2.87	0.72	***	0	3	1.39	0.65	***	***
<b>Proportion</b>	0-7	0.0	7	3.02	1.72	***	0	7	1.53	1.35	***	***
<b>Resemblance between them</b>	0-4	0.0	4	1.92	0.89	-	0	4	2.17	1.23	-	*
<b>Representativeness</b>	0-4	0.0	4	2.36	0.73	***	0	4	2.29	1.13	***	-
<b>Resemblance with you</b>	0-4	0.0	4	2.05	0.80	-	0	4	1.15	1.04	***	***
<b>Similarity between outgroups</b>	0-4	0.0	4	1.90	0.92	-	0	4	1.99	1.06	-	-
<b>Intimate contact</b>	0-4	0.0	4	1.73	0.88	***	0	3	0.95	0.76	***	***
<b>Superficial contact</b>	0-4	0.0	4	1.98	0.84	-	0	4	1.98	1.06	-	-

*Note:*

\* p &lt; .05; \*\* p &lt; .01; \*\*\* p &lt; .001

Table 4 shows the results of the one-sample t-test of the other variables taken into consideration, that are the dimensions related to cognitive liberalization (lines 1 to 8), general outgroup attitudes and the two control variables, personal need for structure and social dominance orientation. As it clearly appears, all constructs are significantly higher than the central point of the scale, with the exception of SDO, that has an overall lower score. This means that the sample is quite open to diversity and values it positively, and at the same time rejects hierarchy and intergroup inequalities (M SDO= 2.08). More specifically, the highest scores on average are in group deprovincialization (M= 6.33), cultural deprovincialization (M= 5.96), and personal growth (M= 5.80), therefore it can be said that the participants in this study feel in continuous development and strongly believe in the need of broadening their cultural point of view on both individual and group level. Accordingly, the sample shows high pro-diversity beliefs (M= 5.28), openness to diversity (M= 5.29) and curiosity (M= 5.33). In particular, social curiosity is the highest (M= 5.66), followed by joyous exploration (M= 5.47) and stress tolerance (M= 4.77). Moreover, cognitive flexibility (M= 4.97) and Langerian mindfulness (M= 5.27) both have moderate high overall scores, meaning that the participants are willing to adapt to new situations and are open to new alternatives and options. Finally, the sample has an overall score in the personal need for structure slightly superior to the central point of the scale.

Table 4

*Cognitive liberalization, general outgroup attitudes and control variables*

	Response scale	Minimum	Maximum	Mean	SD	Central point diff. (sig.)
Langer mindfulness	0-7	3.19	6.81	5.27	0.67	***
Personal growth	0-7	2.50	7.00	5.80	0.88	***
Curiosity - overall	0-7	2.18	6.94	5.33	0.88	***
Curiosity - Joyous exploration	0-7	1.60	7.00	5.47	1.12	***
Curiosity - Stress tolerance	0-7	1.40	7.00	4.77	1.29	***
Curiosity - Social curiosity	0-7	1.29	7.00	5.66	1.25	***
Cultural deprovincialization	0-7	2.50	7.00	5.96	0.87	***
Group deprovincialization	0-7	1.00	7.00	6.33	0.97	***
Cognitive flexibility	0-7	2.92	6.75	4.97	0.79	***
Openness to diversity	0-7	1.57	7.00	5.29	1.22	***
Pro-diversity beliefs	0-7	1.20	7.00	5.28	1.26	***
General outgroup attitudes	0-7	2.62	7.00	4.95	0.98	***
Personal need for structure	0-7	1.36	6.73	4.28	1.00	***
Social dominance orientation	0-7	1.00	5.25	2.08	0.87	***

*Note:*

\* p &lt; .05; \*\* p &lt; .01; \*\*\* p &lt; .001



Lastly, gender differences were explored through independent two-samples t-tests. As the sample only presents 3 participants who do not recognise themselves as either female or male, they have been excluded from the analysis. Moreover, as the variances of the female sample and male one are not equal and their sizes are not comparable (N female= 143, N male= 58), the Welch correction was applied to adjust for the degrees of freedom. As Table 5 shows, there are not many significant differences, except for positive superficial contact (M males= 2.17, M females= 1.89) and social curiosity (M males= 5.24, M females= 5.83). The lack of significant gender differences in social dominance orientation is the most surprising, as it goes against the invariance hypothesis of social dominance theory (Sidanius & Pratto, 2001a), according to which males have, on average, higher levels of SDO compared to females. However, a non-significant p-value cannot be seen as evidence for the null hypothesis, i.e., women and men have the same level of SDO, as there could be many reasons behind the result, as the already mentioned difference in the size of the samples (Makin & Orban de Xivry, 2019). In light of these considerations, gender differences will no longer be taken into account in further analysis.

Table 5

*Gender differences*

	Response scale	Female		F-M diff (sig.)	Male	
		Mean	SD		Mean	SD
Interaction - positive	0-4	2.87	0.73	-	2.82	0.71
Proportion - positive	0-7	3.07	1.72	-	2.90	1.68
Resemblance between them - positive	0-4	1.95	0.94	-	1.83	0.75
Representativeness - positive	0-4	2.38	0.75	-	2.31	0.71
Resemblance with you - positive	0-4	2.04	0.82	-	2.10	0.77
Similarity between outgroups - positive	0-4	1.85	0.96	-	2.02	0.83
Intimate contact - positive	0-4	1.73	0.90	-	1.74	0.85
Superficial contact - positive	0-4	1.89	0.79	*	2.17	0.90
Interaction - negative	0-4	1.35	0.62	-	1.48	0.73
Proportion - negative	0-7	1.50	1.40	-	1.62	1.28
Resemblance between them - negative	0-4	2.08	1.27	-	2.42	1.13
Representativeness - negative	0-4	2.32	1.14	-	2.24	1.11
Resemblance with you - negative	0-4	1.16	1.04	-	1.13	1.09
Similarity between outgroups - negative	0-4	1.92	1.11	-	2.19	0.92
Intimate contact - negative	0-4	0.93	0.74	-	1.02	0.76
Superficial contact - negative	0-4	1.91	1.01	-	2.22	1.12
Langer mindfulness	1-7	5.25	0.71	-	5.34	0.56
Personal growth	1-7	5.85	0.86	-	5.71	0.93
Curiosity - overall	1-7	5.39	0.91	-	5.21	0.81
Curiosity - Joyous exploration	1-7	5.49	1.15	-	5.42	1.05
Curiosity - Stress tolerance	1-7	4.70	1.32	-	5.03	1.16
Curiosity - Social curiosity	1-7	5.83	1.25	**	5.24	1.18
Cultural deprovincialization	1-7	5.99	0.85	-	5.91	0.89
Group deprovincialization	1-7	6.33	0.98	-	6.30	0.97
Cognitive flexibility	1-7	4.95	0.81	-	5.06	0.72
Openness to diversity	1-7	5.31	1.24	-	5.22	1.18
Pro-diversity beliefs	1-7	5.29	1.24	-	5.22	1.35
General outgroup attitudes	1-7	5.01	0.96	-	4.74	0.95
Personal need for structure	1-7	4.29	1.02	-	4.21	0.93
Social dominance orientation	1-7	2.07	0.87	-	2.10	0.91

*Note:*\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

## Descriptive analysis of the outgroups

Before moving on to analyse the relations between the variables, it is worthy to linger over a brief examination of the groups nominated by the participants. Figure 2 shows the distribution of the groups people referred to in relation to positive and negative contact. First of all, the participants mentioned almost the double number of groups in positive contact (565) in comparison with negative contact (317), and the mentioned categories were different as well. In positive contact, there were more variety: 41% (234) of the groups was related to nationality or ethnic origin, 20% (112) were linked to the LGBTQI+ community, 17% (95) referred to different cultural or political ideas, 16% (89) were religious groups, 0.04% (21) nominated skin color, and the remaining referred to socio-economical status (SES - 6), age differences (4) or other dimensions (4). On the other hand, in negative contact, the majority nominated either groups based on nationality and ethnic origins (37% - 116), or cultural and political differences (34% - 107); religious groups counted for 15% (48), while the other categories were considered less than 1% of the time (LGBTQI+ community 0.07% (23), SES 0.03% (9), skin color 0.02% (5), age 0.01% (3), other 0.02% (6)).

Accordingly, looking separately at each of the items of the general outgroup attitudes scale, it can be seen that the ones which refer to nationalities share a similar response pattern, without great differences based on skin color (see Figure 3). Moreover, the attitudes towards people who hold different political opinions are evenly spread on the response scale, in line with the results previously presented. Attitudes towards specific religious groups, namely Muslims and Indu, are overall more positive than negative, while the group for which the participants hold the most positive attitudes is the one of people with a different age. Finally, the attitudes towards people with drug addiction, mental diseases and homeless people are more nuanced, but overall positive. Table 6 shows mean, standard deviation and median of the attitudes towards each group in the sample.

