

Analyzing Participation in the 1994 Genocide in Rwanda

Journal of Peace Research
2023, Vol. 60(2) 291–306
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DOI: 10.1177/00223433221075211
journals.sagepub.com/home/jpr



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Abstract

Recent studies of genocide have yielded varying estimates of the number and characteristics of people who engaged in violence. We address these disparities in estimates for one well-studied case: the 1994 genocide in Rwanda. Using novel data from Rwanda's post-genocide *gacaca* courts, we provide updated estimates regarding participants. Specifically, we find that between 847,233 and 888,307 people participated in the genocide, with 181,280 to 190,113 people found guilty of only violent offenses, 618,164 to 654,152 individuals found guilty of only property crimes, and 44,042 to 47,789 individuals found guilty of both property and violent crimes. In total, we estimate that between 229,069 and 234,155 individuals were found guilty of a violent offense, including those who committed violent offenses as well as both violent and property offenses. These results align with past research, representing an important convergence of evidence regarding participation in this genocide. We also calculate specific characteristics of participants, finding that nearly 90% of all participants were men and that the median age for all participants was 34. Although most participants committed a single crime, between 215,124 and 222,522 people were found guilty of multiple crimes. Approximately 6% of people accounted for 25% of the property crimes, while 11% of people accounted for 25% of the violent crimes. These findings provide foundational information about one of the deadliest episodes of mass violence in the 20th century.

Keywords

genocide, Rwanda, perpetration

Introduction

More people were killed in genocide during the 20th century than in all homicides, manslaughters, and related crimes combined (Savelsberg, 2010), with many deaths occurring in the late 20th century as well as the early 21st century (Goldsmith et al., 2013). Yet, researchers often dispute basic facts about genocidal events, including the number and characteristics of the people who commit violence. This disagreement is unfortunate, as the prevention of genocide hinges on the ability to adequately understand who participates and the nature of their

crimes. Furthermore, as estimates of the number of participants are highly politicized and often inflated (Hintjens, 2008), accurate information is vital.

Accordingly, our analysis offers the most comprehensive information about the participants in one of the deadliest episodes of violence during the 20th century:

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the 1994 genocide in Rwanda.¹ We derive this information from a novel dataset that we created by probabilistically and deterministically matching court records from approximately 1.6 million trials of the *gacaca* courts, which the Rwandan government set up to try people suspected of genocide. Although court data cannot capture all participants and are otherwise flawed, our data provide improved estimates on the nature and scope of participation in this genocide. Indeed, the previous estimates of participation in the genocide have used incomplete and less precise *gacaca* court data (e.g. Yanagizawa-Drott, 2014; Friedman, 2013; McDoom, 2021) or extrapolated participation figures from interviews with incarcerated participants (Straus, 2004). Thus, we make two key contributions to the extant literature on the 1994 genocide in Rwanda. First, we derive updated estimates of participants in the genocide, and second, we assess the demographic characteristics of these participants. In doing so, we highlight how our estimates build upon and reinforce prior best estimates, suggesting an important convergence of evidence.

Our data suggest that between 847,233 and 888,307 people participated in the genocide, with 181,280 to 190,113 individuals found guilty of only violent offenses, 618,164 to 654,152 people found guilty of only property crimes, and 44,042 to 47,789 individuals found guilty of both property and violent crimes. We also estimate that between 229,069 and 234,155 individuals were found guilty of a violent offense, including those who committed violent offenses as well as both violent and property offenses (see Online appendix for details). These figures are somewhat higher than Straus's (2004) estimate of 175,000 to 210,000 participants but lower than other estimates of participation in violent genocidal crime (e.g. Yanagizawa-Drott's (2014) figure of 510,000 participations; McDoom's (2021) estimate of 423,000 participants; and Lemarchand's estimate of 350,000 to 600,000, cited in Hintjens (2008)).

Although most participants committed a single crime, between 215,124 and 222,522 people were found guilty of multiple crimes. Approximately 6% of people accounted for 25% of all crimes committed during the genocide (with 11% of people accounting for 25% of the violent crimes), extending a foundational criminological finding – that a small number of people are responsible

for a large amount of violence (Wolfgang, Figlio & Sellin, 1987) – to the crime of genocide. We also find that nearly 90% of all participants were men and that their median age at the time of the genocide was 34, which accords with some prior work on Rwanda (e.g. Straus, 2006; McDoom, 2013) but also departs significantly from theories of youth bulges (e.g. Urdal, 2006), theories regarding the age at which most people engage in violent crime (e.g. Gottfredson & Hirschi, 1990), and popular accounts suggesting that youth militias like the *Interahamwe* committed the majority of the genocidal violence.

In what follows, we begin by addressing prior research on participation in genocide with an emphasis on determining the number and characteristics of participants. We then outline the methods we employed to match the *gacaca* court records before outlining our findings, which we couch within a discussion of the pitfalls of these court data. Finally, we suggest that a more complete picture of the scale and character of participation is important for research on mass violence, as many theories about the perpetration of genocide are based on the case of Rwanda (Straus, 2006; Fujii, 2009; Loyle, 2009; Owens, Su & Snow, 2013).

Studying participation in genocide

Types of participation

Researchers analyzing the people who perpetrate² genocide have distinguished between the initiation and facilitation of genocidal violence and the on-the-ground implementation of this crime. This distinction can be mapped onto positions of power, with scholarship suggesting that leaders orchestrate genocide when they are threatened or when their countries are in turmoil (Valentino, 2004). Those who enact the violence often wield comparatively less power and may similarly be influenced by threat and fear (Hagan & Rymond-Richmond, 2008), alongside ideology and propaganda (Leader Maynard, 2014), greed (Loyle, 2009), group dynamics and coercion (Staub, 1989), social networks (Fujii, 2009; McDoom, 2013), age-graded and gendered expectations (Nyseth Brehm, Uggen & Gasanabo,

¹ The Rwandan government and the United Nations deem this the '1994 Genocide Against the Tutsi'. This name indicates that the genocide targeted Tutsi though does not underscore the many Hutu who were killed by attempting to save Tutsi, refusing to participate, or being mistaken as Tutsi themselves (Straus, 2019).

² Though early research demarcated perpetrators, victims, rescuers, and bystanders, recent work has recognized that people engage in multifaceted actions (e.g. Fujii, 2009). Given such findings, and the imperative for person-first language in criminology (Denver, Pickett & Bushway, 2017), we refrain from using the term 'perpetrator'.

