Allport meets internet: A meta-analytical investigation of online intergroup contact and prejudice reduction

Allport meets Internet:

A Meta-Analytical Investigation of Online Intergroup Contact and Prejudice Reduction

Chiara Imperato[1], Barry H. Schneider[2], Luca Caricati[1], Yair Amichai-Hamburger[3], Tiziana Mancini[1]

[1] Department of Humanities, Social Sciences and Cultural Industries, University of Parma, Italy

[2] Boston College, USA

[3] School of Psychology, Interdisciplinary Center (IDC) Herzliya, Israel

Author note

Correspondence concerning this article should be addressed to Chiara Imperato, Department of Humanities, Social Sciences and Cultural Industries, University of Parma, Borgo Carissimi, 10, 43121 Parma, Italy.

Contact: chiara.imperato@unipr.it

Abstract

Since Allport's optimal conditions for reducing prejudice by interpersonal contact were defined, numerous empirical studies have confirmed the efficacy of intergroup contact in reducing prejudice towards outgroups. Given that the Internet is changing the way people communicate and interact daily, it is very possible that the Web plays an important role in reducing prejudice. Assuming that the virtual environment fits Allport boundary conditions for effective contact that reduces prejudice, we undertook this meta-analysis. Our aim was to demonstrate that online intergroup contact is a successful means of improving intergroup relations. Results from 23 studies (20 journal articles and 3 unpublished records) showed that the effect is significant. Effect size was independent of the characteristics of samples, including their countries. There were stronger effects when the induced contact focused on cooperation but not for support of the interaction by an authority figure or the presence of common goals.

Keywords: E-contact, intergroup contact, prejudice, electronic contact, meta-analysis

Allport meets Internet: A meta-analytical investigation on online intergroup contact and prejudice reduction

Intergroup conflict, a ubiquitous global phenomenon, is arguably the problem of the century (Al Ramiah & Hewstone, 2013). Characterized by the perception of incompatible goals or values and hostile disputes between groups that differ in ethnicity, religion, political or sexual orientation, among others, intergroup conflict has led to battles, genocide, terrorism and human rights violations throughout history (Woolf & Hulsizer, 2004). Allport's classic *contact hypothesis* (1954) maintains that positive contact with an outgroup member can lead to positive attitudes toward the outgroup. Positive contact is more successful when Allport's optimal contact conditions are met: equal status, common goals, cooperation and support by authority figures (e.g. Pettigrew & Tropp, 2000). Authority support is achieved when both groups recognize an authority (e.g., a lecturer who organizes contact between two groups of students, as in Mustafa & Poh, 2019) that supports contact and interactions between groups.

Researchers have extended the concept of positive contact to indirect and distant forms of contact, demonstrating the potential of these modalities to improve inter-group relations (Dovidio, Love, Schellhaas & Hewstone, 2017). For example, Wright, Aron, McLaughlin-Volpe and Ropp (1997) found that people who know that an ingroup member has an outgroup friend develop more positive attitudes toward the target group than people who are unaware of any such friendships. Another indirect form of contact is *imagined contact* (Turner, Crisp & Lambert, 2007; Harwood, Hewstone, Amichai-Hamburger & Tausch, 2013), in which people engage in mental simulation of an interaction characterized by positive contact, which can reduce negative attitudes towards outgroups. Lastly, Dovidio, Eller and Hewstone (2011)

introduced the concept of *vicarious contact*, in which observing the actions of another person with whom one identifies helps people acquire new understanding about how they should behave towards outgroup members. Extensive research has demonstrated that vicarious contact improves attitudes and increases individuals' intent to engage in direct contact with outgroup members (e.g. Mazziotta, Mummendey & Wright, 2011).

Given the increasing pervasiveness of electronic communication, the contact hypothesis also applies to the online world, based on the assumption that the Internet can be used to promote intergroup dialogue. The aim of this meta-analysis is to provide a synthesis of research conducted with the objective of demonstrating that online intergroup contact is a successful means of improving intergroup relations.

Online contact and prejudice reduction

The virtual environment may help communicators to overcome some of the limitations imposed by geographical distance (Amichai-Hamburger & McKenna, 2006) and to maintain communication even in conflictual and violent contexts (Shonfeld, Ganayam & Hoter, 2006). Amichai-Hamburger and McKenna (2006) posit that Internet allows people to feel comfortable and in control of the situation, to express themselves well and often and to develop close relationships. Online contact shares some features with face-to-face direct contact, providing an instantaneous and naturalistic form of communication (White, Harvey & Abu-Rayya, 2015). It also has specific characteristics that distinguish it from the offline context. Importantly, electronic communication facilitates contact between individuals who are similar in some important ways (Amichai-Hamburger & Hayat, 2013), even though they may belong to different groups that may be separated geographically. The characteristics of electronic communication may either promote or inhibit intergroup acceptance. Douglas and McGarty (2001)

found that people's online anonymity could promote hostility, having a disinhibitory effect, which translated into less accountability and self-awareness. Nevertheless, online anonymity can reduce anxiety in interaction, allowing people to feel less worried about being judged by members of an outgroup (Amichai-Hamburger & Furnham, 2007). For this and other reasons, online communication may facilitate self-disclosure in general and, more specifically, self-disclosure between members of different groups. Self-disclosure also encourages the development of friendly relationships (Davis, 2012). As Pettigrew and Tropp's meta-analysis (2006) highlighted, friendship is one of the most important factors of reducing prejudice.

Online intergroup contact may occur spontaneously, for example in social network sites, or may be induced in a laboratory context. It may bring together citizens of countries with hostile relations, immigrants and members of host countries or individuals of majority and minority sexual orientation. However, no studies have analyzed whether there are differences in prejudice reduction between spontaneous and induced contact.

Objectives of the current meta-analysis

The purpose of our study was to provide a meta-analysis of studies relevant to the reduction of intergroup prejudice by virtue of online content, considering both overall effects and possible moderating variables. As discussed earlier, we assumed that online contact reduces prejudice and that this effect is stronger when the virtual environment fits Allport's boundary conditions for effective contact that reduces prejudice.

