

The Case for Collective Hate: Simulating the Formation of Hate Groups

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Abstract

The purpose of this research is to employ simulation modeling to test theories of group formation as they pertain to hate groups: groups whose hate ideology may or may not condone violent criminal behavior. As of 2010, there were 1002 hate groups known to be active in the United States. Previous examinations of hate groups have assumed formation. This paper uses simulation modeling to test Hamm's (2004) criminological theory of collective hate. Simulation modeling is designed to create a computer simulation that simplifies people and their interactions to mimic a real world event or phenomena. Two different experiments were tested using three models of hate group formation. These experiments test the importance of personal and societal levels of hate in group formation. These experiments also tested hypotheses regarding the number of groups that form, the speed of formation and group size. Data to test these hypotheses was collected from Thirteen thousand model iterations. All models successfully generated hate groups. Hate groups were generated at all levels of societal hate. An in-depth understanding of how hate groups form may assist in slowing the proliferation of these groups and decreasing their appeal.

Introduction

Because hate groups have existed in all fifty United States, it is important to understand how these groups form. Understanding the theoretical elements that are vital to hate group development may enable the creation of programs aimed at addressing these factors to prevent further proliferation of these groups. It may also allow for the creation of intervention programs, perhaps focused through community and educational models with members of defunct groups.

In previous examinations of hate groups, the fact that the hate group existed was taken for granted. How the group formed was only addressed through conjecture of theory, if it was addressed at all. Therefore, this research argues for the need to develop an understanding of how hate groups form and gain membership. It uses simulation modeling to isolate and test theory-based explanations for hate group formation and proliferation. An increased understanding of how these groups form will better inform research on how membership or desire for membership influences individual and/or group behavior.

There are several challenges to studying hate group formation. It is almost impossible and quite dangerous to seek out and monitor potential hate group members and those who could possibly start their own hate group. It is also unethical to manipulate the parameters that may influence hate group formation in the "real world." Agent-based modeling is a computer-based simulation technique growing in popularity in criminal justice studies because it allows for the controlled study of phenomena not amenable to experimental manipulation (Groff, 2007), allowing one to observe the "growth" of a hate group without endangering anyone.

The other problem with simply studying individuals who might form or join a hate group is that there are no guarantees they will do so, and such studies would be prohibitively long and expensive. Thus, hate group formation remains the stronghold of theory, and there is almost no empirical work on this topic. Although there are no guarantees that groups will form as a result of a particular parameter or set of parameters in a simulation model, this technique does allow for cost and time efficient studies of variables associated with hate group development throughout history.

There is great variation in the types of hate groups that exist; this research focuses specifically on white supremacy groups, which are the most prevalent type of hate group in the United States and the type with the longest history. Simulation models were built around Mark Hamm's theory of collective hate, which is used to explain the formation of white supremacy groups, in accordance with a pattern evident throughout history in the development of hate groups in the United States.

Literature Review

Group Formation

Scholarly literature examining group formation has focused on: situational responses (Glick and Jackson, 1970: Breton and Pinard, 1960), homogeneity, heterogeneity, homophily (Merton and Lazerfeld, 1954), benefit, technology, framing, rhetoric, ideology, charismatic leadership (McGuire, 1972: Aghion and Gollier, 2000: Weber, 1947: Popper, 2000: Howell, 1988: Volkan, 1980) and collective identity (Hamm, 2004: Polletta and Jasper, 2001: Olson, 1965: Carroll and Ratner, 1996: Jasper, 1997: Friedman and McAdam, 1992: Klandermans, 1992: and Castells, 1997).

Glick and Jackson, (1970) hypothesized that groups form around a shared situation, such as going to college. Merton and Lazerfeld, (1954) suggest groups form out of the individuals' desire for similarity. Groups form as individuals seek out others who are similar to themselves (Merton and Lazerfeld, 1954). This may be partly due to homogenous groups forming as a response to the differences in a community (Merton and Lazerfeld, 1954). Group formation has been analyzed based on economic models, providing that membership in the group results from the individuals finding a financial benefit from membership in the group (McGuire, 1972: Aghion and Gollier, 2000). Since the advent of the internet, technology has been identified as a catalyst for group formation, especially since the internet gives people the ability to come together in a virtual place rather than a physical one to exchange ideas (Langman, 2005: Adams and Roscigno, 2005).

Some groups form in a very overt fashion. Sussman (1956) qualitatively examined the creation, disintegration and resurrection of a group interested in weight loss. This group formed in response to a call for members who considered themselves overweight (Sussman, 1956). Potential members were invited to meet at the city hall through a series of newspaper articles announcing the group's formation (Sussman, 1956). If no one had responded to the articles, this group would not have formed. These articles called for specific people to come together based on a shared characteristic at a particular time and place. This is an example of situational response. Further literature regarding situational response and homogeneity deals with immigration and assimilation (Breton and Pinard, 1960: Blau, 1956: Eisenstadt, 1951). Specifically, Breton and Pinard (1960) found that immigrants were more likely to form groups based on ethnicity when their education and language skills were found to be inadequate for assimilation and when they found employment with individuals who had emigrated from the same country of origin. Inadequate education and unfamiliarity with the local language prevented most immigrants in the study from making contacts outside of their ethnic group and limited the number of employment opportunities (Breton and Pinard, 1960). This study supported other earlier works examining the necessity of homophily in the establishment of groups (Breton and Pinard, 1960). Despite identifying why immigrants developed groups based on their ethnicity apart from the society into which they had immigrated, the study does not shed light on how groups form. It focused on how associations were made between individuals. A better explanation for group formation can be found in studies examining collective identity.

Collective Identity

One key factor in human group formation is an overt or developed collective identity that draws the individuals together and maintains the group's cohesiveness (Jasper and Poulsen, 1995: Polletta and Jasper, 2001: Jacobs and Potter, 1998; Hamm, 2004: McVeigh, 2006: Berbrier, 1998). Part of the formation of such groups is the call for membership based on this identity or identifying characteristics (Useem, 1972: Jasper and Poulsen, 1995: Langman, 2005: Jasper and Polletta, 2001: Berbrier, 1998).

Polletta and Jasper (2001) argue that it is a collective identity that draws individuals together when examining protest and social movements. Once this common identity is established, individuals mobilize strategically and out of a sense of obligation to support their fellow group members (Polletta and Jasper, 2001). Some draw pleasure from being involved in the cause that they view as part of their identity or as possessing strong roots in their culture (Polletta and Jasper, 2001). These individuals require, for the most part, little or no financial or material compensation for their time and involvement (Polletta and Jasper, 2001).

In order to draw individuals into a collective identity, activists may frame a particular cause, such as AIDS or human rights, as a cornerstone of another cultural identity, such as homosexuality or an ethnic minority (Polletta and Jasper, 2001). They then can draw individuals into the movement's identity by appealing to the individual through groups that he or she already claims membership

Polletta and Jasper (2001) define collective identity as "an individual's cognitive, moral, and emotional connection with a broader community, category, practice or institution. It is a perception of a shared status or relation, which may be imagined rather than experienced directly, and is distinct from personal identities, although it may form part of a personal identity." (Polletta and Jasper, 2001: 285) Further, they identify that such collective identities may be developed first by outsiders and then adopted by individuals within the group. Some may use cultural symbols, rituals, and/or clothing to express the collective identity (Polletta and Jasper, 2001). Unlike Hamm's (2004) collective hate, collective identity is viewed as a positive thing, an element of behavior or group cohesion that is beneficial to those involved and the greater community. Polletta and Jasper (2001) take great pains to separate collective identity from any form of ideology; even though, their studies examine political protest and social movements. For more on collective identity see: Olson, 1965: Carroll and Ratner, 1996: Jasper, 1997: Friedman and McAdam, 1992: Klandermans, 1992: and Castells, 1997. In some social movements, the successful outcome may be nothing more than the creation of a collective identity from which activists and lobbyists can draw support or present as a sign of political solidarity or social capital (Polletta and Jasper, 2001).

An earlier examination of radical protest movements by Useem (1972) examined not collective identity, but collective response. If a problem is not readily apparent to the larger population, it is difficult to create a social movement to counteract the problem (Useem, 1972). Likewise, social movements need solidarity, cohesion and a shared sense of purpose that can be considered missing in situations where the movement is sparked by leadership, distant either ideologically or in social standing, from the group's recruitment base (Useem, 1972). Similar to theories presented by Coser (1964), Useem (1972) highlights external hostility and internal ritual as binding functions within groups to enhance commitment and develop bonds within the group, similar to that discussed by Hirschi (1969). It is only after these commitments are solidified and an individual distances him or herself from outside attachments that they develop a political or collective identity within the group (Useem, 1972). Useem (1972) further argued that the group identity distances the individual member from larger society, and his or her previous attachments.

What is Hate?

To understand hate, it is necessary to understand prejudice. Prejudice is a negative response or appraisal of an individual based solely on a defining characteristic (Falk, 2001: Jacobs and Potter, 1998). Hate centers upon extreme prejudice (including both negative affective and cognitive appraisals) towards a stigmatized group (Falk, 2001). This can include hatred directed at one due to one's gender (Klein, 2005: Hood and Rollins, 1995: McPhail, 2002: McPhail and DiNitto, 2005: Rayburn, Earlerwine and Davison, 2003: Levin, 1999), race (Craig, 1999: Torres, 1999: Saucier, Brown, Mitchell and Cawman, 2006: Martin, 1999: Dixon and Gadd, 2006: Saucier, Hockett and Wallenberg, 2008: Hewitt, 2000: Petrosino, 1999: Rayburn, Mendoza and Davison, 2003: Rayburn, Earlerwine and Davison, 2003: Levin, 1999: Young, 1990), religion (Byers, Crider and Biggers, 1999: Baysinger, 2006: Rayburn, Mendoza and Davison, 2003: Rayburn, Earlerwine and Davison, 2003: Levin, 1999), sexuality (Hood and Rollins, 1995: Parrott and Zeichner, 2006: Rayburn, Mendoza and Davison, 2003: Rayburn, Earlerwine and Davison, 2003: Levin, 1999: Berrill, 1990), culture, national origin or ethnicity (Byers, Crider and Biggers, 1999: Rayburn, Earlerwine and Davison, 2003: Levin, 1999), or disability status (Rayburn, Earlerwine and Davison, 2003: Levin, 1999).