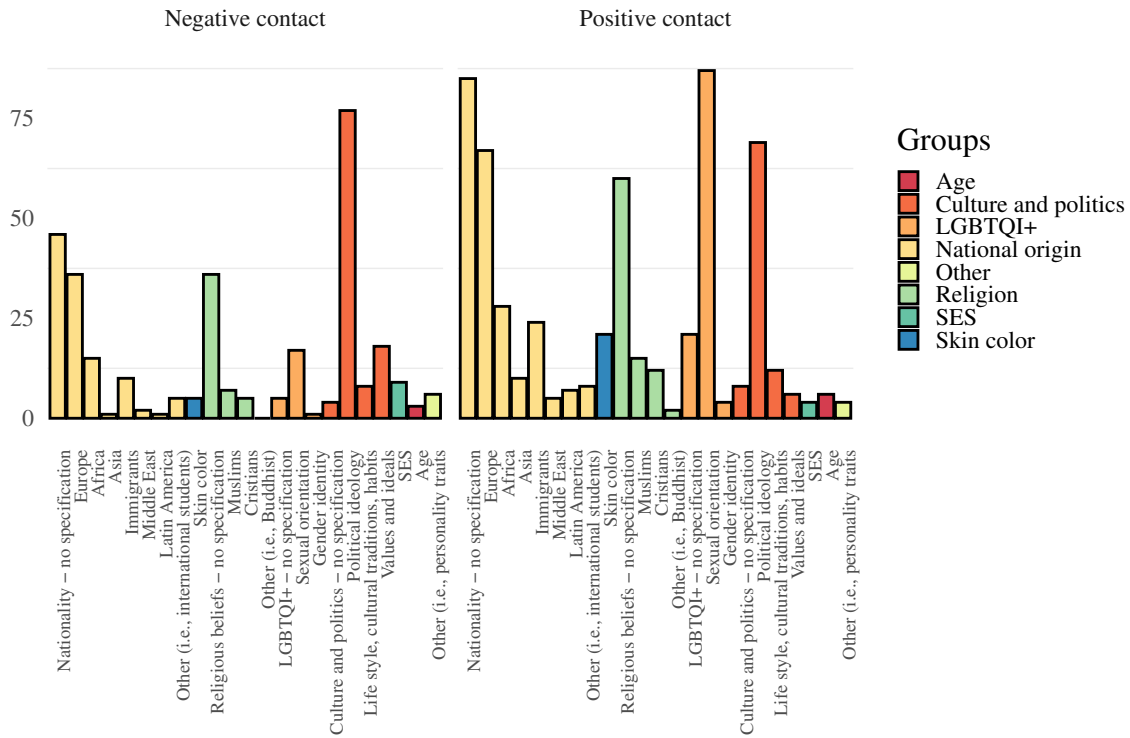


Figure 2. Groups participants referred to

Table 6

*General outgroup attitudes*

	Response scale	Mean	SD	Median
Immigrants from North Africa (i.e., Morocco, Algeria)	1-7	4.89	1.40	5
Immigrants from Center Africa (i.e., Nigeria, Congo)	1-7	5.08	1.29	6
Immigrants from Est-Europe (i.e., Romania, Moldova)	1-7	4.90	1.35	5
Immigrants from China	1-7	5.19	1.19	5
Immigrants from South-East Asia (i.e., India, Pakistan)	1-7	5.10	1.23	5
Immigrants from South America (i.e., Brasil, Peru)	1-7	5.49	1.17	6
Muslims	1-7	4.72	1.45	5
Hindu	1-7	5.11	1.20	5
Different age from yours (i.e., young, elders)	1-7	5.69	1.16	6
Different political ideas	1-7	4.30	1.56	4
People with drug addiction	1-7	4.22	1.56	4
People with mental diseases	1-7	5.02	1.40	5
Homeless people	1-7	4.72	1.45	5

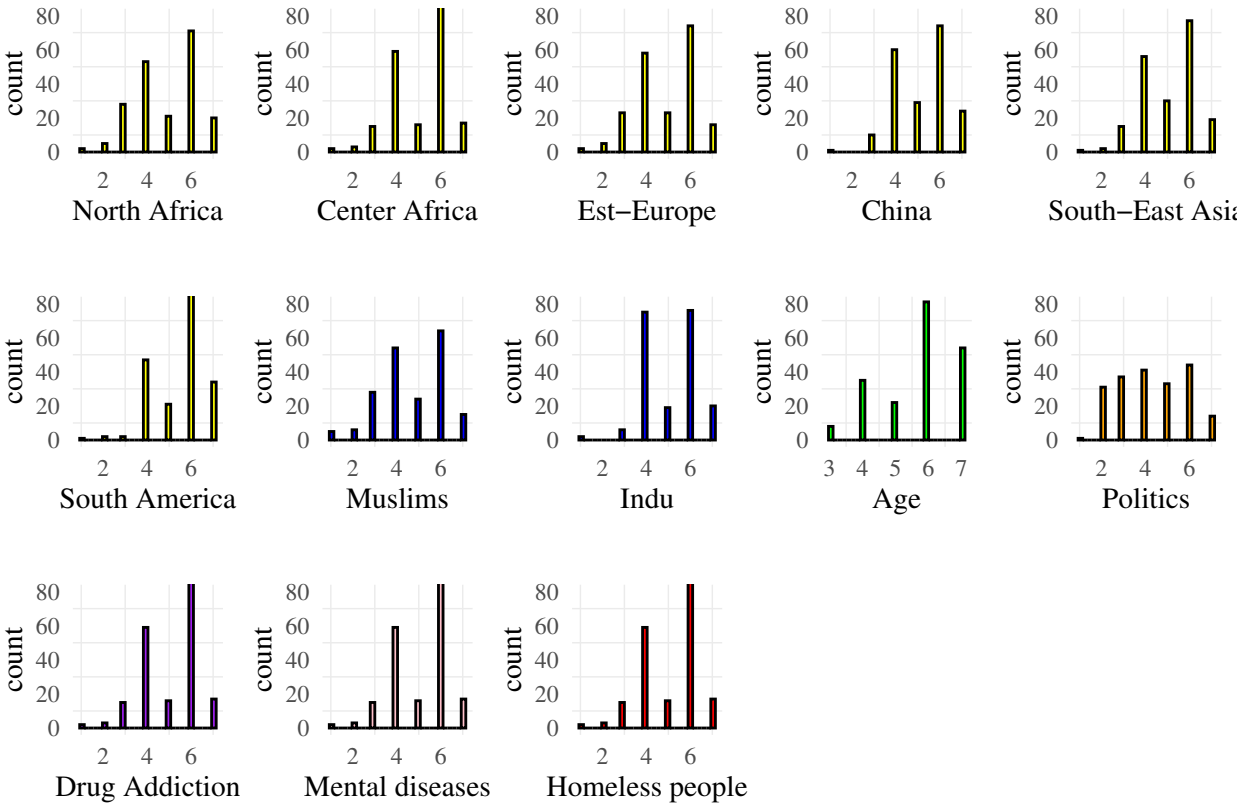
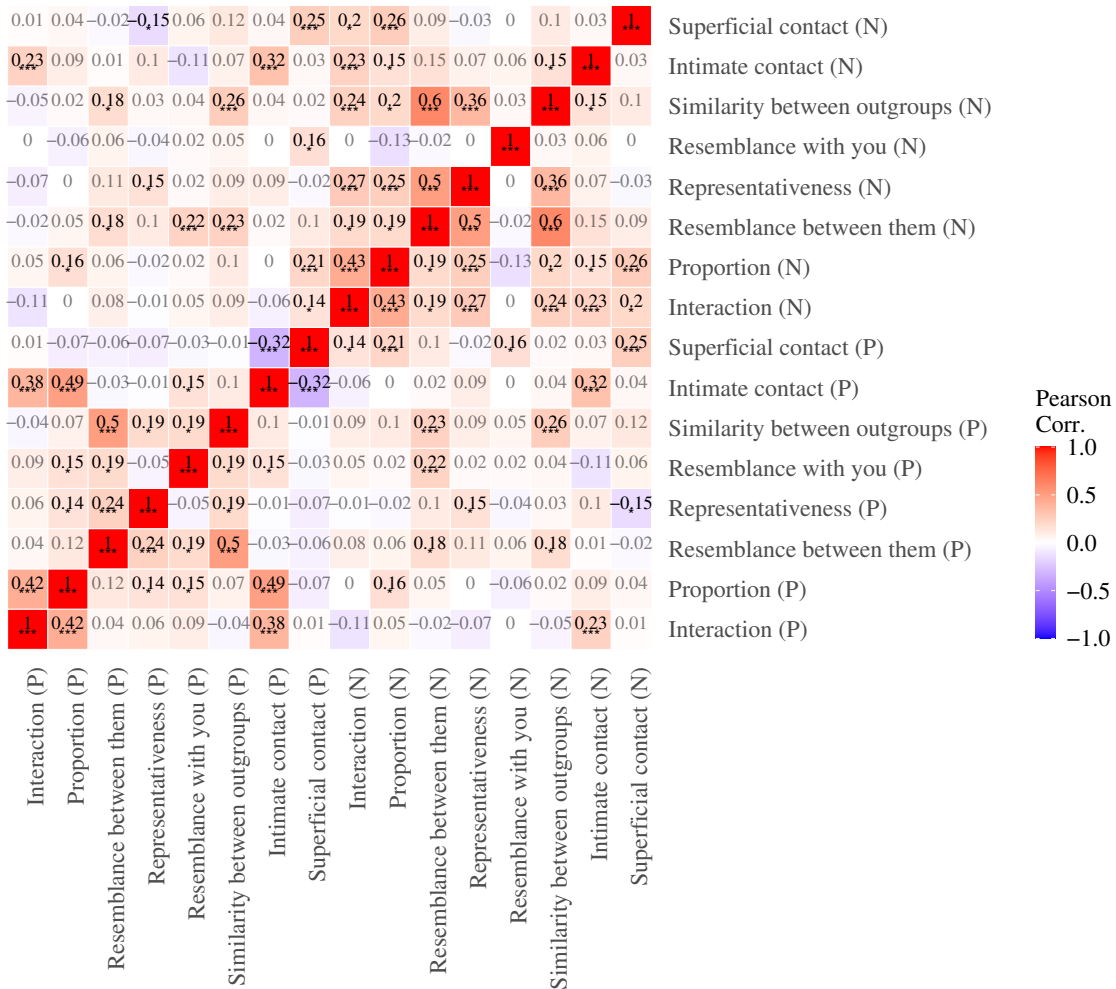


