

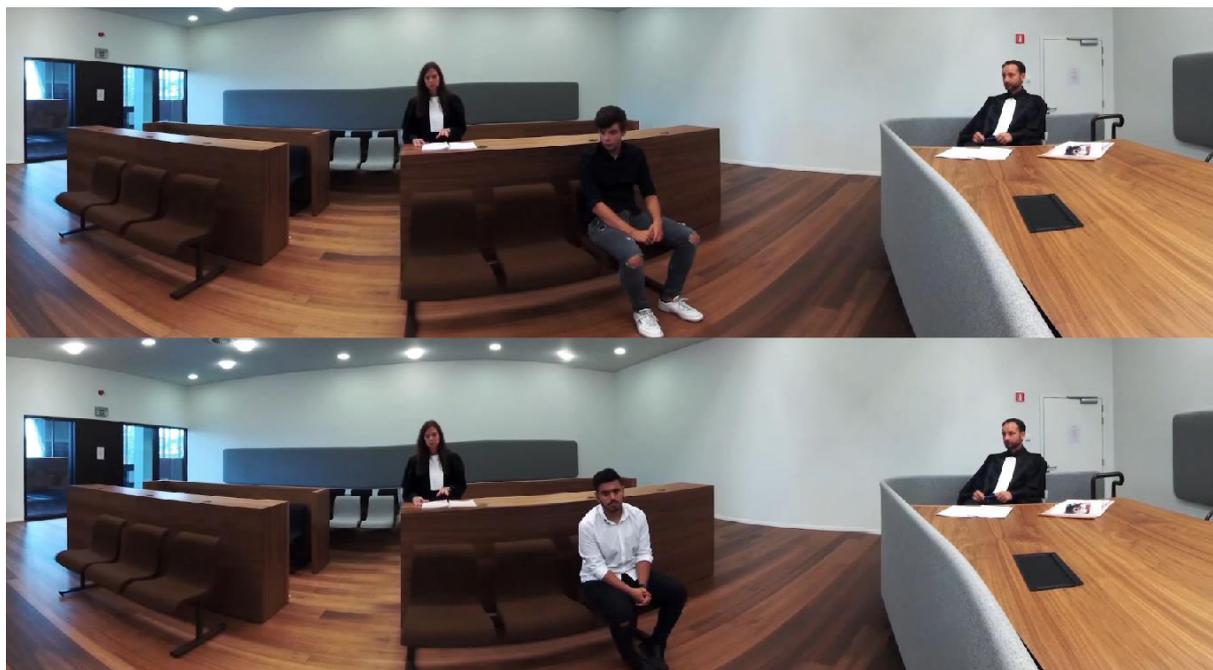
Online Appendix

Racial Bias and In-Group Bias in Virtual Reality Courtrooms

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Figure OA1

A Snapshot of the Virtual Reality Videos of the Same Trial



This scene can be watched at <https://www.uhasselt.be/VR-courts-splitscreen>

Figure OA2

Six Defendants in Six Trials



Minority Defendant-1 (M1)



White Defendant-1 (WH1)



Minority Defendant-2 (M2)



White Defendant-2 (WH2)



Minority Defendant-3 (M3)



White Defendant-3 (WH3)

Table OA1

The Sequence of Trials Watched by Evaluators, and the Identity of Defendants, Prosecutors and Defense Attorneys in Each Trial

Set 1 (Sequence1, Version 1)	Set 2 (Sequence1, Version 2)	Set 3 (Sequence2, Version 1)	Set 4 (Sequence2, Version 2)	Set 5 (Sequence3, Version 1)	Set 6 (Sequence3, Version 2)
$^{WH1}_{SO}BUR^1_B$	$^{M1}_{SO}BUR^1_B$	$^{M2}_{TO}AS^3_P$	$^{WH2}_{TO}AS^3_P$	$^{WH2}_{TO}BUR^3_B$	$^{M2}_{TO}BUR^3_B$
$^{M1}_{SO}BUR^2_B$	$^{WH1}_{SO}BUR^2_B$	$^{WH3}_{M}AS^2_P$	$^{M3}_{M}AS^2_P$	$^{M3}_{M}AS^1_P$	$^{WH3}_{M}AS^1_P$
$^{WH2}_{TO}BUR^3_B$	$^{M2}_{TO}BUR^3_B$	$^{M3}_{M}AS^1_P$	$^{WH3}_{M}AS^1_P$	$^{M1}_{SO}BUR^2_B$	BUR^2_B
$^{M3}_{M}AS^1_P$	$^{WH3}_{M}AS^1_P$	$^{WH2}_{TO}BUR^3_B$	$^{M2}_{TO}BUR^3_B$	$^{WH3}_{M}AS^2_P$	$^{M3}_{M}AS^2_P$
$^{WH3}_{M}AS^2_P$	$^{M3}_{M}AS^2_P$	$^{M1}_{SO}BUR^2_B$	$^{WH1}_{SO}BUR^2_B$	$^{WH1}_{SO}BUR^1_B$	$^{M1}_{SO}BUR^1_B$
$^{M2}_{TO}AS^3_P$	$^{WH2}_{TO}AS^3_P$	$^{WH1}_{SO}BUR^1_B$	$^{M1}_{SO}BUR^1_B$	$^{M2}_{TO}AS^3_P$	$^{WH2}_{TO}AS^3_P$

Note. Each evaluator was randomly assigned to one of these six sets. Each set includes six cases (trials), that are watched in the order listed in each column. Each cell, such as $^{WH1}_{SO}BUR^1_B$, summarizes the characteristics of that particular trial. BUR and AS stand for a burglary case, and an assault case, respectively. BUR¹ means the first burglary case, BUR² means the second burglary case, AS³ stands for the third assault case, and so on.