Hate is a stronger sentiment than prejudice as it can serve as a catalyst for action against a stigmatized group (Medoff, 1999: Allport, 1955: Staub, 1989: Fromm, 1947). Hate can be situational, influenced, guided or sanctioned by the dominant views of society or an authority figure. These can be reflected in changes in accepted social norms, such as the Anti-Semitic policies of the Third Reich or the laws governing the treatment of slaves in the Antebellum American South and the Jim Crow Laws of the post-Reconstruction American South (Pettigrew, 1959: Goldhagen, 1996: Milgram, 1974: Olzak and Nagel, 1986: Medoff, 1999). Hatred can include impulse and aggression and may be a key factor in decisions to commit violent or property crimes directed at the hated group (Medoff, 1999: Allport, 1955). Although not everyone who hates someone will engage in violence, hate can be destructive and a brutal tool in the hands of the powerful (Medoff, 1999). Hate is an essential part of decisions to engage in genocidal programs against a social or political out group (Medoff, 1999).

Hate also has a hidden psychological component (Allport, 1955; Staub, 1989; Fromm, 1947). It can be a response related to the low self-image of the hater (Staub, 1989). Engaging in violence against or belittling members of the target group boosts the ego and self-assurance of the hater (Staub, 1989). Hatred possesses a projective-punitive factor (Allport, 1955). The one who hates believes that fault always rests upon the target of his or her animosity (Allport, 1955). The hater can fault the target for his personal misfortune or lack of opportunity as well as greater social problems such as economic turmoil or crime. Blaming the victims lessens the guilt felt by those engaging in violence against the target (Allport, 1955).

Fromm (1947) argues that there are two types of hatred: rational and character-conditioned. Rational hatred is a response to a personal violation, an attack or threat. This is similar to Sykes and Matza's (1957) theory of neutralization that deals with the existence of a series of subterranean values within conventional society and argues that within this subterranean value system, legal codes are seen as inconsistent and vulnerable. Subterranean values can include prejudicial treatment or informal rules of conduct between authority figures and the general population (Sykes and Matza, 1957). Legal codes that are applied in an inconsistent or prejudicial fashion become vulnerable and lose their influence (Sykes and Matza, 1957). If excuses for illegal behavior are accepted; and therefore, an individual is not punished for the behavior, the law becomes neutralized, decreasing an individual's belief that he should adhere to any established laws (Sykes and Matza, 1957). Neutralization can occur at any time, before, during or after a criminal event and includes the denial of responsibility, of injury and/or of the victim, as well as condemnation of the condemner and/or an appeal to higher loyalties (Sykes and Matza, 1957).

Character-conditioned hatred, by contrast, has little basis in reality (Fromm, 1947). The target of an individual's hate may be chosen at random, and the hater then develops a reason to justify his or her hatred (Fromm, 1947). Character-conditioned hate focuses on target groups and avoids personalizing the animosity. The out-group is belittled in the hater's mental and social dialogue until the group and its membership are entirely dehumanized (Fromm, 1947). As a result, the individual then believes his or her hatred and hostility is justified (Fromm, 1947). Dehumanization or de-individuation, in turn, has been shown to be a factor in particularly heinous race-based violent crimes, specifically the lynching of African-Americans throughout the post-Reconstruction South (Mullen, 1986).

Hatred can be situational or culturally specific (Pettigrew, 1959; Milgram, 1974). Individuals learn to hate as they are socialized into their in-groups (Pettigrew, 1959; Milgram, 1974). These in-groups need not be actual hate groups. They can be one's peer groups, family or co-workers (Pettigrew, 1959). In an effort to fit in with these groups and conform to their social norms, individuals learn to hate the groups that their peers and family or co-workers hate (Pettigrew, 1959). Hate can be especially virulent in these situations if these individuals are influenced by an authority figure (Milgram, 1974), possibly more so in the presence or under the influence of a charismatic leader (Weber, 1947).

What is a Hate Group?

Taking the above literature review into consideration for this research, a hate group is defined as any group of like-minded individuals, united by a common hatred of one or more target groups, who often support, but may or may not plan, and/or perpetrate hate crimes⁶. It is important to note that an individual need not be a member of a hate group to support, plan, or commit a hate crime. In the past, the perpetrators of many hate crimes were unattached to any well-defined hate group (Torres, 1999). Increasingly, hate crimes are being committed by, if not members of organized hate groups, those who attribute their actions to a particular hate group's philosophy, rhetoric or propaganda (Southern Poverty Law Center, 2008; 2009). Further, some who engage in hate crimes may claim membership to a group that they have not formally joined or were refused membership. This may be done to prove themselves to the group, or to show their own beliefs are in-line with the group's agenda (SPLC, 2008; 2009). Once imprisoned for these crimes, these individuals are provided with a smorgasbord of potential groups to join. Many hate groups have sections in or have formed within the prison system, such as the United Society of Aryan Skinheads (SPLC, 2009). Hate groups, whether or not they engage in hate crime, hate specific targets.

Theory

Mark Hamm (2004) theorized that bonds can be created between individuals through a "common hatred of social out-groups" (Hamm, 2004: 327).

He applies these ideas to the hate groups he identifies as domestic terrorists in the United States, including Neo-Nazi and Right wing extremist and militia groups. This theory has been adapted herein to examine hate groups, the linkage between these domestic terrorist groups and hate groups being easily made, as Neo-Nazi and other Right wing extremist groups adhere to a white supremacist ideology. These groups also “arose from an intense collective hatred for the federal government” (Hamm, 2004: 334). In some of his most definitive work, Hamm has closely examined the American skinhead movement (Hamm, 1994a; Hamm, 1994b).

Specifically, Mark Hamm (2004) theorized that bonds can be created between individuals through a shared hatred. He asserts that hate groups and hate organizations in the United States, including Neo-Nazis, right wing extremists and militia groups, “arose from an intense collective hatred for the federal government” (Hamm, 2004: 334). Hate, or a belief in a hate group’s rhetoric or philosophy, is a defining characteristic of hate group members or potential members in the real world. Therefore, this study uses three types of hate as primary parameters for manipulation: intrinsic, extrinsic, and societal. Intrinsic hate is the individuals’ privately held feelings toward a target group, which may or may not be totally revealed through extrinsic hate, or overt expressions of hatred. Extrinsic hate is how the individual expresses him or herself in regards to his or her hate, the language they use, the tattoos they have, and/or the slogans printed on the clothing they wear. The coming together of individuals based on their levels of intrinsic and extrinsic hate is the basis for collective hate. These individual representations of hate are needed to draw the individuals together into a collective hate, where individuals share the same hate beliefs and rhetoric. Societal hate refers to a “background” level of hate held by general society toward a particular target group.

Research Question: Does collective hate influence variations in the attributes of hate group formation?

H1a: The greater the level of hate possessed by the individual agents; the greater the number of groups that are formed by the individual agents.

H1b: The greater the level of hate possessed by the individual agents; the greater the speed at which groups form.

H1c: The greater the level of hate possessed by the individual agents; the greater the size of the groups that form.

Building upon the collective hate thesis as described by Hamm (2007), these hypotheses test whether individuals are drawn together by an intense collective hatred. It is this shared belief that causes groups to form. Because Hamm’s theory highlights the idea of a shared intense hatred as the deciding factor for joining a group, the more hate an individual has; the more likely he will agree with other haters and the more likely a group will form.

Illustrative of these hypotheses, in 1913, a large number of people formed the Knights of Mary Phagan in response to the murder of Mary Phagan. This group formed to lynch the primary suspect, Leo Franks, and perpetuated itself as a hate group targeting outsiders from the North, Jews and other minorities (Frey and Thompson, 1988). It was absorbed into the Ku Klux Klan a year later (Frey and Thompson, 1988; Wade, 1987; Chalmers, 1981).

H1d: The greater the level of societal hate; the greater the number of groups that form.

H1e: The greater the level of societal hate; the greater the speed at which groups form.

H1f: The greater the level of societal hate; the greater the size of the groups that form.

At points in history when a hate ideology was widely accepted by society (e.g., the Antebellum South, the Post-WWI United States, Nazi Germany, and to a certain extent, the American South during the Civil Rights Era), hate groups witnessed rapid growth in membership and in popular support. Hate groups do not form in a void: they form within the larger fabric of society. Although hate groups may form in the absence of societal support, history shows that groups like the Ku Klux Klan and skinheads are more likely to form in areas where and at times when there is some level of social acceptance of their views. The higher the levels of societal hate, the more social support the hate groups are afforded. Also a larger pool of potential members is available for recruitment into existing or formation of new groups.

Illustrative of these hypotheses are the American South after the Civil War and during the Civil Rights Era which saw a proliferation of Ku Klux Klan groups during times when it was socially acceptable to hate minorities and governmental actions designed to increase the rights and freedoms of minorities, especially African Americans.

Simulation Modeling Basics

A simulation model distills a social or natural phenomenon down to its most basic working parts (Epstein, 2007; Miller and Page, 2007; Gilbert and Troitzsch, 2005).

It is a “bare bones” representation of the real world (Epstein, 2007; Miller and Page, 2007; Gilbert and Troitzsch, 2005). When modeling social phenomena, the model is a representation of a combination of location and people interacting within that location (Epstein, 2007; Miller and Page, 2007; Gilbert and Troitzsch, 2005). The location is the environment; it stands for the general milieu in which the model is situated. It can be specified to mirror a city or a rural area or it can be programmed to be very generic, simulating simply an open space in which people interact. The people interacting in the model are referred to as agents. Agents are the representation of the “who” or “what” the modeler is investigating. In models of social events or behaviors, agents are computerized representations of human beings (Epstein, 2007; Miller and Page, 2007; Gilbert and Troitzsch, 2005). They are given characteristics and behavior rules. In the same model, a variety of agents are included that have randomly assigned start values for characteristics and a specified set of behavior rules to govern the actions and decisions emitted by the agents.

Characteristics are traits that differentiate one agent from another. Starting values for these characteristics usually are randomly assigned at the beginning of a model run. Characteristics can encompass a wide variety of traits and demographics found in the real world. For example, an agent can be assigned a specific profile to mirror a type of person in the real world, such as a college student (Epstein, 2007; Miller and Page, 2007; Gilbert and Troitzsch, 2005). However, similar to empirical observations, the more variables or traits added to the mix, the more complex the model and the more likely that the specific interactions that result in the event or behavior of interest will be obscured (Epstein, 2007; Miller and Page, 2007; Gilbert and Troitzsch, 2005). Thus it is considered in simulation modeling, that less is more. Characteristics can be altered or even removed from the model in successive runs to determine whether or not there is a relationship between the characteristics and the behavior, or whether something else is involved (Epstein, 2007; Miller and Page, 2007; Gilbert and Troitzsch, 2005).

