

Do racial biases differ between generations?

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“The views stated in this thesis are those of the author and not necessarily those of the supervisor, second assessor, Erasmus School of Economics or Erasmus University Rotterdam”

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Abstract

Racial discrimination is currently still present in society. This is caused by implicit and explicit racial biases. Some studies have pointed out that both biases changed towards neutrality over time. The exact reason for this change is still unclear. In this thesis one possible explanation for this change is tested, generational differences. It is investigated if there are generational differences and if these possible differences stem from variation in quantity and quality of interracial contact. The results show that there are generational differences in implicit racial bias, but not in explicit racial bias. The younger generations show less implicit racial bias than the older generations. In contrast to the expectations, this difference is not caused by the quantity and quality of interracial contact, because the interracial contact variables show no significant influence on the implicit racial bias. However, the quality of interracial contact might have a decreasing effect on the explicit racial bias. This means that a higher quality of interracial contact might lead to less explicit racial bias. Although the sample still shows to be implicitly and explicitly biased towards white people, the results show that the implicit racial bias is lower for young generations. If this trend continues, there will be an implicit and maybe explicit neutral biased generation in the near future. This could lead to less discrimination in society.

Keywords: Racial Discrimination, Implicit Racial Bias, Explicit Racial Bias, Contact Hypothesis, Interracial Contact

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Introduction

Over the last decade, discrimination received more and more attention. This is led by the Black Lives Matter (BLM) movement that started in the United States of America. The movement started after a killer got acquitted for the death of a seventeen year old black kid. From this moment the BLM movement stepped up to fight any sort of discrimination against black people. The phenomenon of BLM got international in 2020 after the death of George Floyd. All over the world protests took place to gain attention for and try to stop all forms of discrimination. This might have led to more awareness for the problem. People's opinions and thoughts might be influenced by the movement or the events that led to the construction of the movement. This could be in the unconscious thought, also known as implicit, or in their expressive thoughts and behaviour, also known as explicit. A study showed that most participants in the BLM movement are people from younger generations, aged 18 to 29 (Olteanu et al., 2015). Because of this, the younger generations might have different points of view than older generations when it comes to this discrimination problem.

The definition of discrimination refers to an unequal treatment because of some characteristic (Pager & Shepherd, 2010). This means that people are treated differently purely focused on such a characteristic. There are many characteristics that can be thought of, such as race, gender and disability. In this thesis the focus will be on racial discrimination, meaning being treated unequally based on your race. Many studies have showed the negative effects of racial discrimination, for example the study of Harris et al. (2006) that showed an inequality in health because of discrimination. These studies show that discrimination leads to severe problems.

Discrimination stems from people's biases. Those biases are separated into implicit and explicit. The two differences between the two that are most commonly indicated are awareness and willingness to report. Implicit biases are biases that people are unaware of and explicit biases are biases that people are aware of, but may be unwilling to report to fit into the social construct. Several studies have shown the correlation between implicit and explicit racial biases and discriminatory behaviour (e.g. McConnell & Leibold, 2001).

To stop this kind of behaviour, it seems that the implicit and explicit biases need to be changed. There are many studies that looked into the malleability of implicit and explicit biases in the short term (Lai et al., 2014; Lower et al., 2001; Wittenbrink et al., 2001; Rydell et al. 2007; Blair et al., 2001; Beattie et al., 2011). All show that both types of biases can be altered in the short term. Which means that people's biases were momentarily changed during the experiment and sometimes shortly after the experiment.

Finally, there are some studies that looked into the long term malleability of implicit and explicit biases (Charlesworth & Banaji, 2019 & 2021; Baron & Banaji, 2006; Gawronski et al.,

2017). The results of these papers do not show one clear answer, but the results are contradicting one another. Some argue that explicit biases are less stable than implicit biases, but others argue the exact opposite. Therefore, it is not possible to draw a hard conclusion about the long term malleability of both biases.

Charlesworth and Banaji (2019 & 2021) showed twice that both implicit and explicit racial biases move towards neutrality. One of the speculated reasons they give for this phenomenon is that the people who filled in the survey later in time are less biased. This can be caused by younger people filling in the survey later on during the study. This points out that there could be generational racial bias differences. There could be many reasons why the younger generations would be less biased. For example, the portion of people with a migration background in the Netherlands in 2018 was 25.7%. This portion was only 19.6% in 2008. Over the four big cities Amsterdam, Rotterdam, Utrecht and Den Haag, this portion is 51.8% (Centraal Bureau voor de Statistiek, 2022). This means that people will be more and more confronted with other races, for example in schools or at work. More contact between races could lead to less stereotyping and discrimination, called the contact hypothesis (Allport, 1954). College students are found to be more affected by this contact hypothesis than adults (Pettigrew & Tropp, 2006). They also found that children are even more affected. Because of this, it is possible to say that the contact hypothesis has more influence on relatively younger people.

So, discrimination is still a big problem that stems from people's implicit and explicit biases. As mentioned, these biases can be changed in the short term in various ways. But, there is still no certainty about the malleability of implicit and explicit biases in the long term. The studies of Charlesworth and Banaji (2019 & 2021) suggest that there could be generational differences in racial biases. This suggestion is supported by the study of Pettigrew and Tropp (2006). Younger generations seem to be influenced more by the contact hypothesis, meaning that they could be influenced more by interracial contact. This study will investigate if there are indeed differences in implicit and explicit biases between generations. The biases that will be studied are racial biases, meaning biases towards a certain race. It covers the biases towards black people compared to white people. The population is divided here into different generations based on the year of birth. There are different ways to classify the generations, but this thesis will use the same distribution as Charlesworth and Banaji (2019). That means that the participants are divided into baby boomers (born between 1945 and 1963), generation X (born between 1964 and 1975), millennials (born between 1976 and 1994) and generation Z (born between 1995 and 2009). This leads us to the research question of this thesis:

'Is there a racial bias difference between younger and older generations?'

This is answered by testing three hypotheses that are mentioned in the literature review. The implicit and explicit racial bias and interracial contact are compared between the different generations to see if there is indeed a generational difference. Also, the effect of interracial contact on implicit and explicit racial bias is measured to see if possible generational differences can be explained by differences in interracial contact.

The next part will first shed a light on the existing literature in this field. This will give an explanation about what is already known and what is yet unknown. After this, the data and methodology that are being used are explained. This is followed by an overview of the results. Finally, the results are being discussed, followed by a conclusion.

Literature review

This part will give a summary of what is already known in the field of discrimination, implicit and explicit racial biases. First of all, the severe effects of discriminatory behaviour are discussed. This will give an insight in some of the problems that can be caused by discrimination. After this, the distinction between implicit and explicit biases is explained, as well as their relation with discriminatory behaviour. This paragraph shows why it is necessary to adjust implicit and explicit racial biases to tackle the problem of discrimination. Then it is discussed how both biases can be changed in the short term with the use of certain interventions. Furthermore, the long term malleability of both biases are discussed, followed by the hypotheses of this study.

Consequences of discrimination

Facing discrimination can have severe effects. For example on mental and physical health or economic situation. A study that investigated the effect of racial discrimination on behavioural health outcomes under adolescents found that 73% of the 2,490 participants experienced some form of racial discrimination, of which 43% 'somewhat-' or 'very disturbing'. They also found that the participants who experienced racial discrimination had an increased risk for almost all the behaviours tested, like depression, suicidal ideation or physical aggression (Tobler et al, 2012). Another study in New Zealand found that discrimination led to an inequality of health between two ethnic groups. The Māori were more likely to be discriminated than the European inhabitants. They found that this difference was associated with multiple health measures. The Māori had an increased chance of reporting to be in fair or poor health, low physical functioning, cardiovascular disease and low mental health (Harris et al., 2006). Besides health problems, discrimination can also lead to economic problems. Nunley et al. (2015) found in a field experiment that black applicants receive around 14% less job interview requests than their similar white counterparts. They also found that the racial employment gap is bigger for jobs where contact with customers is required or where the work is judged on production or quality. Another study also found evidence of discrimination in the labour market, this time in Brazil. An employment gap between different races was found. Besides that, they show that being brown or black leads to a lower wage compared with white employees (Arcand & D'hombres, 2004). This all shows that discrimination can lead to serious problems. That's why it is necessary to try and tackle the discrimination problem.

Implicit and explicit biases

In research, biases are divided into two groups, implicit or explicit. There are multiple differences between implicit and explicit biases, but two of them are most commonly used. The first of these commonly used differences between implicit and explicit biases is the presence

or absence of conscious awareness (Hulstijn, 2005). Implicit biases are the ones people are not consciously aware of and explicit biases are the ones that people are consciously aware of. The other commonly used difference is that people may be unwilling to report their true explicit biases and control their explicit response to come over as unprejudiced (Maass et al., 2000).

A study in the United States found that there is a relation between implicit and explicit racial biases and discriminatory behaviour (McConnell & Leibold, 2001). During the experiment the participants were confronted with a white experimenter for half of the time and a black experimenter for the other half of the time. The participants' behaviour was judged by both the experimenters and behavioural experts. Besides that they filled in an implicit association test (IAT) which also included a questionnaire to measure explicit racial biases. With these measures, the study found that there is a positive association between discriminatory behaviour and implicit and explicit racial biases. So people who's IAT showed a negative association with black people, were more likely to have more negative social interactions with black people and they reported more black prejudices in the questionnaire. Hence, there is a correlation between discrimination and implicit and explicit racial biases. Whitfield and Jordan (2009) showed that different learning methods could influence both implicit and explicit attitudes. They stated that implicit and explicit attitudes can stem from the same source and they can influence each other. This means that there is a correlation between the two. Another study tested this correlation between the two types of biases. They found that the correlation between the two can be very high when the structures of both tests are equalled, even on the topic of racial attitudes (Payne, Burkley & Stokes, 2008).

On the other hand, there are also studies that argue that both biases differ from each other. For example, Greenwald and Banaji (1995) argued that there is a firm difference between implicit and explicit cognition. Implicit effects are such that they are not detectable with introspective or self-reported measures, so that these effects operate automatically and unconsciously. They describe explicit effects as processes that require conscious thought. Wilson, Lindsey and Schooler (2000) agreed with this and proposed a 'dual attitudes' model. They argue that people have both conscious and automatic components when it comes to their attitudes. The conscious component is captured by explicit measures and the automatic component by implicit measures. In cases where people make decisions with deliberation, the conscious component of their attitudes is dominating. If there is not much deliberation the automatic component is dominant.

This 'dual attitudes' model is proved by another study. In this study the effect of negations (statements that something is not true) on both implicit and explicit measures is researched. The study shows that a single stimulus can have opposite effects on the implicit and explicit measures (DeCoster et al., 2006).

Therefore, it is hard to draw conclusions about the relation between implicit and explicit measures. According to some studies there seems to be a correlation between the two. Other studies point out that the two are completely different and do not correlate with each other. Because of this, it is necessary to measure and test both in this study. This makes it possible to see the effect of both and to study the correlation between both measures.

Short term influence on implicit and explicit biases

A study found that many different interventions could change social implicit biases in the short term. This means that it is possible to situationally decrease these biases (Lai et al., 2014). An example of such an intervention is by letting participants read a story where white people are the 'bad guys' and black people are the 'heroes'. This effect is also shown by some other studies. Lowery, Hardin & Sinclair (2001) showed a temporarily decrease of implicit social biases when the experimenter was black instead of white. Wittenbrink, Judd & Park (2001) found that the situation they showed black people in could also decrease implicit social biases temporarily. For example by showing the black person at a family barbecue instead of at an old street corner. Also mental imagery was found to be successful in decreasing implicit social biases in the short term (Blair, Ma & Lenton, 2001)

It is also possible to influence the explicit attitudes of people. Beattie, Sale and McGuire (2011) showed in a study about the explicit attitudes towards climate change that explicit attitudes can be changed. By showing participants an informative and emotional film, the explicit attitudes were significantly changed during the experiment. Rydell et al. (2007) also showed that explicit attitudes are malleable. They provided their participants different levels of counter attitudinal information to see the effect on implicit and explicit attitudes. Implicit attitudes changed very slowly, but explicit attitudes were influenced very quickly. Even with low amount of counter attitudinal information, the explicit attitudes were influenced.