Method

Inclusion criteria

We included studies if the following criteria were met:

a) The Web was the key context of intergroup contacts of the participants;

b) The researchers reported one or more measures of prejudice, including prejudice, intergroup bias, social distance, and acceptance and tolerance as outcome variables. *Intergroup bias* has been considered a specific form of traditional and contemporary prejudice (see Dovidio & Gaertner, 1999). *Social distance* is also considered a form of prejudice (e.g., Pettigrew, 1959) because the more prejudiced a person is towards a specific group, the less he/she will interact with members of that group (Dawes, 1972). Finally, *tolerance and acceptance* are considered indicative of attitudes toward LGBTQ persons (e.g., LaMar & Kite, 1998). We excluded studies focusing on symbolic, realistic or general threat as outcomes of online contacts because these constructs are widely regarded as antecedents rather the indicators of prejudice (e.g., Riek, Mania & Gaertner, 2006);

c) The researchers reported one or more measures of contact (quantity/frequency or quality), or contact was experimentally induced; and

d) The researchers reported sufficient statistics for computing effect size.

Sample of studies

We searched both published and unpublished studies since November 2018 and until March 2020 using PsycInfo (Ebsco), Scopus, Psychological and Behavioural Sciences (Ebsco) and the core collection of the Web of Science. The search string included terms referring to the online context, the outcome of online contact and theoretical framework. The search terms are displayed in Table 1. We searched the title, abstract and keywords of each publication. We also searched for unpublished materials using Google, Google Scholar, GreyNet, Psych File Drawer, European Social Survey,

using the same keywords and combinations that we used for published materials. We also requested materials from all members of the European Association of Social Psychology. We contacted the authors of the main articles requesting further data as needed. Finally, we checked the reference lists of the articles retrieved in order to identify further eligible studies. The studies in the final sample are displayed in Table 2 along with the main study features (i.e., that related to online contact) and global ES.

[Insert Table 1 about here]

The final pool of studies

This search strategy supplied 325 records (see Figure 1 for the PRISMA flowchart), including one pertinent publication from the reference list of a study in the original pool. Thirty-four records were duplicate reports of the same data and were eliminated, leaving a total of 292. We excluded 10 theoretical articles containing no original data; 32 records not including a contact measure; 13 records not including a prejudice measure; 31 records about studies in which intergroup contact did not occur online; and 2 articles without sufficient data to compute effect sizes (and whose authors did not respond to e-mail requests). We also located 3 unpublished reports: a poster presented at European Association of Social Psychology meeting in 2019, and two databases available upon request by authors. The final pool consisted of 20 published and 3 unpublished records.

[Insert Figure 1 about here]

Effect size computation

We computed effect sizes (ES) using Cohen's *d* when means and standard deviations were reported or by converting Pearson correlation coefficients to Cohen's *d* when measure of associations were reported. Thus, positive values of Cohen's *d* indicate that contact reduced prejudice.

Moderators

We considered following study features as potential moderators of the relationship between online contact and prejudice:

a) *Sample characteristics*. Mean age of participants; percentage of women; student status (i.e., only students or mixed);

b) S*tudy characteristics*. Publication year; publication status (i.e., published vs. unpublished); length of the prejudice measure (i.e., scale vs. single item); content of the measures (i.e., prejudicial attitude vs. other constructs, including social distance, outgroup avoidance, intergroup bias, tolerance and acceptance); target of prejudice (i.e., religious, ethnic, sexual orientation or other). We also coded the reliability of measurement. With only one exception (Mustafa & Poh, 2019), reliability was .80 or higher. Therefore, we did not retain this category for statistical analysis;

c) *Contextual characteristics*. We coded for *Country*, which we categorized based on: Hofstede clusters (https://www.hofstede-insights.com), i.e., into Anglo (k = 12; including Australia, Canada, Ireland and USA), West Europe (k = 6; including Italy and Belgium), Middle East (k = 9; including Israel and Serbia, Croatia and Cyprus) and Asia (k = 2; including China and Malaysia); frequency of Internet use based on Hofstede Insights (https://www.hofstede-insights.com); and Global Peace Index, based on Vision of Humanity (http://visionofhumanity.org).

We also coded the *modalities of electronic contact,* categorized in text-only (i.e. environments where interactions among users occurs through wrote texts, e.g. chat rooms, forums, blogs) and mixed-based (i.e. environments where users can interact using wrote texts, photos, videos, music and other multimedia channels, e.g. social network sites, instant messaging) (White et al., 2015);

d) *Experimental vs survey studies.* In experimental studies, a structured online contact occurs: Participants interact with outgroup members in an experimental context contrived by the researchers with precise rules. In survey studies, an unstructured online contact occurs. Individuals freely choose to interact with people they have chosen in a virtual context with few rules. Typically, the researcher learns about the extent and nature of the online contact in surveys that asked participants to report their online contact experiences on platform such as social network sites;

e) *Intergroup contact properties.* We considered *group status*, i.e., whether the researchers collected data from majority (e.g., data collected from host-culture participants only) or both majority and minority groups (e.g., data collected from both host-culture and migrants). We could only code the absence or presence of Allport's optimal conditions for experimental studies. This is because the online platforms used in survey studies (i.e., Social Network Sites, MMORPG, blogs) were often unsupervised (White et al., 2015; Hasler & Amichai-Hamburger, 2013) and did not include ratings of the features. In the experimental studies, we coded: a) *common goals,* according to whether or not both online groups had to reach (presence) or not reach (absence) a common goal in working on a problem or a task; b) *intergroup cooperation,* according to whether or not both groups had to work together without competition (presence) or with competition (absence); c) *authority support*, according to whether or not both

groups acknowledged some authority that supports the contact and interactions between the groups (presence) or did not acknowledge it (absence). For example, in Mustafa and Poh (2019) authors set the experimental procedure to fulfil authority support by granting the approval from participants' respective lecturers to participate in the experiment.

We coded the *number of interactions*. In experimental studies, we coded the number of interactions - i.e., the number of contact sessions of experimental protocol (one or more) -, while in survey studies, we considered the frequency of self-reported online contact. We could not code for *equality of status,* an important potential moderator mentioned by Allport, because the participants in all studies did not appear to differ in terms of status.

f) *Exploratory analysis of quality of contact and initial level of contact.* There were several variables with the potential to be important moderators of ES that could not be coded except for a small number of studies. These include several variables emphasized by Allport. Although we did not include these variables in our main analysis, we conducted exploratory analysis for heuristic value.

One such variable is the quality of contact. This variable was only coded for 7 studies. We present an exploratory analysis of the data from this small sample.

Another potentially important dimension concerns the initial level of conflict between the groups brought into contact. It would have been helpful if the researchers had asked the participants to rate the degree of initial conflict, but no study included it. Although we are not familiar with the levels of conflict between all of the groups in the studies and know of no reliable index to impute in this regard, our experiences indicate that the relations between Jews and Muslims in the Middle East is highly conflictual as

are the conflicts between Protestants and Catholics in Ireland, and Israelis and Iranians. Thus, we considered this variable only in an exploratory analysis in which we compared the studies conducted with members of these groups that we believe to be high in conflict with the rest of the sample.