Behavior rules guide the agents’ activity (Miller and Page, 2007; Gilbert and Troitzsch, 2005). Behavior rules can be complex or simple (Epstein, 2007). A simple rule can be used to move an agent a fixed distance in a random direction. A complex rule would build on that action, asking the agent to take into account its perception of traffic density and personal energy level before adding in a random factor. Both rules require the agent to do something, but one is far more complex than the other. Behavior rules are not designed to be predictive but rather to represent basic components of decisions (Epstein, 2007; Miller and Page, 2007; Gilbert and Troitzsch, 2005). The decisions agents make stem from their consideration of the behavior rule but add a randomly generated number which represents information not included in the model that can change the decision to a different one. The goal of a simulation model is to identify the smallest number of characteristics and simple rules that result in the computerized agents mimicking the “real-world” behavior being studied (Epstein, 2007; Miller and Page, 2007; Gilbert and Troitzsch, 2005).

Because some social phenomena take longer to occur than others, time becomes a factor. Behavior rules can be designed to inform agents that they should “sleep” for a certain period of time during each representation of a day. In a simulation model, time also is controlled by the programmer. The modeler makes the decisions about how time will be used in a model (Epstein, 2007; Miller and Page, 2007; Gilbert and Troitzsch, 2005). A model is designed to run through a set number of steps. When the model finishes its run, the “clock is up” for the agents in the model. A model can be run to simulate what the agents do in a brief period of time, such as a few minutes or a longer period of time, like years (Epstein, 2007; Miller and Page, 2007; Gilbert and Troitzsch, 2005).

Each run of a simulation model produces data. Data is captured in a separate log file for each run (Epstein, 2007; Miller and Page, 2007; Gilbert and Troitzsch, 2005). Data can be collected continuously through the model run or only at specific points, such as the beginning, middle, and end of the model run. Data are exported into any statistical program and analyzed (Epstein, 2007).

In terms of model validation, a model is typically considered successful if it creates the behavior of interest (Epstein, 2007; Miller and Page, 2007; Gilbert and Troitzsch, 2005). Multiple model runs using the same programming are used to ensure that the model run that resulted in the behavior of interest was the result of chance alone. Multiple model runs using the same programming are used to see whether these replicate the previous model. In order to make certain there is variability between model runs, random number generators are used to assign different levels to variables of interest, as well as the starting location and movement of the individual agents. If the model repeatedly results in the same outcome even across a range of sensitivity testing, it is robust to changes in the tested value.

In terms of model verification, the accuracy of the programming code and the logic of behavior rules are typically checked by other modelers in order to identify and correct mistakes in the programming (Manson, 2001). Further, sensitivity testing is used; varying different parameters slightly over initial model runs and the changes in outcome are noted in order to determine the limits of the model's application (Manson, 2001). In order to verify the models used in this research, each individual process was programmed separately and print statements were used to verify that the processes were running. Further, in watching the model update over the course of the initial individual process runs, key elements of processes were given visual cues, agents and background patches changed color, allowing for a visual assessment of how the model was running, what agent behaviors were in place, whether or not time was being divided properly, and whether agent characteristics were remaining static or changing.

As the processes were created individually, they were verified by Dr. Stephen Frezza who checked the programming language against the visual cues designed to highlight the processes and the print statements. The individual processes were then combined, allowing them to cascade into the full model for theory testing. The model at this point was checked again by Dr. Frezza, and all errors in programming language were documented and corrected. The full models in the three experimental conditions (control and collective hate) were run 100 times, each separate from the model runs for data collection. This output was used to verify that the log files were populating correctly and that the data generated by the models was within the ranges set for the different agent characteristics and behaviors of interest.

Each model is an alternative representation of how hate groups might form under different conditions. The variations maintain the simplistic representation of the world inherent in simulation modeling. Each model variation builds on the previous variations in order to make it possible to clearly identify which parameters are being manipulated.

Methodology

ABM Modeling Platform

There are many different ABM modeling platforms available. Each platform was designed for different purposes and this makes it important to be aware of the specialization of the modeling platform. Because of the wide range of program available, it is necessary to check the various surveys of programs that have been conducted (Castle and Crooks, 2006; Leszczyna, 2004; Tobias and Hoffman, 2004; Nikolai and Madey, 2009). Some of these surveys examine only a few modeling platforms (i.e. Tobias and Hoffman (2004) examined four Java-based platforms). The most extensive is the Nikolai and Madey (2009) survey. Nikolai and Madey (2009) surveyed and compared 53 different ABM modeling platforms. These modeling platforms were rated on five separate characteristics "language required to program a model and to run a simulation, operating system required to run the toolkit, type of license that governs the toolkit, primary domain for which the toolkit is intended, and types of support available to the user" (Nikolai and Madey, 2009, 12).

The program chosen here was NetLogo. NetLogo is a simulation modeling program that was designed for examining social and natural events and activities and is well-suited to the simulation of "complex systems that develop over time." (Wilensky, 1999:1) Nikolai and Madey (2009) highlight NetLogo's accessibility, ease of operation and its primary specialization as one geared towards the general social sciences. Because of this specialization, NetLogo has seen extensive use in the social sciences. Notably, NetLogo has been used to examine political behaviors and situations (Lustick, Miodownik, & Eidelson, 2004; Kuznar, & Sedlmeyer, 2005), as well as for developing an understanding on how communities form, collective identities develop and cooperation between individual and groups (Berman, Nicolson, Kofinas, Tetlich, & Martin, 2004; Flache, & Macy, 2002; Lansing, 2000; Lansing, & Miller, 2005, Burnett, 2000; Lustik, 2000). NetLogo has also been used to model how stereotypes and norms develop among and between groups (Adams, & Markus, 2004; Agar, 2005; Aoki, Wakano, & Feldman, 2005; Brauer, Judd, & Jacquelin, 2001; Doreian, 2001; Gotts, Polhill, & Law, 2003; Sun, 2001; Gumerman, Swedlund, Dean, & Epstein, 2003; Hastie & Stasser, 2000; Kenrick, Li, & Butner, 2003; Kohler, 2000; Lyons, & Kashima, 2003; Sallach, 2003).

Programming

NetLogo is programmed using the computer programming language Java but modelers use simplified language propriety to NetLogo to program their models (Wilensky, 1999). Programming is kept rather simple. Programming is divided into procedures; the number of procedures varies depending on model complexity.

Random Numbers

Because it is impossible to know or account for the interactions that make up every situation, a degree of randomness is necessary so that some other factor could come into play. Thus, an agent could evaluate an invitation based on the relative difference in hate levels and find it attractive, but once the error term is added, they could decide not to join. The distribution of the random number generator reflects the modeler's best estimate about the probabilities involved. If there is no basis for preferring one over the other, a uniform distribution is often used because there is an equal chance that any number in the range will be selected. If most of the time a low value is expected (i.e., that random factors are not very important), a Poisson distribution is utilized so that more often, the number generated will be closer to zero. The random term is generated from a normal random number distribution and ranges from $-X$ to X . The reason for the random generation of a response is to simulate the interaction between people whose ideology or level of hate is the same, but have different opinions on what should be done or how their beliefs are expressed.

In NetLogo there are eight different ways in which random numbers are used. These are: random-xcor/ycor or pxcor/pycor, random-seed number, random, random-float, random-exponential mean, random-gamma alpha lambda, random-normal mean standard-deviation, and random-poisson mean. Table 4 below shows the different ways random numbers were used in the experiments. The first, random-xcor/ycor or pxcor/pycor is used to place agents within the environment. Random-xcor/ycor is used to place the agents at random x and y coordinates anywhere in the model landscape. Random pxcor/pycor places agents randomly to the center of patches within the model landscape.

The second, random-seed number is used to provide an integer for a pseudo-random number generator. This use of random numbers was not used in this model. Random and random-float are used to report a number of zero or greater to a point pre-set by the programmer. In this research, random-float was used for agreements and disagreements and for error terms in group formation. Random was used to assign numbers within a range for extrinsic hate, motivation, and susceptibility. Random was also used after agreements or disagreements were made between agents to separate the agents and cause them to seek out other agents. In this second case, agents were given the command random 360, causing both agents to turn away from each other and move away at the random angle assigned by the program in order to seek out another agent. When the distribution of numbers is more important, NetLogo provides a series of options random-exponential mean, random-gamma alpha lambda, random-normal mean standard-deviation, and random-Poisson mean.

This research used random-Poisson mean, where mean was replaced with 2, 4, 6, or 8, depending on the level of societal hate for the model run. This means that intrinsic hate was randomly distributed according to a Poisson distribution centered on the level of societal hate in the model. When societal hate was allowed to change based on agent behavior, this does mean that, when compared to the real world, dramatic changes in levels of societal hate could happen in a short time frame, if on day 100 half the agents had not made an agreement, they could all change their intrinsic hate at the same time and cause significant changes in the societal hate of the model. Because of this, the fluctuation of societal hate in models where it has been allowed to vary due to agent behavior is noted in the log file and the data are collected for future analysis and research. In model runs that were absent of societal hate, where societal hate was not included, intrinsic hate was treated like extrinsic hate and declared as random for the intrinsic hate range.

Model

The purpose of the model designed for this research was to test theories of hate group formation. Hate group formation has been examined through theory and retrospective. Although some histories exist for well-known hate groups, such as the origins of the Ku Klux Klan, the proliferation of hate groups in the United States and elsewhere over the past ten years increases the need to understand how hate groups form. The structure of the model is simplistic. Individual agents in the model are designed to represent ordinary people. There is nothing extraordinary about the people who form or join hate groups, they are every day, ordinary human beings.

Therefore, the agents in the model are the same. The agents are stripped down versions of these ordinary human beings; they have an internal belief system (intrinsic hate), an external representation of their views (extrinsic hate), and motivation. They do not have social status, education, or economic status, as these characteristics distract from the core problem.

Hate group members have, historically, been drawn from all social and economic strata and from a variety of educational backgrounds. The environment was also minimalist and will be discussed in the next section. The temporal scale of the model was a one year period, a very brief period of time for hate group formation, or any type of group formation, but a manageable period of time, as the SPLC measures the number of active hate groups in the United States on a yearly schedule. For the agents in the model, this scale was subdivided into 6-hour blocks, measured by one tick of the model's run time. The agents' motivation process was directly tied to these ticks.

Motivation is one of the key processes in the model. When the model is programmed to motivate the agents, it is the start of all other processes. Motivation is divided into three categories. The most motivated agents are active 18 hours a day, the second category of agents are active 12 hours a day and the least motivated agents are active only 6 hours a day. When the motivation process begins, the agents who are motivated to be active during that time period begin the communication process. Those who are not motivated to be active during that time period do not initiate the communication process.

The communication process governs the interaction between agents. The agents are programmed to look for other agents within their current patch who present themselves (extrinsic hate) as having similar beliefs (intrinsic hate). When an agent finds another agent who fits this qualification, the agent approaches that agent and they discuss their beliefs. This process is within the communication process, where the agents compare their views (intrinsic hate to extrinsic hate). The agents are not mind readers, so they are comparing the external representation of each other's beliefs (extrinsic hate) to their own internal beliefs (intrinsic hate). The next step of this process is the agreement/disagreement process.