Based on the evidence of the studies mentioned above, it is possible to say that both implicit and explicit attitudes can be influenced by multiple forms of interventions in the short term.

Long term change in implicit and explicit biases

So implicit and explicit social biases could be affected on the short term, but what about the long term? There is not much research on the long term change. Charlesworth and Banaji (2019) tried to study this topic. They used the data of four million online IATs over the period 2007 to 2016. They studied the explicit and implicit attitudes towards six social groups: race, skin tone, sexual orientation, age, body weight and disability. They found that for almost all social groups, the explicit and implicit biases towards them moved towards neutrality. The correlation between explicit and implicit social biases remained around the same.

Charlesworth and Banaji (2019) discussed the generational influence on the biases. They state that the decrease in biases is partly caused by external factors that are the same for everyone, called the period effects. These effects are dependent on the time frame. For example, discrimination was seen as less of a problem in the history than nowadays. They also mention that generational effects may occur, because younger generations are affected more by social forces that cause change. For example, legislations or media campaigns. It is argued that an interaction between these period effects and the generational effects account for the differences between age groups. With their data, they can not distinguish the exact individual effects, so they recommended doing this in future research. This is exactly what this study tries to investigate.

Charlesworth and Banaji (2021) found again that implicit and explicit racial biases moved towards neutrality. They also show that younger generations moved faster towards neutrality for both implicit and explicit biases. In contrast to this, Baron and Banaji (2006) show that implicit social biases remain constant through development. In this study, adults show the same amount of implicit bias as 6-year-olds and 10-year-olds. Besides that, they show that explicit biases are lower for adults than for children. This decrease in explicit bias as people get older can be explained by societal norms. As people get older, they want to meet the norms and adjust their explicit attitudes towards them. Therefore, the explicit racial biases could decrease when people age. Baron and Banaji (2006) state that this split between implicit and explicit biases first emerges around the age of ten. After this, the split gets bigger.

Gawronski et al. (2017) also studied the long term changes in implicit and explicit racial biases. In contrast to Baron and Banaji (2006), they found that implicit biases are less stable over time than explicit biases. This means that implicit biases might be more influenced by recent experiences than explicit biases. As mentioned before, younger generations are affected more by social forces that cause change, which could indicate that implicit biases are easier to influence for younger people than older people.

Hypotheses

To be able to formulate an answer to the research question of this study, there are some hypotheses that need to be tested. As discussed above, the pattern of implicit social biases across ages is uncertain. Some studies show that younger generations are less biased and other studies show the opposite. To be able to make an expectation for the first hypothesis, we will focus on the interpretation of the results of early mentioned studies and on the contact hypothesis (Allport, 1954).

As Charlesworth and Banaji (2019) stated, younger people are influenced more by social forces that cause change. Besides that, the society is getting more and more diverse starting from the bottom, for example in schools. This means that the younger generation could

get sooner and more in contact with other races than older generations. This contact could lead to less implicit and explicit biases towards other races (Allport, 1954). Baron and Banaji (2006) also stated that familiarity plays a big role in racial biases. The more familiar someone is with the other race, the less biased they will be. Besides that, it has been found that the contact hypothesis has a higher effect on younger people, meaning that younger people are more likely to become familiar with people from other races (Pettigrew & Tropp, 2006). Because of these reasons, it is expected that younger generations in this research will show less implicit racial bias than older generations. This is tested with the hypothesis:

'H1: Younger generations show less implicit racial bias than older generations.'

It is expected that in every test a younger generation compared with an older generation shows less implicit racial bias. Especially when comparing the youngest and oldest generation, a significant difference in implicit racial bias is expected.

Baron and Banaji (2006) showed that explicit biases decreased with age between children and adults. They don't cover the difference between adult ages, so this difference is unknown. The study of Charlesworth and Banaji (2021) shows that explicit biases move faster to neutrality for younger generations than for older generations, where both generations consist of adults. The contact hypothesis can also play a role when it comes to explicit racial biases. As explained above, younger people can become familiar with other races sooner than older people, which could lead to less prejudice towards the other races (Allport, 1954; Pettigrew & Tropp, 2006). Because of this, it is expected that younger generations show less explicit bias. Therefore, the hypothesis for explicit racial bias is as followed:

'H2: Younger generations show less explicit racial bias than older generations.'

Similar to the first hypothesis it is expected that when comparing generations, the youngest generations comes out as less explicitly biased. Especially when the youngest and oldest generation are compared with each other.

Like mentioned before, it might be possible that the differences in racial biases stems from the amount of contact with other races. This is called the contact hypothesis (Allport, 1954). The hypothesis says that prejudices or conflicts between groups can be solved by contact between the groups. This means that the more contact someone has with another race, the less prejudices and biases this person will have towards this race. One of the reasons for differences in racial biases can be this contact hypothesis. Therefore, it is useful to test this.

This hypothesis is tested before. For example, Binder et al. (2009) studied, among other things, the effect of friendship contacts on prejudices. The prejudices were measured by seven questions about feelings towards the other race, where one contained the general feeling, three contained a negative feeling and three contained a positive feeling. Ellison, Shin and Leal (2011) also showed that more contact leads to more favourable attitudes. These attitudes were measured as a rating on several characteristics combined with a rating on social, economic and cultural contributions. This third hypothesis is divided into two parts. First of all it is tested if there is a difference in interracial contact between generations. Secondly it is tested if the social biases are influenced by the contact hypothesis. This leads to the following hypotheses:

'H3a: Younger generations have more interracial contact than older generations.'

'H3b: A higher amount of interracial contact decreases people's implicit and explicit racial biases.'

The expectations of this hypothesis are similar to the first two hypotheses. It is expected that in every comparison the younger generation will have more interracial contact than the older generation. Also, it is expected that this interracial contact has a decreasing influence on people's implicit and explicit racial bias.

Methodology

Survey

Recruitment

The survey ran the full month of April, 2022. It consisted of several questions to obtain characteristics and to measure explicit and implicit racial biases. First of all, the respondents will see an explanation about the survey, about the anonymity of their answers and the question if they agree that their answers are used in this thesis. The survey also contains a random lottery incentive of two €10 gift cards, conditional on completing the full survey. Respondents can participate in this lottery by filling in their mail address. Although respondents might fill in their mail address, the obtained data from the survey remains fully anonymous. The survey is spread via social media and my own social network. To obtain as much respondents as possible I also used some close contacts to spread it to their social networks. This way, I was able to gather respondents in the older generations. Figure 1 below shows the survey flow. The arrows between the boxes indicate the order in which the boxes appeared to the participants. The two arrows on the side indicate that these two boxes were randomised in order.

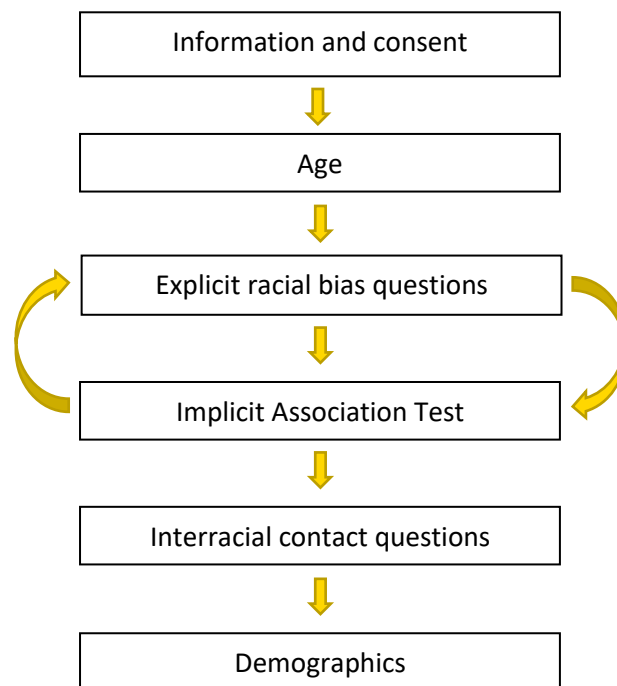


Figure 1. The survey flow

Age

After this, the most important demographic is asked, namely the age of the respondent. The other demographic questions are at the end of the survey to make sure that the participants have their full focus on the more important tasks in the survey. So after filling in their age, the participants move on to the explicit and implicit racial bias measures. These two tasks are randomized in order of presentation to ensure that the results are not biased by an order effect.

Self-report explicit measures

The explicit racial bias of the respondent is measured by a question about the preferences of the respondent and about how warm or cold they feel towards other races. The first question of this part replicates the explicit bias measures of another study into implicit racial associations (Nosek et al., 2007). In this question the respondent is asked which of the answers described them the best. The answers are on a 7-point Likert scale ranging from 'I have a strong preference for white people over black people' to 'I have a strong preference for black people over white people'. Besides that, the respondents are asked how warm or cold they feel towards black people and white people. These two questions are inspired by another study into explicit racial biases (Leitner et al., 2016). These two questions also have a 7-point Likert Scale with responses ranging from 'extremely warm' to 'extremely cold'.

Implicit association test

To measure the implicit racial biases, the respondent have to make a racial IAT (Greenwald et al., 1998). The IAT is used to study the underlying automatic evaluations of the respondents in regards to race. It measures if the respondents associate a particular race sooner with being pleasant than another race. The IAT is generated with the use of a website founded by Carpenter et al. (2019). The pictures that are used in this IAT were the same as the pictures Nosek et al. (2007) used in their study. A total of twelve pictures is used of which six of black people and six of white people. All pictures are cropped at the chin and the forehead (Table A1). The words that are used are also replicated from the same study. All words can be clearly classified as pleasant or unpleasant (Table A2). A list of the used words and pictures can be found in Appendix A. The task consists of seven rounds. In every round, one category is in the top left corner and one category in the top right corner. Both categories are linked with a key, 'E' for left and 'I' for right. This is shown in Figure A1. The stimuli, words and pictures, appear in the middle of the screen and the respondents have to categorize them by pressing either the 'E' or 'I' key, as shown in Figure A2. In parts one, two and five only Black-White or Pleasant-Unpleasant are the categories. For the other rounds a combination of Black-White and Pleasant-Unpleasant are the categories. The blocks with combined categories will eventually lead to the implicit racial bias measure. The implicit association is further explained in the variables section. Right before the IAT, the test is explained in Dutch to make sure that

everyone understands the instructions. This instructions page ends with questioning if the participants have been in contact with such a test before to make it possible to control for learning effects.

Interracial contact

After the explicit and implicit measures, some questions are used to measure the interracial contact of the participants. These questions are replicated from the study into contact of Binder et al. (2009). First the respondents are asked to what race they belong. Then is it asked how many friends from other races the respondent has in categories 'none', '1-3', '4-6', '7-9' and '10 or more'. This is followed by the question how often they see these friends, 'rarely', 'sometimes', 'neutral', 'regularly' and 'often'. These two questions indicate the quantity of interracial contact. The quality of the interracial contact is measured by three questions about how close, equal and cooperative the friendship is. The interracial contact questions are formatted as Likert-scale questions with five options. The answer options vary from 'very distant/unequal/non-cooperative' to 'very close/equal/cooperative'. These questions determine the quality of interracial contact.