Table 2 contains the list of the studies, together with the study features, properties of intergroup contact for experimental and survey studies and ES.

[Insert Table 2 about here]

Results

Data analysis strategy

We performed all statistical analysis with the ProMeta v3.0 (2019) meta-analysis software. We used the random effect model as a conservative approach to facilitate the generalization of the results obtained in the present meta-analysis beyond studies included. We assessed the heterogeneity among studies with Cochran's Q; significant Q values indicate no homogeneity of results among studies, and I^2 statistics index, the percentage of variance due to heterogeneity. To explain the heterogeneity among studies, we computed meta-regressions and moderation analysis and conducted sensitivity analysis to estimate the stability of study findings. This involves computing how the overall ES would change removing one study at a time. Lastly, we assessed publication bias using Egger's regression test, Begg and Mazumdar's rank correlation test, Trim and Fill analysis and Rosenthal's Failsafe N.

Pooled results

The studies included in the final sample supplied 29 different effect sizes based on data from 6576 participants. The overall effect size was significant (d = 0.36, SE = 0.05, $p < .001$, 95% CI [0.27, 0.45]) indicating that online contact moderately reduced prejudice (see Figure 2 for forest plot). There was considerable heterogeneity among studies (Q (28) = 107.03, $p < .001$, I^2 = 73.84%), suggesting the presence of moderators, as expected. Furthermore, we tested whether the overall effect size changed by removing one at a time study; the overall effect size showed changes ranging from 0.34 to 0.37. This indicates that no single study influenced the overall results excessively. Figure 2 shows effect sizes, 95% confidence intervals, standard errors, and significance overall and for each study.

[Insert Figure 2 about here]

Egger's regression test and Begg and Mazumdar's rank correlation test indicated no publication bias (Egger's test: 0.00, t = -0.00, p = 0.99; Begg's test: Z = 0.11, p = 0.91). Rosenthal's Failsafe N was 1582, thus the value is above Rosenthal's rule of thumb (5k + 10 = 155). Lastly, Trim and Fill analysis confirmed the absence of publication bias (see also S1 in the supplementary online material for funnel plot).

Moderator analysis

Sample characteristics. Mean sample age was 24.19 years (k = 27, two missing), ranging from 12.50 to 40.30. The overall sample consisted of more women (n = 4176) than men (n = 2400) (k = 28, one missing). Students were the sole participants in 15 studies (n = 2330), while 14 studies included both students and others (n = 4246). Meta-

regression showed no significant effects of age (β = -0.003, p = 0.68), percentage of women (β = 0.001, p = 0.77) or student status (Q (1) = 0.05, p = 0.82).

Study characteristics. Studies were published from 2012 to 2019; 26 were journal articles and three unpublished studies. Most of the studies (k = 20) used Likert-type scales but some (k = 9) used a single item, the majority of which (k = 7) were emotional thermometers. The majority of studies used prejudicial attitudes as an outcome variable (k = 20), 5 considered social-distance measures, 3 considered intergroup bias, and 1 considered a measure of tolerance and acceptance. The prejudice targets were religious (k = 10), ethnic (k = 9), sexual (k = 6), students who did or did not join fraternities (k = 2), belonging to a game faction (k = 1) and suffering from schizophrenia (k = 1). We did not use the categories with small frequencies in the analysis.

Moderator analysis showed no effects for publication year (β = -0.004, p = 0.88), publication type (Q (1) = 0.05, p = 0.83), outcome measurement (i.e., scale vs. single item; Q (1) = 0.56, p = 0.45), the nature of outcome considered (i.e., prejudicial attitudes, social distance, intergroup bias, and tolerance and acceptance; Q (1) = 1.02, p = 0.31) or prejudice target (i.e., religious, ethnic, sexual, and other; Q (2) = 2.03, p = 0.36).

Contextual characteristics. Studies were conducted in Anglo (k = 12), Middle Eastern (k = 9), West European (k = 6), and Asian (k = 2) cluster countries. Frequency of Internet use for each Country (M = 84.5, SD = 5.06), ranged from 72 to 91 and measure of Global Peace Index (M = 1.98, SD = 0.57), ranged from 1.22 to 2.73. With regard to different E-contact modality, 13 studies were text-only and 16 were mixed-based contact.

There were no specific effects for any of the country groupings we attempted: Hofstede clusters (Q (3) = 2.81, p = 0.42), frequency of Internet use in the country (β = -0.016, p = 0.08), and global index peace (β = 0.054, p = 0.55). There was no specific effect for mixed-based vs. text-based web contest (Q (1) = 2.08, p = .15).

Experimental vs survey studies. Most studies considered were experimental (k = 19) rather than survey (k = 10) studies. Only marginal differences (Q (1) = 3.46, p = 0.06) were found between the experimental (d = 0.29, SE = 0.06, p < .001, 95% CI [0.18, 0.39]) and survey studies (d = 0.46, SE = 0.08, p < .001, 95% CI [0.31, 0.62]).

Intergroup contact properties. The participants in the data collection in 13 studies were only majority group members whereas 15 involved both minority and majority groups. Information about Allport's optimal conditions was only reported in experimental studies (k = 19).

We found no differences between studies conducted with only majority group participants and studies in which the participants were both minority and majority group members (Q (1) = 0.03, p = 0.87). Moderator analysis showed no effects for common goals (Q (1) = 1.75, p = 0.19) or support by persons in authority (Q (1) = 0.03, p = 0.86). However, moderation analysis showed a significant effect for cooperation, (Q (1) = 4.59, p = 0.03), with stronger effects when participants were instructed to cooperate (k = 13; d = 0.35, SE = 0.07, p < .001, 95% CI[0.21, 0.50]) than in studies in which cooperation was not controlled (k = 6; d = 0.15, SE = 0.06, p < .01, 95% CI[0.05, 0.26]). Moderation analysis showed no significant effects for the number of experimental sessions (Q (1) = 1.38, p = 0.24). Moderation analyses showed no significant effect for contact frequency in survey contact studies (β = 0.116, p = 0.39).

Exploratory analysis of quality of contact and initial level of contact. These results may inform future studies but should not be considered conclusive.

With regard to contact quality, we computed a preliminary analysis of this data despite the lack of adequate statistical power. The results were somewhat counter-intuitive and should not be interpreted at this stage. A preliminary analysis showed that in 4 out 7 studies more positive contact was actually associated with lower effect sizes ($\beta = -0.403$ $p = 0.13$).