2016), and other aspects of the social situation (Mirondo, 2004).

In this article, we focus on the individuals who commit genocidal violence on the ground. Participation in such acts varies widely across genocides. Sometimes, those who initiate and facilitate violence and those who implement the violence are the same. Indeed, certain genocides are executed by a relatively small group of individuals, such as German General Lothar von Trotha's armed forces inciting and committing genocide against the Herero and Namaqua peoples in Southwest Africa (Hull, 2013). Other genocides, like the Holocaust, are organized by individuals in positions of power who depend on thousands of others, including civilians, to implement the violence (Bloxham, 2009). In fact, numerous other genocides – like those in Bosnia-Herzegovina or Cambodia – saw civilian participation in the violence. Documenting the degree of participation among these individuals is valuable because theories about *why* people participate in genocidal violence rely upon understandings of the degree, nature, and scope of engagement with violence.

To date, one of the defining characteristics of individuals who participate in genocide is that they are 'ordinary' individuals who act in extraordinary situations (Browning, 1998). This 'ordinary men' thesis derives from research on the Holocaust but has been extended to numerous other cases, including Bosnia-Herzegovina, Cambodia, Guatemala, and Rwanda (e.g. Waller, 2007; Smeulers & Hoex, 2010; Hinton, 2016). Work in this paradigm has also sought to profile the people who engage in violence. For instance, Mann (2000: 338) collected and analyzed biographies of 1,581 'presumed German war criminals' involved in violence during the Holocaust. In doing so, he argued that simple data – such as age, sex, and employment sector – shed light on the perpetration of violence.

We concur, and in this article, we examine the extent of engagement in the 1994 genocide in Rwanda, including participants' demographic information. Research on the demographic information of people who commit numerous other types of violence indicates the importance of identifying demographic characteristics. For instance, age and sex are two of the strongest correlates of crime; participation in crime often peaks in the late teens and early 20s, and men are more likely to commit crime than women at any age (Gottfredson & Hirschi, 1990; Hirschi & Gottfredson, 1983; Schwartz et al., 2009). Broadly, criminologists link these patterns to external controls on peoples' lives, like marriage or

employment³ (Laub & Sampson, 1993). In much the same way, youth bulges have been associated with increased opportunities and motives for violence (Urdal, 2006; Farzanegan & Withuhn, 2017; Yair & Miodownik, 2016), and countries with high levels of under- or unemployed young men are at increased risk of political violence (e.g. Azeng & Yogo, 2013).

Some evidence suggests that the correlates of crime vary across *types* of crimes as well (e.g. DeLisi & Vaughn, 2016). For instance, Steffensmeier et al. (1989) documented variation in the age distribution across forms of crime, while Victoroff (2005) compiled evidence illustrating that the age, gender, and employment status of people who engage in terrorism varies across action type. With respect to genocide, causing serious bodily or mental harm, preventing births, destroying livelihood, forcibly transferring children (Rome Statute, 1998; United Nations, 1948), and committing rape and other sexualized violence (ICTR v Jean-Paul Akayesu, 1998) can constitute acts of genocide as outlined in international law. Scholarship has documented other forms of violence as well, including but not limited to staffing roadblocks, torturing, mutilating, demolishing homes, destroying cultural symbols, forcibly displacing, and involuntarily interning. Yet, few studies have analyzed how many people commit certain types of crimes during genocide or how participants' demographic characteristics are associated with types of violence (Berrebi, 2007; Humphreys & Weinstein, 2008).

Finally, research on some forms of violence has established that some people are comparatively more likely to engage in multiple crimes. Much criminological inquiry has focused on identifying high-rate offenders (Wolfgang, Figlio & Sellin, 1987), suggesting that a small percentage of people are often responsible for a high percentage of violence. Studies in life-course criminology seek to distinguish life-course trajectories of high- and low-rate offenders and have documented variation in age and type of crime among these groups (Piquero, Sullivan & Farrington, 2010). Somewhat related work on political violence has suggested that particular individuals may engage in more armed violence than others (Mueller, 2003). As such insights have yet to be applied toward understanding the rate of offending during genocide, we analyze whether there were high-rate offenders in Rwanda and, if so, the percentage of crimes attributable

³ Symbolic interactionists posit that transitions into adult work and family roles also influence identity, maintaining that such identity shifts impact age–gender–crime patterns because criminalized behavior is inconsistent with the prescribed role expectations of adults (Massoglia & Uggen, 2010).

to them. Prior to detailing our methods to assess how many people participated in the genocide in Rwanda, the types of crimes they committed, possible high-rate offenders, and their characteristics, we turn first to a brief summary of the case.

The case of Rwanda

Rwanda was named a German colony in 1884, though colonialism became particularly consequential when Belgium took control of the country as World War I ended. Belgian officials mandated that Rwandans carry identification cards that classified each citizen as Hutu, Tutsi, or Twa. Although these groups existed before colonialism, Belgian colonialists racialized existing identities and enacted policies that benefited Tutsi, who dominated positions of power despite comprising no more than 15% of the population (Mamdani, 2001; Newbury, 1988).

During the early 1950s, Hutu began to express discontent at years of marginalization. As a result, a Hutu emancipation movement emerged, culminating in Rwandan independence (1962) and the institution of a Hutu-led government. Violence and discrimination against Tutsi became common, and many Tutsi fled the country (Reyntjens, 1996; Des Forges, 1999; Hintjens, 1999).

A 1973 coup brought President Habyarimana to power, and his regime continued to discriminate against Tutsi. Meanwhile, some refugees formed an armed liberation movement known as the Rwandan Patriotic Front (RPF) in neighboring Uganda. On 1 October 1990, their army attacked Rwanda's northern border. Propaganda and fear swept through the country, and soon all Tutsi were associated with the enemy (Straus, 2006; Kimonyo, 2008). A widely disliked peace process began as tensions remained high (Verwimp, 2013; Guichaoua, 2015).

Then, on 6 April 1994, President Habyarimana's plane was shot down as it was landing in the capital. This assassination marked the beginning of the genocide, which targeted Tutsi but which also took the lives of numerous Hutu who refused to participate in the violence or attempted to rescue Tutsi. A small group of political elites known as the *Akazu* orchestrated the violence, and many Hutu civilians implemented it by joining killing groups and looting property (Straus, 2006; Fujii, 2009).