Demographics

Finally, the characteristics that are gathered are gender, marital status, education in years, occupation and province the respondents live in. The combination of marital status, years of education and occupation makes it possible to control for socioeconomic status (SES).

Variables

The explicit measure

The explicit measures are computed with the help of three questions. The first question has a 7-point Likert scale going from 'I have a strong preference for black people over white people' (-3) to 'I have a strong preference for white people over black people' (3). Secondly, the participants are asked how warm or cold they feel towards black and white people. Again a 7-point Likert scale is used going from 'Extremely cold' (-3) to 'Extremely warm' (3). The difference between the questions about black people and white people is calculated ranging from 0 to 6. This leads to two explicit racial bias variables. The variables do not capture exactly the same, which is also shown by the low correlation (Table 8). Because of this both variables will be treated separately in the analysis. They are referred to as 'explicit' and 'warmth'.

The implicit measure

The implicit bias of the participants is measured with the mentioned IAT. As explained, the where Black-White and Pleasant-Unpleasant are combined will lead to the final measure. In block three and four the categories are Black-Unpleasant and White-Pleasant and in blocks

six and seven Black-Pleasant and White-Unpleasant are the categories. The response time of respondents is measured in all blocks. To come to the final measure, the D-score, the differences between block three and six and block four and seven are calculated. These differences are divided by a pooled standard deviation of the corresponding blocks. This gives two outcomes, namely one for block three and six and one for block four and seven. These two outcomes are averaged, which leads to the final D-score that is used in the analyses. (Greenwald et al., 2003). By calculating the D-scores this way, it is a relative measure. It is measured how much faster or slower the respondent acted in the one of the opposite blocks. The D-score is zero if the response times in both part were the same. The D-score is positive if the participant was quicker in the White-Pleasant and Black-Unpleasant part than in the White-Unpleasant and Black-Unpleasant part, meaning that the respondent associates white people with being pleasant sooner than black people with being pleasant. This means that the respondent has a implicit preference for white people over black people. A negative D-score implicates the opposite, associating black people with being pleasant sooner than white people with being pleasant. So, the respondent implicitly prefers black people over white people. (Carpenter et al., 2019).

Interracial contact measures

As mentioned before, the interracial contact measures are replicated from Binder et al. (2009). All questions are answered with a 5-point Likert scale. First, two questions measure the quantity of interracial contact. First 'How many of your friends belong to another race?'. The answer options are 'none', '1-3', '4-6', '7-9' and '10 or more'. The second question is 'How often do you see your friends from another race?'. The answer options reach from 'rarely' to 'often'. These two questions are averaged and together form the quantity of interracial contact. Then, three questions measure the quality of interracial contact. These questions cover closeness, equality and cooperation. The 5-point Likert scale for these questions go from 'very distant/unequal/non-cooperative' to 'very close/equal/cooperative'. Finally, these measures are averaged to form the quality of interracial contact. Except for the first question, all questions have the middle option, option three, as 'neutral' answer. The quantity and quality of contact are separately used in the analysis, because they both measure different aspects of interracial contact.

Control variables

Race will be included in the regressions as dummy variable. The variable will be zero for all white people and one if the participants was not white. Also gender will be included as a dummy variable, where women are denoted by zero and men by one. Besides that, the marital status is defined into two categories, being single or being in some form of relationship. By doing this,

it is possible to include this variable as a dummy to control for the marital status. The number of educational years is included as a continuous variable. Occupation will be used as a categorical variable. The reference group will be the largest occupation in the sample, 'Care & Welfare'. Same goes for the province variable. It will be included as categorical variable where the reference group will be 'Zuid-Holland'. Finally, the variable if the participant has encountered other IAT's before this survey is included as a dummy variable. The variable will be zero if the participant did not and one if the participant did.

Data

Participants

The survey had a total of 137 participants. Not all participants completed the full survey. A total of 37 observations were dropped, because they did not contain data for both the implicit and the explicit measures. Besides that, one observations showed an outlying implicit racial bias score (Figure B1). All implicit measures are between -0.45 and 1.21, but this observations is -1.16. The outlier is detected by using a histogram as graphical evidence and calculating z-scores for all observations. The implicit bias is over three standard deviations lower than the mean ($z=-3.75$), so it will be treated as an outlier. Therefore, the implicit racial bias score for this observation is set to be missing, because all other variables of this observation show no outlying numbers. By doing this, the outlier can not influence the results concerning the implicit racial bias, but the observation can be used for explicit racial bias and interracial contact analyses. Not excluding the outlier does not change the sign of the coefficients, but it does change the magnitude. Because the outlier is negative and the participant belonged to the young generations, the difference between the young and old generations would have been overestimated. Besides that, the implicit racial bias is missing for one respondent due to excessive speed during the IAT. This is done when more than 10% of the trials of a respondents are faster than 300 milliseconds.

The ages of the participants are divided into generations as followed, 'Z' is aged 13 to 26, 'Millennials' is aged 27 to 45, 'X' is aged 46 to 57 and 'Boomers' is aged 58 to 77. Two observations are dropped because the age of the participants (both 83) did not fit into one of the generational demarcations. This leaves a dataset of 97 observations of which the descriptive statistics can be found in the next section. Not all respondents finished the full survey, so therefore there are some differences in number of observations between variables. Table 1 show how the respondents are divided over the generations. A total of 47 respondents belong to generation 'Z', 14 belong to generation 'Millennials', 15 belong to generation 'X' and the final 22 belong to generation 'Boomers'.

Table 1. Tabulation of generations

	Freq.	Percent
Z	47	47.96
Millennials	14	14.29
X	15	15.31
Boomers	22	22.45
Total	98	100.00

An a priori power calculation is used to see if the amount of participants per generation provides enough power to perform an ANOVA test and t-tests. First, the formula shows that every generations must consist of 19 participants to obtain a minimum power of 0.8 with an ANOVA test. This is based on Cohen's *f* large effect size of 0.4 (Cohen, 1988). Half of the generations consist of less than 19 participants, so an ANOVA test with sufficient statistical power can not be run. Second, the calculation shows that every group must contain 21 participants to obtain a minimum power of 0.8 with the t-tests. This number is again based on Cohen's *d* large effect size of 0.8 (Cohen, 1988). Only two of the generations consist of enough participants to meet the minimum sample size. Therefore, it is also not possible to run multiple t-tests with sufficient statistical power. Because of this, the two youngest and the two oldest generations are merged together into a 'young' and 'old' group. This way the number of participants per group is large enough to run t-tests with sufficient statistical power.

Descriptive statistics

Table 2 shows the descriptive statistics of the new generation variable and the control variables. as mentioned, the amount of participants per generation group is now large enough to run t-tests with sufficient statistical power. Most of the participants are white (80), compared to a small group of participants who are not (9). With 56 against 34 the majority of the sample is female. Most of the participants are in some form of a relationship, namely 64 compared to 26 participants who are single. The average number of educational years is 11.125. The occupation groups are all small (between one and eleven participants), except for the group 'Care & Welfare' which consists of almost 30 percent of the sample. A majority of 64.44 percent of the sample lives in Zuid-Holland. The other provinces are, with an amount between one and eight, not highly represented in the sample. Lastly, most of the participants, 95.79 percent, had not done another IAT test before the one in this survey.

Table 2. Descriptive statistics of the generation variable and the control variables.

Variable	Frequency	Percent/Mean
Generation	98	100
Young	61	62.24
Old	37	37.76
Race	90	100
White	81	90.00
Asian	4	4.44
Black	1	1.12
Other	4	4.44
Gender	90	100
Female	56	62.22
Male	34	37.78
Marital Status	90	100
Single	26	28.89
With a partner	64	71.11
Educational years	88	11.125
Occupation	89	100
Other	5	5.62
Economic & administration	11	12.36
Commercial	8	8.99
Creative & linguistic	1	1.12
Service	5	5.62
ICT	3	3.37
Do not work (yet)	11	12.36
Managers	2	2.25
Public administration, security & legal	9	10.11
Pedagogical	6	6.74
Technical	1	1.12
Transport & Logistic	1	1.12
Care & welfare	26	29.21
Province	90	100
Drenthe	1	1.11
Gelderland	5	5.56
Limburg	6	6.67
Noord-Brabant	8	8.89
Noord-Holland	4	4.44
Overijssel	1	1.11
Utrecht	7	7.78
Zuid-Holland	58	64.44
Done IAT before	95	100
No	91	95.79
Yes	4	4.21

Table 3 shows the descriptive statistics of the variables of interest. The implicit bias measure has 88 observations and an average of 0.477 ($SD=0.399$) with a minimum of -0.454 and a maximum of 1.206. This shows that the average of the respondents is positive, meaning that the respondents on average implicitly prefer white people over black people. The first explicit bias measure has 98 observations with an average of 0.337 ($SD=0.657$), a minimum of -2 and a maximum of 3. An outcome of 0 for the explicit bias measure means no explicit preference. The average is just over 0, meaning that there is on average a light explicit racial preference for white people over black people. The second explicit bias measure is warmth. This variable has a mean of 0.061 ($SD=0.375$). With a mean just above 0 this variable also suggest that there is a small explicit preference for white people over black people. Quality of interracial contact has 83 observations. The average of this variable is 3.847 ($SD=0.632$) with a minimum of 1 and a maximum of 4.667. The Likert-scale included a neutral answer, namely 3. Because the mean is over 3 the variable suggest that the quality of interracial contact of the respondents is better than neutral. Quantity of contact has 90 observations with an average of 2.594 ($SD=0.807$). The variable has a minimum of 1 and a maximum of 5. Again the neutral answer was set at 3. The mean is below three, meaning that the quantity of contact is less than neutral.

Table 3. Descriptive Statistics of the variables of interest.

Variable	Obs	Mean	Std. Dev.	Min	Max
Implicit racial bias	88	0.477	0.399	-.454	1.206
Explicit racial bias	98	0.337	0.657	-2	3
Warmth	98	0.061	0.375	-1	2
Quality interracial contact	83	3.847	0.632	1	4.667
Quantity interracial contact	90	2.594	0.807	1	5

Table B1 shows the correlations between the variables. Most obvious are the low correlation between the quantity and quality of interracial contact and the implicit racial bias (0.052 and -0.003). This suggest that the quantity and quality of interracial contact does not lead to a significant change in implicit bias. The correlation for quantity and quality of interracial contact and explicit bias is stronger (-0.105 and -0.217). These correlations suggest that an increase in interracial contact, both quantity and quality, decreases the explicit bias. Besides that, the correlation between the implicit and explicit bias is relatively large with 0.190. This means that an increase in explicit bias also leads to an increase in implicit bias. It is also remarkable that the generation variable has a positive correlation with the implicit bias (0.182) and a negative correlation with the explicit bias (-0.047). This means that belonging to one of the older generations increases the implicit bias and decreases the explicit bias.

Planned analysis

The first three hypotheses that are tested are:

H1: Younger generations show less implicit racial bias than older generations.

H2: Younger generations show less explicit racial bias than older generations.

H3a: Younger generations have more interracial contact than older generations.

H3b: A higher amount of interracial contact decreases people's implicit and explicit racial biases.