The mean ES of studies involving situations that are probably of high conflict – i.e., Jews and Muslims in Middle East, Protestants and Catholics in Ireland, and Iranians and Israelis – is .43 ($k = 9$, $d = .43$, $SE = 0.12$, $p < .001$, 95% CI[0.20, 0.66]), compared with overall ES equal to .36, which includes studies of situations of relatively low conflict, such as membership in college fraternities. Although this difference does not appear large, it is in the expected direction. The variable of initial conflict should be measured systematically in future studies.

Discussion

Overall, results indicated that online contact moderately reduced prejudice towards outgroup members, in line with the literature on offline contact (e.g., Pettigrew & Tropp, 2006). We consider this an important finding because this is the first meta-analysis on the effects of online intergroup contact on prejudice. It is necessary to emphasize that the effects presented here are statistical effects that are not to be interpreted as causal effects of contact on prejudice reduction. It is not possible to infer a causal link in studies that analyzed spontaneous contact. In those studies, the contact may have reduced prejudice or pre-existing reduced prejudice may have motivated the contact.

Our meta-analysis also indicated considerable heterogeneity of effect sizes, which suggests that effect of online intergroup contact is highly variable and far from stable across settings; few significant moderators emerged. These results could be due to the specificity of online context (Schwab et al., 2018). Since online intergroup contact is not a simple by-product of offline contact, it may be inappropriate to apply moderating variables considered in the classic literature on prejudice. Moreover, some of these variables such as Allport conditions might be difficult to measure in survey studies, where there are different conditions that could explain when contact was more effective.

We discovered a marginal difference between studies experimentally inducing contact, for example in studies employing structured contact programs (i.e. DIEC program; White et al., 2015), and more "naturalistic" studies – i.e., survey studies – that considered spontaneous contact. The positive effect of contact on prejudice was slightly stronger in survey studies, perhaps because in naturalistic contexts it was up to individuals to choose to dialogue with outgroup members. Moreover, enabling free choice of the outgroup member with whom to interact could lead participants to come in contact with people for reasons other than their outgroup membership, thus being able to trigger decategorization mechanisms (Gaertner, Dovidio, Banker, Houlette, Johnson & McGlynn, 2000). Conversely, in experimental studies, participants were prompted to interact with an outgroup member based on his/her membership to a specific target group. Online contact in survey studies often occurred in online contexts created for purposes other than intergroup contact, such as social network sites, including platforms used for self-promotion and self-expression (Ellison, Steinfield, & Lampe, 2007). Platforms of this nature are probably more appropriate for maintaining intergroup

contact than initiating it (Hasler & Amichai-Hamburger, 2013). It is important to emphasize that in 8 out 9 studies included in the meta-analysis the target of prejudice was religious. The role of religious prejudice is still controversial in the literature, because religion can both increase and reduce prejudice (see Hewstone, Clare, Newheiser & Voci, 2011). Religious groups considered in the studies included in this meta-analysis were characterized by high segregation of the religious communities caused by historical conflicts (i.e. Catholics and Protestant in Northern Ireland in White, Turner, Verrelli, Harvey & Hanna, 2019; Jews and Arabs - mostly Muslim - in Israel in Lissitsa, 2017, and in Walther, Hoter, Ganayem & Shonfeld, 2015). Offline physical segregation could lead the two groups to have fewer contact opportunities, therefore to have less chance of reducing prejudice. Since face-to-face contact could be impossible or difficult to manage due to physical or socio-structural barriers, online intergroup contact might have allowed these participants to overcome their physical segregation, acting as a bridge between two groups whose face-to-face contact opportunities were scarce.

With regard to Allport's optimal contact conditions, only cooperation between groups significantly moderated the relation between online contact and prejudice reduction although we could not explore several other relevant conditions because of limited data in the original studies. In partial contrast with White and colleagues' suggestions (2015), the disinhibiting effect did not appear to act strongly enough to make Allport's conditions necessary for the prejudice reduction. Consistent with Pettigrew and Tropp's (2006) findings regarding face-to-face contact, the meta-analytical results suggested that Allport's conditions were not essential, but rather they acted as facilitating conditions that enhanced the tendency for positive contact outcomes

to emerge. Interestingly, we found that cooperation but not common goals moderated the relationship between online intergroup contact and prejudice reduction. In fact, while common goals are abstract and more tied to a positive future outcome, cooperation is a process that takes place here and now, at the very moment in which the two group members interact.

This meta-analysis has some limitations. Despite the careful search of unpublished literature, we were able to include data from just three unpublished studies, all from the same research group. Although publication bias was not significant, the inclusion of other unpublished studies could decrease the strength of relationship found between online intergroup contact and prejudice reduction. Importantly, most of the original studies did not provide much information of the content of the contacts or their affective tone. Perhaps the absence of this information caused our general inability to explain the high heterogeneity between the studies. We also note the small cell sizes in some of our analyses, which we conducted in an effort to identify potential moderators that could be confirmed more confidently as the database increases in size.

Refinements in future studies may be useful in understanding the effects of online contact. For example, studies that may clarify how characteristics of computer-mediated communication (e.g., depersonalization, stereotypization, status equalization) interact with intergroup processes (e.g., intergroup anxiety reduction, increased empathy, inclusion of the other in the self) as well as with interpersonal dynamics (e.g., contact quality, need for identity exploration, dialogical I-Positions) in determining the effects of online contact on prejudice. More studies determining whether and how prejudice reduction following online contact may transfer to offline contexts will be

needed in order to implement programs able to increase the Web potentiality for intergroup dialogue.

Compliance with Ethical Standards

Conflict of Interest

Authors declare that they have no conflict of interest.

Ethical approval

This article does not contain any studies with human participants or animals performed by any of the authors.

References

Abu-Rayya, H. M. (2017). Majority members' endorsement of the acculturation integrationist orientation improves their outgroup attitudes toward ethnic minority members: An electronic-contact experiment. *Computers in Human Behavior, 75*, 660-666. https://doi.org/10.1016/j.chb.2017.06.010

Al Ramiah, A., & Hewstone, M. (2013). Intergroup contact as a tool for reducing, resolving, and preventing intergroup conflict: Evidence, limitations, and potential. *American Psychologist, 68*(7), 527. https://doi.org/10.1037/a0032603

Allport, G. (1954). The nature of prejudice. Cambridge, MA: Addison-Wesley.