The agreement/disagreement process takes place when the agents have made this comparison of beliefs and are determining whether or not they agree with each other. In some cases, the two agents will appear to agree on the surface (extrinsic hate of Agent 1 = extrinsic hate of Agent 2), but this façade does not reveal their internal beliefs and they immediately disagree and seek other connections. In other cases, the agents will agree on the surface and internally (extrinsic hate of Agent 1 = intrinsic hate of Agent 2). These agents are most likely to form a connection. However, everyone knows there is more to making a connection with another person than shared beliefs. Because of this, the process for agreements has a random chance associated with it. The program essentially "tosses a coin" to determine whether or not this connection has been made. If the connection is made, both agents keep track of who it was they agreed with and seek out other connections. If the connection was not made, the same process as the immediate disagreement comes into play.

If an agent does not manage to make any connections over the course of 100 days, a new process comes into play. The agent is given the opportunity to change its mind (intrinsic hate). There are no core rules that govern how the agent changes its mind (intrinsic hate), but if the agent chooses to change, all internal characteristics of the agent change (intrinsic hate, motivation, susceptibility). Although most people change their mind more than three times a year, the idea here is that intrinsic hate is a long-held core belief, not a transient dislike that may change with time and experience.

Whether or not an agent is making connections after each agreement or disagreement, the agents are given the option of changing their outward appearance (extrinsic hate). This process allows the agent to reset their extrinsic hate to any amount. This allows an agent to change their outward representation of their beliefs up or down, in turn giving themselves an increased likelihood of forming connections. The agents want to make connections, because they are representations of human beings, which are social animals.

When an agent has tallied a total of five or more connections (agreements), the group formation²³ process comes into play. The group formation process does not require that the agents be in close proximity to each other when the tally reaches five, just like a group of friends deciding to form a club may contact each other by phone, text message or via social media (e.g., Twitter, Facebook). The agents are alerted to their possibility of group formation. This does not mean a group forms instantly, just as with the agreement process, the group formation process also has a random component. The model once again "flips a coin" to determine whether or not the group forms. If the group does not form, the agents keep their agreements, but continue seeking further connections. If the group does form, the agents populate a group agent and are given new characteristics as group members, commitment and fear.

These new characteristics in combination with the agent's intrinsic hate give the agents the option of staying with the group or leaving the group. A group can gain members from this point as its members make new

Though the group was developed based on a series of connections, it is not a social network model. A social network model establishes pre-existing links between agents and then uses the agents' pre-existing connections to form new connections (Carroll & Ratner, 1996; Dorien, 2001; Friedman & McAdam, 1992). These pre-existing connections run contrary to the basic tenets of Hamm's (2004) collective hate, that people are drawn together by an intense collective hatred. This collective hatred is not theorized as being based in a pre-existing network of friends or acquaintances, but more in the synchronistic coming together of people with similar views and beliefs. Therefore, in these models, while agents bring in their connections, these connections are established in a more free-flowing fashion than a structured social network model. No behavior rule governs how many groups the agents can join, as their real world counterparts can certainly have more than one group affiliation.

The processes in place when the group is populated are the option of changing intrinsic hate and dropping out of the group. The option for changing intrinsic hate comes after the agents have been populated in a group and the group has stayed together for ten days. The agents are then given the option to increase or decrease their intrinsic hate, to radicalize or become disenchanted. When the agents choose to increase or decrease their intrinsic hate, they also reset their internal characteristics (motivation and susceptibility).

The second process in place when a group has formed is the agents dropping out of the group. When these agents joined groups they were given two new characteristics, fear and commitment. Commitment is randomly assigned. Each agent determines how much fear it has based on the difference between the level of hate possessed by the most extreme member of the group and their level of commitment. So, if Agent 1 has a level of commitment of 4 and the most extreme member of the group has a hate level of 7, Agent 1's level of fear is 3.

The decision to leave the hate group is based on the following: if the mean level of hate for the group becomes twice a particular agent's level of fear, that agent will make the decision to leave the group. Therefore, if an agent has a fear level of 3 and the mean level of hate for the group is 6, the agent will leave the group. No matter how much an individual buys into a group's belief system or viewpoint, there is a point at which the group may advocate a position beyond an individual member's comfort zone.

For some agents this can be instantaneous: the minute their levels of fear and commitment are assigned, they may assess the group and leave. Dropping out of the group is governed by a calculation of the agent's characteristics and the group's characteristics.

$$\mu H = 2f$$

Where μH is mean intrinsic hate or the group level of hate and f is the individual agent's level of fear. No matter how much an individual buys into a group's belief system or viewpoint, there is a point at which the group may advocate a position beyond an individual member's comfort zone. For example, a person may absolutely hate a certain segment of the population with a blinding passion, but may not want to engage in acts of violence against those individuals.

When an agent leaves a group, their levels of commitment and fear are documented in the log file for analysis, but they do not retain the commitment or fear characteristics. They are no longer a member of the group, so they are no longer committed to the group. They also have left the situation that was causing or influencing their fear, so they are no longer afraid. They can join another group or even the same group at a later time, at which time they would be assigned a new commitment level and have a new level of fear calculated. If a group's membership falls below three members, the group dissolves.

Agents

Within these experiments there were two kinds of agents; individual people and groups. Each model contained 500 individual agents. These agents were given the characteristics listed in Table 1 below.

Table 1: Individual Characteristics

Individual Characteristics	After Individual becomes a group member	After Individual leaves a group
ID*	Group ID*	Dropout ID*
Intrinsic hate RP(0-10)	Commitment*	
Extrinsic hate R(0-10)	Fear *	
Motivation R(1-3)		

* Included in the model but not used as an independent variable

When an agent leaves a group, their levels of commitment and fear are documented in the log file, but they do not retain these characteristics. They are no longer a member of the group; therefore, they are no longer committed to the group. They also have left the situation that was causing or influencing their fear; therefore, they are no longer afraid. The agent is then given a drop-out ID that tracks which groups they have left. These agents can join another group or even the same group at a later time. If they do so, they would be assigned a new commitment level and have a new level of fear calculated.

Group agents serve as place-holders for the groups that will be formed by the individual agents. Each model contained 100 of these group agents. The group agents were given the characteristics listed in Table 2 below.

Table 2: Group Agent Characteristics

Group Characteristics
ID***
Group mean Hate**(≥5)
Number of members*(≥5)
Group mean Commitment***
Group mean Fear***
Number of drop-outs***

* Used to determine dependent variables: number of groups that formed and size

** Used to determine dependent variables: number of groups that formed, level of hate

*** Included in the model but not used as an independent or dependent variable

Group agent’s characteristics are populated when a group is formed.

Environment

As previously stated, the environment in a simulation model is developed by the programmer. It can be very complex, simulating a bustling metropolis with streets and hubs or simply an open field. The environment design for this simulation model was kept simplistic. The open field landscape was determined to be the best option to prevent interference from environmental factors that could change agent behavior. Therefore, the landscape for the model was composed of patches. Each agent was randomly assigned to a section of a patch at the start of the model run and from that point the agents were able to move to any patch they wanted as they interacted with other agents. This prevented situations where the location at which the agents interacted had more influence over group formation than the individual agent characteristics. Further, hate groups have historically existed in all 50 states, in both rural and urban areas, as well as internationally and in the nebulous environment of the internet. In this environment, the agents are randomly distributed across the landscape. This does affect their earliest conversations with other agents, but as the model run progresses, they are free to move throughout the landscape and speak with whomever they encounter who “looks” like a good prospect based on their extrinsic hate.

Data

Simulation modeling by its very nature is extremely data rich. Based on what information the modeler decides to collect, each model run can produce thousands of data points. In the programming for a simulation model, the programmer sets up a log file with the variables of interest and the number of times the data should be recorded. Data are usually of three varieties, the value of a characteristic (i.e., intrinsic hate 5), a count of some action or behavior (i.e., agreements 12) or a list (i.e., the agent ids of a series of agents in a group). The majority of the data collected for this research was of the first two varieties. In this research, data were recorded for all variables at each tick of the model run.

Each model run in these experiments produced a log file for individual agent data and a second for group data. The 15,000 iterations used to create distributions of results produced a total of 15,000 individual agent log files, and 15,000 group log files for a total of 30,000 individual log files.

All total there were 500 agents in each model and 730,000 data points per model, yielding a total of 10,950,000,000 individual data points of agent data. These data points included information regarding each agent's level of intrinsic and extrinsic hate at any given time, the group or groups they joined and the group or groups they had left if they dropped out of a group. There were 100 possible hate groups that could be populated per model and 146,000 data points per model, yielding a total of 2,190,000,000 data points of group data. These data points included the number of members, the mean intrinsic and extrinsic hate of each group, as well as a list of agents who had joined and a list of agents who had left the group at any given time.

Because these data sets together were large enough to be unwieldy, the data within the log files was used to create cases in the analysis dataset. The log file for agent data and group data were matched up for all model iterations and then the data from each of these files was used to create a single data set where each of the model iterations became a single case within the data set.

The log files were designed such that the variables of interest and the unique identifier for each individual agent in the agent log files and the group identifier in the group log files were listed across the top of the spreadsheet and the tick number at which the data were collected was listed down the left hand side of the spreadsheet. Therefore, at each tick in the model, the agent log file recorded the individual agent's value on all characteristics, as well as the number of agreements and disagreements the agent had made up to that point and whether or not they had joined a group, left a group or stayed in a group. The group log file recorded the group characteristics at each tick of the model, listing the identifiers of agents who had joined a group, left the group, as well as their averages on the individual agent characteristics. Log files can become very large depending on the length of time the model iteration is running, the number of characteristics or actions that the file is programmed to keep track of, and the number of agents included in the model. That was the case with the log files used to collect data from the model runs documented here.

Dependent Variables

The dependent variables of interest for all models were *number of groups that form*, the *speed* at which groups form, and the *size* of the groups that formed. The dependent variables with their conceptual and operational definitions are listed in Table 8 below.