A subscript to the right identifies the prosecutor: BUR¹_B means that the first burglary case is prosecuted by Bruno (B). There are two prosecutors in the experiment: Bruno (B) and Pieter (P). The subscript to the left identifies the defense attorney. There are three defense attorneys: TO, SO and M.

The superscript to the left identifies the defendant. There are three minority defendants: M1, M2, and M3; and there are three white defendants: WH1, WH2 and WH3. See Figure OA2 for the pictures of all six defendants.

The entry $^{WH1}_{SO}BUR^1_B$ represents the first burglary case (BUR¹), where the defendant was WH1. The case was prosecuted by B, and the defense attorney was SO.

The first VR video of Set 1 is $^{WH1}_{SO}BUR^1_B$ and the first video of Set 2 is $^{M1}_{SO}BUR^1_B$. These two videos are identical in all respects but one: the race of the defendant (WH1 vs. M1); See Figure OA1.

Each evaluator watched one of the six sets depicted in Table OA1. Thus, each one of the three burglary cases (BUR¹, BUR², BUR³) as well as each of the three assault cases (AS¹, AS², AS³) is watched by each evaluator.

OA1. Bench Trials in Belgium

Jury trials do not play an important role in the Belgian judiciary, and they are mostly reserved for murder cases. Furthermore, jury trials were abolished in 2016, although they have been reinstalled one year later because the abolishment was deemed unconstitutional by the Belgian constitutional court. Belgium is a civil law country and therefore it relies on an inquisitorial criminal justice system. Consequently, judges play a more important role in trials than they do in adversarial systems dominated by plea bargaining. Plea bargaining did not exist in Belgium until recently. Its implementation started in 2016, and it is applicable for a limited number of crimes (those punishable with fewer than 5 years of prison time). Some crimes, such as rape, sex crimes against minors and manslaughter, are excluded from the possibility of plea bargaining regardless of the sentence. Unlike in the U.S., Belgian law requires the prosecutor's plea bargain to be endorsed by a judge.

OA2. The Experiment

OA2.1. Cases

Although we did not change any details of the actual cases used in the experiment (obtained from the office of the prosecutor), we altered the names of the victims and witnesses to guarantee anonymity of the real cases. Synopses of actual case files are provided to the evaluators before the beginning of the experiment so that the evaluators could assess the background of each case, the forensic evidence, the background of the defendant, and so on, as the judge would do. We did not provide the names of the defendants to evaluators in these case files to avoid any signaling about the race of the defendants. In the videos, the defendant is always referred to as 'my client' (by the lawyer) or as 'the defendant' (by the prosecutor). For burglary cases we changed the location of the event to eliminate the possibility of an evaluator being familiar with a particular burglary incident in a particular neighborhood. Given that the actual defendants were in some cases older than our actor-defendants, we changed the age of the defendant in the case files that are provided to the evaluators to match the age of the defendant-actors in our courtrooms.

OA2.2. Evaluators

We involved 153 students from the Faculty of Business Economics, and Faculty of Law of Hasselt University to act as judges in these trials. The Economics students were a mix of juniors and master's students that were enrolled in the Policy Evaluation course. The Economics group consisted of 86 students. They were randomly subdivided into four groups (because we had 25 headsets to watch the VR videos) to participate in the experiment.^{1,2} The evaluators watched the VR videos using VR headsets (Oculus Rift headsets). The lab hosted 25 students at one time (See Figure OA3).

¹ All four groups watched the videos on the same day, and we made sure there was no interaction between any of the four groups of students. To avoid interaction between the groups, we put them in separate rooms and let them watch a movie (or be lectured by an instructor) while one of the other groups was involved in the experiment. They were also instructed not to inform each other via mail or phone. A professor was always supervising the group of students who were not in the lab.

² Law students are enrolled in Master's degree program at Hasselt University. They participated in the experiment as part of a course on Research Methods, which is mandatory class for all law students. There were 67 law students enrolled in this course, and they all took the experiment the day after the Economics students. Law students were randomly divided into three groups and again we made sure they could not interact with the other groups as the experiment was ongoing for one of the groups.

Figure OA3
Evaluators Watching the VR Videos of the Trials



The evaluators were told that they were participating in an experiment which was an exercise in the adjudication of criminal acts. We organized a random lottery (with 20 movie tickets) for evaluators who participated in both the experiment and the follow up survey.³ A follow up survey, which is completed by the evaluators over the internet, is used to gather background information on the evaluators. This information is collected not on the same day of the experiment but nine days later to minimize concerns about incorrect information being provided.⁴

We recruited practicing attorneys from the Limburg Bar Association. By email and by phone we contacted 250 lawyers who were listed under the category of “criminal law” on the web site of the Association. Thirty-six lawyers agreed to participate.⁵ The attorney received the same information as the student participants and the flow of the proceedings was identical. Because the overwhelming majority of the lawyers were white we could not investigate in-group bias in their decisions, but we were able to analyze the existence of racial bias in lawyers’ decisions.

We also tried to recruit judges and prosecutors, with limited success. We asked the court presidents of multiple courts and the head of one District Attorney’s office for permission to conduct the experiment.⁶ Only eight judges and four prosecutors agreed to participate. The VR experiment with judges and prosecutors was conducted partly in the court buildings, and partly

³ The experiment took place in November 2017. There was no unusual news or events in Belgium during this period related to immigration, terrorism or asylum seekers

⁴ If we had asked the evaluators questions about for example their concern regarding terrorism immediately after they completed the experiment, they might have been cognizant about the purpose of the survey, and may have provided untruthful responses. The survey contained 40 questions, and the key questions were sprinkled throughout. For example, we asked innocuous questions about concerns regarding unemployment, importance of family, and so on, before asking whether they think terrorism is a major problem in Belgium.