Figure 3. Outgroups attitudes distribution

## Correlations

To understand the correlation between the examined variables, Pearson's coefficient was calculated between all the variables. First, the correlations within the contact scale were examined; then, the degree of correlation between the different constructs related to cognitive liberalization was tested; finally, the correlations between the two were analysed. The results are presented in the following paragraphs.

Figure 4 shows the correlation matrix between the items of the contact scale. The ones which refer to quantitative aspects of contact (frequency of interaction, proportion of outgroup members in the acquaintances) strongly correlates between each other both in positive ( $r=0.42$ ) and negative ( $r=0.43$ ) contact subscales. Moreover, in the latter, both in-



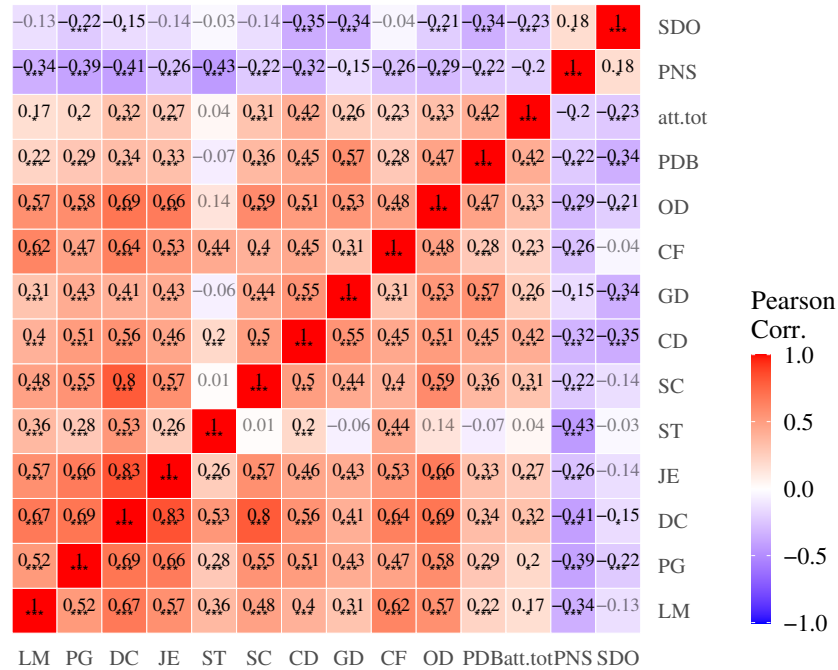
Note: \* p < .05; \*\* p < .01; \*\*\* p < .001

Figure 4. Correlation matrix within the contact scale

interaction and proportion significantly and positively correlate with the qualitative measures of negative contact, except for the perception of similarity with the participant (Resemblance with you). This means that the more negative relationships with outgroups one person has experienced, the more the different outgroups, as much as their members, are perceived as more similar and prototypical. On the other hand, the frequency of positive contact (Interaction) is not related to any of these dimensions, while Proportion only weakly correlates with Representativeness and Similarity with you, meaning that the more outgroup members one person has in their group of acquaintances of which they have a positive opinion, the more

they are perceived as representative of their groups and similar to the subject. Moreover, positive and negative interaction do not correlate together. Taken together, these results sustain both the distinction of positive and negative contact as two separate phenomena, and the fact that, in negative contact, there is a higher category salience (Fuochi et al., 2020). In relation to the qualitative characteristics of contact, the perception of similarity between outgroups, between the outgroup members met by the participant, and their representativeness, all positively correlates between each other both in positive and negative contact, with higher Pearson's coefficients in the latter. In the former, however, they also positively correlates with the perception of resemblance with the participant. Regarding the degree of closeness of the relationships, the correlation matrix show some interesting relations in line with Fuochi et al. (2020)'s findings. Indeed, intimate positive contact positively correlates with both positive interaction ( $r=0.38$ ) and proportion ( $r=0.49$ ), and negatively correlates with positive superficial contact ( $r=-0.32$ ). In the same way, negative superficial contact positively correlates with negative interaction ( $r=0.20$ ) and proportion ( $r=0.26$ ). However, positive superficial and negative intimate contact show a peculiar mixed pattern: the first one positively correlates only with negative interaction ( $r=0.14$ ) and proportion ( $r=0.21$ ), while the second one correlates at the same way with both positive and negative interaction ( $r= 0.23$ ). These results suggest that intimate forms of contact with outgroup members could be more linked to frequent positive relationships, while superficial ones could be more linked to frequent negative contact.

Figure 5 displays the correlation matrix between the chosen measures of cognitive liberalization, general outgroup attitudes, and the two control variables. Almost all the chosen constructs related to cognitive liberalization - namely Langer mindfulness, personal growth, curiosity and its subdimensions, cultural and group deprovincialization, cognitive flexibility, openness to diversity and pro-diversity beliefs - significantly and positively correlate between each other, with Pearson's coefficient that range from a minimum of 0.2 (Stress tolerance - Cultural deprovincialization) to a maximum of 0.69 (Overall curiosity - Openness to di-



LM=Langer mindfulness, PG=Personal Growth, DC=Curiosity – overall, JE= Curiosity – Joyous Exploration, ST= Curiosity – Stress Tolerance, SC= Curiosity – Social curiosity, CD=Cultural Deprovincialization, GD=Group Deprovincialization, CF=Cognitive Flexibility, OD=Openness to Diversity, PDB=Pro-diversity Beliefs, att.tot= General outgroup attitudes, PNS=Personal Need for Structure, SDO=Social Dominance Orientation.

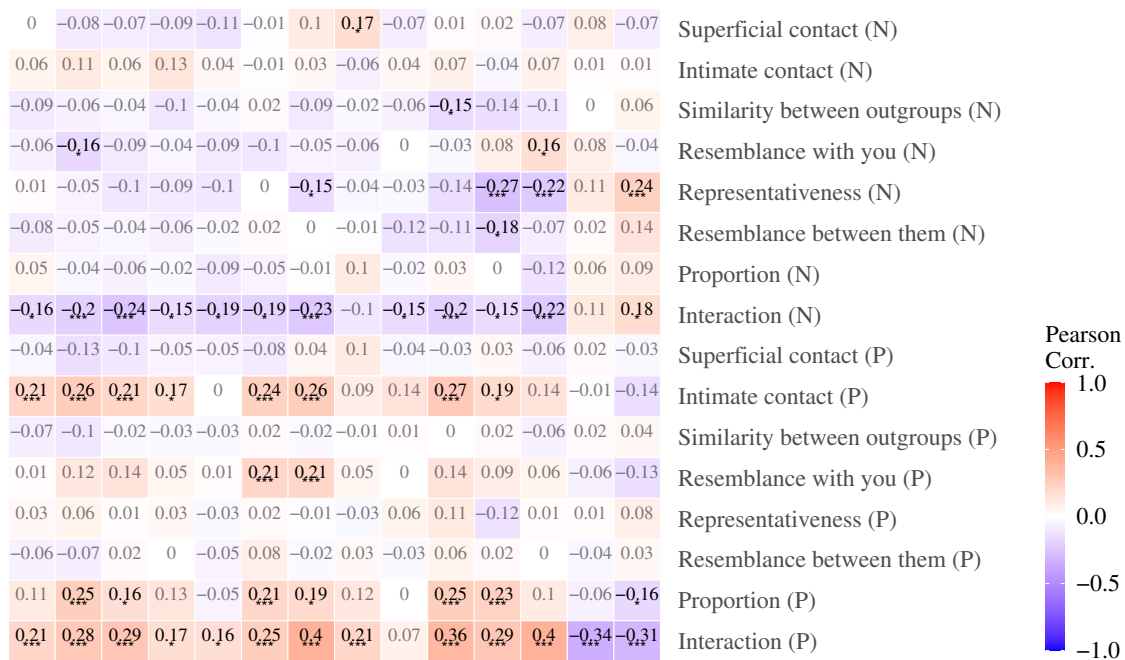
Note: \* p < .05; \*\* p < .01; \*\*\* p < .001