Table 3: Dependent Variables

Dependent variable	Conceptual Definition	Operational Definition
Number of groups	The number of groups that formed	A group with a minimum of 5 members with an average intrinsic hate of 5 or higher
Speed	The amount of time it took for groups to start forming	The first day that a group formed The average number of days for all groups that formed
Size	The number of members in a group	The largest group formed in the model The number of groups that formed above the minimum number of members

Number of groups is conceptualized as the number of groups that form over the course of a model run. *Number of groups* is operationalized as the number of groups of five or more agents that come together and form a group with an average intrinsic hate of 5 or higher. Operationalizing these groups as needing an intrinsic hate of 5 or higher is based on the lowest level of societal hate used as an experimental condition in the models. The lowest level of societal hate used as an experimental condition in the models is 2; therefore, a group with an average intrinsic hate of 5 has a level of hate within their group of 2.5 times the level of societal hate. When societal hate is 4, these groups are those whose hate is 1.25 times the level of societal hate. The concern occurs when societal hate is 6 or 8, where these groups have less intrinsic hate on average than the society; however, increasing the average hate required for a hate group to be counted in these situations would mean that the number of groups could not be compared across levels of societal hate. For this reason, the requirement of an average intrinsic hate of 5 or higher remains constant.

Speed is conceptualized as the amount of time it took for groups to start forming. This variable is operationalized in two different ways. The first is the first day the first group formed. This gives a snap shot of when groups started to form. The second is the average number of days, under the experiment conditions; it took for the groups to form. These two measures of *speed* give a good idea of what is happening in regard to time in the model. Groups can start forming within the first day, this may be due to a series of agents whose levels of hate are compatible being randomly assigned to the same patch within the model environment, giving them an advantage towards group formation, similar to a group of potential skinheads all frequenting the same bar at the same time. To offset this type of accident of circumstance, the average amount of time it took for all the groups to form gives a picture of all the activity in the model.

Size is conceptualized as the number of members in a group. Just like *speed*, *size* is operationalized in two ways, the largest group that formed in the model and the number of groups larger than the minimum group size. The first measure gives an idea of how big the biggest group became over the course of the model run. The second measure looks at comparing how many of all the groups that formed were larger than the minimum set by the program at the end of the model run. This second measure was preferred to a measure of the average number of members in all groups as the number of groups with only the requisite five founding members typically outnumbered the larger groups and would have skewed the mean. This second measure was taken at the end of the model run to account for changes in group membership over the course of the model run, where groups may have had more than the requisite five members at one point during the model and lost members to drop-outs by the end of the model run. This also assured that no group was counted more than once.

Group Formation

A group is defined as having a minimum of five members. The decision to make groups this size is to differentiate between the idea of a few friends who share a belief and an organized group. The number five was chosen to represent a hypothetical group with some internal structure, similar to a club with positions for a president, vice president, secretary, treasurer, and general membership. In order for the group to be counted as a hate group, the average intrinsic hate of the group must be five or higher. While groups may form at lower levels of average intrinsic hate, these groups are not counted in the analysis of hate group formation unless the average level of intrinsic hate in the group increases to the 5 or higher point during the model run.

As agents interact within the model, they make connections based on which agents share their views. Each agreement between agents begins a tally toward group formation. Once five agents are connected, the model randomly generates whether or not the group will form. If the chance generated a no response, the group did not form, though the connections remained intact. This represented those groups that may have had enough people in agreement, but for unknown reasons did not form. If the chance generated a yes response, everyone who is connected through agreements was then populated into that group. An agent does not need to agree with every agent in the group. Once formed, groups are seeking new members and attempting to retain the members they already have. Within the group, as agents change their views based on interactions with one another and group membership, the relationships become more pronounced. However, should a group's membership fall below 3 members, the group is dissolved.

Independent Variables

The independent variables of interest are the characteristics of the individual agents. These variables are listed in Table 4 below. The independent variables of interest for all models were *intrinsic hate*, *extrinsic hate*, the *societal level of hate*, and *motivation*. Each independent variable is examined for its individual effects. Combined effects are not examined in the analysis. Random assignment for independent variables changed depending on which experiment was being used. In experiments where societal hate was part of the model, a Poisson distribution was used. When societal hate was not part of the model, random assignment was normally distributed. Due to the varying levels of societal hate, the Poisson distributions were skewed positively when societal hate was higher and negatively when societal hate was lower. Societal hate is both an experimental condition and an independent variable.

The experiments were run at set levels of societal hate that were systematically changed between model runs, 1,000 each at societal hate 2, 4, 6, and 8, as well as 1,000 runs without societal hate included in the model for all three experiments, control, and collective hate.

Table 4: Independent Variables

Independent Variable	Conceptual Definition	Operational Definition	Type of Agent	Hypothesis
Intrinsic hate	The core personal belief in a hate ideology	Randomly assigned levels from 0-10	All	All
Extrinsic hate	How the agent displays their beliefs	Randomly assigned levels from 0-10	All	All
Societal hate	The societal level of hate	Set at levels 2,4,6,and 8	n/a – model parameter	H1d-f

As you will recall, collective hate is a reflection of two levels of individual hate, *intrinsic* and *extrinsic*. *Intrinsic hate* was conceptualized as the core personal belief of an agent, reflective of the extent to which agents had levels of hate commonly espoused by those adhering to a white supremacist ideology. Agents with lower levels of *intrinsic hate* have little-to-no core personal buy-in to the white supremacist ideology. Those with higher levels of *intrinsic hate* have an increasingly more substantial buy-in to the white supremacist ideology. They are “true believers,” individuals with an unshakeable belief in the tenets of the white supremacist ideology. Operationally, *intrinsic hate* was an interval level variable with values ranging from 0 to 10. A zero reflects an absence of *intrinsic hate*; whereas a 10 reflects the greatest amount of *intrinsic hate* possible.

Intrinsic hate is the level of hate that an agent has developed, presumably based on life experience or social or familial norms (or by prior exposure to others with similar levels of hate). This is the type of hate that influences agents to either agree or disagree with others when contrasted with the other agent’s extrinsic hate. Agents are comparing the outward representation of other agents’ hate level (i.e., the other agents’ extrinsic hate level) to their own personal, core beliefs (i.e., their own intrinsic hate level)

If the agent asking about the individual agent’s agreement has an extrinsic hate that is more than ± 1 of the individual agent’s intrinsic hate, the agent immediately disagrees. The ± 1 range was chosen in order to adhere closest to the ideas of the theory of collective hate, any range larger than ± 1 would have created groups with members with widely disparate opinions and beliefs. If the membership has such widely varying opinions and beliefs, they would not be representative of the intense collective hatred theorized by Hamm (2004). If the asking agent’s extrinsic hate falls within that range, the agent being asked “considers” what the asking agent is ‘saying.’” The final decision is based on an equation that weighs the relative difference between the two agents and incorporates a random term representing unknown factors. In other words, two agents may come into contact, perceive each other to have similar views (± 1 extrinsic hate) and begin a conversation. Over the course of that conversation, the agents weigh what is being said against their internal views and beliefs (± 1 intrinsic hate). This conversation is based on geographic proximity; that is, the agents have to come in contact with one another. This contact is established by the two agents standing next to each other in the same unit of the model environment.

For example, two potential Klan members meet on the street. They are both wearing t-shirts with a logo from a popular white power rock group and have similar tattoos. They strike up a conversation, based on this perceived common ground. Over the course of their conversation, one of the potential Klan members decides that the person he is conversing with is a little more extreme than fits his internal belief system, perhaps he hates minorities and has done a little vandalism, but the person he is talking with is discussing his desire to attack minority children at a local YMCA and kill as many as possible. This discussion has extended beyond the one potential Klan member’s internal views, his core beliefs, his intrinsic hate. If this violent Klan member approached him about a new group that was forming, the nonviolent Klan member would be disinclined to join it.

In the model, the programmer tells the agents to look at the other agents nearby and seek out those agents whose extrinsic hate (their outward appearance or profession of hate) is within ± 1 of their own intrinsic hate (their internal core beliefs). When the agent spots another agent that fits this criterion, the agent is instructed to communicate with that agent. The agents communicate by exchanging information about their extrinsic hate, in other words they size each other up as to whether or not they agree on their hate ideology on the surface. If they agree on the surface, the agent who has been approached considers the other agents views internally.

That is, they compare what this agent is presenting to them through their extrinsic hate with their internal views, their intrinsic hate. If the extrinsic hate falls within +/-1 of the agent’s intrinsic hate the agent decides whether or not they agree. This agreement is contingent on a random chance, an error term that is presented by the model. This allows for two agents who have the right values on their characteristics, intrinsic vs. extrinsic hate to disagree, based on some non-programmed factor, such as bad hygiene or a repulsive habit.

Intrinsic hate is not something that an agent can vary at random, but it can change based on situation or experience, specifically when the conditions listed in Table 10 are met. There is not a set limit on how much an agent can change their levels of hate when they comply with the time limits set by the behavior rules. Each model runs for 1 year, 365 days, the decision to allow intrinsic hate to change (when not in the control model) after 100 days without an agreement was made based on the idea that this is someone’s core internal belief system feeding their intrinsic hate, it would take a long time for them to change this internal system, so nearly 1/3 of the model run. The change in intrinsic hate is left up to the agent; they are given the option of resetting their internal variables (intrinsic hate, motivation, and susceptibility) at these time points.

After 100 days without making any agreements, an agent may increase their intrinsic hate to replicate someone who finds this lack of agreement bolstering to their beliefs – as though they are saying, no one agrees with me because they are all delusional or supporters of the thing I hate. An agent may decrease their hate, replicating someone who finds this lack of agreement as a sign that there might be something amiss with their beliefs – similar to the experience of someone who developed an intense hatred for a racial or ethnic group that they had never encountered and changed their mind after learning more about that group.

Groups are prone to radicalization from within and strengthening of belief systems (Simmel, 1955). Therefore, for group members this decision to change intrinsic hate is 1/10 of the time as compared to when they do not have any agreements. For those who increase their intrinsic hate, these are those members who become increasingly radical, those who decrease their intrinsic hate are those who are made uncomfortable by the group’s viewpoint and distance themselves from the group.

Table 5: Conditions for Changing Perceived and Intrinsic Hate

Conditions for changing extrinsic hate	Conditions for changing intrinsic hate
Unless otherwise noted in an experiment, agents have full autonomy over their extrinsic hate and can change their level of extrinsic hate up or down, any amount without fulfilling any conditions	After 100 days without an agreement, an agent can raise or lower their level of intrinsic hate. See Figure 7.
	After 10 days of membership in a hate group, an agent can raise or lower their level of intrinsic hate. See Figure 7.

If an agent changes its level of *intrinsic hate*, the new level of *intrinsic hate* is maintained until the agent enters into a situation where one of the conditions in Table 5 is satisfied. This change is triggered by the number of days that an agent does not register an agreement with another agent or the number of days it has been a member of a hate group. The agent is given the option to reset its intrinsic hate; therefore, the level of intrinsic hate can increase or decrease any amount.

It should be noted that nothing in the programming code for the models biases an agent towards group membership. Group membership is based on agreements. The only influence that may affect an agent’s potential for group membership is the agent’s motivation. How motivated an agent is will affect how many opportunities that agent has to make agreements.