Arguably, this case saw more civilian participation than most if not all other cases of genocide during the 20th century, representing what Ermakoff (2014) terms an exceptional case. Despite the case's notoriety for

widespread public participation in the violence, estimates of how many people engaged in genocidal crime vary widely – from tens of thousands (see Jones, 2001) of participants to 1 million (see government estimates cited in Drumbl, 2000). These statistics are also highly politicized. Rwandan politicians have suggested that between 1 million and 2 million Hutu participated in the genocide – numbers that would implicate large proportions of the adult Hutu population in 1994 Rwanda (Hintjens, 2008: 22–23).

Taking stock of the numerical ambiguity with respect to participation, Straus (2004) sought to approximate the number of participants through fieldwork. Specifically, he interviewed 210 people in prisons across Rwanda, and 166 of these individuals provided him with estimates of their killing group size and makeup. The average number of group members cited was 22, and Straus multiplied this estimate by a rough count of participation across geographic areas in Rwanda to arrive at a range of between 175,000 and 210,000 participants.⁴

This range was foundational and is widely cited, though it nonetheless is a rough estimate derived from interviews. Moreover, data derived from interviews do not provide key demographic information on participants nor the number of crimes that individuals committed – crucial information in order to comprehend who participates in genocide and the social dynamics that shape their actions. Straus's (2004) calculation also does not incorporate property crimes. To be clear, estimating property crimes was not one of his goals. Yet, while researchers often do not consider the commission of property crime to be perpetration of genocide, destroying livelihood is included in the international legal definition of genocide. Property destruction also causes much harm to peoples' lives and mental health (Dinisman & Moroz, 2017), again rendering estimates of property violence important.

We consequently rely upon novel data from the 1.6 million post-genocide court trials to assess participation. Court data provide an important source of information on crime, and researchers have used court data to study gang violence in the United States (Miller, 1994) and homicide levels worldwide (Stockl et al., 2013), among other crimes. In this case, the Rwandan government established approximately 12,000 courts – known as *gacaca* courts – throughout the country to respond to crimes of genocide (Clark, 2010; Nyseth Brehm, Uggen

⁴ Straus (2004: 92) also weighted the estimates and relied upon approximations of which communes experienced violence.

& Gasanabo, 2014; Chakravarty, 2015; Doughty, 2016; Ingelaere, 2016). Specifically, there were 9,013 cell courts, 1,545 sector courts, and 1,545 courts of appeal. After a pilot phase beginning in 2002, the courts held trials between 2005 and 2012, though individual courts closed prior to 2012 if they completed their caseloads.

As we will address in more detail later, these data do not encompass all violent crimes linked to the genocide. The International Criminal Tribunal for Rwanda indicted 90 individuals for organizing or inciting violence. Rwanda's national court system conducted some trials prior to the inception of *gacaca* as well, and once *gacaca* courts were established, the national system retained jurisdiction of individuals who were particularly responsible for planning, organizing, or supervising the violence, ultimately trying at least 1,179 cases (Hola & Nyseth Brehm, 2016). Furthermore, war crimes and crimes against humanity tied to the concurrent civil war were not tried in any court system (Straus, 2019).

All other crimes tied to the genocide, however, were meant to be tried in the *gacaca* courts, including trials in absence for people who had fled to the Democratic Republic of the Congo or to other locations. Put simply, if someone was accused of committing genocide, they had a trial. This means that there were trials for people who found themselves accused due to a petty squabble with a neighbor or otherwise erroneously accused. Despite these and other issues we further address later, the *gacaca* courts constitute the best source of data on the people who committed genocidal violence on the ground.

These courts used three categories to try people suspected of committing genocidal crimes (Organic Law N, 13/2008):

- Category 1: Planning, organizing, or supervising the genocide; acting in positions of authority at high levels; inciting genocide; committing acts of rape or sexual torture.
- Category 2: Committing murder or being an accomplice; torturing; and other criminal acts against people.
- Category 3: Committing property offenses, such as looting.

Category 1 and 2 cases were tried in courts at the sector level, whereas Category 3 cases were tried in courts at the cell level, which is a lower level of geographic administration (Clark, 2010). We are thus restricted to these three categories of genocidal crime in this analysis. Yet, these categories include killing and physical violence, sexualized violence, torture, property violence, and

joining killing groups, meaning that these data account for many forms of genocidal violence.

Notably, we are not the first researchers to use data from the *gacaca* courts, though we are the only researchers (to our knowledge) who obtained access to the complete⁵ court records, including verdicts. Most prior studies relying upon *gacaca* court records have analyzed a more limited dataset that the government of Rwanda made available online several years before the courts closed (e.g. Yanagizawa-Drott, 2014; Friedman, 2013; La Mattina, 2017; Heldring, 2021; Rogall, 2021). These online data contain the majority of the people who were accused of crimes of genocide, as we illustrate in our Online appendix, though significantly undercount Category 3 crimes and only include accusations (as opposed to guilty verdicts). In one exception, McDoom (2021) compiled accusation data from the pilot *gacaca* trials, which occurred in roughly 7.6% of sectors. He then approximated the acquittal rate and the percentage of community mobilization in other sectors to suggest there were 367,000 individuals who committed a Category 2 crime and 56,000 individuals who committed a Category 1 crime, totaling 423,000.

Previous analyses using these online data or the pilot data are important though nonetheless remain limited because they did not match records to identify people with multiple *gacaca* court trials. For example, if a person was accused of a Category 2 and a Category 3 crime, they had two separate trials (even if those crimes occurred as part of the same incident). Similarly, if people were accused of crimes in more than one place, they were tried in separate courts with separate trials in each sector (for Category 1 and 2) or cell (for Category 3). This meant that many individuals appeared numerous times within the dataset. Yet, there were no unique identifiers that enabled matching across individuals in either the online or the pilot data.⁶

Thus, previous scholarship that has used the *gacaca* court records has not accounted for repeat participants. For instance, in his study of radio broadcasts during the genocide, Yanagizawa-Drott (2014) cited 433,000 people prosecuted under Category 2 and used this number as a proxy for participation. Yet, this figure is much closer to the number of trials than the number of people who stood trial for Category 2 crimes and is more than

⁵ As we address in our Online appendix, it is unlikely that anyone has access to *every* record.