Before these hypotheses can be tested it is necessary to see if the variables of interest significantly differ from their neutral answer. If all groups show no difference from zero it is possible to conclude that there is no significant implicit and explicit bias in this sample. Hence, there is no point in comparing the different groups with each other. One-sample t-tests are used to see if the implicit and explicit measures differ from their neutral answer. After this, there are two statistic tests used to test these hypotheses. First, t-tests are used to compare the young and old generations. This way it is possible to directly see if one of the two has a lower mean than the other. It is expected that the younger generations group shows a significant lower implicit and explicit racial bias than the older group. Also, a significant higher interracial contact, both quantity and quality, is expected for the younger generations compared to the older generations.

After this, regressions are run to see if the possible differences from the t-tests are still present when controlling for demographic variables. So, these regressions serve as a robustness check for the first two hypotheses. Two different regressions are used, an Ordinary Least Squares (OLS) regression and an ordered logistic regression. The OLS regression is used for the continuous implicit bias and the ordered logistic regression is used for the categorical explicit bias. The control variables will be included in all the regressions as they are mentioned in the 'Variables' section. For the third hypothesis similar regressions are used, but this time with the quantity and quality of interracial contact included as independent variables. It is expected that these two variables have a significant negative effect on the outcome variables implicit and explicit racial bias.

Assumptions

t-tests

The use of t-tests is only validated if some assumptions hold. If the assumptions do not hold, the non-parametric equivalent is used, the Mann-Whitney U test. First, both groups must follow a normal distribution. This is tested by a running a Shapiro-Wilk test. The p-value of this test must be above an alpha level of 0.05 to prove that the variable is normally distributed. Otherwise the normality assumption does not hold. Second, the assumptions of equal variances must hold. A Levene's test is run. The p-value should be above the alpha level of 0.05 for the variances to be equal and for the assumption to hold.

OLS regression

To use an OLS regression, there must be a linear relation between the dependent and independent variable. Besides that, the residuals should be normally distributed, which is tested by a Shapiro-Wilk test. Again the p-value must be above the alpha level of 0.05 for this assumptions to hold. Then, the homoscedasticity of the residuals is tested using the White's test and the Breusch-Pagan test. If the p-values of these outcomes are above the alpha level of 0.05, the residuals are homogenous and the assumption holds. Finally, there must be no multicollinearity. This is checked by the Variance Inflation Factor (VIF). If these factors are all below 10, the assumption of no multicollinearity holds.

Ordered logistic regression

Finally, the ordered logistic regressions also need some assumptions to hold. First of all, the dependent variables must be categorical and ordinal. Second, the proportional odds assumptions must hold. This is tested by the likelihood ratio test in Stata. The assumptions holds if the p-value of the test is above an alpha level of 0.05. At last, the no multicollinearity assumptions must hold. This time, the assumption is tested by looking at the correlation between the explicit racial bias variable and the generations variable. If the correlation is lower than -0.7 or higher than 0.7, this assumptions does not hold.

Validation of the methods

Implicit racial bias

Table B2 shows the results of the t-tests used to see if the implicit racial bias is significantly different from zero. All p-values are with a p-value of 0.000 significant at a 1% significance level. This means that the implicit racial bias indeed differs from zero for the whole sample and for both groups individually. This makes it useful to study the differences between the two groups. The Shapiro-Wilk test results can be found in Table B3. The older generations group has a significant p-value at a 5% significance level, meaning that the implicit racial bias is not normally distributed among this group. Besides that, the results of Levene's test indicated that there is no significant difference in variances between the young and old group ($F=0.74$, $p=0.39$). But, because the normality assumption does not hold for both groups, the t-test is replaced by a Mann-Whitney U test.

Figure B2 shows that there is somewhat a linear relation between the implicit bias variable and the generation variable, so this assumption holds. The results of the Shapiro-Wilk test indicate that the residuals are normally distributed ($W=0.985$, $p=0.43$). Also, the results of the White's test ($Chi=61.23$, $p=0.707$) and the Breusch-Pagan test ($Chi=0.06$, $p=0.799$) show that the assumptions of homoscedasticity holds, because both p-values are above 0.05.

Finally, all factors of the VIF (Table B4) are below 10, so there is no need to worry about multicollinearity. Hence, all four assumptions hold.

Explicit racial bias

In Table B5 the results of the one-sample t-tests are shown for the explicit bias and warmth variable. As shown, the explicit bias variable is significantly different from zero for the whole sample and for both groups with p-values of 0.000, 0.000 and 0.001. In contrast to this, the warmth variable is not significantly different from zero with p-values of 0.109, 0.133 and 0.571. This may be due to the fact that many people did not completely understand the temperature questions and therefore filled in the same answer for both questions. Because of this, it makes no sense to compare this variable between the two groups. Therefore, this variable will be excluded from the analysis.

Table B6 shows the results of the Shapiro-Wilk tests to see if the explicit racial bias variable follows a normal distribution in both groups. Both p-values are below 0.05, so the data is not normally distributed in both groups. The results of the Levene's test provide statistical evidence that there is no significant difference in the variances between the two groups ($F=2.34$, $p=0.13$). But, because the data is not normally distributed, the t-test will be replaced by a Mann-Whitney U test.

The assumption of no multicollinearity holds for the ordered logistic regression. The correlation between explicit racial bias and generation is -0.047 (Table B1), which is higher than -0.7. In contrast to that, the results of the likelihood ratio test suggest that the proportional odds assumption does not hold ($Chi=48.67$, $p=0.002$). Because of this, both a generalized ordered logistic regression and a multinomial logistic regression are tried. The generalized ordered logistic regression did not give different results for different outcomes of explicit racial bias, which is probably due to a low number of observations for some of the outcomes. The multinomial logistic regression produces very large standard deviations for some of the outcomes of explicit racial bias. So, the alternatives do not fit the data better than an ordered logistic regression. Therefore, the ordinal logistic model is still used in the analysis. This means that the results might not be completely accurate, but it will be as close to accurate as possible.

Interracial contact

The results of the one-sample t-tests can be found in Table B7. The results are all significant, meaning that there is statistical evidence that the mean of the interracial contact variable differs from the neutral. This is the case for the whole sample and for the young and old generations individually. Therefore, it is useful to use the variable in the analysis to see if there are differences between the groups. Table B8 shows the results of the Shapiro-Wilk tests. Both p-values for the quantity of interracial contact are above the alpha level of 0.05, so for this

variable the data is normally distributed in both groups. For the quality of interracial contact the p-value of the young generations group is below 0.05, so for this variable the data is not normally distributed in both groups. The Levene's tests shows that the equal variances assumption holds for the quantity of interracial contact ($F=0.11$, $p=0.75$) and also for the quality of interracial contact ($F=2.34$, $p=0.13$). So, for the quality of interracial contact a Mann-Whitney U test will be used, because the normality assumption did not hold. A t-test could be used for the quantity of interracial contact, but to make it easier to compare the outcomes of both interracial contact variables again a Mann-Whitney U test is used.

Figure B3 and B4 show that there is a small linear relation between implicit racial bias and both quantity and quality of interracial contact. Besides that, the Shapiro-Wilk tests show that the residuals are normally distributed for both regressions ($W=0.99$, $p=0.599$). Also, the results of the White's tests ($Chi=79.00$, $p=0.447$) and the Breusch-Pagan tests ($Chi=0.22$, $p=0.641$) show that the assumptions of homoscedasticity holds for both regressions, because the p-values are above 0.05. At last, Table B9 shows all factors of the VIF are below 10, so there is no need to worry about multicollinearity. Hence, all four assumptions hold for the two OLS regressions.

The no multicollinearity assumption holds for the ordered logistic regression. As shown in Table B1 the correlation between explicit racial bias and quantity and quality of interracial contact is respectively -0.105 and -0.217. Both correlations are higher than -0.7, so there is no multicollinearity between the variables. The results of the likelihood ratio test suggest that the proportional odds assumption does not hold for the ordinal logistic regression ($Chi=43.90$, $p=0.011$). Therefore, an generalized ordered logistic regression and multinomial regression are tried on the data. Again, these methods bring some problems. The generalized ordered logistic regression does not produce different outcomes for different outcomes of the explicit racial bias. This is probably due to a small number of observations for some of the outcomes of explicit racial bias. Besides that, the multinomial logistic regression produces very big standard deviations for some outcomes of the explicit racial bias. Because of this, it is decided to stick with the regular ordered logistic regression. The outcomes of this model might not be completely accurate, but the alternatives do not produce better estimates.

Results

Hypothesis 1

Figure 2 shows boxplots of the variable implicit racial bias for the young and old generations. According to these boxplots, it seems reasonable to think that there is a significant difference between the two groups.

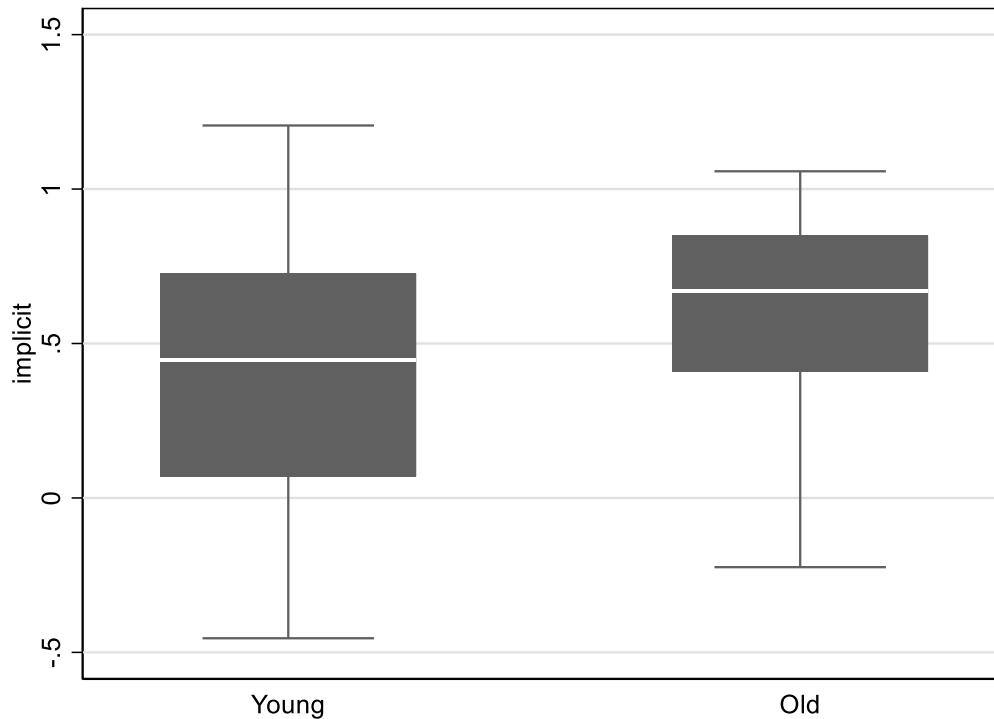


Figure 2. Boxplot graph of the variable implicit racial bias for the young and old generations.

The Mann-Whitney U test is run to see if there is a statistical significant difference in means between both groups. The test result shows that there is indeed a significant difference in means between the groups ($z=-1.788$, $p=0.07$). With a p-value of 0.07 the result is significant at a 10% significance level.

Then, the OLS regression result will show if there is still a statistical difference between the young and old generations when controlling for certain variables. These results show that there is still a significant difference between the two groups. Belonging to one of the two older generations increases the implicit racial bias measure on average with 0.256, *ceteris paribus*. This result is significant at a 5% significance level. Besides that, the province variable is also significant at a 5% significance level, meaning that living in Zuid-Holland on average decreases the implicit racial bias measure with 0.236, *ceteris paribus*. These results can be found in Table C1.

With the results of the Mann-Whitney U test and the OLS regression it is possible to reject or accept the first hypothesis ‘*Younger generations show less implicit racial bias than older generations*’. The results show the same pattern. The younger generations show a significant lower implicit racial bias than the older generations. Therefore, it is possible to accept the first hypothesis, younger generations show less implicit racial bias than older generations.