Amichai-Hamburger, Y., & Furnham, A. (2007). The positive net. *Computers in Human Behavior, 23*(2), 1033-1045. https://doi.org/10.1016/j.chb.2005.08.008

Amichai-Hamburger, Y., & Hayat, Z. (2013). Internet and personality. *The social net: Understanding our online behavior*, 1-20. https://doi.org/10.1093/acprof:oso/9780199639540.003.0001

Amichai-Hamburger, Y., & McKenna, K. Y. (2006). The contact hypothesis reconsidered: Interacting via the Internet. *Journal of Computer-Mediated Communication, 11*(3), 825-843. https://doi.org/10.1111/j.1083-6101.2006.00037.x

Amichai-Hamburger, Y., Hasler, B. S., & Shani-Sherman, T. (2015). Structured and unstructured intergroup contact in the digital age. *Computers in Human Behavior, 52*, 515-522. https://doi.org/10.1016/j.chb.2015.02.022

Andrews, N. P., Yogeeswaran, K., Walker, M. J., & Hewstone, M. (2018). Effect of valenced vicarious online contact on out- group prejudice and perceived out-group variability: A study of online poker. *Journal of Applied Social Psychology*, *48*(10), 571-581. https://doi.org/10.1111/jasp.12548

Bargh, J. A., & McKenna, K. Y. (2004). The Internet and social life. *Annu. Rev. Psychol.*, *55(1)*, 573-590. https://doi.org/10.1146/annurev.psych.55.090902.141922

Brown, R. (2000). *Group processes: Dynamics within and between groups* (2nd ed.). Cambridge, MA: Blackwell.

Cohen, J. (2013). *Statistical power analysis for the behavioral sciences*. Routledge.

Crisp, R. J., & Hewstone, M. (2007). Multiple social categorization. *Advances in experimental social psychology*, *39*, 163-254. https://doi.org/10.1016/s0065-2601(06)39004-1

Davis, K. (2012). Friendship 2.0: Adolescents' experiences of belonging and self-disclosure online. *Journal of adolescence*, *35*(6), 1527-1536. https://doi.org/10.1016/j.adolescence.2012.02.013

Dawes, R. M. (1972). *Fundamentals of attitude measurement*. John Wiley & Sons.

Douglas, K. M., & McGarty, C. (2001). Identifiability and self- presentation: Computer- mediated communication and intergroup interaction. *British journal of social psychology*, *40*(3), 399-416. https://doi.org/10.1348/014466601164894

Dovidio, J. F., & Gaertner, S. L. (1999). Reducing prejudice: Combating intergroup biases. *Current Directions in Psychological Science, 8*(4), 101-105. https://doi.org/10.1111/1467-8721.00024

Dovidio, J. F., Eller, A., & Hewstone, M. (2011). Improving intergroup relations through direct, extended and other forms of indirect contact. *Group processes & intergroup relations, 14*(2), 147-160. https://doi.org/10.1177/1368430210390555

Dovidio, J. F., Love, A., Schellhaas, F. M., & Hewstone, M. (2017). Reducing intergroup bias through intergroup contact: Twenty years of progress and future directions. *Group Processes & Intergroup Relations*, 20(5), 606-620. https://doi.org/10.1177/1368430217712052

Ellison, N. B., Steinfield, C., & Lampe, C. (2007). The Benefits of Facebook "Friends:" Social Capital and College Students' Use of Online Social Network Sites. *Journal of Computer-Mediated Communication,* 12(4), 1143–1168. https://doi.org/10.1111/j.1083-6101.2007.00367.x

Gaertner, S. L., Dovidio, J. F., Banker, B. S., Houlette, M., Johnson, K. M., & McGlynn, E. A. (2000). Reducing intergroup conflict: From superordinate goals to decategorization, recategorization, and mutual differentiation. *Group Dynamics: Theory, Research, and Practice, 4*(1), 98. https://doi.org/10.1037/1089-2699.4.1.98

Harwood, J., Hewstone, M., Hamburger, Y., & Tausch, N. (2013). Intergroup contact: An integration of social psychological and communication perspectives. In C.

Salomon (Ed.), Communication yearbook (pp. 55–102). London, England: Routledge.

Hasler, B. S., & Amichai-Hamburger, Y. (2013). Online Intergroup Contact. The Social Net, 220–252. https://doi.org/10.1093/acprof:oso/9780199639540.003.0012

Hewstone, M., Clare, A., Newheiser, A. K., & Voci, A. (2011). Individual and situational predictors of religious prejudice: Impact of religion, social dominance orientation, intergroup contact, and mortality salience. *Testing, Psychometrics, Methodology in Applied Psychology*, 18(3), 143-155.

Imperato, C. & Mancini, T. (2019, June). *Allport meets Social Network Sites: intergroup contacts and ethnic discrimination on Facebook*. Poster session presented at the Meeting on Intergroup Communication of the European Association of Social Psychology, Bologna, Italy.

Kim, N., & Wojcieszak, M. (2018). Intergroup contact through online comments: Effects of direct and extended contact on outgroup attitudes. *Computers in Human Behavior, 81,* 63–72. https://doi.org/10.1016/j.chb.2017.11.013

LaMar, L., & Kite, M. (1998). Sex differences in attitudes toward gay men and lesbians: A multidimensional perspective. *Journal of Sex Research, 35*(2), 189-196. https://doi.org/10.1080/00224499809551932

Lea, M., Spears, R., & de Groot, D. (2001). Knowing me, knowing you: Anonymity effects on social identity processes within groups. *Personality and Social Psychology Bulletin, 27*(5), 526-537. https://doi.org/10.1177/0146167201275002

Lissitsa, S. (2017). Online political participation, online contacts with out-groups members and social distances. *ASIAN JOURNAL OF COMMUNICATION, 27*(1), 18–32. https://doi.org/10.1080/01292986.2016.1257033

Lissitsa, S., & Kushnirovich, N. (2018). Secondary transfer effect of positive and negative online contact between groups involved in high-intensity conflict. *International Journal of Intercultural Relations, 67*, 71–80. https://doi.org/10.1016/j.ijintrel.2018.10.001

Lissitsa, S., & Kushnirovich, N. (2019). Harnessing Digital Media in the Fight Against Prejudice: Social Contact and Exposure to Digital Media Solutions. *Journalism & Mass Communication Quarterly*, *96*(4), 1052–1075. https://doi.org/10.1177/1077699019837938

MacInnis, C. C., & Hodson, G. (2015). The development of online cross-group relationships among university students: Benefits of earlier (vs. later) disclosure of stigmatized group membership. *JOURNAL OF SOCIAL AND PERSONAL RELATIONSHIPS*, *32*(6), 788–809. https://doi.org/10.1177/0265407514548394