⁶ Verpoorten (2012a) used government statistics on people accused of genocide in each sector, though it is not clear whether or how Verpoorten matched individuals.

half the number of those found guilty of Category 2 crimes, as we will illustrate. To be certain, names were often not included online such that matching across trials was not possible, meaning these studies did the best they could with the data at hand. Nevertheless, analyses that do not match individuals across trials include inaccurate figures of participation and double-count individuals, which violates statistical assumptions about the independence of observations. This study corrects these issues by matching individuals across trials in an updated dataset.

Methods

Data

When the *gacaca* courts closed in 2012, the Rwandan government hired individuals to enter court records – such as defendant name, birth year, sex, location of trial, category of crime, verdict, and punishment – into Excel files. The first author obtained these data in 2012 from the acting Executive Secretary of the Rwandan National Commission for the Fight Against Genocide – explained in more detail in the Online appendix – and compiled a database of records from more than 12,000 *gacaca* courts. These data are a more complete dataset of the trials the government had posted online, meaning that they have the same source as most other studies using *gacaca* court data and that a thorough analysis of this source is justified and warranted.

However, while court data provide valuable information, they are also flawed, both generally and in Rwanda. All court data are created by politicized systems that are affected by bias and discrimination. Official reports also overlook some crimes, and in our discussion, we theorize those who may be missing from these data. The *gacaca* courts also had particular issues, which we address in our discussion section.

Perhaps most importantly, while readers familiar with Rwanda may be concerned about data derived from the government, the data we obtained were so highly disorganized that it would be unlikely and difficult for anyone to have systematically altered or tampered with them prior to our receipt. Furthermore, the first author has found about 200 of the individuals in the dataset for separate projects and thus has been able to validate a subset of records (see Online appendix). Additionally, McDoom (2021) compared the pilot data – which he obtained from local *gacaca* coordinators – with the final government data. He suggested that their close correspondence with respect to Category 1 and 2 crimes indicates that ‘fears of post hoc political manipulation of the data –

at least for the more serious crimes against the person – may be unfounded’ (McDoom, 2021: 288). While it is nonetheless important to keep the issues we address in our discussion in mind, these factors – as well as the fact that the government created the online *gacaca* data used in prior studies that were unable to match participants across trials – convinced us of the value of these updated data. We thus cleaned the data and engaged in matching to identify repeat individuals across trials. In what follows, we describe our matching process, and additional details can be found in the Online appendix.

Data matching

To begin, a team of research assistants manually cleaned the raw data, a process that is commonly employed before probabilistic matching and that we further detail in the Online appendix (Christen, 2012). Next, we turned toward restructuring the dataset as a dataset of individuals rather than cases. To identify people who had multiple trials in the data, all people were matched in two-stages using probabilistic and deterministic matching. The probabilistic match identified repeat individuals if they had similar information in multiple lines. The deterministic match allowed us to match individuals with higher amounts of missing data.⁷

For the probabilistic match, we used a program called Link Plus to match individuals across five variables: (1) last name, (2) first name, (3) birth year, (4) mother’s last name, and (5) father’s last name. We selected these variables because they had fewer missing values and higher accuracy, while variables such as employment and the defendants’ parents’ first names had more missing values and were less likely to be accurate.

We blocked on the defendants’ last names using Soundex.⁸ Blocking is standard in probabilistic matching and required by Link Plus (Jaro, 1995; Steorts et al., 2014). It limits the number of potential pairwise comparisons by identifying the most likely matches by entry. This is necessary because it is too computationally intensive to compare all potential pairs. The data we analyzed have 1,680,753 entries; therefore, there are 1.6 million choose 2 potential pairs in the data. We selected the last name variable for blocking because it is the most accurate

⁷ Some people were tried in absence, and people attending the trial provided names or birth years only when they were known. Additionally, people inputting the data into Excel skipped entries, resulting in missing data.

⁸ Soundex finds potential matches compared to other matching algorithms (CDC, n.d.), which helps reduce false negatives (Christen, 2002; Snae, 2007). See the Online appendix.

variable with the lowest amount of missing data. For two cases to be a match, the last names had to have sounded similar as indicated by a Soundex value Link Plus attributes to each comparison.

Using Link Plus, we then calculated a weight, or score, based on the similarity between the defendants' names, birth years, and parents' names of each pair of court records to predict if the individual is the same person. Next, we spot-checked the data to determine that the score of 17 produced the most accurate data and that scores 16 and 18 were also fairly accurate. Spot-checking involved examining matches in scores 16 to 20, which we selected after manually examining thousands of lines of data to assess likely false negative, false positive, and correct matches across numerous scores. The alternative model specifications, and more details on the probabilistic matching process and scores, are included in the Online appendix.

After the probabilistic match, we deterministically matched the defendants to account for repeat defendants with a high level of missing data. While the probabilistic match allowed individuals to match when some parameters were missing, missing parameters lowered the probability of a match because the weight threshold did not change based on the number of non-missing parameters. Matching procedures consequently suggest that researchers manually adjust matches (i.e. manually match or un-match cases) as the last step (Harron et al., 2017). As it would be impossible to manually check each pair in our data, we employed the deterministic match procedure to approximate this manual process.

For the deterministic match, we matched defendants on their last name, trial date, and trial location. The trial date and location were crucial to this matching strategy because appearing in two different locations on the same day was not possible. However, individuals also had to match on at least one, and not mismatch with any, of the following variables: (i) first name, (ii) mother's last name, (iii) father's last name, or (iv) the absolute difference of two for the birth year. We allowed for some flexibility with birth year because many defendants did not know their exact birth year.⁹

Table I displays the matched data (following both probabilistic and deterministic matching) for scores 16 to 20 and, specifically, the number of trials per person. The summary statistics for all matched data between scores 16 and 20 are similar, with the same interquartile range and median counts for all tested scores. Further, the maximum count of guilty verdicts is the same across scores 18 through 20.

Table I. Summary statistics for number of trials per person by score

Score	Min	Quantile		Mean	Median	Quantile	
		25%	75%			Max	
16	1	1	1.73	1	1	2	140
17	1	1	1.69	1	1	2	100
18	1	1	1.65	1	1	2	87
19	1	1	1.61	1	1	2	87
20	1	1	1.57	1	1	2	87

Results

We begin by providing an overview of the number of people who were found guilty of different categories of crime in the *gacaca* courts, as well as of the individuals who were found guilty of multiple crimes. We believe guilty verdicts provide the best approximation of participation, as accusations could have been tied to politicized motives. For instance, sometimes people accused their neighbors of participating in the genocide as retaliation for a petty argument (Ingelaere, 2016). However, as *gacaca* accusations have been used to proxy participation in prior studies (e.g. Yanagizawa-Drott, 2014; Heldring, 2021; Rogall, 2021; Verpoorten, 2012a), we redo all analyses with the full dataset of all accused individuals in the Online appendix. We also vary our language between 'people found guilty of violence' and 'participation' in the violence to remind the reader that we are relying upon guilty verdicts and that such data are approximations – a point we return to in our discussion.