Figure 5. Correlation matrix between measures of the cognitive liberalization effect, PNS and SDO

iversity). Stress tolerance makes an exception, as it correlates positively only with Langer mindfulness, personal growth, cultural deprovincialization, cognitive flexibility and another sub-dimension of curiosity, joyous exploration. Therefore, stress tolerance seems less linked to other constructs that directly refer to social interactions, and it distinguishes itself as a broader individual feature, in line with its definition as the ability to manage unknown situations (Kashdan et al., 2018), that might not be strictly social in nature. Accordingly, also the general outgroup attitude is positively and significantly correlated to all the measures mentioned above, with the exception of stress tolerance; the correlation coefficients range from 0.17 (Langer mindfulness) to 0.42 (Overall curiosity, Pro-diversity beliefs). Moreover, as expected, the variables correlate negatively with the two control variables. Personal need



for structure (PNS) significantly correlates with all of them: the weakest relation is with group deprovincialization ( $r=-0.15$ ), the strongest with stress tolerance ( $r=-0.43$ ). On the other hand, social dominance orientation (SDO) significantly correlates only with personal growth, overall curiosity, cultural deprovincialization, group deprovincialization, openness to diversity and pro-diversity beliefs, and the Pearson's coefficients range from -0.15 (Curiosity - overall) to -0.35 (Openness to diversity). PNS and SDO are positively correlated between each other ( $r=0.18$ ) and negatively correlated with the general outgroup attitude ( $r$  PNS = -0.20,  $r$  SDO = -0.23).



LM PG DC JE ST SC CD GD CF OD PDB att.tot PNS SDO  
 LG=Langer mindfulness, PG=Personal Growth, DC=Curiosity – overall, JE= Curiosity – Joyous Exploration,  
 ST= Curiosity – Stress Tolerance, SC= CUriosity – Social curiosity, CD=Cultural Deprovincialization,  
 GD=Group Deprovincialization, CF=Cognitive Flexibility, OD=Openness to Diversity, PDB=Pro–diversity Beliefs,  
 att.tot= General outgroup attitudes, PNS= Personal Need for Structure, SDO=Social Dominance Orientation  
 Note: \* p < .05; \*\* p < .01; \*\*\* p < .001

Figure 6. Correlation matrix between the contact scale and all other measures

To conclude, in Figure 6 the relations between the contact scale, predictor of the study, and all other variables taken into consideration are analysed. As it clearly appears, positive and negative interaction are the two variables that are associated the most with the

constructs related to cognitive liberalization. More in detail, the frequency of positive interaction is positively and significantly correlated with all the variables, with the exception of cognitive flexibility; the strength of the relation is medium, with Pearson's coefficients that range from 0.16 (Stress tolerance) to 0.4 (Cultural deprovincialization). On the other hand, negative interaction holds negative, significant correlations with all the constructs, except for group deprovincialization; correlation coefficients are medium-low, with a minimum of -0.15 (Joyous exploration, Cognitive flexibility, Pro-diversity beliefs) to a maximum of -0.24 (Curiosity - overall). The proportion of outgroup members in the acquaintances of the participants is relevant only in positive relationships, and not for all the examined constructs. Another variable in positive contact that is highly correlated with these constructs is the proportion of intimate contact, that positively correlates with almost all of them, with the exception of stress tolerance, group deprovincialization, and cognitive flexibility; correlation coefficients vary from 0.17 (Joyous exploration) to 0.27 (Openness to diversity). Other characteristics of contact have significant correlations with only one or two of the constructs taken into consideration to study cognitive liberalization; for example, the degree to which the outgroup member is perceived as representative of their group in negative contact correlates negatively with pro-diversity beliefs ( $r=-0.27$ ) and cultural deprovincialization ( $r=-0.15$ ). General outgroup attitude also has some significant correlations: it is positively associated with positive interaction ( $r=0.40$ ) and the perception of similarity with oneself in negative contact ( $r=0.16$ ), while it is negatively associated with the frequency of interaction ( $r=-0.22$ ) and the degree of perceived representativeness of the outgroup member in negative contact ( $r=-0.22$ ). Finally, personal need for structure is negatively correlated with the frequency of positive contact ( $r=-0.34$ ), while social dominance orientation is negatively correlated with both frequency of interaction ( $r=-0.31$ ) and proportion ( $r=-0.16$ ) of positive relationships, and positively correlated with frequency of interaction ( $r=0.18$ ) and perceived representativeness ( $r=0.24$ ) in negative contact.

## Linear regression models

As the ultimate goal of the study is to test the cognitive liberalization hypothesis (Hodson et al., 2018), it is important to consider the direction of the relationship between the variables, beside their level of correlation. To do so, linear regression models were carried out to understand first how positive and negative contact are associated with the different constructs related to cognitive liberalization, and then the mediating role of these latter in the effect of intergroup contact on general outgroup attitudes. It is important, however, to highlight that the relations in the model are not causal in nature, as the implemented study design does not allow such inferences. Based on the results of the correlation analysis, the frequency of positive and negative contact (Interaction) were chosen as main predictors. Four multiple linear regression models were done for each measure of cognitive liberalization, first considering only the contact effect (Table 7 and 11), and then introducing personal need for structure and social dominance orientation as control variables, both separately (Table 8, 9, 12 and 13) and together (Table 10 and 14). All the analysis were run with the *lm()* function of the R package *stats()* (R core team, 2022). The results related to more general cognitive dimensions (Langer mindfulness, personal growth, curiosity and its subdimensions, cognitive flexibility) will be presented first, while constructs more specific to the encounter with diversity (cultural and group deprovincialization, openness to diversity, pro-diversity beliefs) will be taken into consideration in a second moment.

Table 7 shows the standardized regression coefficients for each outcome variable when considering only for positive and negative contact. The coefficients can be considered as an index of the power of the predictors, that is how strongly they are related with the outcome variable. Positive contact has an overall medium positive effect on almost all the variables, except for cognitive flexibility; the strongest relationship is with social curiosity ( $b=0.23$ ), the weakest with joyous exploration ( $b=0.16$ ). Negative contact, on the other hand, has a medium negative effect only on personal growth and two curiosity subdimensions: stress

Table 7

*Linear regression model with contact as predictor and cognitive constructs as outcome variables*

Outcome variables	Langer Mindful.	Personal Growth	Curiosity- overall	Joyous Explo.	Stress Tolerance	Social Curiosity	Cognitive Flexibility
<b>R<sup>2</sup></b>	<b>0.05 **</b>	<b>0.1 ***</b>	<b>0.12 ***</b>	<b>0.04 *</b>	<b>0.05 **</b>	<b>0.08 ***</b>	<b>0.02</b>
Intercept	0	0	-0.01	-0.01	-0.01	0	0
Positive contact	0.19 **	0.26 ***	0.27 ***	0.16 *	0.14 *	0.23 ***	0.07
Negative contact	-0.14	-0.17 *	-0.21 **	-0.13	-0.17 *	-0.17 *	-0.14

*Note:*

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

tolerance and social curiosity. However, the explanatory power of these models is quite low, as  $R^2$ , an index that represents the proportion of the variation in the outcome variable that is accounted for by the predictors, range between 0.02 and 0.12. This means that, for example, the frequency of positive and negative contact that an individual experienced together explain 12% of their overall curiosity. Nonetheless, all the models, with the exception of the one related to cognitive flexibility, are significant ( $p < 0.05$ ), meaning that positive and negative contact together account for a portion of variance of each outcome variable that cannot be considered equal to zero.

Table 8 and 9 display the regression coefficients when considering, respectively, personal need for structure (PNS) and social dominance orientation (SDO) in the regression model. In the first case, the relationship of contact with the cognitive variables change consistently, and they hold, although weaker, only for personal growth and social curiosity. Indeed, the tendency to prefer simple and structured representations of the world is associated with lower levels of mindfulness, personal growth, curiosity and cognitive flexibility. In

Table 8

*Linear regression model with contact and PNS as predictors and cognitive constructs as outcome variables*

Outcome variables	Langer Mindful.	Personal Growth	Curiosity- overall	Joyous Explo.	Stress Tolerance	Social Curiosity	Cognitive Flexibility
<b>R<sup>2</sup></b>	<b>0.14 ***</b>	<b>0.18 ***</b>	<b>0.21 ***</b>	<b>0.07 **</b>	<b>0.19 ***</b>	<b>0.09 ***</b>	<b>0.08 ***</b>
Intercept	0.01	0.01	0.01	0.01	-0.01	0.01	0
Positive contact	0.12	0.15 *	0.14 *	0.07	0.02	0.16 *	-0.02
Negative contact	-0.13	-0.14 *	-0.18 **	-0.1	-0.11	-0.16 *	-0.15 *
PNS	-0.3 ***	-0.33 ***	-0.34 ***	-0.22 **	-0.41 ***	-0.15 *	-0.26 ***

*Note:*

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

particular, personal need for structure relates to particularly low levels of stress tolerance. The models that consider it as a predictor beside intergroup contact account for a higher portion of variance in the outcome variables, that range between 8% and 21%, and they are all significant. On the contrary, the introduction of social dominance orientation in the models do not bring important changes (see Table 9): the influence of positive contact is maintained, with the exception of two curiosity subdimension, joyous exploration and stress tolerance; the regression coefficients of SDO are not significant; and the values of  $R^2$  remain the same. However, interestingly negative contact is no more significantly associated with personal growth and social curiosity, but the relations with Langer mindfulness and cognitive flexibility become significant. This peculiar pattern may indicate that a negative experience with an outgroup member is processed differently based on their individual level of social dominance.