⁵ The lawyers took the experiment individually during a ten-day period in July 2018.

⁶ Obviously, the prosecutors who participated in the VR trials did not take part in the evaluations. The courts and District Attorney’s office sent an email to all judges and prosecutors and asked them if they wanted to take part in a study on criminal trials that uses virtual reality technology.

at Hasselt University for those who weren't available on the dates the VR equipment was set in the court buildings. Participating judges and prosecutors are guaranteed anonymity.

OA3. VR Production

A professional Virtual Reality production firm was hired, and a cameraman and a technician were in charge to ensure the technical quality of the video and the audio. A static 360 camera (OZO) was used to shoot the cases. The camera was positioned before the bench of the judge and was on the same height as the judge, which allowed the participant in the experiment to observe the court room from the exact same angle as the actual judge. All videos are shot in one court room in the main court building in Hasselt, Belgium.

We developed a website that guided the participants through the experiment. The website contained instructions for the evaluators on what to do (when to put on the headsets, when to take them off, when to read a case folder, etcetera). The website also communicated with the headset so that the videos would play automatically in the correct order, and provided a platform which allowed the evaluators to submit their decisions in each case (conviction/acquittal and sentences in case of conviction). As a real judge would do, the evaluators had to first read the case folder pertaining to that particular case. The case folders were color-coded so that each of the six cases were assigned a different color folder. The case folders contained the relevant background information about the cases, including the summary of the police report, and the criminal history of the defendant (See Section OA8 for the details of each of the six cases, the way they were presented to the subjects).

OA4. Details of the Experiment

OA4.1. The Set-up of the Experiment

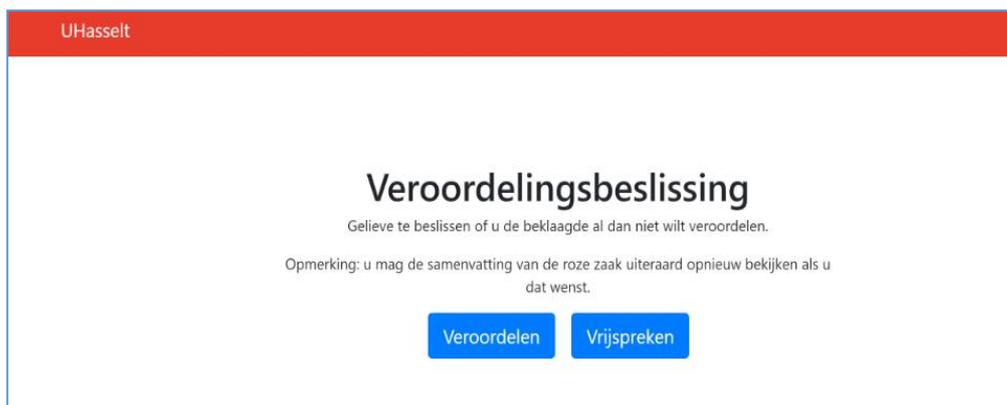
The participants are granted anonymity during the experiment and in the follow-up survey (see Section OA2). Upon entering the computer lab, students had to randomly draw a three digit number from a bowl. After drawing the number, the students could randomly choose one of the 25 computers in the lab. Before they could start with the experiment they had to type in the three digit number in a custom made online tool.

For the purpose of the experiment we developed a website that would guide the participants through the experiment. The website contained clear instructions for participants on what to do. The website also communicated with the headset so that the videos would play automatically in the correct order. The experiment took 2 hours, with a five minute break after watching three videos.

Participants first had to read the case folder of a certain case. The folders were color coded to avoid confusion. After reading the case folder participants could click on a button to start the video. They had 30 seconds to put on the headsets. After watching the video they could take off the headset and click on the button to go to the deliberation phase.

OA4.2. Sentence Assignments

After watching each case video, the students were faced with the choice to either acquit or convict the defendant. The picture below shows the screen students were shown during the deliberation phase.



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Veroordelingsbeslissing

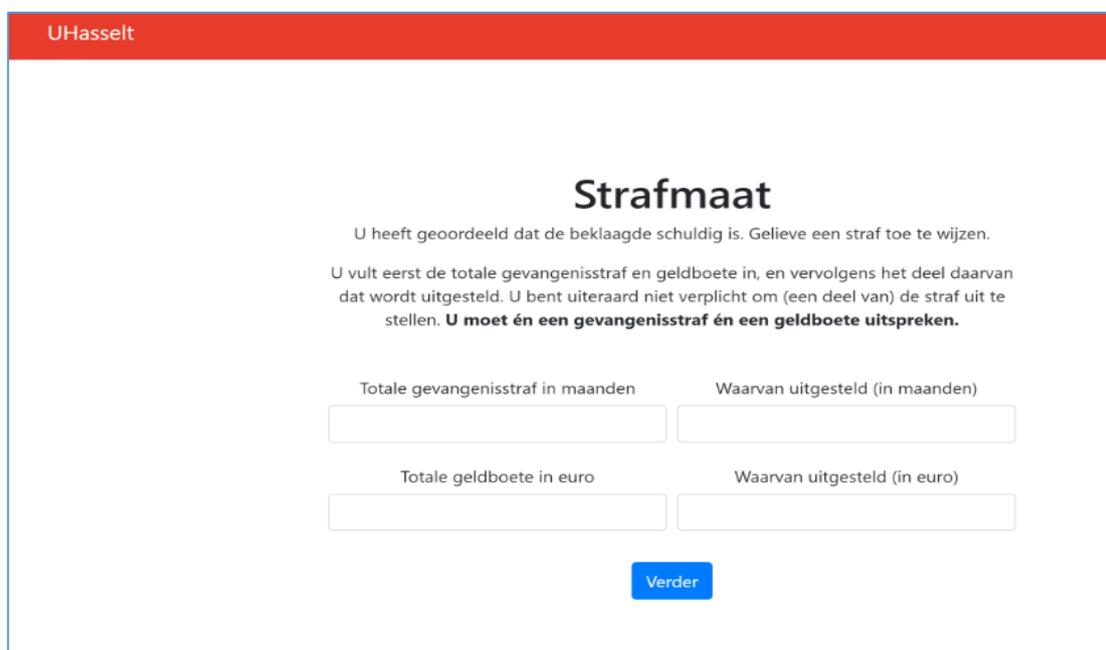
Gelieve te beslissen of u de beklaagde al dan niet wilt veroordelen.