After outlining the number of people who were found guilty by the *gacaca* courts, as well as their types and numbers of crimes, we examine participants' demographics, including age, sex, and employment. We derive all estimates (including those presented earlier and those presented in the following sections) by varying a minimum cutoff score for probabilistic matches between 16 and 18. A score of 16 identifies more potential matches of individuals, while a score of 18 offers more conservative estimates. We provide ranges from scores 16 and 18 to underscore that our figures are estimates.¹⁰ As we believe score 17 estimates are the

⁹ The first author was told this in many interviews with *gacaca* judges.

¹⁰ Score 16 produces the lowest count of participants but the highest count of repeat participants, while score 18 produces the opposite. Therefore, score 16 is the lower boundary for the counts of participants that committed one crime and the upper boundary for the counts of participants that committed multiple crimes, while

most accurate, we provide those in footnotes throughout as well.

Number of genocide participants

Our data indicate that between 847,233 and 888,307 people were found guilty of participating in the genocide across Categories 1, 2, and 3. Specifically, there were between 43,582 and 44,526 individuals found guilty of Category 1 crimes, between 197,671 and 201,325 individuals found guilty of Category 2 crimes, and between 702,673 and 732,586 individuals found guilty of Category 3 crimes.¹¹ These estimates illustrate that the majority of people found guilty in the *gacaca* court system were found guilty of crimes against property (Category 3), either as a single crime or alongside a violent crime.

If we only consider violent crime, we find that between 229,069 and 234,155¹² individuals were found guilty of a violent offense (Category 1 or 2 crimes). Many researchers previously employed vague terms like ‘hundreds of thousands’ of participants, and after Straus’s (2004) estimate of 175,000 to 210,000 violent participants was published in 2004, scholars largely coalesced around this claim. Although our range of 229,069 to 234,155 is larger than Straus’s estimated range, it is strikingly similar given the difference in methods. However, our updated estimates are still approximately 30% higher on the lower bounds and 10% on the upper bounds. These estimates are also notably lower than those presented in studies that used unmatched individuals or that did not distinguish between guilty and non-guilty verdicts.

Beyond general participation figures, we know relatively little about the distribution of this violence (Des Forges, 1999). Indeed, some people committed multiple crimes, and these individuals are therefore counted more than once in estimates presented thus far (e.g. they committed a Category 1 and a Category 2 crime or committed Category 2 crimes in two locations and thus are counted twice). Disaggregating these individuals illustrates that between 624,711 and 673,183 people committed a single crime, while between 215,124 and 222,522 individuals were found guilty of multiple

score 18 is the upper boundary for the counts of participants that committed one crime and the lower boundary for the counts of participants that committed multiple crimes.

¹¹ In score 17, 868,917 people were found guilty. This includes Categories 1 (44,044), Category 2 (199,633), and Category 3 (718,583).

¹² The point estimate for score 17 is 231,757.

crimes, including multiple crimes within a category or across categories.¹³ The average number of crimes committed per person was between 1.62 and 1.70, and the range of crimes committed extends to 121.¹⁴

To illustrate numbers of crimes committed by type of genocidal violence, Figure 1 disaggregates participation among those who committed multiple crimes and those who committed one crime. We consider violent (Category 1 and 2) and property crime (Category 3) participants separately when analyzing people who committed multiple crimes. Between 480,663 and 519,682 individuals committed a single property crime, while between 134,470 and 137,501 individuals committed multiple property crimes. With respect to only violent crimes, between 144,048 to 153,501 people committed a single violent crime, while between 80,654 to 85,021 individuals committed multiple violent crimes.¹⁵

Looking further at those who committed multiple crimes, some individuals were particularly active during the genocide. Although rates of offending are typically assessed throughout the life course (Sampson & Laub, 2003), there is also value in identifying rates of offending during a single episode of genocide, including short-term, high-rate offenders who may be responsible for a high proportion of crimes (Piquero, Sullivan & Farrington, 2010). Accordingly, Figure 2 displays the number of crimes as a log–log plot of offenses committed per person, disaggregated both by type of crime and by sex.

As illustrated in Figure 2, the count of offenses committed per person is highly over-dispersed in each case, meaning that a small number of individuals account for a high proportion of property crimes and of violent crimes. In fact, approximately 75% of those found guilty of any crimes of genocide (property or violent) were found guilty of only one crime. Yet, 6% of people accounted for 25% of the property crimes, while 11% of people accounted for 25% of the violent crimes. In total, 6% of participants accounted for all 25% of all crimes.¹⁶ This mirrors criminological research documenting that a small group of individuals are often responsible for a large

¹³ Score 17 suggests that an estimated 650,104 people were found guilty of one crime and 218,813 were found guilty of multiple crimes.

¹⁴ The average crimes in score 17 were 1.66, and score 17 had a maximum of 87 crimes committed.

¹⁵ In Score 17 data, an estimated 82,788 committed multiple violent crimes, 148,969 committed a single violent offense, 136,025 committed multiple property crimes, and 501,135 committed a single property offense.

¹⁶ These percentages are the same across the scores, as are percentages of men presented in the subsequent paragraph.