Table 9

*Linear regression model with contact and SDO as predictors and cognitive constructs as outcome variables*

Outcome variables	Langer Mindful.	Personal Growth	Curiosity- overall	Joyous Explo.	Stress Tolerance	Social Curiosity	Cognitive Flexibility
<b>R2</b>	<b>0.06 **</b>	<b>0.09 ***</b>	<b>0.11 ***</b>	<b>0.03 *</b>	<b>0.03 *</b>	<b>0.07 **</b>	<b>0.01</b>
Intercept	0	0	-0.01	-0.01	-0.03	0	0
Positive contact	0.17 *	0.21 **	0.25 ***	0.14	0.14	0.2 **	0.06
Negative contact	-0.16 *	-0.12	-0.19 **	-0.1	-0.16 *	-0.14	-0.15 *
SDO	-0.06	-0.14	-0.04	-0.08	0.04	-0.06	0.01

*Note:*

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Finally, when considering for the four predictors altogether (see Table 10), the personal need for structure is the only predictor that has a significant effect on almost all the analysed cognitive constructs, with the only exception of social curiosity. This result may indicate that its relationships with the outcome variables either cover the ones of intergroup contact, or that this latter influences PNS itself. The theoretical background and the implications of these two hypothesis will be further developed in the Discussion session.

Table 10

*Linear regression model with contact, PNS and SDO as predictors and cognitive constructs as outcome variables*

Outcome variables	Langer Mindful.	Personal Growth	Curiosity- overall	Joyous Explo.	Stress Tolerance	Social Curiosity	Cognitive Flexibility
<b>R2</b>	<b>0.12 ***</b>	<b>0.18 ***</b>	<b>0.19 ***</b>	<b>0.06 **</b>	<b>0.19 ***</b>	<b>0.08 ***</b>	<b>0.06 **</b>
Intercept	0	0.01	0	0	-0.03	0.01	0
Positive contact	0.11	0.12	0.13	0.05	0.04	0.14	0.01
Negative contact	-0.14	-0.11	-0.17 *	-0.08	-0.14 *	-0.13	-0.14
PNS	-0.27 ***	-0.32 ***	-0.33 ***	-0.2 **	-0.41 ***	-0.14	-0.25 **
SDO	-0.02	-0.12	-0.03	-0.08	0.08	-0.07	0.05

*Note:*

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

The previous models had a specific focus on the “pure” cognitive constructs related to cognitive liberalization. However, cognitive liberalization is a process that also has an interpersonal component, related to how an individual thinks about the different other, and at himself in relation with them. This dimension will now be explored. Table 11 shows the coefficients of a regression model that examines how the frequency of positive and negative contact is related to cultural deprovincialization, group deprovincialization, openness to diversity, and pro-diversity beliefs. Positive contact has an overall, medium-high, positive relationship with all constructs, while negative experiences are only associated with lower levels of cultural deprovincialization and openness to diversity. Both predictors have an effect on general outgroup attitudes, so that, together, positive and negative contact account for almost 20% of the variability of general outgroup attitudes. All the models are significant, meaning that positive and negative contact have a real explanatory power in relation to the

Table 11

*Linear regression model with contact as predictor and interpersonal attitudes as outcome variables*

<b>Outcome variables</b>	<b>Cultural Deprov.</b>	<b>Group Deprov.</b>	<b>Openness Diversity</b>	<b>Pro-Diversity Beliefs</b>	<b>General outgr. att.</b>
<b>R<sup>2</sup></b>	<b>0.19 ***</b>	<b>0.04 **</b>	<b>0.15 ***</b>	<b>0.09 ***</b>	<b>0.18 ***</b>
Intercept	-0.01	0	0	0.01	0.02
Positive contact	0.38 ***	0.2 **	0.35 ***	0.27 ***	0.38 ***
Negative contact	-0.19 **	-0.08	-0.17 *	-0.12	-0.19 **

*Note:*

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

considered outcomes.

Differently from the previous group of outcome variables, when personal need for structure is added in these regression models (see Table 12), there are not relevant changes: the regression coefficients of positive contact are not altered, and the same is true for the ones of negative contact, which has a significant, negative effect on the value people give to diversity too; the values of  $R^2$  remain the same as well. Indeed, PNS has a significant, negative, medium effect only on cultural deprovincialization and openness to diversity. On the other hand, the introduction of SDO as a predictor in the model improves it: as Table 13 displays, the proportion of variance of the outcome variables explained by the predictors slightly increases. Both positive and negative contact are still associated with the outcome variables, with an exception for group deprovincialization, whose variability is associated almost exclusively with SDO. This latter also predicts a tendency to see the world in a ingroup-centric way and lower appreciation of diversity as a group resource, while it is not



associated with general outgroup attitudes.

Table 12

*Linear regression model with contact and PNS as predictors and interpersonal attitudes as outcome variables*

<b>Outcome variables</b>	<b>Cultural Deprov.</b>	<b>Group Deprov.</b>	<b>Openness Diversity</b>	<b>Pro-Diversity Beliefs</b>	<b>General outgr. att.</b>
<b>R<sup>2</sup></b>	<b>0.21 ***</b>	<b>0.05 **</b>	<b>0.19 ***</b>	<b>0.1 ***</b>	<b>0.19 ***</b>
Intercept	0.01	0	0.01	0.01	0.03
Positive contact	0.3 ***	0.2 *	0.28 ***	0.21 **	0.38 ***
Negative contact	-0.19 **	-0.09	-0.21 **	-0.16 *	-0.18 *
PNS	-0.21 **	-0.08	-0.17 *	-0.13	-0.05

*Note:*

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Table 13

*Linear regression model with contact and SDO as predictors and interpersonal attitudes as outcome variables*

<b>Outcome variables</b>	<b>Cultural Deprov.</b>	<b>Group Deprov.</b>	<b>Openness Diversity</b>	<b>Pro-Diversity Beliefs</b>	<b>General outgr. att.</b>
<b>R<sup>2</sup></b>	<b>0.23 ***</b>	<b>0.11 ***</b>	<b>0.16 ***</b>	<b>0.15 ***</b>	<b>0.21 ***</b>
Intercept	0	0	0.01	0.01	0.04
Positive contact	0.32 ***	0.11	0.3 ***	0.17 *	0.39 ***
Negative contact	-0.15 *	0	-0.2 **	-0.12	-0.17 *
SDO	-0.22 **	-0.3 ***	-0.08	-0.26 ***	-0.08

*Note:*

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Finally, Table 14 refers to the models that take into account all four predictors. These models account for the highest variability of cultural deprovincialization ( $R^2=0.27$ ), which is associated with more frequent positive contact, fewer negative experiences, and a lower level of both PNS and SDO. The model has a good fit also for openness to diversity, which is linked to recurrent positive intergroup contact, fewer negative ones and a lower level of PNS. However, in this framework only SDO holds a significant effect for group deprovincialization and pro-diversity beliefs, and the general attitude towards outgroups is associated only with previous intergroup experiences.

Table 14

*Linear regression model with contact, PNS and SDO as predictors and interpersonal attitudes as outcome variables*

<b>Outcome variables</b>	<b>Cultural Deprov.</b>	<b>Group Deprov.</b>	<b>Openness Diversity</b>	<b>Pro-Diversity Beliefs</b>	<b>General outgr. att.</b>
<b>R<sup>2</sup></b>	<b>0.27 ***</b>	<b>0.11 ***</b>	<b>0.18 ***</b>	<b>0.15 ***</b>	<b>0.2 ***</b>
Intercept	0.01	0.01	0	0	0.03
Positive contact	0.25 ***	0.11	0.26 ***	0.13	0.37 ***
Negative contact	-0.14 *	-0.01	-0.2 **	-0.12	-0.17 *
PNS	-0.21 **	-0.05	-0.17 *	-0.12	-0.05
SDO	-0.21 **	-0.29 ***	-0.06	-0.25 ***	-0.07

*Note:*

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

The liberalization process theorized by Hodson and colleagues (2018) includes both the general cognitive characteristics and the interpersonal component analysed above. As the effects of intergroup contact on the former may be hidden by personal need for structure, this construct was not included in the test of the mediation role of cognitive liberalization in the association between intergroup contact and general outgroup attitudes, while SDO was introduced as a covariate. Moreover, an overall score for each of the two components was calculated, so that *Cognitive openness* is the average score of Langer mindfulness, personal growth, stress tolerance, social curiosity and cognitive flexibility, while *Cultural liberalization* is the average score of cultural deprovincialization, openness to diversity, and pro-diversity beliefs. Joyous exploration and group deprovincialization have been excluded as they are not associated significantly with either positive or negative contact when taking into account

SDO (see Table 9 and 13). Cognitive openness and cultural liberalization are significantly and positively correlated ( $r=0.65$ ). Therefore, three multivariate linear regression models were done by employing the *sem()* function in the R package *lavaan()* (Rosseel, 2012): the frequency of positive contact, negative contact, and the degree to which an individual supports inequality and hierarchy were taken as predictors of each model, general outgroup attitudes as the final outcome, and, as mediators of the relation, both cognitive openness and cultural liberalization were taken into account, together (Table 15) and separately (Table 16 and 17). Each model will now be presented in detail.