Hypothesis 2

Table 4 shows the means and the standard deviation of the variable for explicit racial bias for every generation. The means of the generations are all close to each other. This suggest that there are no big differences in explicit racial biases between the generations.

Table 4. The mean and standard deviation of explicit racial bias for the young and old generations.

Explicit Racial Bias	N	Mean	SD.
Young	61	0.361	0.731
Old	37	0.297	0.520

To see if this suggestion is also statistically significant, the results of the Mann-Whitney U test could help. The result show that there is no significant difference in means between the two groups ($z=0.400, p=0.69$). The high p-value of 0.69 is not significant, meaning that there are no differences in the mean of the explicit racial bias measure between the young and old generations.

The ordered logistic regression will show if these results still emerge when including the control variables. Table C2 shows the regression results. These results show no significant outcomes for the young and old generation variable, which is in line with the outcome of the Mann-Whitney U test.

With the results of the Mann-Whitney U test and the multinomial logistic regression it is possible to accept or reject the second hypothesis ‘*Younger generations show less explicit racial bias than older generations*’. None of the used tests provides evidence for a statistically significant difference in explicit racial bias between the generations. Therefore, it is possible to state that the second hypothesis is rejected, the younger generations do not show less explicit bias than older generations.

Hypothesis 3a & b

In Table 5 the means and standard deviations of the interracial contact variable are displayed for every generation. This way it is possible to see that the means of the young and old

generations are very similar. These means suggest that there is no difference in interracial contact between the generations.

Table 5. The mean and standard deviation of both quantity and quality of interracial contact for the young and old generations.

Contact	N	Mean	SD.
<i>Quantity interracial contact</i>			
Young	57	2.579	0.778
Old	33	2.621	0.866
<i>Quality interracial contact</i>			
Young	52	3.859	0.706
Old	31	3.828	0.493

To test if this is indeed the case, a t-test and Mann-Whitney U test are used. The result of the t-test suggests that there is no difference between the two groups. The younger generations did not show higher quantities of interracial contact compared to the older generations ($z=0.150$, $p=0.88$). The test for the quality of interracial contact also shows that there is no significant difference between the young and old generations ($z=0.785$, $p=0.43$).

The regression results will show if the quantity and quality of interracial contact significantly influence the implicit and explicit racial bias. Table C3 contains the OLS regression results and table C4 shows the standardized ordered logistic regression results. The OLS regression with the implicit racial bias as outcome variable has no significant coefficients for the quantity and quality of interracial contact. In contrast to that, the ordered logistic regression shows a significant coefficient for the quality of interracial contact for every level of explicit racial bias. The coefficient shows that a one unit increase in quality of interracial contact leads to a decrease in explicit racial bias of 1.077, *ceteris paribus*. These coefficients are significant at a 10% significance level. So, the quality of interracial contact is negatively associated with explicit racial bias, meaning that an increase in quality of interracial contact could lead to a decrease in explicit racial bias. On the other hand, the quantity of interracial contact did not show any significant coefficients.

With these results we can accept or reject both parts of the third hypothesis ‘*Younger generations have more interracial contact than older generations*’ and ‘*A higher amount of interracial contact decreases people’s implicit and explicit racial biases*’. The t-test and Mann-Whitney U test proved that there are no significant differences in interracial contact between the young and old generations. So the first part of the hypothesis is rejected, the younger generations do not have more interracial contact than the older generations. The regressions showed that quantity of interracial contact does not have a significant effect on both implicit and explicit racial biases. But, an increase in quality of interracial contact could decrease the

explicit racial bias. Though it should be taken into account that the estimates might not be completely accurate. However, Figure C1 and C2 that show a scatter plot of the explicit racial bias against the quantity and quality of interracial contact support these results. A linear line is fitted with the data. These lines show that there is a stronger negative association between quality of interracial contact and explicit racial bias than between quantity of interracial contact and explicit racial bias. Besides that, Table C5 shows that the correlation is both stronger and significant between quality of interracial contact and explicit racial bias, which also supports the ordered logistic regression results. Hence, with the results of the OLS and the ordered logistic regression the second part of the third hypothesis is partially accepted. A higher amount of interracial contact does not decrease implicit or explicit racial biases. But, an increased quality of interracial contact could decrease the explicit racial bias.

Discussion

This study looked into implicit and explicit racial bias differences between generations. Besides that, an explanation for possible differences in racial bias is tested, namely interracial contact. The findings of this study support, extend and contradict existing literature on implicit and explicit racial biases and the role of contact in these biases. Evidence is found that there are generational differences in implicit racial bias. The younger generations showed on average a racial bias for white over black, but in a smaller magnitude than the racial bias among the older generations. In contrast to that, there is no evidence found in a difference in explicit racial bias. There is an explicit racial bias present for white over black in the full sample and in all generations, but there are no significant differences between the generations. Finally, the expected reason for differences in racial bias, interracial contact, is found to be similar in all generations. No evidence was found that quantity of interracial contact influenced implicit or explicit racial biases. However, it is shown that the quality of interracial contact might decrease explicit racial biases. The findings are further discussed below.

The data of this study points out that there is indeed a difference in implicit racial bias between the younger and the older generations. The younger generations showed less implicit racial bias than the older generations, which is in line with the expectations beforehand. The results contradict the findings of Baron and Banaji (2006) that the implicit bias is similar between young children and adults. The findings of this diminishing implicit racial bias between generations are positive for the BLM movement and everyone who is against discrimination. As mentioned, the implicit racial bias is associated with discriminatory behaviour. The younger generations being less implicitly biased could therefore lead to less discrimination. If this decrease continues, we can expect an implicitly unbiased generation in the near future and maybe a world without discrimination.

In contrast to this first finding, this study finds no evidence for a difference in explicit racial bias between the younger and older generations. The tests show that there are no differences between these two groups. This was not expected beforehand. However, this study did show that an explicit racial bias is present in the sample. This is not in line with the findings of Baron and Banaji (2006), because they found that the explicit racial bias disappeared around the age of 12. Therefore, this finding is still interesting. Apparently there is still an explicit preference for white people over black people present in both the younger and older generations of society, which was not expected. This could be problematic, because the explicit racial bias is often proven to be associated with discriminatory behaviour. So, this finding is less positive than the finding for implicit racial bias.

Beforehand it was also expected that there would be a difference in interracial contact between the generations. The analysis showed that this expectation was not met. Results of

the test prove that there are no significant differences in interracial contact between the generations. The interracial contact was expected to be a cause in differences in implicit and explicit racial biases between the younger and older generations. This expectation was based on the contact hypothesis that more contact with other races would lead to less prejudice and more favourable attitudes (Allport, 1954). Besides that, many papers have indicated this contact hypothesis as an important indicator of implicit and explicit racial biases and discriminatory behaviour (e.g. Baron & Banaji, 2006; Binder et al., 2009; Ellison et al., 2011). The results show that there is no evidence found that the quantity of interracial contact decreases the implicit or explicit racial biases. So, this is contradicting the contact hypothesis and the findings of the papers mentioned before. However, the quality of interracial contact might decrease the explicit racial bias. It should be taken into account that the estimates for the explicit racial bias might not be accurate because the small amount of observations for some outcomes of the variable.

There are also a some limitations in this study. First of all, the sample size was not sufficient for the intended analyses of four generation groups. Because of this, the generations had to be reorganised into two groups. This makes the results of the tests less precise. It is possible to state things about the two younger generations compared to the two older generations, but it would have been interesting to analyse the generations separately. Besides that, the small sample size may have led to some problems with the ordered logistic regressions. With the current sample the proportional odds assumption did not hold, which might have led to inaccurate estimates. However, the possible alternatives did not produce better estimates. Therefore, it is decided to use the ordered logistic regression even when not all assumptions are met. These problems can be tackled in future research by collecting more data to have sufficient sample sizes in all generations and for all different outcomes in the categorical variables.

Second, the explicit racial bias measure using the temperature questions did not work properly. Some participants told to be a bit confused by the questions, which caused them to answer the same for both questions. The data also proves this, because the value for this variables was zero for most of the participants. Besides that, the mean of the variable was not significantly different from zero. Future research could use other explicit racial bias measure than the temperature questions. This way there would be multiple explicit racial bias measures to include in the analyses.

Third, the participants were mostly gathered from a particular contact circle, so the sample size is not completely random. Because of this, the sample size was skewed in some of the demographic variables, like age, occupation and province. This makes the results less generalizable. Future research could replicate this study with a bigger sample size. This way it is possible to find out if the findings still emerge when the sample size is bigger and more

randomised. Finally, the results of this study show that the contact hypothesis does explain differences in implicit racial biases and does not full explain differences in explicit racial biases. It would be interesting to find out the exact reasons for differences in both implicit and explicit racial biases in future research.

Conclusion

This study tried to answer the following question: is there a racial bias difference between younger and older generations? Also, it is formulated that the expectation was that if there is a difference in racial bias, this is caused by a difference in interracial contact. The hypotheses that are tested in this study made it possible to answer this research question. First, the data of this study shows that there is an implicit racial bias present in the sample, meaning that the participants on average associated white people with pleasant words sooner than black people with pleasant words. But, the results show that there are significant differences in this implicit racial bias between the younger and older generations. The younger generations show less implicit racial bias than the older generations. In contrast to this, the study shows that there are no significant differences in explicit racial bias between the younger and older generations. However, there is on average a explicit racial bias present in the sample. The average shows a preference for white over black people. Finally, the quantity of interracial contact is showed to not have a significant influence on both the implicit and explicit racial bias. However, the quality of interracial contact might have a negative association with the explicit racial bias. This means that an increase in quality of interracial contact might decrease the explicit racial bias.

The finding that the sample is on average still implicitly and explicitly biased towards white people is concerning for the battle against discrimination. Many studies proved the relation between implicit and explicit racial bias and discriminatory behaviour, so these results indicate that there could be participants that behave in a discriminatory way. This shows that movements like the BLM are still necessary in the society to raise awareness for the problem that discrimination forms. A positive note for the battle against discrimination is that the younger generations are less implicitly biased than the older generations. This might lead to less discriminatory behaviour from the younger generations. If this decrease in implicit racial bias continues over generations, there will be an racially unbiased generation in the near future. An racially unbiased generation could mean an end to all forms of racial discrimination.

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Appendix A

Table A1. Pictures used in the IAT.

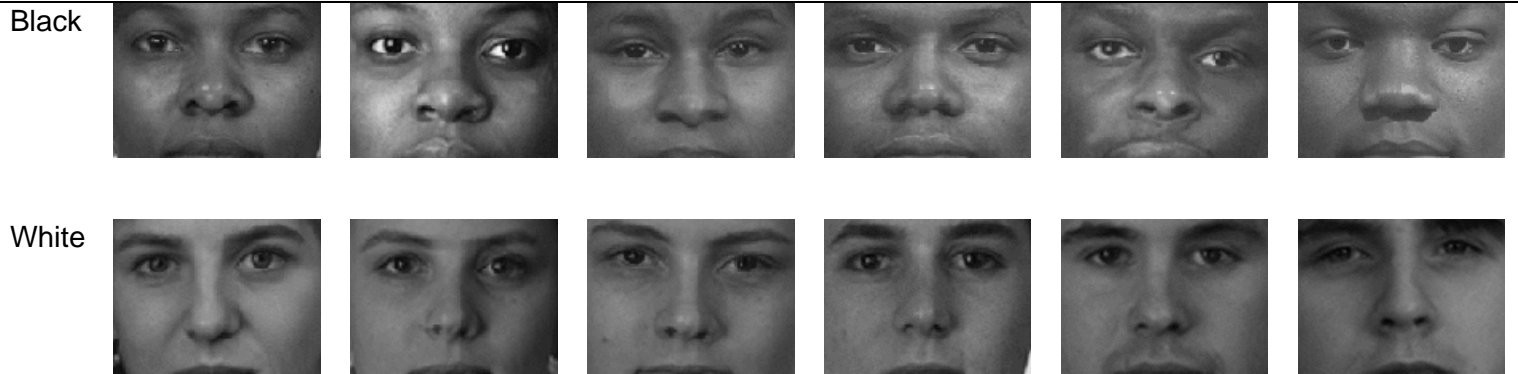


Table A2. Words used in the IAT.