Mancini, T., Caricati, L., Balestrieri, M. F., & Sibilla, F. (2018). How to reduce intergroup hostility in virtual contexts: The role of alts in decreasing intergroup bias in World of Warcraft. *Computers in Human Behavior*, *83*, 8-15. https://doi.org/10.1016/j.chb.2018.01.021

Maunder, R. D., White, F. A., & Verrelli, S. (2018). Modern avenues for intergroup contact: Using E-contact and intergroup emotions to reduce stereotyping and social distancing against people with schizophrenia. *Group Processes &*

Intergroup Relations, 1368430218794873. https://doi.org/10.1177/1368430218794873

Mazziotta, A., Mummendey, A., & Wright, S. C. (2011). Vicarious intergroup contact effects: Applying social-cognitive theory to intergroup contact research. *Group Processes & Intergroup Relations, 14*(2), 255-274. https://doi.org/10.1177/1368430210390533

McKenna, K. Y., & Bargh, J. A. (1998). Coming out in the age of the Internet: Identity" demarginalization" through virtual group participation. *Journal of personality and social psychology, 75*(3), 681. https://doi.org/10.1037//0022-3514.75.3.681

McKenna, K. Y., Green, A. S., & Gleason, M. E. (2002). Relationship formation on the Internet: What's the big attraction?. *Journal of social issues, 58*(1), 9-31. https://doi.org/10.1111/1540-4560.00246

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Annals of internal medicine, 151*(4), 264-269. https://doi.org/10.7326/0003-4819-151-4-200908180-00135

Mustafa, H., & Poh, S. K. C. (2019). Increasing Intercultural Contact in Cyberspace: How Does it Affect the Level of Prejudice among Malaysians?. *Pertanika Journal of Social Sciences & Humanities, 27*(1).

Pettigrew, T. F. (1959). *Social distance attitudes of South African students*. Soc. F., 38, 246.

Pettigrew, T. F., & Tropp, L. R. (2000). Does intergroup contact reduce prejudice? Recent meta-analytic findings. *Reducing prejudice and discrimination*, 93, 114.

Pettigrew, T. F., & Tropp, L. R. (2006). A meta-analytic test of intergroup contact theory. *Journal of Personality and Social Psychology*, *90*(5), 751–783. https://doi.org/10.1037/0022-3514.90.5.751

ProMeta V3.0 [Computer software]. (2019). Retrived from https://idostatistics.com/prometa3/

Reicher, S. D., Spears, R., & Postmes, T. (1995). A social identity model of deindividuation phenomena. *European review of social psychology*, *6*(1), 161-198.

Riek, B. M., Mania, E. W., & Gaertner, S. L. (2006). Intergroup threat and outgroup attitudes: A meta-analytic review. *Personality and social psychology review*, *10*(4), 336-353. https://doi.org/10.1207/s15327957pspr1004_4

Schumann, S., Klein, O., Douglas, K., & Hewstone, M. (2017). When is computer-mediated intergroup contact most promising? Examining the effect of out-group members' anonymity on prejudice. *Computers in Human Behavior*, *77*, 198–210. https://doi.org/10.1016/j.chb.2017.08.006

Schwab, A. K., Sagioglou, C., & Greitemeyer, T. (2018). Getting connected: Intergroup contact on facebook. *The Journal of Social Psychology*. https://doi.org/10.1080/00224545.2018.1489367

Shonfeld, M., Ganayem, A., & Hoter, E. (2006, September). *Constructing bridges between cultures in conflict through an online teacher education course.* Paper

presented at the International Conference on the Role of ICT in Bridge-building and Social Inclusion, University.

Spears, R., Postmes, T., Lea, M., & Wolbert, A. (2002). When are net effects gross products? *Communication. Journal of Social Issues, 58*(1), 91-107. https://doi.org/10.1111/1540-4560.00250

Tawa, J., Ma, R., & Katsumoto, S. (2016). "All lives matter": The cost of colorblind racial attitudes in diverse social networks. *Race and Social Problems, 8*(2), 196-208. https://doi.org/10.1007/s12552-016-9171-z

Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D., & Wetherell, M. S. (1987). *Rediscovering the social group: A self-categorization theory*. Basil Blackwell.

Turner, R. N., Crisp, R. J., & Lambert, E. (2007). Imagining intergroup contact can improve intergroup attitudes. *Group Processes & Intergroup Relations, 10*(4), 427-441. https://doi.org/10.1177/1368430207081533

Walther, J. B., Hoter, E., Ganayem, A., & Shonfeld, M. (2015). Computer-mediated communication and the reduction of prejudice: A controlled longitudinal field experiment among Jews and Arabs in Israel. *Computers in Human Behavior, 52,* 550–558. https://doi.org/10.1016/j.chb.2014.08.004

White, F. A., & Abu-Rayya, H. M. (2012). A dual identity-electronic contact (DIEC) experiment promoting short-and long-term intergroup harmony. *Journal of Experimental Social Psychology, 48*(3), 597-608. https://doi.org/10.1016/j.jesp.2012.01.007

White, F. A., Abu-Rayya, H. M., Bliuc, A.-M., & Faulkner, N. (2015). Emotion expression and intergroup bias reduction between Muslims and Christians: Long-term Internet contact. Computers in Human Behavior, 53, 435–442. http://doi.org/10.1016/j.chb.2015.04.074

White, F. A., Harvey, L. J., & Abu-Rayya, H. M. (2015). Improving intergroup relations in the Internet age: A critical review. *Review of General Psychology,* 19(2), 129-139. https://doi.org/10.1037/gpr0000036

White, F. A., Turner, R. N., Verrelli, S., Harvey, L. J., & Hanna, J. R. (2018). Improving intergroup relations between catholics and protestants in northern ireland via e- contact. *European Journal of Social Psychology*. https://doi.org/10.1002/ejsp.2515

White, F. A., Verrelli, S., Maunder, R. D., & Kervinen, A. (2019). Using electronic contact to reduce homonegative attitudes, emotions, and behavioral intentions among heterosexual women and men: A contemporary extension of the contact hypothesis. *The Journal of Sex Research*, 1-13. https://doi.org/10.1080/00224499.2018.1491943

Woolf, L. M., & Hulsizer, M. R. (2004). Hate Groups for Dummies: How to Build a Successful Hate-Group. *Humanity & Society*, *28*(1), 40-62. https://doi.org/10.1177/016059760402800105

Wright, S. C., Aron, A., McLaughlin-Volpe, T., & Ropp, S. A. (1997). The extended contact effect: Knowledge of cross-group friendships and prejudice. *Journal of Personality and Social psychology, 73*(1), 73. https://doi.org/10.1037/0022-3514.73.1.73