Table 15

*Model 1: parameters and variance explained*

	Cognitive Openness	Cultural Liberalization	General outgroup attitudes
Intercept	-0.01	0.02	0.02
Positive contact	0.19 **	0.26 ***	0.23 **
Negative contact	-0.14 *	-0.17 **	-0.06
SDO	-0.06	-0.18 **	0.02
Cognitive Openness			-0.18
Cultural liberalization			0.65 ***
<i>Residuals variance</i>	<i>0.44</i>	<i>0.45</i>	<i>0.65</i>
<b>R<sup>2</sup></b>	<b>0.14 ***</b>	<b>0.28 ***</b>	<b>0.38 ***</b>

*Note:*

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ . Total coefficient of determination= 0.40

Table 15 shows the standardized parameters of the model when considering for both components of the cognitive liberalization process in the regression (Model 1). Every column contains an endogenous variable, that is a variable that is influenced by at least one other variable within the model: each value represents the direct effect of each variable in line over the variable in the relative column. Coherent with the previous findings, positive and negative contact hold a significant relationship, in opposite directions, with both cog-

tive openness and cultural liberalization, while SDO has a significant association only with cultural liberalization. When cognitive openness and cultural liberalization are entered in the model, only positive contact and cultural liberalization have a significant, medium-strong positive association with general outgroup attitudes. Indirect effects of positive and negative contact were calculated as the product of the effects of the predictor on the mediator and of the mediator on the outcome variable; their significance was tested through the bootstrapping procedure with 10000 resamples. These analyses show that both positive and negative contact have a significant indirect effect on general outgroup attitudes mediated by cultural liberalization ( $b_{positive}=0.17$  with  $95\%CI=0.80;0.28$ ,  $b_{negative}=-0.11$  with  $95\%CI=-0.20;-0.03$ ), while cognitive openness is not a significant mediator in the relationship. The indirect effect of SDO on the outcome variable was not taken into account as the two are not significantly associated (see Table 13), thus being the basic assumptions for a mediation model not fulfilled (Baron & Kenny, 1986). Therefore, our results suggest that experiencing good intergroup relationships foster positive outgroup attitudes as it promotes an open and curious state of mind, while negative contact has a detrimental effect on outgroup attitudes because it inhibits the willingness to discover and embrace different points of view. The table also shows the variance of the residuals for every endogenous variable, an important parameter of the model ( $\psi$ ) that is an index of auto-influence; in other words, it indicates how much every variable co-vary with itself. Although the variance of the residuals is quite high, the model has a good index of fit, as the frequency of the two types of contact and social dominance orientation together account for 40% of the variability of the endogenous variables. Figure 7 shows a graphic representation of the model.

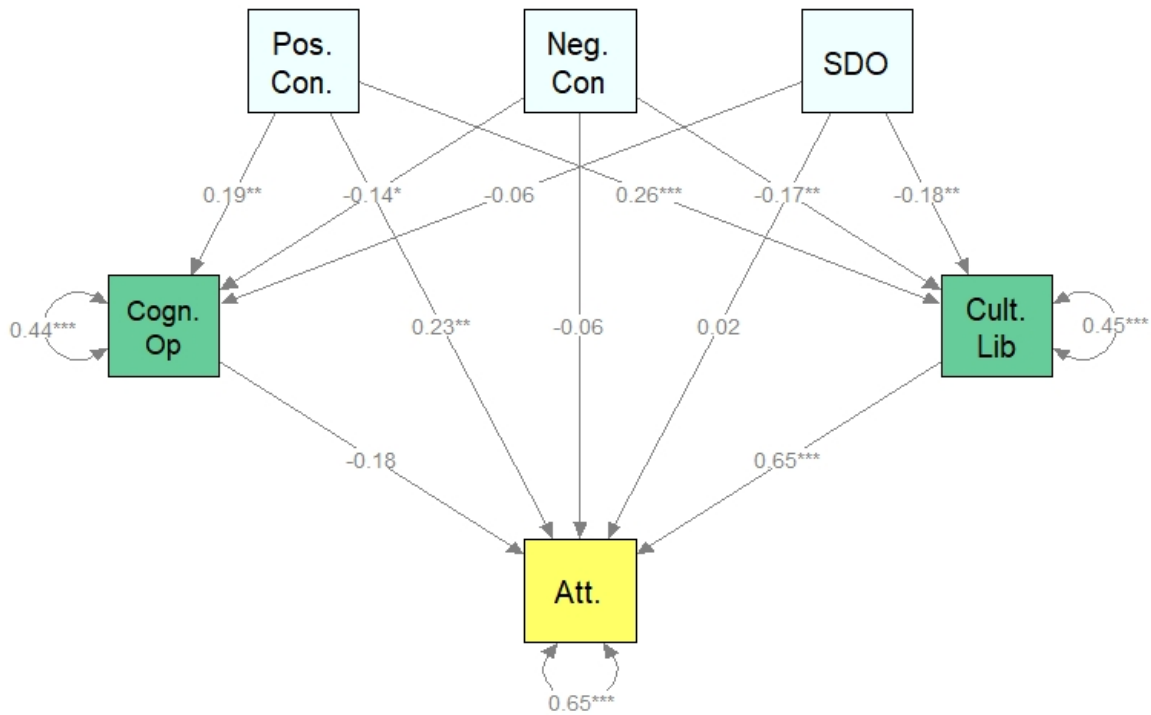


Figure 7. Model 1 with cognitive openness and cultural liberalization as mediators

In the second model, only cognitive openness was considered as a mediator of the relation between intergroup contact and general outgroup attitudes. The regression coefficients in this model, displayed in Table 16, are quite similar to the ones of the previous model. Indeed, cognitive openness is favored by positive experiences with outgroups, it is restrained by negative ones, while it is not associated with social dominance orientation. However, in Model 2, cognitive openness has a significant, medium positive effect on general outgroup attitudes: this means that, without considering the individual approach to cultural differences, having a flexible mind, eager to learn and understand how things - people, in particular- work, leads to a more positive attitude towards others. This result, that may seem contradictory to the previous findings, has to be considered in light of the high correlation between the two components of the cognitive liberalization process: in Model 1, the influence of cognitive openness may have not been significant because of the presence of cul-

tural liberalization, that has a stronger effect in the regression. In Model 2, positive contact has a significant and positive relationship with general outgroup attitudes, net of the effect of the mediator. Moreover, positive and negative contact have an indirect effect on general outgroup attitudes through cognitive openness (*b positive=0.03 with 95%CI=0.00;0.08, b negative= -0.03 with 95%CI= -0.09;0.00*). Overall, this model explains less variability than Model 1, with a total coefficient of determination ( $R^2$  of the whole model) of 0.27. Figure 8 shows a graphic representation of the model.

Table 16

*Model 2: parameters and variance explained*

	Cognitive openness	General outgroup attitudes
Intercept	-0.01	-0.01
Positive contact	0.19 **	0.33 ***
Negative contact	-0.14 *	-0.1
SDO	-0.06	-0.07
Cognitive Openness		0.24 *
<i>Residuals variance</i>	<i>0.44</i>	<i>0.76</i>
<b>R2</b>	<b>0.14 ***</b>	<b>0.22 ***</b>

*Note:*

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ . Total coefficient of determination= 0.27

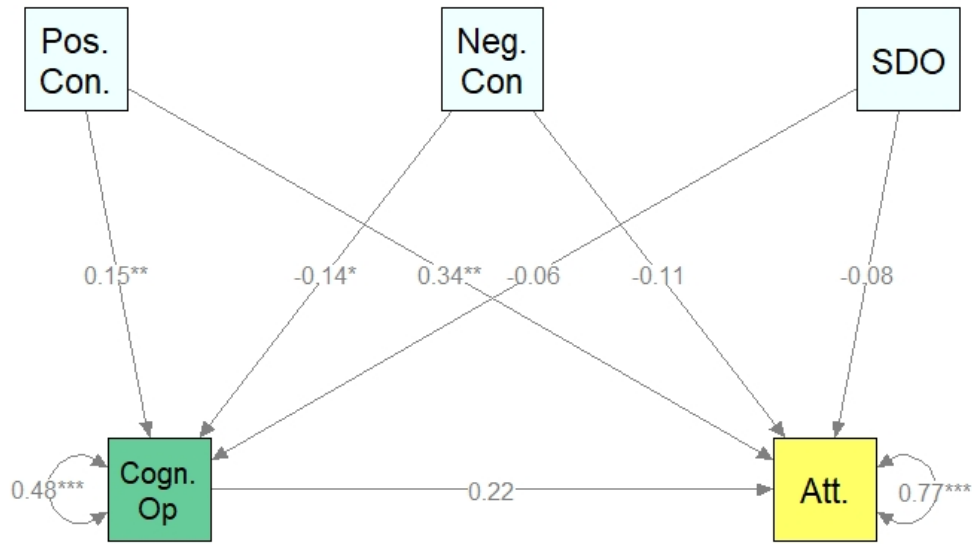


Figure 8. Model 2 with cognitive openness as mediator

Finally, in the third model, cultural liberalization was introduced in the regression model as the only mediator. In line with the previous results of the multiple linear regressions (see Table 13), cultural liberalization is positively associated with good experiences with outgroup members, while it is inhibited by high levels of social dominance and negative intergroup experiences. The tendency to be open and value diversity is a strong predictor of positive attitudes towards outgroups. In line with Model 1, both positive and negative contact have a significant indirect effect on general outgroup attitudes via cultural liberalization ( $b$  positive = 0.14 with 95%CI = 0.07;0.22,  $b$  negative = -0.09 with 95%CI = -0.17;-0.03). The model overall accounts for 33% of the variability of cultural liberalization and general outgroup attitudes. Figure 9 shows a graphic representation of the model.