Pleasant	Unpleasant
Happy	Angry
Love	Rage
Friend	Poison
Nice	Enemy
Cheerful	Evil
Party	Hate
Enjoy	Fail
Cosy	Furious

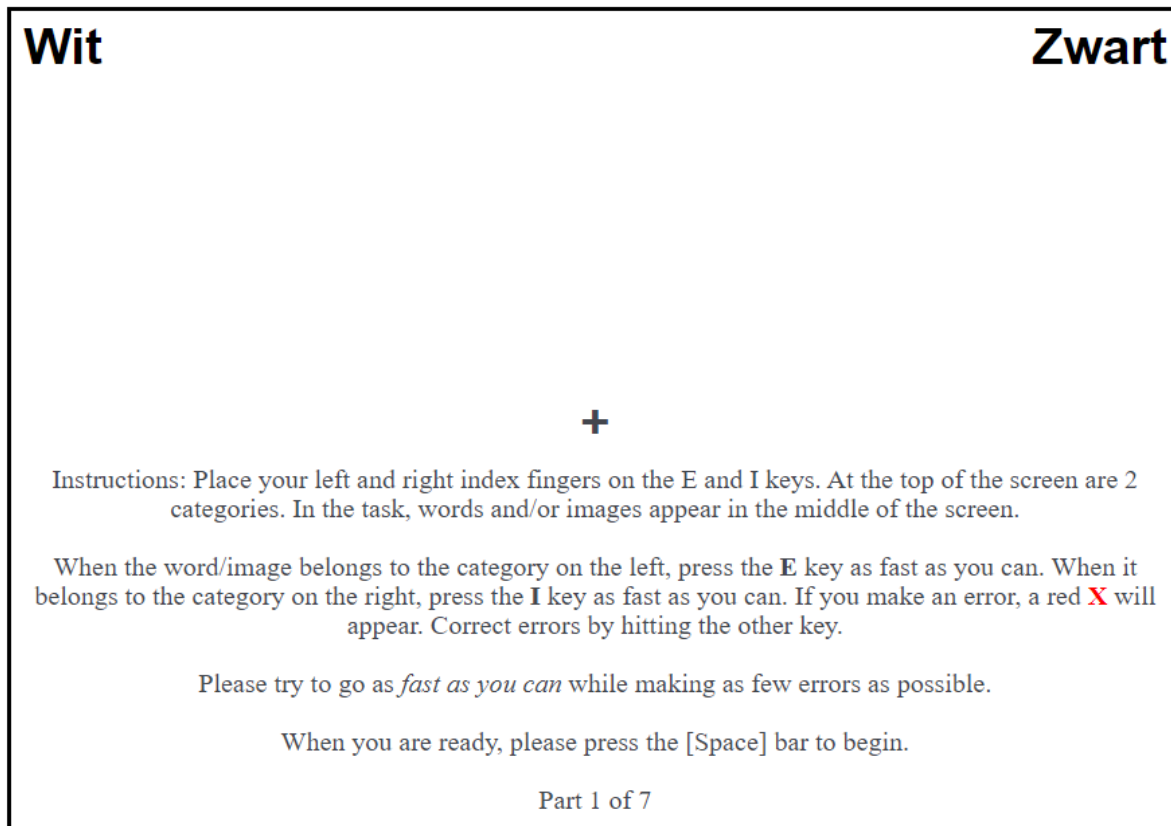


Figure A1. Example of the screen that the participants see at the start of the IAT.

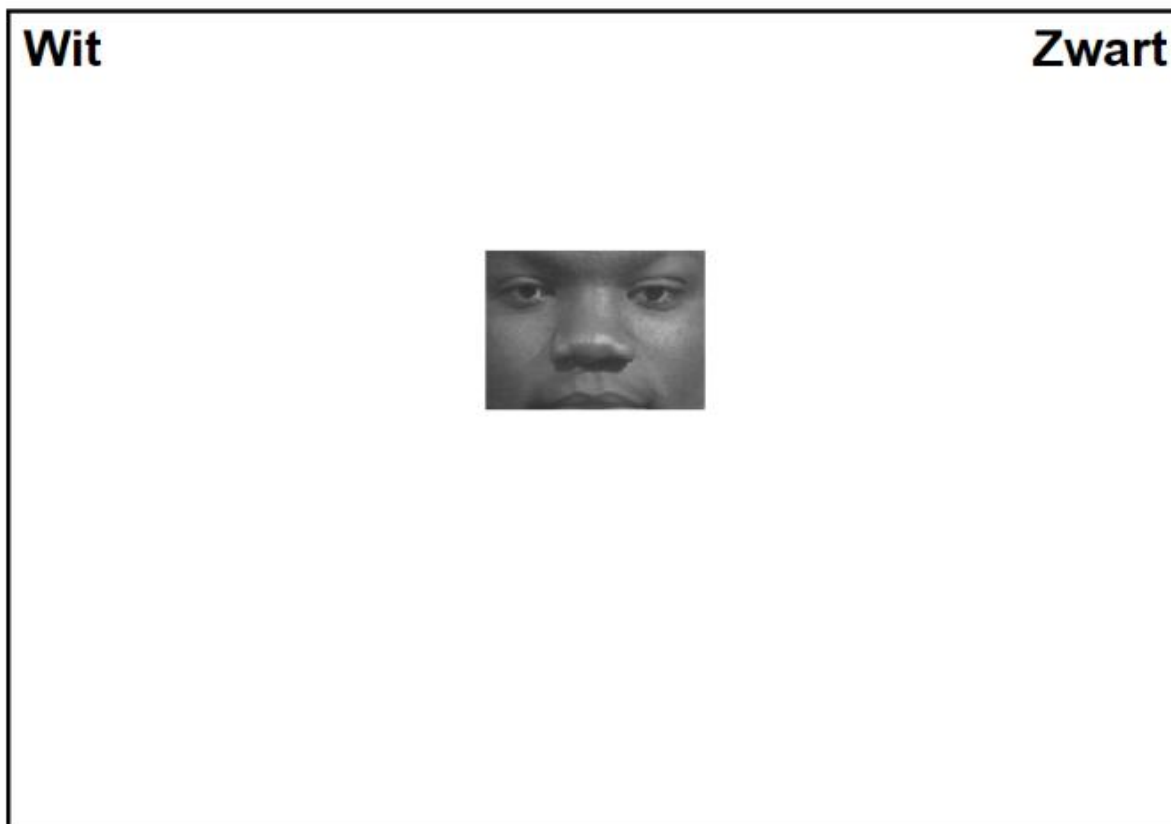


Figure A2. Example of a picture appearing in the middle of the screen to be categorised in one of the two categories at the right and left top of the screen.

Appendix B

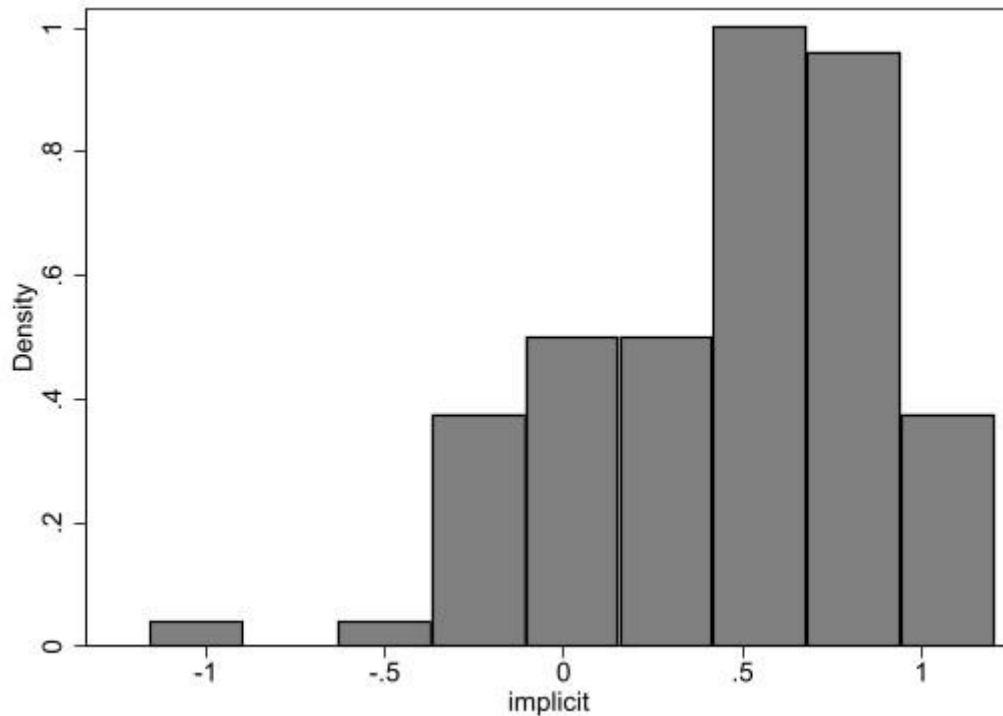


Figure B1. Histogram of the implicit racial bias variable before dropping the outlier.

Table B1. Correlation table for all the variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) implicit racial bias	1.000												
(2) explicit racial bias	0.190	1.000											
(3) warmth	0.076	0.167	1.000										
(4) generation	0.182	-0.047	-0.071	1.000									
(5) quantitycontact	0.052	-0.105	-0.006	0.025	1.000								
(6) qualitycontact	-0.003	-0.217	-0.041	-0.024	0.381	1.000							
(7) race	-0.038	0.038	0.030	0.054	0.145	-0.094	1.000						
(8) gender	0.171	0.086	-0.101	0.120	0.122	-0.057	-0.031	1.000					
(9) maritalstatus	0.042	-0.053	-0.064	0.281	-0.154	0.057	-0.033	0.042	1.000				
(10) edyears	0.014	-0.122	-0.035	0.277	-0.077	0.018	0.013	-0.201	0.285	1.000			
(11) occupation	-0.125	-0.010	0.088	-0.001	-0.047	-0.159	-0.076	-0.013	0.014	-0.085	1.000		
(12) province	-0.192	0.047	0.025	0.133	0.030	0.083	-0.062	0.148	0.039	0.028	0.008	1.000	
(13) IAT	-0.083	0.048	0.103	-0.164	0.094	-0.056	0.144	-0.017	-0.018	-0.010	-0.042	-0.155	1.000

Table B2. t-test results testing if the implicit racial bias variable is different from zero.

Shapiro Wilk	Mean	Sig.
Total	0.477	0.000
Young	0.421	0.000
Old	0.570	0.000

Table B3. Shapiro-Wilk test results to test the normality of the implicit racial bias variable.