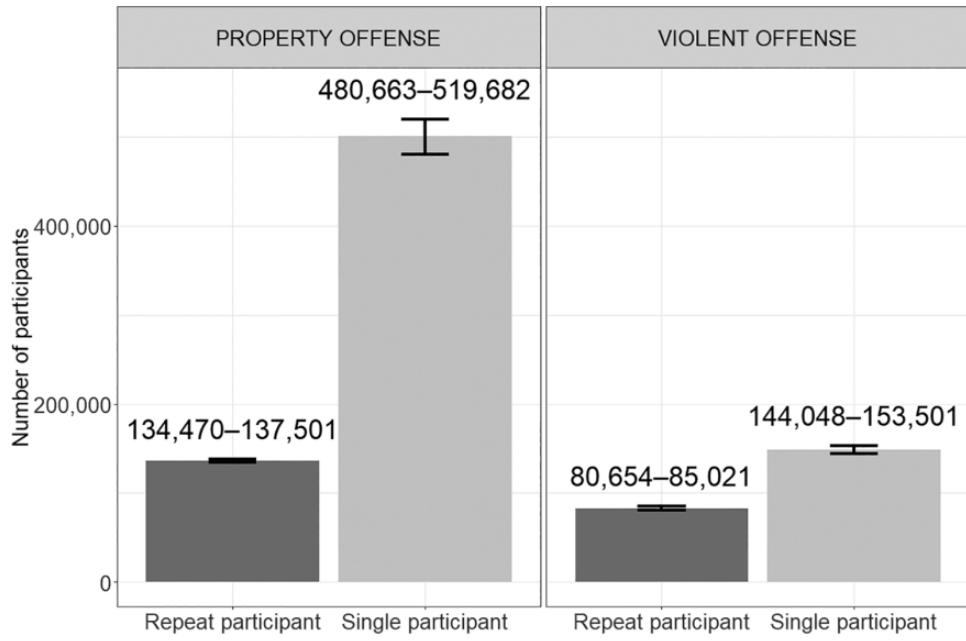


Figure 1. The number of people found guilty of property (Category 3) and violent (Category 1 and 2) offenses, stratified by number of crimes

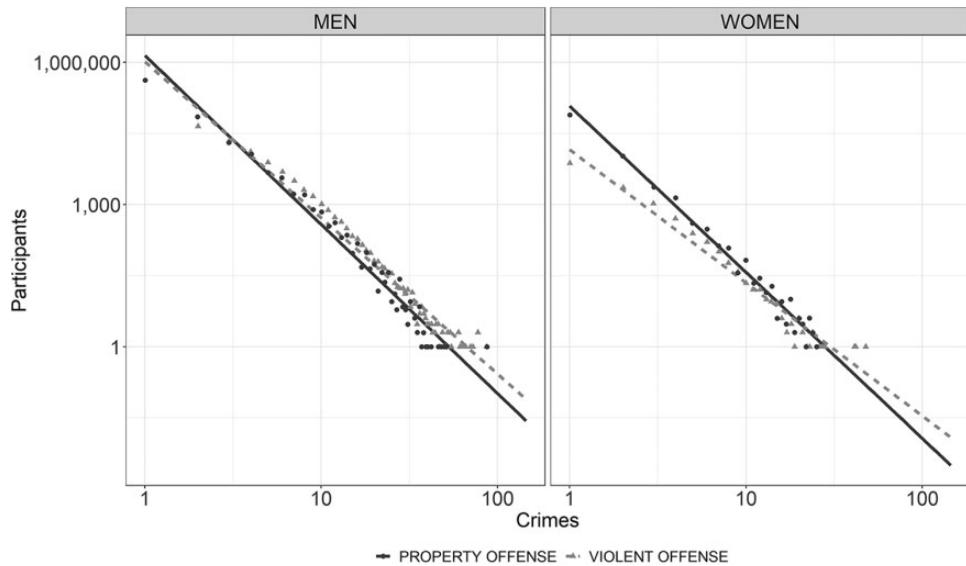


Figure 2. Log–log plot for the number of offenses committed per person

amount of crime and extends this finding – previously documented for more common types of crime – to the crime of genocide (Wolfgang, Figlio & Sellin, 1987).

Demographic characteristics

Given prior research on participation in crime and political violence, we also consider these participants' age, sex, and employment statuses in 1994. Turning first to sex, existing research based on interview or survey-based samples has

suggested that a large proportion of the participants were likely to be men (e.g. Straus, 2006; McDoom, 2013; Verwimp, 2013). Our data allow for greater specification, and we find that approximately 88% of all participants were men. When considering only those who committed violent offenses, about 95% of participants were men. This is consistent with previous research on the gendered nature of participation in the genocide and with research documenting the Rwandan government encouraging men to

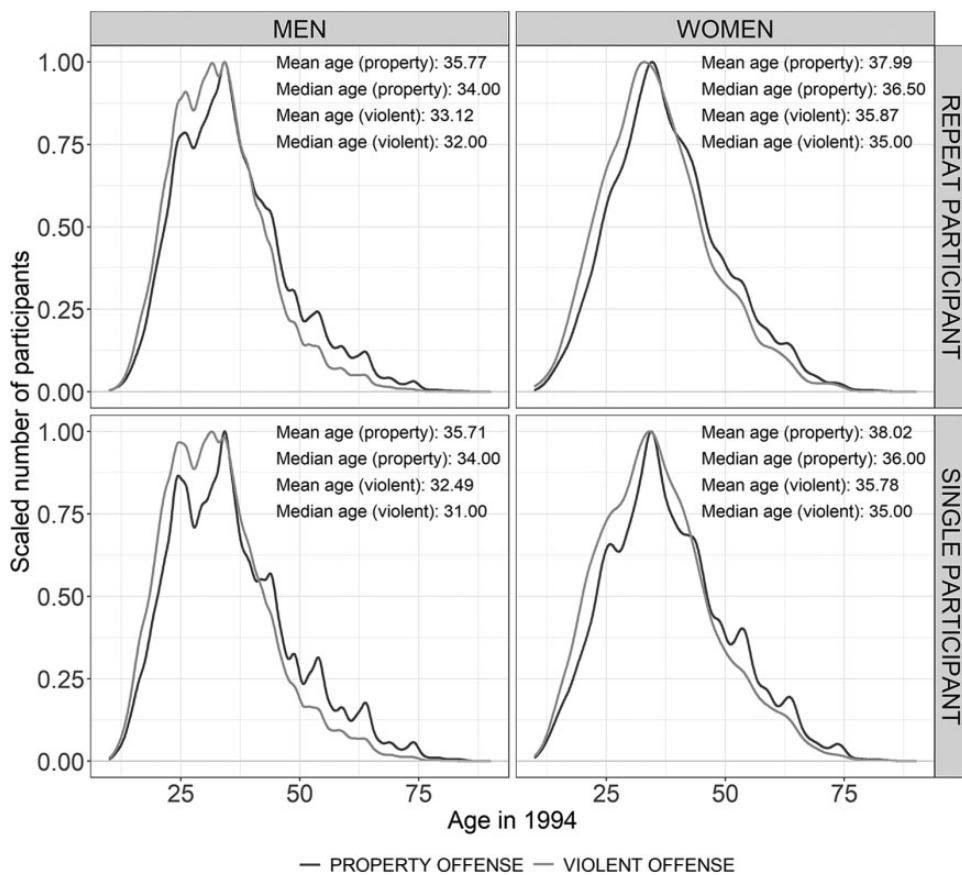


Figure 3. Age–crime curves by type of crime and sex

kill Tutsi to protect their families and communities (Des Forges, 1999; Straus, 2006; Nyseth Brehm, Uggen & Gasanabo 2016).