Opmerking: u mag de samenvatting van de roze zaak uiteraard opnieuw bekijken als u dat wenst.

Veroordelen Vrijspreken

(Translation: Conviction decision: Please indicate whether you want to convict or acquit the defendant. Note: You can read the pink case folder again if you want. Buttons: Convict; Acquit)

If the evaluators acquitted the defendant, they would automatically proceed to the next case and they were instructed to read the next case folder. If they convicted the defendant they would go to the next screen to assign the sentences (which could be a prison sentence, a fine or a combination of both, depending on the circumstances of the case). For each case the evaluators could assign a sentence that was in accordance with the range prescribed by the penal code (for instance, a prison sentence between 12 months and 60 months). The Belgian criminal code also allows for the suspension of sentences (both for prison sentence and for fine). So the evaluators also had the option to assign a certain sentence and then suspend (part of) the sentence. For example, they could assign a prison sentence of 12 months and suspend 4 months of this sentence. This would mean that the defendant would go to prison for only 8 months, and the other 4 months were suspended. Both the law and econ students were given a small lecture (by the same lecturer) on the assignment of sentences before they participated in the experiment. If the penal code prescribes that the actual judge in a certain type of crime has to assign both a prison sentence and a fine or either one of them, we made sure the participants were faced with the same option. See the picture below.



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Strafmaat

U heeft geoordeeld dat de beklaagde schuldig is. Gelieve een straf toe te wijzen.

U vult eerst de totale gevangenisstraf en geldboete in, en vervolgens het deel daarvan dat wordt uitgesteld. U bent uiteraard niet verplicht om (een deel van) de straf uit te stellen. **U moet én een gevangenisstraf én een geldboete uitspreken.**

Totale gevangenisstraf in maanden Waarvan uitgesteld (in maanden)

Totale geldboete in euro Waarvan uitgesteld (in euro)

Verder

(Translation of text: You have decided that the defendant is guilty. Please assign a sentence. You first have to fill in the total prison sentence and fine, and next you fill in the part of the

sentence that is suspended. It is of course not mandatory to suspend (part of) the sentence. You have to fill in a prison sentence and a fine. Translation of boxes: Total prison sentence in months; postponed prison sentence (in months); Total fine in euro; postponed fine (in euro))

We made sure the students could not type in values for the postponed sentences that were higher than the total sentences. We also made sure that students could not go outside of the range prescribed by the penal code. The information on the sentence range allowed by the penal code was on the case folders (see the case folders in Section OA8 for the ranges of the sentences for each case).

After making the decision on acquittal or conviction and assigning the sentences for each of the six cases, the students were presented an overview of all their conviction decisions and sentences. They were then informed that they could make changes to their answers. We registered both the initial answers of the students as well as their changed answers.

Overzicht veroordelingsbeslissingen

#	Zaak	Beoordeling	Gevangenisstraf	Waarvan uitgesteld	Boete	Waarvan uitgesteld
1	Roze zaak	<input type="button" value="Veroordelen"/> <input type="button" value="Vrijspreken"/>	<input type="text" value="10"/>	<input type="text" value="5"/>	<input type="text" value="500"/>	<input type="text" value="20"/>
2	Oranje zaak	<input type="button" value="Veroordelen"/> <input type="button" value="Vrijspreken"/>	<input type="text" value="30"/>	<input type="text" value="0"/>	<input type="text" value="1000"/>	<input type="text" value="0"/>
3	Blauwe zaak	<input type="button" value="Veroordelen"/> <input type="button" value="Vrijspreken"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
4	Groene zaak	<input type="button" value="Veroordelen"/> <input type="button" value="Vrijspreken"/>	<input type="text" value="4"/>	<input type="text" value="3"/>	<input type="text" value="500"/>	<input type="text" value="0"/>
5	Gele zaak	<input type="button" value="Veroordelen"/> <input type="button" value="Vrijspreken"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
6	Witte zaak	<input type="button" value="Veroordelen"/> <input type="button" value="Vrijspreken"/>	<input type="text" value="10"/>	<input type="text" value="10"/>	<input type="text" value="600"/>	<input type="text" value="0"/>

(Translation: Overview conviction decision; # Case; Decision ; Prison sentence; Postponed prison sentence; Fine; Postponed fine)

OA4.3. Pilot Testing the Experiment

Two weeks prior to the experiment, we had an extensive testing phase. We tested the entire experiment with two groups of respectively 8 and 15 participants (who had no connections to the university). They tested both the functionality and the user friendliness of the online website and the headsets. This led to the inclusion of a 1 minute instruction video on how to use the headsets in the beginning of the actual experiment. The participants also tested the clarity and terminology of the case folders which led to minor changes in the wording.