Wu, Y., Mou, Y., Wang, Y. (Jasmine), & Atkin, D. (2018). Exploring the de-stigmatizing effect of social media on homosexuality in China: an interpersonal-mediated contact versus parasocial-mediated contact perspective. *Asian Journal of Communication, 28*(1), 20–37. https://doi.org/10.1080/01292986.2017.1324500

Žeželj, I. L., Ioannou, M., Franc, R., Psaltis, C., & Martinovic, B. (2017). The role of inter-ethnic online friendships in prejudice reduction in post-conflict societies: Evidence from Serbia, Croatia and Cyprus. *Computers in Human Behavior, 76*, 386-395. https://doi.org/10.1016/j.chb.2017.07.041

Table 1

Search string applied to title, abstract and keywords in four scientific databases

Context	Outcome	Theretical Framework
online OR	*prejudice* OR*	*social identity theory OR*
Internet OR	*discrimination* OR*	*SIT OR*
web OR*	*stigma* OR*	*intergroup relation* OR*
mow OR	*sexism* OR*	*social categorization theory OR*
SNS OR	*racism* OR*	*contact theory OR*
social netwok OR*	*islamophobi* OR*	*E-contact OR*
blog OR	*homophobi* OR*	*electronic contact OR*
chat OR*	*ageism**	*Allport OR*
*instant message**		*computer mediated contact*

Table 2

Summary of studies and contexts features, properties of intergroup contact and effect sizes.

AUTHORS (YEAR)	*N*, COUNTRY, SAMPLE CHARACTERISTIC(S)	EXPERIMENTAL OR SURVEY STUDY	INTERACTING GROUPS	MAJORITY, OR BOTH MAJORITY AND MINORITY MEMBERS	COMMON GOALS	COOPERATION	AUTHORITY SUPPORT	NUMBER OF INTERACTIONS	FREQUENCY OF CONTACTS (range 1-5)	QUALITY OF CONTACTS (range 0-1)	ES
1. Contact among ethnic groups											
Abu-Riya (2017)	129, Israel, students	Experimental	Israelis and Ethiopians	Majority	Present	Present	Absent	More			.62
Andrews, Yogeeswaran, Walker & Hewstone (2018)	150, New Zealand, students	Experimental	New Zealanders and Russians	Majority	Absent	Absent	Absent	One			.02
Kim & Wojcieszak (2018) (B)	155, United States, mixed sample	Experimental	Americans and undocumented immigrants	Majority	Absent	Absent	Absent	One			.18
Mustafa & Poh (2019)	50, Malaysia, students	Experimental	Malaysians and Chinese	Both majority and minority	Present	Present	Present	More			-.29
Tawa, Ma & Katsumoto (2016)	64, United States, mixed sample	Experimental	Asians, blacks and whites	Both majority and minority	Absent	Absent	Absent	One			-.01
Imperato & Mancini (2019)	800, Italy, mixed sample	Survey	Italians and migrants	Both majority and minority					2.08		.26
Schwab, Sagioglou & Greitemeyer (2018)	160, Israel, mixed sample	Survey	Iranians and Israelis	Both majority and minority					1.87		.50

Imperato & Mancini, database made available by authors 2019	350, Italy, mixed sample	Survey	Italians and migrants	Both majority and minority					2.52	.29	.38
Zezelj, Ioannou, Franc, Psaltis & Martinovic (2017)	374, Serbia, Croatia, Cyprus, students	Survey	Serbs and Albanians, Greek Cypriots and Turkish Cypriot, Croats and Serbs	Majority					2.10		.95
2. Contact among different religious groups											
Walther, Hoter, Ganayem & Shonfeld (2015) (A)	17, Israel, mixed sample	Experimental	Religious Jews, and secular Jews and Muslims	Majority group	Present	Present	Present	More			.32
Walther, Hoter, Ganayem & Shonfeld (2015) (B)	23, Israel, mixed sample	Experimental	Secular Jews, and Religious Jews and Muslims	Majority group	Present	Present	Present	More			-.12
Walther, Hoter, Ganayem & Shonfeld (2015) (C)	31, Israel, mixed sample	Experimental	Muslims, and religious and secular Jews	Both majority and minority	Present	Present	Present	More			.49
White & Abu-Rayya (2012)	201, Australia, only students sample	Experimental	Muslims and Christians	Both majority and minority	Present	Present	Present	More			.42
White, Abu-Rayya, Bliuc & Faulkner (2015)	205, Australia, only students sample	Experimental	Muslims and Christians	Both majority and minority	Present	Present	Present	More			.61

White, Turnert, Verrelli, Harvey & Hanna (2018) (A)	43, Ireland, only students sample	Experimental	Catholics and Protestants	Both majority and minority	Present	Present	Present	One			.61
White, Turnert, Verrelli, Harvey & Hanna (2018) (B)	43, Ireland, only students sample	Experimental	Protestants and Catholics	Both majority and minority	Present	Present	Present	One			.91
Lissitsa & Kushnirovich (2018)	380, Israel, mixed sample	Survey	Israeli Jews and Palestinians	Majority					1.39	.44	.25
Lissitsa & Kushnirovich (2019)	450, Israel, only students sample	Survey	Jews and Muslims	Majority group					1.12		.19
Lissitsa (2017)	458, Israel, mixed sample	Survey	Jews and Muslims	Majority group							.87
3. Contact between persons of majority and minority sexual orientation											
Kim & Wojcieszak (2018) (A)	106, United States, mixed sample	Experimental	Heterosexuals and homosexuals	Majority	Absent	Absent	Absent	One			.42
MacInnis, & Hodson (2015) (A)	109, Canada, only students sample	Experimental	Heterosexuals and homosexuals	Majority	Present	Absent	Present	One		.84	.17
MacInnis, & Hodson (2015) (B)	105, Canada, only students sample	Experimental	Heterosexuals and homosexuals	Majority	Present	Absent	Present	One		.80	.13
White, Verrelli, Maunder & Kervinen (2019)	280, Australia, only students sample	Experimental	Heterosexuals and homosexuals	Both majority and minority	Present	Present	Present	One			.09
Mancini, & Imperato,	407, Italy, mixed sample	Survey	Heterosexuals and	Both majority and minority					2.62	.43	.53

database made available by authors (2020)			homosexuals								
Wu, Mou, Wang & Atkin (2017)	980, China, mixed sample	Survey	Heterosexuals and homosexuals	Both majority and minority					1.59		.32
4. Contact between other target groups											
Maunder, White & Verrelli (2018)	90, Australia, only students sample	Experimental	Schizophrenic and non-schizophrenic individuals	Majority	Present	Present	Present	One		.74	.34
Schumann, Klein, Douglas & Hewstone (2017) (A)	64, Belgium, only students sample	Experimental	Students who joined fraternities and not	Both majority and minority	Present	Present	Present	One			.5
Schumann, Klein, Douglas & Hewstone (2017) (B)	37, Belgium, only students sample	Experimental	Students from two different universities	Both majority and minority	Present	Present	Present	One		.77	.40
Mancini, Caricati, Balestrieri & Sibilla (2018)	315, Italy, mixed sample	Survey	Different game factions						0.65		.45

Figure 1

Flowchart of records included in meta-analysis.