Extrinsic hate was conceptualized as the way in which the individual agents present themselves to others. This represents the extent to which they outwardly show support for a white supremacist ideology. Agents with lower levels of *extrinsic hate* would be perceived by other agents as having little or no interest in a white supremacist ideology. Those with higher levels of *extrinsic hate* would be perceived by other agents as having increasingly more interest and support for a white supremacist ideology. Operationally, *extrinsic hate* is an interval level variable with values ranging from 0 to 10, where zero reflects no *extrinsic hate* and 10 reflects the greatest level of *extrinsic hate* possible. *Extrinsic hate* is randomly distributed; this is not a uniform or normal distribution.

Extrinsic hate can be varied at any time in all experiments except the control experiments. The reasoning behind this is that extrinsic hate is how the agent presents itself to its surroundings. This is similar to changing clothes or carrying a sign. It is the same as choosing different vocabulary or a different story when talking to another person. Because of this, the agents are given the opportunity to change their extrinsic hate after each evaluation of the agents that are in closest proximity. The agents are asked if they see any other agents in their surroundings that have extrinsic hate that is +/- 1 of their intrinsic hate and are asked to pick one and communicate with that agent. If an agent finds someone or more than one person, that agent may not choose to change its extrinsic hate, if they do not find someone the agent may change its' extrinsic hate. This choice is completely under the agents' control in the collective hate experiments. In the control experiments, extrinsic hate, just like all other characteristics, remains static.

Societal hate was conceptualized as the degree to which the society in which the agents are interacting accepts the presence of white supremacists and their ideology. Lower values of societal hate are representative of less support for white supremacists and their ideology. Higher levels of societal hate are representative of a society that is more accepting of white supremacists and their ideology. Operationally, societal hate is an interval variable with values ranging from 0 to 10. It was calculated as the mean of the intrinsic hate possessed by all 500 agents present in that specific model.

Societal hate during the control experiments was held at fixed values of exactly 2, 4, 6, and 8 for the entire experiment. Any societal hate lower than 2 would be indicative of nearly Utopian societies, at level 0, the average hate for the society would be 0, at level 1, the average hate would be 1, this would result in hate being too rare a phenomena in the society to really measure. Likewise, societal hate higher than 8 results in societies so saturated with hate that it becomes increasingly difficult to separate out the formation of hate groups, the society itself would be an informal hate group. Utopian societies and societies completely saturated with a hate ideology are nonexistent in the real world and as simulation models attempt to recreate real world phenomena, these extremes would be outside the model scope. In all other experiments, the level of societal hate was allowed to increase and decrease, reflecting aggregate changes in the individual agents' levels of intrinsic hate. In all models when societal hate was allowed to vary and reflect aggregate changes in the individual agents' levels of intrinsic hate, no matter what the starting point was, societal hate increased and decreased over the course of the model run.

These changes in societal hate were recorded in the log file. Societal hate did not always increase, and it did not always decrease over time. When societal hate started lower, it tended to increase over the course of the model run rather than decrease, when it started higher, it tended to decrease rather than increase. Variation in societal hate was recorded in the log files for all experimental models. In the analysis, societal hate at the starting point, the set societal hate at the beginning of the model, is used to differentiate between the model runs. While the changes in societal hate and the ending societal hate are recorded, for comparison purposes, the models are analyzed based on the level of societal hate with which they started. Beginning societal hate was used in the analysis because it was the common starting point, this allowed for the direct comparison of the control condition and the two experimental conditions. Because societal hate could vary substantially within the same model run under the experimental conditions, this choice was made to maintain uniformity in the data set. Time series analysis can be used in future examination of the data to make a more nuanced examination of the effect of changing societal hate on hate group formation in individual model runs. The levels of societal hate used in the control models are loosely defined and presented in Table 6 below. The literature on societal hate is limited to explanations of Nazi Germany and levels of societal hate have not been presented in previous research. These levels are not concrete representations but are provided in order to give the reader a point of comparison between the real world and the simulations.

Table 6: Societal Hate

Level of Societal Hate	Definition
Societal Hate 2	When the mean level of hate in the society is 2, the society is rather accepting of differences, very little social unrest. Individuals with higher levels of hate are a minority in society, similar to most large urban areas in the United States currently.
Societal Hate 4	When the mean level of hate in the society is 4, the society is accepting of differences, but there may be pockets of social unrest. Individuals with higher levels of hate are still a minority in society, similar to the current anti-immigration movement in Arizona.
Societal Hate 6	When the mean level of hate in the society is 6; the society is rather intolerant of differences, increasing amounts of social unrest. Individuals with higher levels of hate are a small majority in society, similar to the United States during the Civil Rights Era.
Societal Hate 8	When the mean level of hate in the society is 8, the society is intolerant of differences, and there is a high likelihood of social unrest. Individuals with higher levels of hate are a majority in society, similar to Nazi Germany at the height of World War II. ¹

Covariate of Interest

Motivation was conceptualized as the level to which an agent actively sought out relationships with other agents, how motivated the agent was to seek out individuals who might agree with his hate beliefs. Operationally, *motivation* is an interval level variable with values of 1 (equivalent to 6 hours of inactivity), 2 (equivalent to 12 hours of inactivity) and 3 (equivalent to 18 hours of inactivity). Each agent was inactive for at least 6 hours and as many as 18 hours. The decision to provide agents with at least 6 hours of inactivity was that this would account for at least a minimum amount of time that a person in the real world would spend asleep. An agent that is inactive only 6 hours is highly motivated because they are active for 18 hours. This is equivalent to someone who interacts with others for most of the time they are awake. This is not static over the course of the model run. If an agent chooses to change its level of intrinsic hate, the model also randomly reassigns a level of motivation. The motivation may be the same as before, or it may increase or decrease. An agent may increase their level of intrinsic hate, but the model may decrease their motivation. The model randomly assigned a third of the agents to each level of motivation. See Table 7 below for explanations of the different levels of motivation. These explanations are provided solely for the purpose of a reference that explains individual agent behavior in real world terms.

Table 7: Levels of Motivation

Levels of Motivation	Equivalence in the Real World
Motivation 1	Actively seeking others 18 hours out of every day. This is someone who is very extroverted and interacts often with others, a real “people person.”
Motivation 2	Actively seeking others 12 hours out of every day. This is someone who is friendly but not immediately classified as an extrovert and interacts often with others, but also likes to be left alone from time to time.
Motivation 3	Actively seeking others 6 hours out of every day. This is someone who is friendly, but not very active. They interact occasionally with others, but prefer to be left alone most of the time.

Control Condition

In the control condition, the agents were unable to alter their extrinsic or intrinsic levels of hate. Also, unlike subsequent experiments, agents in this condition were randomly assigned values for their levels of *extrinsic* and *intrinsic hate* that they were not able to alter. Societal hate was systematically assigned, and because intrinsic and extrinsic hate were not allowed to vary over the year modeled, this means that societal hate remained constant during each model. Intrinsic hate, which is the basis for societal hate was randomly assigned using a Poisson distribution centered on the level of societal hate as the mean.

¹ While to most individuals Nazi Germany has all the trademarks of a society completely saturated with hate, however due to the presence of individuals who willingly risked and sacrificed their lives in opposition to the Nazi regime and those whose accounts of life under the Nazis express the prevalence of coercion and fear that influenced the behavior of everyday citizens, it is not possible to rank Nazi Germany as the epitome of societal hate (Goldhagen, 1996; Gellately, 2001; Kershaw, 2008).

See Table 8 below for the conditions present in the control model concerning societal hate and agent characteristics. When societal hate was low; the intrinsic hate of all agents was skewed to the low end. When societal hate was high; the intrinsic hate of all agents is skewed to the high end. The dependent variables measured included number of groups that form, speed of group formation, and group size. The control condition which represented what would happen in the absence of the ability to vary hate and form a collective identity, (i.e., collective hate) across different levels of societal hate provided data for comparison to the experiments described next.

Table 8: Control Model and Conditions

Control Model	Conditions	Use in Analysis
No Societal Hate	Societal hate was not included in the model. All agents were randomly assigned levels of extrinsic and intrinsic hate that could not vary over the course of the model run.	Analysis for hypotheses 1a-1c
Societal Hate 2	Societal hate was set at level 2 and did not vary over the course of the model run.	Analysis for hypotheses 1d-1f
Societal Hate 4	Societal hate was set at level 4 and did not vary over the course of the model run.	For all societal hate conditions, all agents were randomly assigned levels of extrinsic and intrinsic hate that could not vary over the course of the model run. Intrinsic hate was randomly assigned using a Poisson distribution that used the level of societal hate as its mean.
Societal Hate 6	Societal hate was set at level 6 and did not vary over the course of the model run.	
Societal Hate 8	Societal hate was set at level 8 and did not vary over the course of the model run.	

Experiments

Manipulating Collective and Societal Hate

Using the behavioral rules previously discussed, the experiments described in this section were used to generate data to systematically manipulate variables central to Hamm's theory of group formation. The first model set for collective hate provided data for determining whether a simple relationship existed between collective hate and the 3 dependent variables

The second model set for collective hate added societal hate as a potential moderating variable. For these, the collective hate model was run at each level of societal hate (i.e., 2, 4, 6, and 8) for each of the 3 dependent variables. This provided data to test whether higher levels of societal hate intensified the relationship between collective hate and the 3 dependent variables.

It is akin to being able to see how different people would react in different conditions and situations that were selected for analysis based on the review of the literature on hate group formation and the theory of collective hate (Hamm, 2004). Although the models encompassed increasingly complex representations of the conditions for hate group formation, they still were far simpler than the real world. Each experiment was built on the previous experiments to make it possible to clearly identify which parameters were being manipulated, how many groups formed, how quickly these groups formed and how large they became. The analytic strategies used to examine each of these hypotheses are described next.

Analytic Plan

All data generated by the log files of the experiments was analyzed using the statistical analysis program SPSS. The data were analyzed using a series of one way, 2x4 and 3x4 ANCOVAs. ANCOVA or analysis of covariance was designed to expand upon the ideas of the ANOVA, which compares means of multiple groups as well as the interaction effects within those groups through the analysis of their variance (Harlow, 2005). ANCOVA expands on this type of analysis by allowing for the inclusion of covariates, factors that may influence or predict the outcome, but are not considered part of the main experiment. In the analysis of the data produced by the collective hate experiments, the covariate of interest is motivation, how much time did the agents spend seeking connections.