OA5. The Follow-up Survey

OA5.1. Drafting and Testing the Follow-up Survey

We decided to organize a follow up survey for the participants. For the questions of the survey we made use of questions from the European Social Survey rounds 5 and 8. The survey contained groups of questions on the following topics: personal characteristics of the respondent, crime and migration, institutions, income and human values. We tested the survey on a group of 15 participants to make sure the questions were clear and the total duration of the survey took no more than 12 minutes. The survey was programmed in Qualtrics and was available via an online link. In the beginning of the survey the participants had to fill in the same three digit number they used in the experiment, this way we were able to match their answers and guarantee their anonymity.

OA5.2. Organization of the Follow-up Survey

We conducted the survey nine days to two weeks after the experiment during a lecture in the respective courses of the economics and law students. All students were informed to bring their laptops to fill in the survey. We sent an email with the link to students who were not in class so they could also fill in the survey. In total 153 of the 165 students that participated in the experiment filled in the survey. These 153 students constitute the sample used in the paper.

The survey contained 40 questions, and the key questions were sprinkled throughout. For example, we asked innocuous questions about concerns regarding unemployment, importance of family, and so on, before asking whether terrorism is a major problem in Belgium.

For the lawyer participants we registered the survey immediately after the experiment. Race questions were not included in the survey given to lawyers because all lawyers were white.

OA6. Testing the Photos of Defendants: Race of the Evaluators

We used a different group of 89 students who were enrolled in a freshman Microeconomics course of Business Engineering degree at Hasselt University to test whether the students can correctly identify the race of the actors used in the experiment. These 89 students have not participated in the experiment and presumably have no knowledge of the experiment. The students were in an auditorium and a large screen in the auditorium displayed defendants' pictures one at a time. Under each picture there were options to choose from regarding the racial/ethnic heritage of the person in the picture. The options were: Western European descent, Middle Eastern or North African descent, and Asian descent. Students were told that examples of Western European descent would be countries such as Belgium, Netherlands, Germany and France; Middle Eastern and North African descent would include such countries as Turkey, Morocco, Syria and Iraq, and examples of Asian descent would include countries such as China, Japan and South Korea. Each student had a hand-held device to enter their choices within 30 seconds after each picture was shown. The students were not allowed to talk to each other during this process. In addition to the six defendants in our trials, we added the picture of a young Chinese man for the students to evaluate.

The results showed almost unanimous consensus regarding the racial/ethnic heritage of the individuals in the pictures; and their heritage was identified correctly. Specifically, 97 percent of the students correctly guessed that the first minority defendant was of Middle Eastern/North African descent. All students who participated in this exercise guessed correctly the heritage of the second and third minority defendants. The students guessed with 98 percent accuracy that the first and the second White defendants were of Western European origin (Belgian), and they guessed with 100 percent accuracy that the third white defendant-actor had in fact Western European descent. Also, all students correctly identified the Chinese person as someone of Asian descent. Overall the minority defendant-actors have been identified as being a minority with almost 99 percent accuracy, and white defendants are identified correctly as being of Western European descent with 98.5 percent accuracy.

OA7. Race vs. Ethnicity

Ethnicity refers to common ancestry, a perception of common history and culture. Race typically refers to a group of people defined by physical characteristics. Race classifications are not established by a set of natural or biological factors but they are human constructs where skin color, eye shape, height, hair type are used as markers to define races (Omi and Winant 1994). The European Court of Human Rights states that "Whereas the notion of race is rooted in the idea of biological classification of human beings into subspecies on the basis of morphological features such as skin color or facial characteristics, ethnicity has its origin in the

idea of societal groups marked in particular by common nationality, religious faith, shared language, or cultural and traditional origins and backgrounds".

Race and ethnicity often overlap, and groups of people may move between categories. For example, as explained by Omi and Winant (1994), for the British, Irish were considered as a different race, although they had similar physical attributes as the British. In the U.S. Irish used to be treated as similar to the Black race. Now they are considered "white" but they constitute an ethnic group. U.S. Census Bureau listed five races in 1870: White, Colored (Blacks), Colored (Mulattoes), Chinese, Indian. In 1950 there were three race classifications: White, Black, Other. In 1990 the classifications became White, Black, Asian or Pacific Islander, American Indian or Alaska Native, and in 2010 they consisted of White, Black, Asian, Hawaiian or Pacific Islander, American Indian or Alaska Native. The Census Bureau contemplated using Arab as a new racial category for the 2020 census, although the idea was not implemented.

OA8. Case Descriptions

OA8.1. Burglary-1

Charge

Burglary, to the detriment of Frederik Smits and Bram Rogiers (victims). The following goods have been taken: a vehicle BMW 320cd, 100.00 EUR cash, a men's watch with a value of 50.00 EUR and spare keys of the BMW 320.

Defendant

- 20 years old
- Unmarried
- Unemployed

Criminal record of the defendant

- Refusal drug test and driving without driver's license: fine 2,400 EUR, 3 months driving ban.
- Driving without insurance and without driver's license, with vehicle that does not meet technical requirements of vehicles (motor vehicle inspection) and is not registered: fine of 2,400 EUR, 3 months driving ban.
- Burglary: 3-month prison sentence.
- Burglary by breaking, climbing in, or false keys: 8-month prison sentence.