Table 17

Model 3: parameters and variance explained

	Cultural Liberalization	General outgroup attitudes
Intercept	0.02	-0.03
Positive contact	0.26 ***	0.23 **
Negative contact	-0.17 **	-0.05
SDO	-0.18 **	0.01
Cultural Liberalization		0.53 ***
<i>Residuals variance</i>	<i>0.45</i>	<i>0.66</i>
<b>R2</b>	<b>0.28 ***</b>	<b>0.33 ***</b>

Note:

\* p < .05; \*\* p < .01; \*\*\* p < .001. Total coefficient of determination = 0.33

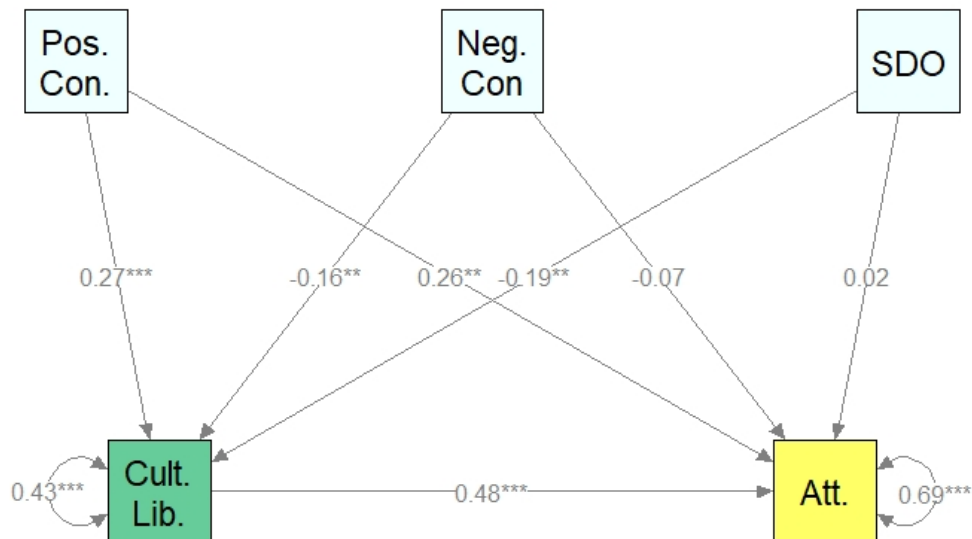


Figure 9. Model 3 with cultural liberalization as mediator

To make a comparison between the three models, two ANOVA analysis were done to establish whether it was better to consider the two components of cognitive liberalization separately or together. The results show that Model 1 is better than Model 2 and Model 3, as it explains a significantly higher amount of variance of both (Model 1 compared to Model 2:  $F(4,204)= 73.14, p<0.001$ ; Model 1 compared to Model 3:  $F(4,204)= 27.34, p<0.001$ ).

## Discussion

Intergroup contact is one of the mayor challenges of the present time. The World Wide Web, globalization, increasing migration and international tourism have made societies more culturally varied, in which the encounter with diversity is almost inevitable (Bowman, 2014; Christ & Kauff, 2019; Hong et al., 2016; Nguyet & Benet-Martinez, 2013). This brings several challenges, as the individual is faced with unfamiliar values, habits, and norms, thus having to effortfully analyse the new and unknown stimuli and, in turn, potentially experiencing discomfort (Allport, 1954; Bowman, 2010). Nonetheless, research from different fields has also shown the benefits of intergroup contact. Its prejudice-reducing effect is now well established and supported by several studies with different populations and contexts, all around the world (Pettigrew & Tropp, 2006; Vezzali et al., 2021). More recently, Hodson and colleagues (2018) hypothesised that intergroup contact could have a broader effect on cognition (*cognitive liberalization hypothesis*), fostering openness, cognitive flexibility, and systematic thinking. Indeed, studies from different fields have linked the encounter with diversity with cognitive development (Bowman, 2010), as it promotes the endorsement of more complex representations (Benet-Martinez et al., 2006; Groyecka-Bernard et al., 2021), creativity (Hakstian et al., 2022; Hong et al., 2016; Sommers, 1996), cognitive flexibility (Nguyen & Benet-Martinez, 2013) and less reliance on heuristics and stereotypes (Antonio et al., 2004; Sommers, 2006). Thus, understanding how intergroup contact works can help making a resource out of a potential problem.

The present study tested the cognitive liberalization hypothesis in an Italian sample. More in detail, frequent positive and negative intergroup contact were expected to be related to cognitive liberalization in opposite directions, respectively positively and negatively (H1 and H2); cognitive liberalization was expected to play a mediating role in the relationship between intergroup contact and outgroup attitudes (H3); and the previous relations were expected to hold when controlling for personal need for structure (PNS) and social dominance

orientation (SDO) (H4). Cognitive liberalization was measured through a battery of eight scales of different related constructs, namely: Langer mindfulness, personal growth, curiosity, cultural deprovincialization, group deprovincialization, cognitive flexibility, openness to diversity, and pro-diversity beliefs.

The final sample consisted of 204 participants, mainly females (70%) and relatively young ( $M=32.35$ ), although the age range was quite wide (18-68 years). The participants were overall highly educated, as 63% of them held a university degree of at least Bachelor's level, and had medium-high profile jobs. From t-test analyses, it also emerged that, on average, the sample had frequent positive interactions with outgroups and very rarely negative interactions (Table 3), it was overall open-minded and approached positively both diversity and novelty (Table 4). Indeed, all one-sample t-tests of the scales chosen to measure cognitive liberalization were significant and higher than the central point. In line with this result, SDO in the sample was significantly lower than the scale's midpoint, while more surprisingly PNS was slightly higher (Table 4). Gender differences had been explored, but they were not taken into account due to the different sizes of the sub-samples (Table 5).

As regard to the differences between positive and negative contact, the results overall sustain the hypothesis that category salience is higher in the latter. Indeed, in negative interactions, the outgroup members were perceived as more similar to each other and more different from the individual compared to positive contact (Table 3). Moreover, the more negative interactions one experienced, the more the outgroup member was perceived as prototypical, similar to other outgroup members, and the outgroups were seen as more similar to each others as well (Figure 4). On the other hand, positive interaction did not correlate significantly with these dimensions. Thus, taken together, these results suggest that group membership might be more salient in negative compared to positive contact, where the intergroup dimension might prevail. The outgroup member in the two types of contact, however, is equally perceived as quite representative of their group. These results open questions about the role played by representativeness and category salience in intergroup

contact: the two constructs, indeed, are often treated as one the proxy of the other, but they might refer to separate processes. The results are also in line with the hypothesis that positive contact may lead to a higher perception of heterogeneity in the outgroups (Boin et al., 2021). Finally, coherent with Fuochi and colleagues (2020)' findings, results of correlational analyses showed that positive contact was more linked to intimate forms of relationships, as it was positively correlated with the measure of both positive and negative intimate interactions, but not with superficial positive contact; while negative contact correlated with both intimate and superficial negative contact *and* positive superficial contact.

As all the scales used to measure cognitive liberalization were positively correlated with each other (Figure 5), and almost all were significantly correlated with positive and negative interaction in the hypothesised directions (Figure 6), linear regression models were run to test for H1, H2 and H4, taking into consideration only one construct at a time. The role of positive and negative interactions as predictors of Langer mindfulness, personal growth, curiosity, cultural deprovincialization, group deprovincialization, cognitive flexibility, openness to diversity, and pro-diversity beliefs was first tested alone, and then controlling for PNS and SDO, both separately and together. The standardised regression coefficients were considered as index of the power of the relative predictor, as they represent the strength of their association with the dependent variable.