More specifically, 135,146–144,046 men and 8,123–8,758 women committed a single violent offense. Between 76,783–80,814 men and 3,421–3,739 women committed multiple violent offenses. Furthermore, 404,803–437,709 men and 74,481–80,661 women committed a single property offense, while 117,155–118,820 men and 14,968–16,133 women committed multiple property offenses.¹⁷

With respect to age, some prior research has indicated that many participants in the genocide were youth. For instance, some participants were members of a Hutu youth militia known as the *Interahamwe*¹⁸ (Des Forges,

1999). Numerous authors have also highlighted how young men were most likely to commit genocide more generally. For instance, Jones (2002) argued that a large proportion of unemployed young men drove the high levels of civilian participation (see also Mamdani, 2001).

To be sure, youth is situationally defined, and at the time of the genocide,¹⁹ coming of age was often marked by marriage (Sommers, 2012). Indeed, Verpoorten's (2012b) analysis suggests there was more genocidal violence in areas with little opportunity for *young men* to acquire land, which enabled marriage. By 1994, the average age of men's first marriage was 26.8 (McDoom, 2013). Furthermore, according to the 1991 Census, 76.7% of 30-year-old men were (or had been) married, and 91.3% of 30-year-old women were married (IPUMS, 1991).

Yet, our data indicate that the median age of people who participated in any type of genocidal crime was 34.

¹⁷ Score 17 suggests that 139,755 men and 8,476 women committed a single violent offense, while 78,770 men and 3,559 women committed multiple violent offenses. Furthermore, 421,665 men and 78,121 women committed a single property offense, while 118,093 men and 15,464 women committed multiple property offenses.

¹⁸ The *gacaca* data include 103 members of *Interahamwe*. No other youth militias are indicated.

¹⁹ Today, youth is defined in a national policy at 14–35. As life expectancy was barely 50 during the 1980s, 35 was hardly young.

Table II. Participant employment

	<i>Percent of sample*</i>	<i>Count of violent participants</i>	<i>Percent violent participants</i>	<i>Median age</i>	<i>Percent men</i>	<i>Average number of crimes</i>
Farming	97.03%	843,078	25.31%	34	87.09%	1.65
Blue-collar	1.22%	10,643	66.80%	33	94.90%	2.13
White-collar	0.32%	2,793	55.71%	36	93.91%	2.32
Security	0.27%	2,317	64.78%	31	96.94%	2.20
Politician	0.12%	1,065	60.56%	39	94.08%	3.07
Student	0.05%	464	69.83%	21	92.46%	1.93
Religion work	0.02%	169	72.19%	37	94.08%	1.66

*The percent of sample with employment data does not sum to 100% given our inability to categorize several jobs.

For more precision, Figure 3 shows the mean and median age by sex, type of crime, and whether the person committed multiple offenses. Among men who committed a single offense, the median age was 33 overall and 31 for those who committed a violent offense; among men who committed multiple offenses, the median age was 33.5 overall and 32 for those who committed violent offenses. For women who committed a single violent offense and multiple violent offenses, the median age was 35. The median age for those who committed property crimes skews just slightly older, at 34 for men and 36 for women, compared to 32 and 35 respectively.²⁰ Thus, while there is not much variation, those who engaged in violent crimes were slightly younger, on average, than those who engaged in property crimes.

Our data consequently indicate that there was wide participation among Rwandans who were older than theories of youth bulges suggest, especially since research on youth bulges often defines 15–24 as ‘youth’ (e.g. Urdal, 2006). Scholarship emphasizing the cultural relevancy of youth – that for Rwanda would point toward the importance of marriage (Sommers, 2006) – likewise would suggest younger participants than these data show. Again, data on marriage indicate that many of these individuals had to have been married, especially as approximately 87.6% of 33-year-old men were married or had been married (IPUMS, 1991). As such, our findings on age and gender support Straus’s (2006) argument that the *Interahamwe* youth militia shaped popular perceptions of those who committed violence despite the fact that most people who engaged in violence were not in this or other youth militias. In fact, the average age of Straus’s interviewees was precisely 34, and McDoom’s (2013) survey in one community in Rwanda similarly documented

that participants were markedly older – and more likely to be married – than prior research had suggested.

One may nonetheless anticipate that youth were particularly active during the genocide. Perhaps, for instance, people who engaged in one crime were more likely to be older, while those who engaged in multiple crimes were more likely to be younger. However, the age distributions do not shift considerably when analyzing only highly active individuals. For those who committed 10 or more violent crimes, the median age was 33 for men and 37 for women, while the median age for those who committed 10 or more property crimes was 34 for men and 36.5 for women. Though the differences in age are small, this finding suggests there were also high rates of participation among slightly older individuals.

Finally, regarding employment,²¹ the vast majority of participants, at approximately 97%, were farmers. This, too, conforms with prior work (Verwimp, 2013) and with the demographic profile of Rwanda, as much of the population engaged in agricultural endeavors. The next largest category was blue-collar workers at 1.2%, and the remainder of the categories – detailed in Table II and explained in Footnote 21 – comprise under 1% of participants. Students were the youngest participants with a median age of 21, while white-collar workers and religion workers were the oldest participants, at median ages of 36 and 37 respectively. Farmers had a median age of 34. Finally, politicians committed the most crimes with an average of 3.07, while farmers and religion workers committed the fewest crimes on average (1.65 and 1.66, respectively).

²⁰ Percentages are virtually the same across the scores.

²¹ The *gacaca* data included specific employment categories, and we recoded them into politicians, white-collar, blue-collar, security, religion work, and students (see Online appendix). Approximately 0.01% had jobs in two or more categories. We categorized these individuals’ jobs in the following order: politician, white-collar, security, religion work, blue-collar, student, and farmer.