Police report summary

- Victim Frederik Smits reported a burglary with breaking in his house.
- The forensics investigation for trace evidence in the house does not yield any results with the DNA and fingerprint databank.
- The burglar has gained access by ramming down a wooden door.
- 2 days after the burglary the victim informs the police that a friend has found the missing BMW.
- Forensics conducts an investigation of trace evidence on the car, and finds a fingerprint and DNA on exterior door.
- The fingerprint turns out to be the defendant's.
- House search (with consent defendant) at defendant's does not yield results (stolen goods not found).
- During interrogation the defendant denies having something to do with these facts, and does not know how his fingerprint ended up on the car. He does not know the victim.
- Victim says that he does know the defendant, however, the defendant has never been in his car with him.

Sentence range allowed by the penal code

- In case of conviction the defendant can be sentenced with a prison sentence from 1 month till 60 months and a fine between 156 EUR and 6,000 EUR.

OA8.2. Burglary-2

Charge

Burglary, to the detriment of John Peeters and Elke Deferm (victims). The following goods have been taken: a music installation of Bose, a golden watch from Ferrari, parfum of Mugler and Burberry, a HP laptop and 1,000 EUR cash.

Defendant

- 22 years old
- Unmarried
- Unemployed

Criminal record of the defendant

- Threatening to attack persons: 3-month prison sentence (suspended) and a fine of 600 EUR (suspended).
- Document fraud: 100 hours of community service.
- Indecent exposure: 2-month prison sentence (suspended).

Police report summary

- Victim John Peeters reported a burglary with breaking in his house.
- The forensics investigation includes taking trace evidence in the house and on an outside window. The DNA on the outside of the window matches with the DNA of the defendant.
- The defendant denies the facts and has no explanation why his DNA is on the window. He also claims to be physically not capable of breaking into the house due to a broken toe and a malfunctioning knee.
- The defendant admits to have been in the area of the break-in frequently at the time because he had a relationship with someone in the same area.

Sentence range allowed by the penal code

- In case of conviction the defendant can be sentenced with a prison sentence from 1 month till 60 months and a fine between 156 EUR and 6,000 EUR.

OA8.3. Burglary-3

Charge

Burglary, to the detriment of Tom Bamps (victim). The following goods have been taken: 2 HP laptops, 1 Apple tablet, 1 Rolex watch, 2 golden necklaces and 2,500 EUR cash.

Defendant

- 23 years old
- Unmarried
- Unemployed

Criminal record of the defendant

- No criminal record

Police report summary

- Victim Tom Bamps reported a burglary with breaking in his house. The victim came home from a night out and finds that the alarm system is not turned on. Upon entering the house he noticed that there had been a burglary. The neighbor indicates she noticed a black Volkswagen Passat standing in front of the house in the evening but she did not notice the number plate.
- The victim claims to have turned on the alarm system before he left the house. The alarm system appears to be working and there is no sign that the alarm system has been tampered with.
- The burglar(s) gained access through a small window in the back of the house that was not protected by the alarm system.
- The alarm system was only installed in the week prior to the break-in. The victim states that one of the technicians was asking a lot of questions on their social activities in the coming weeks. The victim saw him in their street a few days before the burglary.
- The forensic investigation turns up one finger print on the outside of the window that was used by the burglar(s) to gain access to the house.
- Both technicians that installed the alarm system are interrogated. One of them has an alibi for the night of the burglary. The second technician was fired from the company the day before the burglary under suspicion of stealing material from the company.
- The technician denies the allegations of breaking in. He states to have no financial problems and that his parents would support him if he had financial problems.
- The technician owns a black Volkswagen Passat (same model as seen in front of the house the night of the burglary). He claims not to have been in the street at the time of the facts.
- The fingerprint found on the window matches the fingerprint of the technician. He claims that the fingerprint was there because he installed the alarm system the week before the burglary.

Sentence range allowed by the penal code

In case of conviction the defendant can be sentenced with a prison sentence from 1 month till 60 months and a fine between 208 EUR and 8,000 EUR.

OA8.4. Assault-1

Charge

Intentional assault of partner.

Defendant

- 25 years old
- Unmarried
- Unemployed

Criminal record of the defendant

- No criminal record

Police report summary

- Victim and defendant have a relationship for five years and have a 3-year old son together.
- There was an argument between the victim and the defendant, because he was not allowed to take the son to a family gathering.
- The victim tried to film the argument with her smartphone and the defendant grabbed the smartphone and smashed it. The victim states that the defendant then grabbed her and threw her on the table and on the ground. The defendant says she lost her balance and fell but that he was not behaving violently.
- The victim says she managed to get upstairs and call the police with another cell phone.
- The police see no apparent injuries on the victim. The police also see no signs on the table of a fight.
- The victim goes to the hospital on the same day and the medical record shows that she has pain in the neck, nausea and a tingling feeling in both her arms. The defendant claims that she had these complaints for an entire year and it has nothing to do with the argument.
- The victim claims that he has been aggressive before and hit her on multiple occasions in front of their son. The police was called to the house a year ago, but no police report was filed.
- The victim and the defendant decide to live in the same house for financial reasons. Once they sell the house, they will each go their own way.

Sentence range allowed by the penal code

In case of conviction the defendant can be sentenced with a prison sentence from 4 months till 24 months and a fine between 300 EUR and 1,200 EUR.

OA8.5. Assault-2

Charge

Intentional assault of partner.