Results

This section details the results of the statistical analysis. It is divided into four sections. Each section provides the ANCOVA analysis for one of the four sets of hypotheses tested in this research and detailed in Table 8 in the previous section. The ANCOVA allows for the analysis of the main effects and interactions for the primary independent variables (i.e., collective hate and societal hate) net the influence covariates on the outcomes of interest, including group formation, group size, and speed of formation. The order in which the results are presented below follows the same order as the hypotheses.

Hypotheses 1a-1c

This section provides the results of the ANCOVA analyses comparing the control condition to the experimental collective hate condition. These ANCOVAs test the first set of hypotheses, those dealing with collective hate only. Societal hate is not considered in these analyses. For this section, the effects of interest when present are represented by the symbols provided in Table 9 below. For example, in the results tables that follow, a statistically significant effect of the model condition on an outcome will be marked as A ‘significant main effect for model condition’.

Table 9: Effects and their Representations in for ANCOVAs for H1a-H1f Results Tables

<u>Effect of Interest (H1a-H1f)</u>	<u>Representation in Effects</u>
Significant main effect for Model condition	A
Significant main effect for Societal hate	
Significant Model condition X Societal hate interaction	B
Motivation as a significant covariate	AxB
Significance level p<.1	
Significance level p<.05	C
Significance level p<.001	†
	**

Findings for the first hypothesis, H1a, as presented in Table 10, show the number of hate groups formed was significantly associated with model condition (control versus experimental) [F(1, 1,997) = 55.0, p<.001], as well as motivation [F(1, 1,997) = 4.1, p<.05]. In this analysis, the experimental model was consistent with expectations. That is, the experimental models produced significantly more hate groups than the control models.

For the second hypothesis, H1b, which examined group size as the dependent variable (first based on the largest group formed), there was a significant effect for the experimental condition [F (1, 1,997) = 260.8, p<.001], and a marginally significant effect for motivation, [F (1, 1,997) = 2.3, p<.1]. Because of the exploratory nature of this research, the marginal effects become important for guiding future examination of model parameters. In this situation, the idea that motivation is marginally significant, means that this is a parameter that in future research should be kept in the model and further manipulated, perhaps with smaller time increments, 4 hours rather than 6 or as larger increments, agents active for a week and then inactive for 2 or 3 days. The control model produced the largest group when compared to the experimental condition. This finding is contrary to theory, because it was expected that the largest groups would have been seen in the experimental models rather than in the control models. The individual log files showed that agents did not leave groups in the control models but they did frequently leave groups in the collective hate models. The net effect of this was that groups became larger than those in the experimental models because the group never experienced member attrition. That is to say, the control groups kept growing because no agents left the group or groups that they joined and more agents were added to those groups throughout the model run.

When group size was operationally defined as the number of larger groups formed (i.e., groups that were larger than the requisite 5 members needed to define a group), a marginally significant effect for the experimental condition was observed [F (1, 1,997) = 2.4, p<.1]; however, motivation was not a statistically significant covariate. The control models produced slightly more, larger groups than the experimental condition. This does not meet expectations, as the experimental condition was expected to produce larger groups and more of them.

The individual log files showed that agents frequently left established groups in the experimental condition, making these groups slightly smaller than their control model counterparts.

In the last analysis for Hypotheses 1a to 1c, the ANCOVA examined the relationship between experiment type and how quickly the groups formed (i.e., H1c). The first of these analyses examined at how quickly groups began to form operationalized as the number of days that elapsed before the first group formed. In this analysis, there was a significant effect for the experimental condition, [F (1, 1,997) = 3.8, $p < .05$]. The first group that formed in both the control model and the collective hate model formed, on average, on the 12th day of the model run. The experimental condition produced its first hate group slightly earlier than the control model.

When looking at how quickly groups formed using the average amount of time it took for each group to form aggregated across the entire model run, there was a significant effect for collective hate, [F (1, 1,997) = 11.5, $p < .001$]. The control models created groups faster, on average, than the experimental collective hate models. It was expected that the experimental models would produce their hate groups faster than the control model, making this finding contrary to expectations. The log files did not show any particular reason for this pattern of findings. Groups in the experimental model took longer to form, perhaps because of the frequency with which the agents changed their extrinsic hate, something that the agents controlled in the experimental models but were unable to do so in the control models.

Table 10: ANCOVA Analysis for Control vs. Collective Hate H1a-H1c

Variables	Control	Collective Hate	Significant Effects
# of Hate Groups	18.7(94.0)	20.1 (4.4)	A***, C**
Size			
Largest Group	17.1(3.2)	15.0(2.6)	A***, C†
# of Larger Groups	27.0(3.2)	26.8(3.3)	A†
Speed			
Formation of First Group	11.9(4.1)	11.5(3.8)	A**
Average Formation Time	211.3(3.8)	211.9(4.6)	A***

Note: Standard deviations appear in parentheses

Hypotheses 1d- 1f

This section provides the results of the ANCOVA analysis comparing the control condition to the experimental condition in the models, taking into account the effect of societal hate as outlined in the second set of hypotheses, H1d-H1f. The results of the analyses are presented in Table 11 below. The means and standard deviation are presented in order, societal hate levels of 2, 4, 6, and 8 respectively.

The first analysis examined the effect of societal hate on the number of hate groups that form in the experimental condition (H1d). The analysis showed that there was a significant main effect for model condition [F (1, 7,991) = 618.9, $p < .001$]. In the control model, societal hate is stagnant; in the experimental condition, societal hate varies across the model run, as a function of changes in agent's intrinsic hate level. Examination of the log files showed that in the experimental models the agents with lower levels of hate were "hesitant" to increase their intrinsic hate past the set societal hate average. This is to say that an agent with intrinsic hate 2 when societal hate was 4 would not increase his hate past 4, no matter what his situation. This was an emergent property of the model. Agents in the experimental models were given full control over increasing or decreasing their intrinsic hate and nothing was programmed into their behavior rules that explicitly capped how much these levels could be increased.

For the next hypothesis, H1e, which examined group size as the dependent variable (first based on the largest group formed), the analysis showed that there was a significant effect for the experimental condition [F (1, 7,991) = 21373.7, $p < .001$] and motivation as a significant covariate, [F (4, 7,991) = 5.1, $p < .05$]. The control model always produced the largest group when compared to the experimental condition, regardless of the level of societal hate. This mirrors the same findings as the previous analysis of the largest groups in H1b.

The log files showed that when agents were given more control over their intrinsic and extrinsic hate; group membership fluctuated with agents commonly joining and then leaving a group in the experimental models, thus preventing groups from growing to the size seen in the control models.

Examining the number of larger groups, the analysis showed that there was a significant effect for the experimental condition [F (1, 7,991) = 915.2, p<.001], and a marginally significant interaction between societal hate and the experimental condition [F (4, 7,991) = 19.3, p<.1]. Motivation was not statistically significant as a covariate in either analysis for group size. Here the findings followed theoretical expectations, no matter what the level of societal hate; increasingly larger groups were observed in the experimental model as societal hate increased.

The last hypothesis in this series dealt with the speed of group formation. The first analysis examined how quickly groups began forming. In this analysis, there was a marginally significant main effect of the experimental condition [F (4, 7,991) = 2.5, p<.1], as well as a marginally significant interaction between societal hate and the experimental condition [F (4, 7,991) = 1.9, p<.1]. The addition of societal hate resulted in the control models outperforming the experimental models. This results in a counterintuitive finding, as the experimental models were expected to form groups before the control model and did so, when societal hate was not included. The log files showed that this trend may have been due to the agents’ constant shifting of their extrinsic hate early in the model runs, as extrinsic hate shifted, the ability to make connections that would lead to potential hate group formation were constantly in flux.

The analysis conducted using the average amount of time it took for each group to form aggregated across the entire model run showed that there was a significant effect for the experimental condition [F (1, 7,991) = 567.5, p<.001]. The control models created groups faster, on average, than the experimental collective hate models. It was expected that the experimental models would produce their hate groups faster than the control model, making this finding contrary to expectations. Because the changing levels of intrinsic hate in the experimental condition are interconnected with societal hate (i.e., societal hate was the average collective intrinsic hate of the agents in the model); the changing levels of intrinsic hate inherent in the experimental condition model had a corresponding impact on societal hate, which in turn impacted how quickly the groups came together. Motivation was not a statistically significant covariate in either analysis for speed of formation.

Table 11: ANCOVA Analysis Control vs. Collective Hate for H1d-H1f, Societal Hate Effects

Variables	Societal Hate Level	Control	Collective Hate	Significant Effects
# of Groups	2	19.0(3.6)	17.2(3.5)	A***
	4	19.2(3.6)	17.2(3.6)	
	6	19.0(3.4)	16.9(3.5)	
	8	19.0(3.6)	17.2(3.6)	
Size Largest Group	2	17.9(3.7)	14.8(2.6)	A***, C**
	4	18.1(3.9)	14.8(2.5)	
	6	18.1(3.7)	14.7(2.6)	
	8	17.9(3.7)	14.7(2.7)	
# of Larger Groups	2	24.8(3.3)	27.1(3.3)	A***, AxB†
	4	24.9(3.0)	27.1(3.3)	
	6	24.9(3.0)	26.9(3.3)	
	8	24.9(3.1)	27.3(3.4)	
Speed Formation of First Group	2	12.5(4.8)	12.8(4.3)	A†, AxB†
	4	12.9(4.6)	12.6(4.2)	
	6	12.6(4.6)	12.9(4.3)	
	8	12.6(4.6)	12.9(4.1)	
Average Formation Time	2	132.5(11.5)	138.6(10.3)	A***
	4	133.0(11.5)	138.7(10.6)	
	6	132.8(11.4)	132.3(10.5)	
	8	132.5(11.8)	138.6(10.0)	

Discussion

Does collective hate influence variations in the attributes of hate group formation? These findings have important implications for agent-based simulation models as methodology, criminological theory, public policy and future research.

The research has identified the following findings:

- The theoretically-informed models of human behavior generated hate groups.
- The experimental models produced more hate groups when societal hate was not added to the models.
- For the experimental models, larger groups were more prevalent than in the control model, at all levels of societal hate.
- When societal hate was included in the models, the control model, which gave the agents the least amount of freedom over their levels of intrinsic and extrinsic hate, produced the most hate groups and the largest hate groups.
- Because all models produced hate groups, there was support for Hamm's (2004) theory of collective hate.