When considering only intergroup contact as predictor, positive experiences were a stronger predictor compared to negative ones for all the examined constructs, with a higher influence on the variables previously grouped as *cultural liberalization*. Negative contact, on the other hand, was linked to about half of the constructs, with smaller power and no difference between the two components of cognitive liberalization. The effects were in the hypothesised directions. When controlling for SDO, the effects of positive and negative contact were maintained almost unchanged both for cultural liberalization and the more general, cognitive variables, that constitute the *cognitive openness* component of cognitive liberalization. SDO, however, was significantly and negatively associated only with cultural

liberalization and not to cognitive openness. On the contrary, the introduction of PNS in the models strongly reduced the effect of positive and negative intergroup contact on cognitive openness, while it did not change their association with cultural liberalization. When both SDO and PNS were considered as predictors along with intergroup contact, the latter almost had no significant effect on the variables related to cognitive openness, while almost all effects were maintained for the ones related to cultural liberalization.

The reasons behind these results can be multiple. First of all, personal need for structure is intrinsically related, by definition, to the way in which individuals cognitively represent the world around them, so it is not surprising that it is more related to cognitive openness than cultural liberalization. In the same way, social dominance orientation concerns how individuals position themselves and their group compared to outgroups, so it is reasonable that it has a stronger effect on cultural liberalization. In relation to the lack of significance of intergroup contact on cognitive openness when considering for personal need for structure and SDO, it could then be hypothesised either that the effect of PNS covers the one of intergroup contact, being the latter already quite small even without control variables, or that intergroup contact has an effect on PNS. Indeed, a change in PNS has been found with ageing (Hess et al., 2012) and the need for cognitive closure, a construct strictly related to personal need for structure, is associated with intergroup contact (Roets et al., 2015). Thus, an effect of intergroup contact on personal need for structure cannot be excluded. Moreover, being a motif, PNS is sensible to circumstances and can change, allowing more complex structures, when doing so the overall cognitive effort is reduced (Neuberg & Newsom, 1993). Therefore, it might also be that frequent experiences with outgroups might show the limits and dysfunctionality of oversimplified categorizations, thus allowing for more complex representations of the outgroups to lower the overall cognitive fatigue. In the absence of empirical testing, however, these are just speculations. The topic requires further research and, as it was not possible to develop it within the current study, it has been decided to not consider it in the test of H3.

To test for the mediating role of cognitive liberalization in the association between intergroup contact and general outgroup attitudes, three multivariate linear regression models were run taking into consideration positive and negative interactions along with SDO as predictors; general outgroup attitudes as the dependent variable; and cognitive openness and cultural liberalization as mediators, both together and separate. Cultural liberalization was a strong mediator in all the models, while cognitive openness was not a significant mediator when considered together with the other component of cognitive liberalization. Nonetheless, when considered separately, cognitive openness had a significant and positive relationship with general outgroup attitudes, and it mediated the relationship between intergroup contact and general outgroup attitudes. Moreover, the model that considered both components of cognitive liberalization as mediators explained a higher portion of variance of general outgroup attitudes compared to the ones that take into account only one of the two. Both cognitive openness and cultural liberalization were significantly related to positive and negative contact in the expected directions.

Altogether, these results sustain the cognitive liberalization hypothesis. Positive and negative intergroup interactions were both associated with cognitive liberalization (H1 and H2), with different powers based on the specific construct taken into consideration. Against the positive-negative contact asymmetry hypothesis (Barlow et al., 2012), we found that positive contact was a stronger predictor of general outgroup attitudes than negative contact. Indeed, in all regression models, the regression coefficient of positive contact was higher than the one of negative contact. In relation to H3, the mediating role of cultural liberalization stood out as more relevant compared to the one of cognitive openness. However, we also found evidence for a weak association of this latter with both intergroup contact and general outgroup attitudes, so the importance of this construct for intergroup contact effect cannot be excluded. This finding resembles the conclusions of a review of studies on the effect of college diversity experiences on cognitive development (Bowman, 2010), according to which diversity experiences have a higher influence on *cognitive tendencies*, meaning a preference

for a way of thinking, rather than on *cognitive skills*. A possible explanation of both results could be that cognitive skills, and therefore cognitive openness, could require more time to change as they are more general processes (Roksa et al., 2017). Further research is needed on the topic. Finally, we also found partial evidence for H4, as the study successfully tested the hypotheses controlling for SDO. This finding adds to the growing evidence in literature that intergroup contact could be beneficial also for people with ideologies prone to accept inequalities (Turner et al., 2020).



## Limitations and Future directions

Historically, the studies of intergroup contact have focused on prejudice. In line with Hodson and colleagues (2018)' hypothesis, this study has found evidence of a broader effect of intergroup contact on cognition. Indeed, intergroup contact can stimulate an open and curious mind that approaches diversity as a valuable resource to respect and explore. If these results are sustained and developed by future studies, intergroup contact could turn out to be a precious tool to train people to successfully navigate modern societies and to collectively “build a culture of enlightenment” (Hodson et al., 2018, p. 538). The present research alone, however, cannot support such statement as it has several limitations, that will now be described in detail.

First, the study is based on snowball sampling, therefore, it may not be representative of the Italian population, as the sample was mostly composed by young and female participants. Thus, there are important constraints on generality. Moreover, the results should be carefully generalized to other populations with different cultures and social systems, as Sheehy-Skeffington and Thomsen (2020) found that the cultural context, and especially how much equality is supported, influences the effect of intergroup contact over outgroup attitudes. Another limitation is that literature has shown that being part of a majority or a minority may moderate the intergroup contact effect (Boin et al., 2021; Pettigrew & Tropp, 2006; Roksa et al., 2017), but the present research made no distinctions in this regard. Future research should fill this gap.

Second, the sample was also quite open and oriented towards equality, as the average score of all the constructs used to measure cognitive liberalization are above the central point of the scale, positive contact is experienced more frequently than negative one, and SDO is on average low. Thus, it cannot be excluded a ceiling effect, that is a distortion of the results due to having a unilateral sample. It is also possible that the high-scores are expression of the perception of a common social norm that sustain equality and acceptance of the diverse,

potentially being a confounding variable in the interpretation of the results.

Finally, the study is based on a cross-sectional design, thus no causal interpretation of the data can be made. In other words, it cannot be excluded that the direction of the associations is reversed, being people high in cognitive openness and cultural liberalization to be more prone to experience positive intergroup contact and less negative contact. Therefore, the cognitive liberalization hypothesis cannot be considered fully tested, as according to Hodson et al. (2018), “contact serves as a liberalizing agent over time” (p. 532). Not having a longitudinal design, the results of this study cannot sustain such statement, but they do give support to the existence of a strong association between intergroup contact and a more liberal mindset. It is worth notice that the highlighted problem is common to the whole field of research on intergroup contact since its original formulation (*causal-sequence problem*, Allport, 1954). However, Pettigrew and Tropp (2006) in their review found that the path from contact to reduce prejudice is stronger than the inhibiting-effect of prejudice on intergroup contact; thus, it is plausible to find similar results for cognitive liberalization as well.

A part from its main results, the research also found some interesting patterns that future research could address. First, it is not clear which is the role played by personal need for structure, as surprisingly PNS is slightly high in the sample, while the participants are generally quite open and flexible on the other explored dimensions. Moreover, its introduction in the regression models create important changes that could be explained in multiple ways; thus, further research is needed to disentangle these associations. Second, the results sustain the hypothesis that semantic distance, as conceptualized by Meleady et al. (2019), could potentially play an important role in the contact effect, but this has been just briefly discussed in the present work and needs to be further explored. Third, the qualitative data gathered about the nominated outgroups in positive and negative contact has a great potential and could be further analysed. For example, it is worth noticing that the majority of the groups nominated in negative contact referred to either nationality and ethnic origins (37%)

or cultural and political differences (34%). If the first one has been widely investigated, the second one has almost never been considered in intergroup contact literature, and could be an interesting area for future investigations.

As a final mark, it is important to draw a connection between theory and practice. The present historical time is signed by multiple, intertwined crisis: climate change, political tensions, economic uncertainty, to cite a few (United Nations Development Programme, 2023). In this unpredictable environment, prejudice and intergroup conflicts are reinforced as people look for scapegoats (Allport, 1954). Indeed, recent years have been characterised by increasing polarization, intolerance, and eventually violent conflict. Thus, there is an urge for interventions that promote positive intergroup contact, as it would not just prevent potential social problems, but it might also lead to the development of helpful skills, beneficial for the society as a whole. Interventions must be well-thought and carefully designed, as it is not enough to make the intergroup contact happen: the right conditions that favour positive outcomes in the specific situation have to be identified (Barlow, 2012). In order to do so, the processes in act have to be understood, and a multilevel approach is highly recommended as intergroup relationships are a complex phenomenon that is influenced by societal aspects (i.e., how much equality is supported), group characteristics (i.e., majority/minority, norms, values), and personal features (i.e., cognitive structure, values, personality) (Allport, 1954). Ideally, a good intervention would tackle all of these aspects, and create opportunities to share experiences and promoting reciprocal knowledge (Fuochi et al., 2020). Further evidence in support of the cognitive liberalization hypothesis could be, in this regard, be extremely useful in motivating more prejudiced people to engage in the interventions, as they could be attracted by their cognitive benefits. Thus, to conclude, we renew Boin and colleagues (2021)' call for collaboration between researchers and practitioners, in order to effectively pursue, together, changes that can bring diverse groups to harmoniously live in society and benefit from their reciprocal presence.

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