Defendant

- 24 years old
- Married
- Employed

Criminal record of the defendant

- No criminal record

Police report summary

- Victim calls the police and claims that the husband has locked her in the house.
- Police enter the house through a window.
- Victim says that she and her husband have been problems for 6 months.
- Victim claims that her husband destroyed her clothes three weeks ago and strangled her in front of their 2 year old son. She shows the police pictures of her injured neck but she did not file it.
- Victim claims that her husband hit her and locked her in the house.
- The defendant claims that he did not hit his wife, and that she has a key so that she could have left the house. He claims to have never hit his wife and that she destroyed her own clothes three weeks ago.
- The defendants sister is interrogated and claims that the victim lived with her for a while because of the problems in her marriage. The sister claims that she could not believe that her own brother would use violence and states that the victim was aggressive herself.

Sentence range allowed by the penal code

In case of conviction the defendant can be sentenced with a prison sentence from 3 months till 24 months and a fine between 208 EUR and 1,600 EUR.

OA8.6. Assault-3

Charge

Intentional assault of partner.

Defendant

- 23 years old
- Unmarried
- Employed

Criminal record of the defendant

- Driving under influence: loss of driver's license for a month and 1,100 EUR fine.
- Driving under influence: loss of driver's license for 4 months.
- Document fraud: 7 months prison sentence (suspended) and fine (962.5 EUR).
- Online fraud: 6 months prison sentence and fine (600 EUR).

Police report summary

- Police are called to the house for a domestic dispute. The police have been at the house before for domestic disturbances while both partners are drunk.
- Police find a broken glass on the kitchen sink and hair of the victim on the stairs.
- The victim goes to the doctor to document the injuries and provides the police with previous reports of injuries which she claims have been caused by the defendant.
- The argument started the previous day during a night out at a bar, when the defendant claimed that the victim was hanging around other men. The defendant left irritated and his partner stayed there. She did not come home that night, but only around noon the next day. The victim claimed to spent the night at a friend's place, while the defendant claims that she spent the night with another man. When she arrived at home, the couple started to have the argument.
- The victim claims that the defendant pulled her by her hair throughout the house. After that she claims he pushed her down the stairs. The defendant denies to have hit her. He claims that she fell from the stairs herself (without him pushing her) and that he did aggressively tried to help her up by pulling her hair.
- Both of them admit to drink too much. The defendant claims that the victim has a real problem.
- The DA's office has tried mediation in this case to avoid it coming to court, but the mediation was not successful.
- The couple is back together at the moment of the trial.

Sentence range allowed by the penal code

In case of conviction the defendant can be sentenced with a prison sentence from 1 month till 12 months and a fine between 156 EUR and 600 EUR.

OA9. Extensions and Robustness

We used an alternative measure to determine the cultural background of evaluators. Instead of making use of information on parents' country of origin, we determined whether the evaluator is a minority in Belgium by using information on the language used in the household. Using this alternative indicator of minority status provided very similar point estimates.

The unconditional mean of the prison sentence and the fine assigned by the evaluators are smaller than their respective variances and the distributions are left-skewed. Estimation of the prison term and fine regressions using negative binomial models provided the same inference. During the experiment the evaluators had the option (as the actual judicial procedure allows for) to reflect and to revise their original decisions on conviction, prison sentence and fine. There are 153 evaluators who made 2,258 decisions (918 decisions on whether to convict, and 670 decisions on prison sentence and fine on those who are found guilty). We divided the sample into two groups: those evaluators who never altered their first decisions (88 evaluators) and those who made at least one change in their decisions (65 evaluators). Changing a decision may indicate that the evaluator contemplated more carefully about the case and therefore felt the need to revise his/her original decision. Alternatively, if an evaluator was very deliberate in watching the presentations of the prosecutor and the defense attorney and if the evaluator read the case file carefully, he/she did not have the need to go back and revise the original decisions about conviction and/or sentencing. It is also possible that changing a decision at the end of the experiment may indicate that the evaluator has realized the purpose of the experiment, and as a result he/she went back to revise at least one of the decisions he/she made during the experiment. In this case, any statistically significant effect of racial bias would disappear or would be smaller in the sample of evaluators who changed at least one of their decisions. As shown in columns (4) and (5) of Table OA2, the result were similar between these two groups of evaluators.

To investigate whether evaluators took their task seriously, we analyzed the time they spent in making their decisions. Figure OA4 displays the distribution of total time spent on 6 trials by evaluators for decision-making. For example, 500 seconds means that that the evaluator took on average 1 minute and 23 seconds to decide on a case after he/she completed watching the VR video of the case.⁷ Recall that the evaluators read the case files prior to watching the VR videos of the case. The case file contains information about the case (such as police reports as well as the sentencing guidelines for that particular crime (see Section OA8)). A quick decision after reading the case files and after watching the trial may imply that the evaluator watched the trial carefully and formed an opinion during the trial, and did not have to think long about the verdict and punishment. Alternatively, a quick decision may indicate that the evaluator did not pay attention to the case and made a quick and haphazard decision. To investigate the sensitivity of the results to decision time, we dropped from the sample 25 percent of the fastest evaluators and 25 percent of the slowest evaluators and re-estimated the models, which provided similar results (see columns 6 and 7 of Table OA2). We repeated the exercise by dropping the slowest and fastest 30 percent, 20 percent, and 15 percent of the distribution of cases, and obtained very similar results.

Similarly, the evaluators may have gotten fatigued during the experiment and they may have lost their concentration towards the end. If this is the case, the decisions made later during the experiment should be less careful and more noisy. Alternatively, they may have realized the purpose of the experiment, and may have made their decisions accordingly. To investigate this

⁷ This is total time spent to make the decision on guilt/innocence, and on prison sentence and fine.

point, we analyzed separately the first three decisions and the last three decisions made by the evaluators, which showed no difference between these groups. Finally, we re-estimated the models using the sample of male or female evaluators and using only law students or only economics students. Table OA2 summarizes the results of these exercises and demonstrates the robustness of the results.