Shapiro Wilk	Statistic	Sig.
Young	0.972	0.233
Old	0.901	0.006

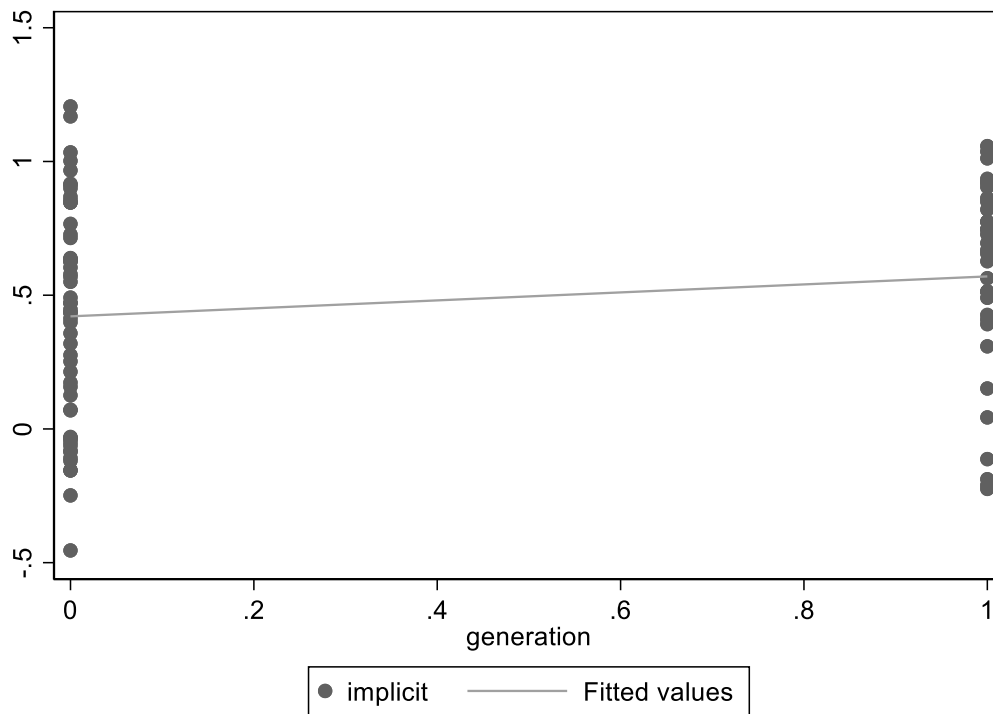


Figure B2. Linearity assumption implicit racial bias and generation where generation is zero for the young generations and one for the old generations.

Table B4. Variance Inflation Factors OLS regression with implicit racial bias as dependent variable and generation as independent variable.

	VIF	1/VIF
generation	1.638	.61
race	1.194	.837
gender	1.294	.773
1.maritalstatus	1.284	.779
edyears	1.334	.75
2.occupation	1.375	.727
3.occupation	1.575	.635
4.occupation	1.125	.889
5.occupation	1.204	.831
6.occupation	1.149	.871
7.occupation	1.619	.618
8.occupation	1.138	.879
9.occupation	1.342	.745
10.occupation	1.196	.836
11.occupation	1.092	.916
13.occupation	1.307	.765
province	1.338	.747
IAT	1.126	.888
Mean VIF	1.296	.

Table B5. One-sample t-test outcomes to test if explicit racial bias and warmth variable differ from zero.

Generation	p-value Explicit Bias	p-value Warmth
Total	0.000***	0.109
Young	0.000***	0.133
Old	0.001***	0.571

***p<0.01, ** p<0.05, *p<0.1

Table B6. Shapiro-Wilk test results to test the normality of the explicit racial bias variable.

Shapiro Wilk	Statistic	Sig.
Young	0.942	0.006
Old	0.821	0.000

Table B7. One sample t-test outcomes to test if the interracial contact variables differ from zero.

Generation	p-value Quantity contact	p-value Quality contact
Total	0.000***	0.000***
Young	0.000***	0.000***
Old	0.017**	0.000***

***p<0.01, ** p<0.05, *p<0.1

Table B8. Shapiro-Wilk test results to test the normality of the interracial contact variables.

Shapiro Wilk	Statistic	Sig.
Quantity contact		
Young	0.992	0.963
Old	0.956	0.203
Quality contact		
Young	0.844	0.000
Old	0.988	0.971

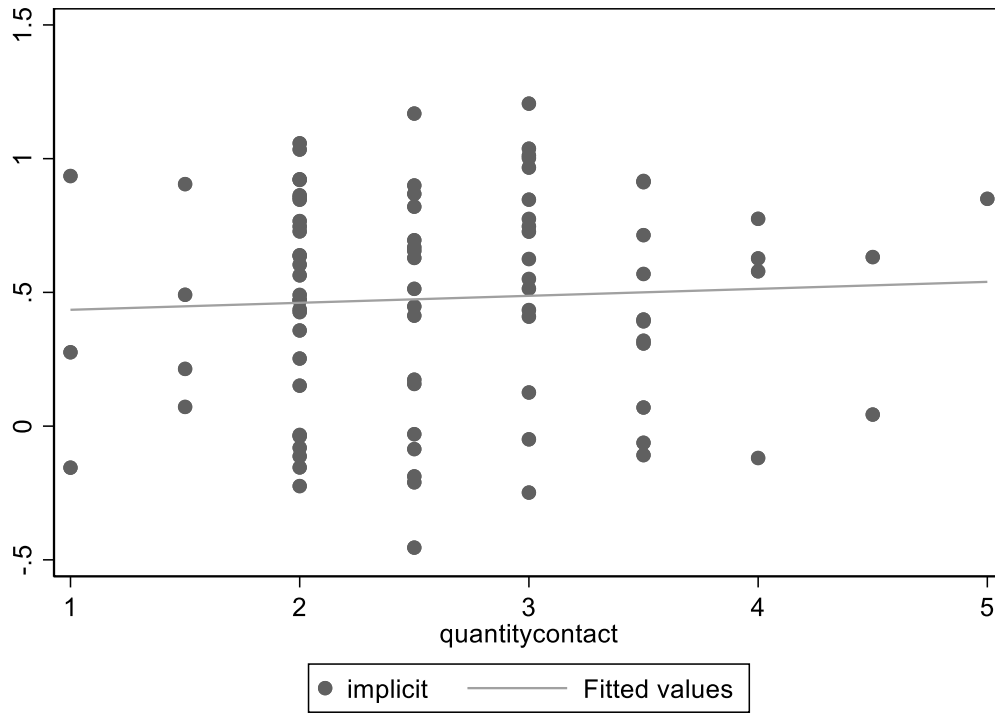


Figure B3. Linearity assumption implicit racial bias and quantity of interracial contact.

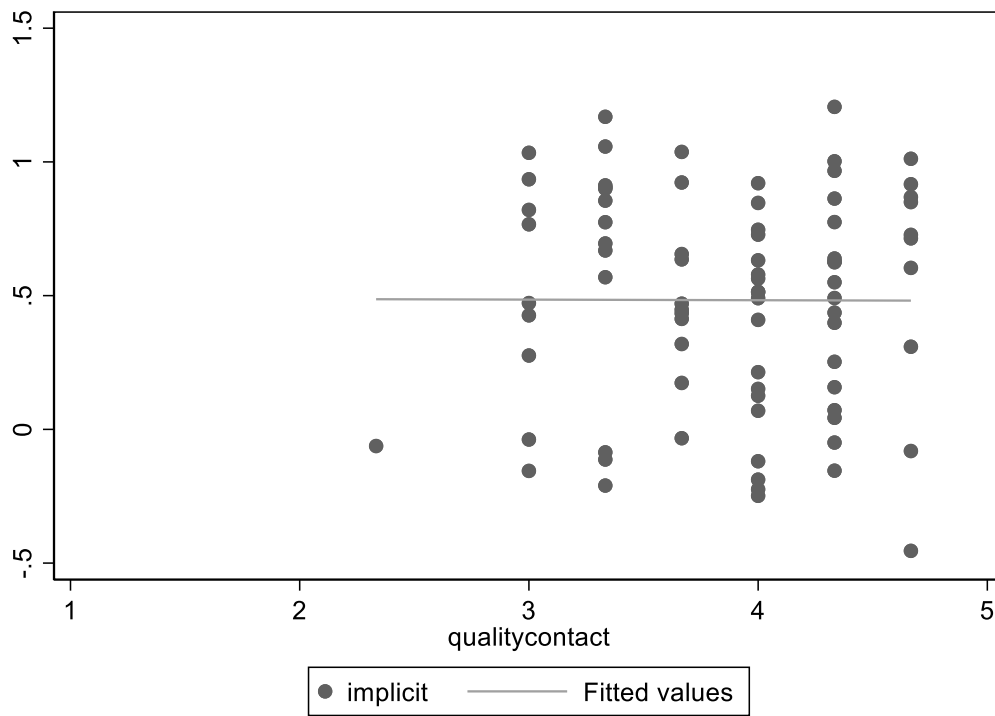


Figure B4. Linearity assumption implicit racial bias and quality of interracial.

Table B9. VIF OLS regression with implicit racial bias as dependent variable and quantity and quality of interracial contact as independent variables.

	VIF	1/VIF
quantitycontact	1.547	.646
qualitycontact	1.476	.678
generation	1.652	.605
race	1.293	.773
gender	1.464	.683
1.maritalstatus	1.393	.718
edyears	1.361	.735
2.occupation	1.482	.675
3.occupation	1.655	.604
4.occupation	1.179	.848
5.occupation	1.2	.834
6.occupation	1.27	.788
7.occupation	1.773	.564
8.occupation	1.182	.846
9.occupation	1.389	.72
10.occupation	1.26	.794
11.occupation	1.179	.848
13.occupation	1.443	.693
province	1.347	.743
IAT	1.164	.859
Mean VIF	1.385	.

Appendix C

Table C1. OLS regression results with implicit racial bias as dependent variable and generation as independent variable.

Implicit racial bias	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Generation	.256	.112	2.29	.025	.033	.479	**
Race	-.074	.158	-0.47	.641	-.39	.242	
Gender	.083	.101	0.83	.41	-.117	.284	
Marital status							
Alone	0	.	.	.	.	.
Together	-.038	.106	-0.35	.725	-.25	.175	
Educational years	-.004	.02	-0.20	.844	-.043	.036	
Occupation							
Care & Welfare	0	.	.	.	.	.
Economic & Administration	.3	.161	1.87	.067	-.021	.622	*
Commercial	.086	.182	0.47	.638	-.277	.449	
Creative & Linguistic	.228	.416	0.55	.585	-.602	1.058	
Service	-.128	.197	-0.65	.518	-.522	.266	
ICT	.277	.246	1.13	.263	-.213	.767	
Don't work (yet)	-.074	.16	-0.46	.646	-.394	.246	
Managers	.252	.297	0.85	.4	-.342	.846	
Public administration, Security & Legal	-.087	.159	-0.55	.587	-.405	.231	
Pedagogical	.07	.181	0.39	.699	-.29	.431	
Technical	-.147	.41	-0.36	.721	-.965	.671	
Other	-.067	.205	-0.33	.745	-.477	.343	
province	-.236	.102	-2.30	.024	-.44	-.031	**
Done IAT before	-.201	.243	-0.83	.412	-.686	.285	
Constant	.542	.26	2.08	.041	.022	1.062	**
Mean dependent var		0.462	SD dependent var		0.395		
R-squared		0.235	Number of obs		85		
F-test		1.123	Prob > F		0.351		
Akaike crit. (AIC)		97.528	Bayesian crit. (BIC)		143.938		

*** $p < .01$, ** $p < .05$, * $p < .1$

Table C2. Ordered logistic regression results with explicit racial bias as dependent variable and generation as independent variable.