Discussion and conclusion

Before discussing these results, we note several limitations tied to trials in absence, those who were not tried, and the fact that some innocent people were likely found guilty. First, *gacaca* courts held trials in absence, and approximately 57,000 individuals were found guilty in absence. The National Commission for the Fight Against Genocide informed us that these individuals were included in the files we had received, and we were able to confirm this by matching the majority of them following a procedure we outline in the Online appendix.

Although the practice of trials in absence helps assure us that these data include some people who fled the country, it is likely that trials in absentia were more likely than in-person trials to result in a guilty verdict. It stands to reason that if a person was not able to testify on their own behalf – and if family and friends also had less incentive to testify if their loved one was not present – these individuals were likely found guilty at a higher rate. However, the data we obtained only indicate the people found guilty in absentia rather than all trials in absentia, meaning that we do not know the acquittal rate in these trials as compared to all trials.

Furthermore, the people tried in absentia are not random. For instance, among the people found guilty in absentia, the average ages of men and women were 29 and 31, respectively – significantly younger than the data we presented earlier. Indeed, younger participants without families and with less social capital may have been more likely to flee as compared to older participants, which in turn may have impacted guilty verdicts through their overrepresentation in trials in absentia.

Second, it is also likely that some individuals were not tried, especially those who were not well known, who committed crimes outside of their communities, or who died. This means that some people who fled – possibly ‘murderers in the middle’ – may not be reflected in the database, though it is difficult to assess how many people may fall into this category, especially given the trials in absence (see Loyle & Davenport, 2020).

Third, some people found guilty were almost certainly innocent. The *gacaca* courts had a 14% acquittal rate across trials (Nyseth Brehm, Uggen & Gasanabo, 2014), indicating that there were not blanket guilty verdicts.²² Nevertheless, many factors likely impacted who

was found guilty. For instance, the courts’ reliance on eye-witness testimony – which is notoriously unreliable – and the pressure from the government to conduct trials quickly probably affected the outcomes. The intense pressure to confess also likely inflated guilty verdicts (Chakravarty, 2015; Ingelaere, 2016), which is again why we reran all analyses with accusations in the Online appendix.

The limitations of *gacaca* court data notwithstanding, these data will have numerous uses going forward. For instance, they could be used to analyze the community-level factors associated with engagement in violence, as well as the factors linked with property crime versus violent crime. Researchers could also model whether and how rates of participation are associated with community outcomes (e.g. crime, trust) today.

For now, our analyses have shed light on the deadliest genocide since the end of the Cold War by updating estimates on participation in violent and property crimes. Specifically, we illustrate that approximately between 847,233 and 888,307 people participated in the 1994 genocide in Rwanda, with 181,280–190,113 people found guilty of violent offenses, 618,164–654,152 found guilty of property crimes, and 44,042–47,789 individuals found guilty of both property and violent crimes. We also estimate that between 229,069 and 234,155 individuals were found guilty of a violent offense (see Online appendix).

Furthermore, several of our findings suggest the applicability of criminological insights toward studying genocide. First, we find that a small proportion of individuals committed significantly more crimes than other participants. Specifically, 6% of participants accounted for 25% of the property crimes, and 10% of participants accounted for 25% of the violent crimes. This finding aligns with hallmark criminological research and indicates that additional attention should be paid to what criminologists would identify as ‘high-rate offenders’ during genocide.

Second, we illustrate that participation was highly skewed by sex, with men accounting for 88% of all participants, and that participants were middle-aged. Criminologists point toward the importance of age-graded social controls for understanding crime generally, and criminologists have argued that genocide is a crime of conformity in which adults can fulfill age-graded roles

²² Approximately 9% of trials went to appeal. However, we exclude them from estimates because appeals had to be written, and many Rwandans were illiterate. Scholarship in other contexts has

documented that age, sex, and other social factors shape the outcomes of trials, and we imagine that such factors were at play here (e.g. Steffensmeier, Ulmer & Kramer, 1998).

tied to protecting their families and communities (e.g. Anderson, 2017; Nyseth Brehm, Uggen & Gasanabo, 2016). Our findings support such arguments, and they also align with gendered recruitment strategies that have been documented for the case of Rwanda. Indeed, efforts to create civilian defense corps directly prior to the genocide targeted men of marriage age, with a convicted architect of the violence writing that the recruits were ‘to be married men “who have something to defend”’ (Colonel Bagasora cited in Des Forges, 1999: 104–105). Notably, our findings regarding age, sex, and employment also align with other work on Rwanda, most notably Straus’s (2006) and McDoom’s (2021). Again, given that their work drew upon interviews and surveys, convergent results from divergent methods point toward the strength and validity of our findings.

This article also provides a significant contribution for studies on political violence. The 1994 genocide in Rwanda remains an important case for research on participation in genocide, and numerous theories are based in research stemming from the case (for a review of some of this work, see Loyle, 2009). Thus, more accurate estimates of the scale and scope of participation in this case provide an accurate foundation on which to build future studies of other cases.

In addition to the scholarly contributions, a more thorough understanding of *who* participates may help prevent and de-escalate future conflicts because such information can be used for targeted interventions. It is premature to suggest the precise form of such interventions. Yet, if policymakers can better understand who is more likely to engage in violence and the types of violence they may commit, capacity-building programs in states at risk of genocide may be able to target these individuals.

Moreover, our findings may also have policy lessons for Rwandan society. In the face of inflated estimates of participation that implicate many Hutu who were alive during the genocide, our figures make clear that far fewer than 1 or 2 million people engaged in genocidal violence. More accurate stories may help minimize collective guilt and broad-based finger pointing as Rwandan society continues to rebuild – an endeavor that continues today.

Replication data

The dataset for the empirical analysis in this article, along with the Online appendix, can be found at <http://www.prio.org/jpr/datasets>. There is a brief embargo on the data such that they will be available later in 2022, and while individual-level data cannot be made available due

to the first author’s data agreement (see Online appendix), aggregated data will be made available.

Acknowledgments

The authors thank the National Commission for the Fight Against Genocide, the reviewers, Christopher Uggen, Evelyn Gertz, Genevieve Daniel, Timothy Brandes, Gabrielle Master, Brooke Chambers, and Courtney DeRoche.

Funding

The authors disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research was funded by the US National Science Foundation (Award 1626123). Hollie Nyseth Nzitatira worked on this article while on fellowship at the Notre Dame Institute for Advanced Study.

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