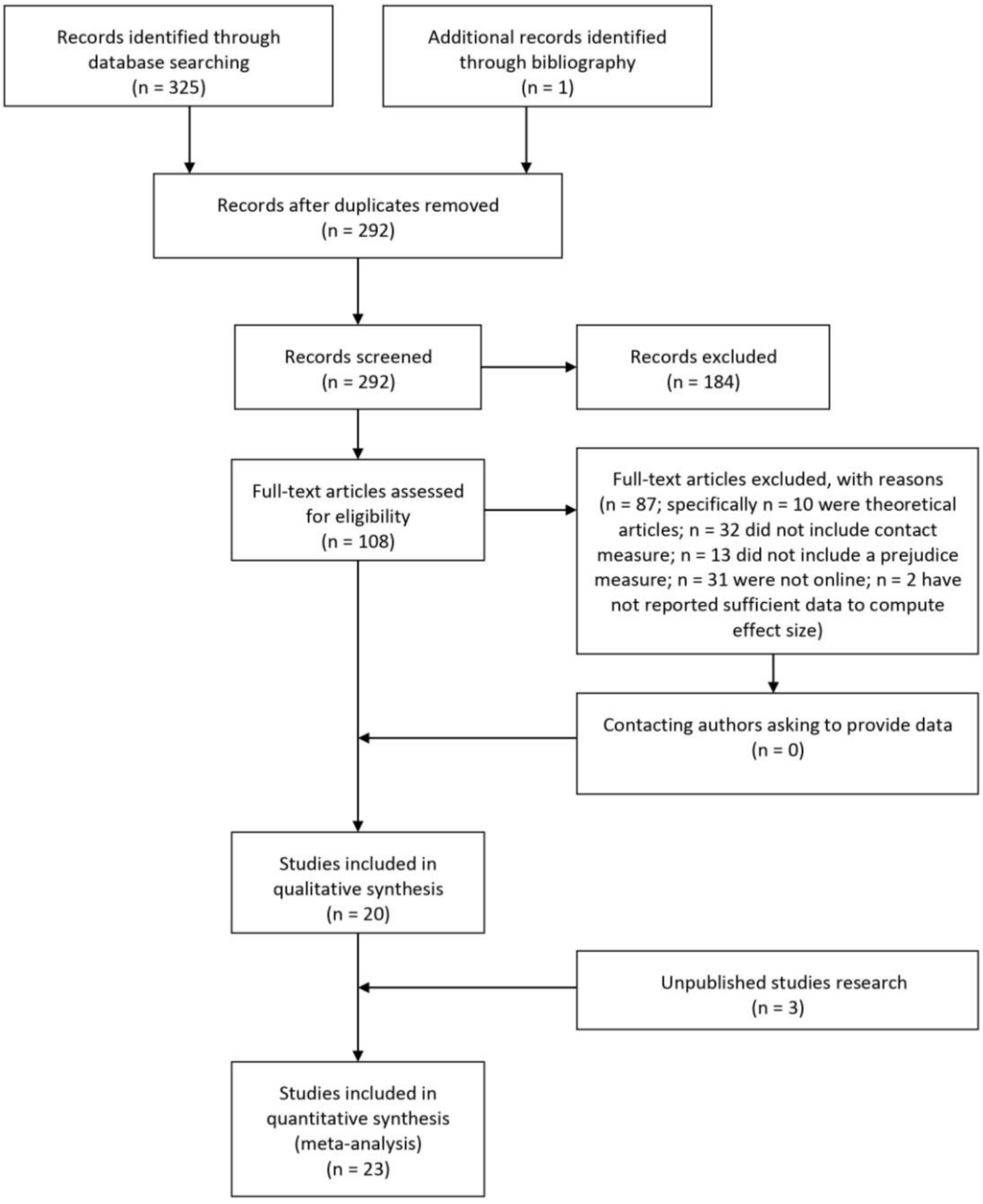
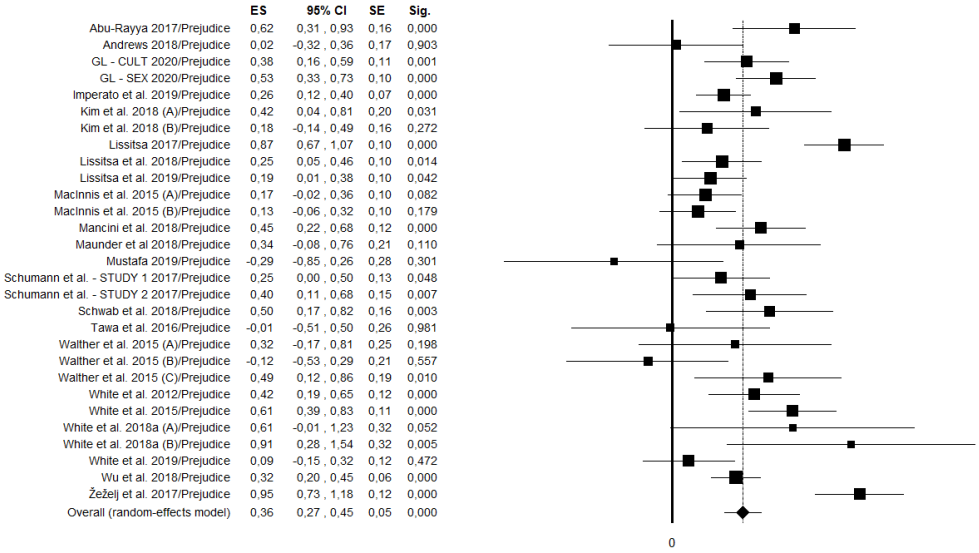


Figure 2

Forest plot of Effect Sizes (ES) for each study included.



Supplementay material 1

Funnel plot.