Explicit racial bias	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Generation	.063	.632	0.10	.921	-1.176	1.302	
Race	.032	.913	0.03	.972	-1.757	1.821	
Gender	-.242	.558	-0.43	.665	-1.335	.852	
Marital status							
Alone	0	.	.	.	.	.
Together	.049	.606	0.08	.936	-1.139	1.236	
Educational years	-.194	.114	-1.70	.089	-.417	.03	*
Occupation							
Care & Welfare	0	.	.	.	.	.
Economic & Administration	.166	.925	0.18	.858	-1.648	1.979	
Commercial	.248	.963	0.26	.797	-1.639	2.134	
Creative & Linguistic	-1.678	3.397	-0.49	.621	-8.336	4.981	
Service	1.698	1.027	1.65	.098	-.314	3.71	*
ICT	2.752	1.278	2.15	.031	.247	5.257	**
Don't work (yet)	.915	.902	1.01	.31	-.853	2.684	
Managers	2.63	1.394	1.89	.059	-.103	5.363	*
Public administration, Security & Legal	.652	.894	0.73	.465	-1.099	2.404	
Pedagogical	-.427	1.162	-0.37	.713	-2.706	1.851	
Technical	-2.088	3.366	-0.62	.535	-8.686	4.51	
Other province	-2.078	1.613	-1.29	.198	-5.239	1.083	
Done IAT before	.153	.574	0.27	.79	-.973	1.279	
cut1	1.291	1.244	1.04	.299	-1.147	3.729	
cut2	-6.755	1.956	.b	.b	-10.588	-2.922	
cut3	-.864	1.508	.b	.b	-3.82	2.092	
cut4	1.535	1.534	.b	.b	-1.472	4.542	
cut4	3.261	1.763	.b	.b	-.194	6.716	
Mean dependent var		0.368	SD dependent var			0.684	
Pseudo r-squared		0.117	Number of obs			87	
Chi-square		17.606	Prob > chi2			0.482	
Akaike crit. (AIC)		177.128	Bayesian crit. (BIC)			231.378	

*** $p < .01$, ** $p < .05$, * $p < .1$

Table C3. OLS regression results with implicit racial bias as dependent variable and the quantity and quality of interracial contact as independent variables.

Implicit racial bias	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Quantity of interracial contact	.052	.069	0.76	.453	-.086	.19	
Quality of interracial contact	.003	.101	0.03	.972	-.198	.205	
Generation	.219	.12	1.83	.072	-.02	.459	*
Race	-.167	.181	-0.92	.361	-.529	.195	
Gender	.072	.115	0.62	.536	-.159	.303	
Marital status							
Alone	0	.	.	.	.	.
Together	-.035	.123	-0.29	.776	-.281	.211	
Educational years	.001	.021	0.07	.947	-.041	.044	
Occupation							
Care & Welfare	0	.	.	.	.	.
Economic & Administration	.286	.173	1.65	.104	-.061	.633	
Commercial	-.009	.205	-0.04	.964	-.419	.4	
Creative & Linguistic Service	.156	.439	0.36	.723	-.723	1.035	
ICT	-.107	.226	-0.48	.636	-.559	.345	
Don't work (yet)	.273	.267	1.02	.31	-.26	.807	
Managers	-.096	.181	-0.53	.597	-.459	.266	
Public administration, Security & Legal	.219	.313	0.70	.486	-.407	.845	
Pedagogical	-.122	.177	-0.69	.494	-.475	.232	
Technical	.057	.192	0.30	.766	-.326	.441	
Other province	-.101	.439	-0.23	.818	-.98	.778	
Done IAT before	-.109	.223	-0.49	.627	-.556	.337	
Constant	-.239	.11	-2.18	.034	-.458	-.019	**
	-.191	.255	-0.75	.457	-.702	.32	
	.383	.496	0.77	.443	-.61	1.375	
Mean dependent var		0.469	SD dependent var			0.397	
R-squared		0.237	Number of obs			79	
F-test		0.902	Prob > F			0.586	
Akaike crit. (AIC)		97.734	Bayesian crit. (BIC)			147.492	

*** $p < .01$, ** $p < .05$, * $p < .1$

Table C4. Ordered logistic regression results with implicit racial bias as dependent variable and the quantity and quality of interracial contact as independent variables.

Explicit racial bias	Coef.	St.Err.	t-value	p-value	[95% Conf Interval]	Sig
Quantity of interracial contact	.183	.414	0.44	.658	-.628 .994	
Quality of interracial contact	-1.077	.568	-1.90	.058	-2.19 .036	*
Generation	.331	.69	0.48	.632	-1.022 1.684	
Race	.29	1.052	0.28	.783	-1.773 2.353	
Gender	-.473	.624	-0.76	.449	-1.696 .75	
Marital status						
Alone	0	.	.	.	.
Together	.22	.694	0.32	.751	-1.14 1.579	
Educational years	-.219	.125	-1.76	.079	-.464 .025	*
Occupation						
Care & Welfare	0	.	.	.	.
Economic & Administration	.348	1.013	0.34	.732	-1.638 2.334	
Commercial	.98	1.081	0.91	.365	-1.139 3.1	
Creative & Linguistic	-.755	3.596	-0.21	.834	-7.803 6.294	
Service	3.161	1.186	2.67	.008	.837 5.485	***
ICT	2.97	1.351	2.20	.028	.322 5.618	**
Don't work (yet)	1.282	1.035	1.24	.215	-.746 3.31	
Managers	2.974	1.554	1.91	.056	-.073 6.02	*
Public administration, Security & Legal	.711	.989	0.72	.472	-1.227 2.649	
Pedagogical	-.066	1.231	-0.05	.958	-2.479 2.348	
Technical	-2.869	3.592	-0.80	.424	-9.909 4.17	
Other	-2.519	1.671	-1.51	.132	-5.794 .756	
province	-.013	.631	-0.02	.983	-1.251 1.224	
Done IAT before	.826	1.306	0.63	.527	-1.734 3.386	
cut1	-10.692	3.207	.b	.b	-16.978 -4.407	
cut2	-4.592	2.764	.b	.b	-10.009 .826	
cut3	-1.713	2.734	.b	.b	-7.071 3.646	
cut4	-.075	2.773	.b	.b	-5.51 5.359	
Mean dependent var		0.370	SD dependent var		0.679	
Pseudo r-squared		0.175	Number of obs		81	
Chi-square		24.470	Prob > chi2		0.222	
Akaike crit. (AIC)		163.755	Bayesian crit. (BIC)		221.222	

*** $p < .01$, ** $p < .05$, * $p < .1$

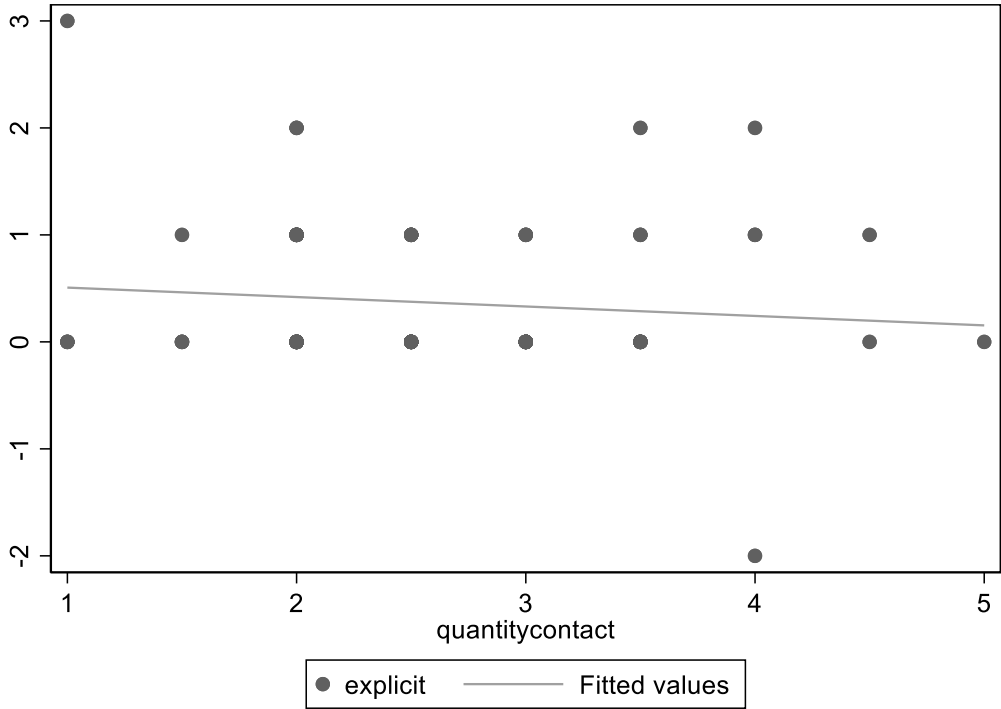


Figure C1. A scatter plot showing the association between the explicit racial bias and the quantity of interracial contact.

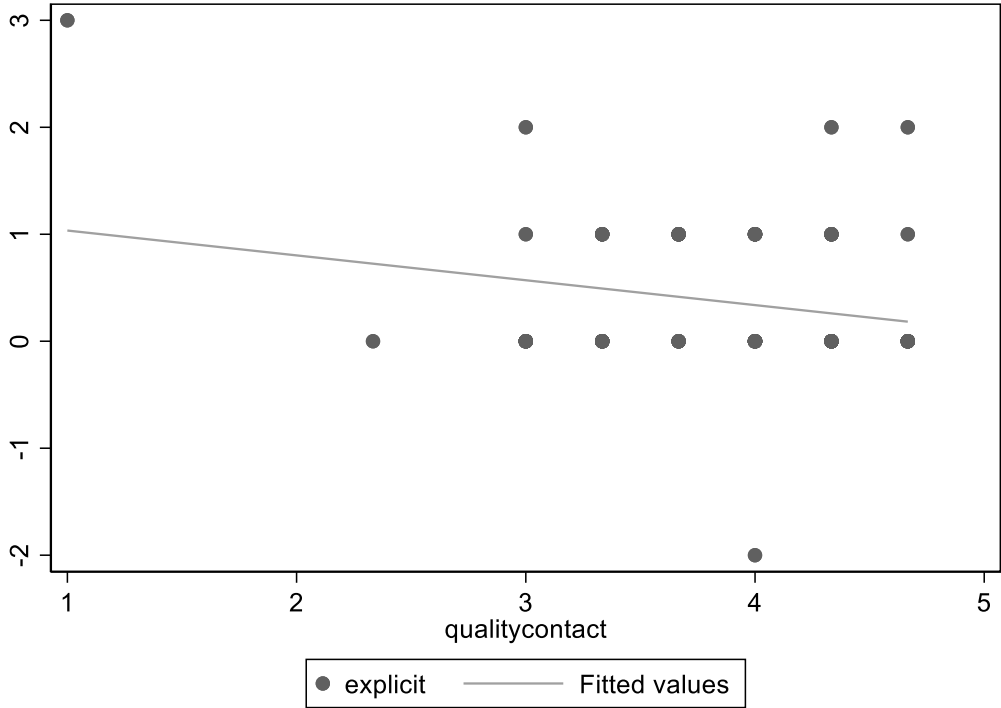


Figure C2. A scatter plot showing the association between the explicit racial bias and the quality of interracial contact.

Table C5. The correlations between the explicit racial bias and both the quantity and quality of interracial contact, where the p-value is between brackets.

Variables	(1)	(2)	(3)
(1) Explicit racial bias	1.000		
(2) Quantity of interracial contact	-0.105 (0.324)	1.000	
(3) Quality of interracial contact	-0.217 (0.049)	0.381 (0.000)	1.000