Hate groups formed at all levels of societal hate. There was a significant difference between the control and experimental models, especially when societal hate was included in the models. In cases where larger groups formed, these groups in the real world can have more moderate views and behaviors than their smaller counterparts; these groups essentially police the behavior of their membership through the overall numbers within the group (SPLC, 2009). Small groups can radicalize faster than larger groups and can also be more inclined to engage in criminal activity (Hamm, 2007). Groups that formed quickly may not have the staying power of groups that formed more slowly, in the case of Robert Matthews nearly a decade passed between when he formed the Sons of Liberty and the formation of the Order, of the two, the Order was far more involved in criminal behavior and acting upon Matthews' supremacist ideology (Hamm, 2007). When societal hate was included, the control models produced more groups and in all cases produced the largest group. Although this seems somewhat counterintuitive, comparison of the control and experimental model log files revealed two factors relating to this difference:

1) When societal hate was included in the models, the societal level of hate established a starting point for the intrinsic hate of the agents in all models. The control model did not allow for the variation of this hate. This hate could vary within the collective hate model, and the agents with lower levels of hate in this model were "hesitant" to change their intrinsic hate when given the option, and rarely did so to a level above the societal average. This means that an agent starting with hate equal to 2 in a model where the societal average started at 4 very rarely increased their level of hate beyond 4. This is an emergent property² that held throughout the models. It cannot be explained by the model programming. This opens up new questions to explore within these models and the resultant data. Situations like this one highlight a key difference between simulated and other forms of research: where this result would inspire further interviews in qualitative research or the creation of a revised survey in quantitative research, the changing numbers present in the model log files cannot be asked to elaborate.

When societal hate was allowed to change, there was an increased likelihood of groups to form when societal hate was decreasing in the models where societal hate began at higher levels. This is consistent with the real world phenomena where hate groups, particularly Klan groups or groups that form due to a particular political issue, believe that society is becoming too accepting of that which they hate – Klan groups drew increased membership when schools desegregated, in the past two years the SPLC has had to increase the number of categories of hate groups to account for new anti-gay and anti-immigrant groups, forming in reaction to changes in political and public policy. When societal hate started low and was able to change, groups formed as societal hate increased, where more agents started raising their level of hate, this is also similar to the real world phenomena where hate groups form as more people establish a hate of a particular target, case in point anti-Muslim groups after the 9/11 terrorist attacks or anti-German groups in the wake of the American entry into World War II.

2) A second explanation for why the control model produced more hate groups when societal hate was included in the models is that while in the collective hate model agents left groups and joined new groups, agents formed multiple groups in the control model. In these situations, the agents in one group also formed satellite groups.

²An expanded discussion of emergent properties and their relation to ABM can be found in Railsback, S. and Grimm, V. (in press) *Agent-Based and Individual-Based Modeling A Practical Introduction*, Princeton, Princeton University Press.

This was not something that happened in the experimental conditions, so in the experimental conditions, the agents likely left the group and joined another rather than maintaining membership in multiple groups.

Limitations of Simulation Modeling

As a methodology, simulation modeling cannot replace other forms of research, either qualitative or quantitative. This is because models lack the detail that can be accomplished through qualitative and quantitative research that can get at the purely human element of social phenomena. However, simulation modeling can take these more traditional forms of research in new directions, like when examining something that cannot be measured with a survey, or objectively identified through qualitative means, like hate group formation.

Although the goal of simulation modeling is to use the simplest combination of characteristics and behavior rules to duplicate social phenomena in a computerized environment, it is always possible that the model oversimplifies the situation (Miller and Page, 2007; Gilbert and Troitzsch, 2005). Simulation models should be seen as a springboard for “real world” qualitative and quantitative research (Gilbert and Troitzsch, 2005). Simulation cannot replace real world observation, ethnographic, historical or archival research, but in situations where real world observation is dangerous or ethically inadvisable, it provides a viable resource for theoretical examination (Miller and Page, 2007; Gilbert and Troitzsch, 2005; Groff, 2007).

Limitations of the Models used in this Research

The models used in this research have identified hate as a primary characteristic of interest and tested the theory of collective hate, in an attempt to recreate the dynamics of hate group formation in simulation. The rigid structure of the control models, specifically the inflexible nature of the model (not letting agents change) had the effect of agents not dropping out of a group once they had joined. This is very different from real world groups and this complicated the comparison with the experimental models.

Human beings are incredibly complex in their thoughts, interactions and responses to the situations in which they find themselves. Though hate groups formed under these conditions, it is still probable that something has been overlooked. Although many human characteristics that are typically considered important were not included (i.e. education level, socio-economic status), this limitation was partially offset by the fact that hate groups form at every level of these characteristics in the real world.

Nevertheless, these models did not include one characteristic that is considered very important to hate groups and that is race. Race was not included as it is an assumed characteristic in Hamm’s (2004) theory. This theory designed to explain behaviors and phenomena seen in racially or ethnically homogenous settings. Therefore, all agents were the same race and racial pride was not a characteristic given to the agents. In future research examining hate group behavior and hate crime, this is a characteristic that will likely need to be included. Also, these models were not designed to examine even simulated responses to a specific “trigger” event that could increase hate group formation, such as a heinous crime, as in the case of the Knights of Mary Phagan.

Further, different types of hate groups, even within the broader category of white supremacist groups form along generational lines. Ku Klux Klan or Neo-Nazi group members may join as teens or as adults up into their 50s and 60s, while Skinhead groups usually are formed by and recruit individuals below the age of 25. The exclusion of age, while maintaining the simplicity of the models, does prevent more careful examination of how subgroups differing in age within white supremacy groups may emerge differently in both simulation and the real world. Finally, societal hate was operationalized as the mean of the intrinsic hate of all agents in the models; societal hate is a relatively new concept and may not relate at all to a mean level of hate in a society. While historians, archivists and ethnographers examining Nazi Germany and the Ku Klux Klan have discussed the role of society and social views on the rise of these groups, no one has sought to measure a society’s psychological or emotional level regarding hate. Although, opinion polls on various subjects that are “hot button” issues to hate groups (gay marriage, desegregation, immigration, to name a few) exist, they are fraught with methodological and validity concerns and at best are only a proxy measure of societal hate. Public opinion is fickle. Although many hate groups have been able to increase their membership and support by playing off public opinion, this does not mean that societal hate is the best proxy.

It can be argued that these models could be used to form groups for a variety of purposes by switching intrinsic and extrinsic hate with other characteristics, such as “love of chess.” Due to the lack of a means for externally validating the hate group formation models, this can be seen as a limitation.

The same argument can be made for any simulation model, that any characteristic is only a label provided by the modeler and embodies only as much meaning as that label. While this is a limitation of these and other simulation models, the models generated groups that are listed as hate groups, under the conditions provided in the model programming.

The distribution of both intrinsic and extrinsic hate and whether or not they are correlated with one another may be another limitation to this study. There simply have been no real world surveys of hate to enable a determination of how close real world estimations would match those of the simulation. Eleven levels of intrinsic and extrinsic hate may be too many or too few to show the varying degrees of hate that are present in society. Furthermore, the agents may have been given too much freedom over their characteristics, especially evident because this was a driving force in the experimental models that differentiated how many groups formed when agents were given more freedom versus the absence of freedom in the control model.

Implications for Criminological Theory

Results from the models indicate that there was support for Hamm's (2004) theory of collective hate. The support for Hamm's (2004) theory of collective hate, evidenced in both the control and collective hate models supports the idea that collective hate is, at the very least, if not absolutely necessary, is a sufficient condition for hate groups to form. Hate groups did form at each level of societal hate and societal hate effects were supported by the analysis. It might be useful to further explore each theory individually and relate the findings to the historical events that influenced the creation of these theories and the foundation of these models.

Collective Hate

These models produced groups at varying levels of hate; and therefore, not only did they successfully model group formation but also hate group formation in a way that appears to support Hamm's (2004) theory of collective hate. The models included three types of hate, intrinsic, extrinsic, and societal. Hate was programmed as the driving force for interactions between individuals and the agents did interact and form groups based on this characteristic. The control model, which was a version of the collective hate model without "free will" to change the values of their internal and external characteristics, was consistent with the theory of collective hate. Perhaps more compelling was that when agents were given "free will" like their real world counterparts in the experimental models, they still produced hate groups. Although allowing agents to have autonomy over intrinsic/extrinsic hate levels is more representative of how people behave in the "real world", the fact that collective hate led to group formation in the control condition as well as the experimental condition provides strong support for this idea. Conceptually it is accurate to say that the exchange between individuals with differing levels of both intrinsic and extrinsic hate represents a 'shared belief' in the sense that only those who have similar levels of hate form a group.

Further examination of the data will shine more light on which types of hate and at which level they influenced hate group formation. Research conducted by Ramakrishna (2006), with Islamic militant youth has shown that a collective prejudice or bigotry is instrumental in influencing individuals to seek out and join terrorist groups. If hate is the driving force behind hate group formation and hate is being identified as part of the connection between members of terrorist and other extreme groups, the current research is valuable for examining the spread of such groups. Expansion of the models used in this research, to other, more extreme groups, can examine the dissemination of ideology via media as well as how the internet or other non-person-to-person communication can spread a belief and expand a group's support base. From a different perspective, other emotional connections, such as desire, loyalty or revenge can be modeled to use variations of these experiments to model gang formation or the establishment of criminal or subversive networks, such as child pornography rings, cults or counter-government movements.

Societal Hate

Societal hate produced significant effects in the models used in this research. However, the number of hate groups did not increase as societal hate increased. Hate groups formed at all levels of societal hate, but did their best, especially in the experimental models, when societal hate was not included in the model. Unlike in the past, hate groups are not always at their most prevalent when society supports their views. Hate groups can be very reactionary. If society is not supporting the hate group's views it can almost be seen by the hate group that there is a greater need to form additional groups to gather the "believers" together to fight a society that is delusional, in their opinion, for not sharing their views and beliefs.

Hate groups that have formed throughout history have seen increased support and membership when society as a whole appeared to be evolving, such as when Supreme Court cases found in favor of equality and desegregation during the Civil Rights Era (Wade, 1987; Chalmers, 1981). This is part of the conjecture of Hamm's (1994) examination of skinheads that led to his collective hate theory, that potential skinheads perceived society or government as supporting the target of their hatred rather than those blue-collar, white, Anglo-Saxon, Protestants who were the skinhead's family, friends, and neighbors. Although the collective hate models allowed for the levels of societal hate to vary over time, the level of variance was not examined in the present analysis. Hate groups formed at each level of societal hate; therefore, this change in societal hate likely merits further evaluation. Further examination of the data may show support for changing levels of societal hate to better match the politically and socially reactionary history of hate groups. Societal hate may be different from societal acceptance of a hate group's presence or activities. Altering societal hate to not be related to the hate possessed by the agents themselves may present a better way to examine the phenomena. Societal hate is a relatively new concept, while it has been linked to the everyday German in the years preceding and throughout the Nazi regime (Kershaw, 2008; Goldhagen, 1996). This merits future examination, especially if one or the other can be used to explain genocide or other atrocities in more recent history.

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