Punishment decisions (prison sentence and fine) are made on those who are convicted. Recall that the results reveal racial bias in the conviction decisions against minorities (columns 1-3 of Table 3). This means that the sample of convicted defendants include some minorities who are found guilty because of their race. Thus, in the analyses pertaining to prison term and fine we focus on the trimmed samples which drop marginally innocent minority defendants. Alternatively, instead of trimming the sample to eliminate marginally not guilty defendants, we used all defendants regardless of their conviction status, but assigned a prison sentence of zero and a fine of zero to those who were found not guilty. We then used the entire sample to run prison sentence and fine regressions. The results were consistent with those reported in Tables 6 and 7. The estimated impacts were smaller in magnitude but they were sizable and statistically significant.

Finally, we created a dummy variable which takes the value of one if the defendant is convicted and received an effective prison sentence greater than zero months. The variable equals zero if the defendant is acquitted, or if the defendant is convicted but was assigned no prison term (entire sentence suspended, making effective prison term zero). Using this variable on the whole sample of students we found that the outcome is 7.8 percentage points more likely to take place for minority defendants (0.078, $se=0.028$). The in-group bias coefficient was -0.141 ($se=0.086$) in this specification. In the attorney sample, the coefficient of minority defendant was 0.120 ($se=0.065$).

Figure OA4
Distribution of Time Taken to Make Decisions (in Seconds)

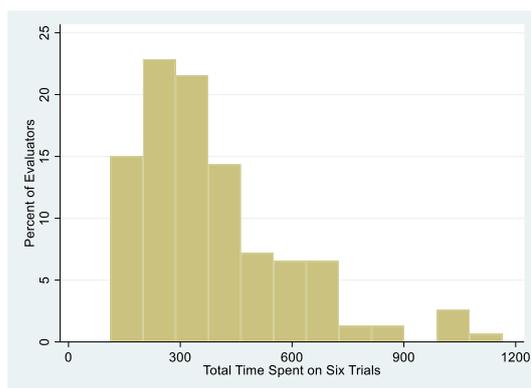


Table OA2
Results of Sensitivity Analyses

	Whole Sample (1)	First 3 Decisions (2)	Last 3 Decisions (3)	Change (4)	No Change (5)	Drop Slow 25% (6)	Drop Fast 25% (7)	Males (8)	Females (9)	Law Students (10)	Econ Students (11)
Racial bias in conviction	0.120** (0.024)	0.115** (0.041)	0.123** (0.033)	0.061+ (0.031)	0.164** (0.035)	0.123** (0.029)	0.107** (0.029)	0.129** (0.040)	0.115** (0.030)	0.146** (0.037)	0.098** (0.033)
In-group bias in conviction	0.085 (0.084)	0.148 (0.114)	0.027 (0.114)	-0.016 (0.072)	0.221 (0.138)	-0.037 (0.106)	0.016 (0.091)	0.159 (0.135)	0.025 (0.107)	0.199 (0.142)	0.061 (0.102)
Racial bias in prison sentence	1.285* (0.511)	1.093 (0.907)	1.482** (0.562)	0.859 (0.530)	1.692* (0.837)	1.325* (0.655)	0.462 (0.324)	1.830* (0.910)	0.722 (0.446)	1.013* (0.480)	1.479+ (0.837)
In-group bias in prison sentence	-3.766** (1.240)	-3.055+ (1.580)	-4.340* (1.953)	-3.946* (1.591)	-3.158* (1.455)	-4.045* (1.809)	-3.050* (1.190)	-5.894** (1.955)	-2.163 (1.496)	-2.529* (1.066)	-4.305* (1.706)
Racial bias in fine	1.071** (0.196)	0.999** (0.305)	1.125** (0.268)	1.113** (0.269)	1.037** (0.285)	1.074** (0.219)	1.032** (0.226)	1.076** (0.289)	1.214** (0.250)	1.105** (0.294)	1.047*** (0.266)
In-group bias in fine	-0.616 (0.576)	-0.273 (0.567)	-1.172 (0.927)	-1.101 (0.791)	-0.012 (0.825)	-0.235 (0.852)	-0.829 (0.587)	-1.740** (0.625)	0.400 (0.776)	-0.942 (0.826)	-0.450 (0.759)

Note. Table OA2 summarizes the results obtained from the sensitivity analyses. Overall Bias indicates the estimated coefficient of Minority Defendant in the relevant regression. In-group bias pertains to the coefficient of Minority Defendant x Minority Evaluator. Column (1) replicates the estimates obtained from the entire sample as presented in Tables 3, 5 and 6. Columns (2) and (3) report the results based on the first three and last three decisions, respectively, of each evaluator. Column (4) presents the estimates related to cases in which the evaluators have modified at least one of their initial decisions. Column (5) pertains to the sample of cases where the initial decisions are not modified. Finally, columns (6) and (7) present the estimates where the slowest 25 percent and fastest 25 percent of evaluators are dropped from the estimation sample. As Table OA2 reveals, the estimates are highly consistent across various sub-samples, which indicates that fastness or slowness of decision-making, altering or not altering the initial decisions, or decisions made earlier or later during these six trials have no significant impact on the results. Similarly, there is no appreciable difference between law students and economics students (columns (10) and (11)) and between male and female evaluators (columns (8) and (9)), with one difference: racial in-group bias is not significantly different from zero in case of females. + $p < .10$, * $p < .05$, ** $p < .01$

Reference

Omi, Michael, and Howard Winant. 1994. *Racial Formation in the United States*. New York: Routledge.