He's Got Friends in Online Places: The Presence of Social Media in Radicalization

by

Connor James Stewart

A Thesis Presented in Partial Fulfillment
of the Requirements for the Degree
Master of Science

Approved July 2019 by the
Graduate Supervisory Committee:

Jacob Young, Chair
Scott Decker
Cody Telep

ARIZONA STATE UNIVERSITY

August 2019

ABSTRACT

Social media has become a significant aspect of American life and culture. Criminal groups including extremists of various ideological milieus have found social media useful in their recruitment efforts. Further, these online spaces allow extremists to easily interact with one another, reinforcing each other's radical perspectives. Little research has examined social media's role in radicalization and fewer studies have tested the differences between the radicalization processes of individuals espousing disparate ideologies. Using Profiles of Individual Radicalization in the United States, a data set of 804 extremist men, this study sets out to determine whether the role of social media in the radicalization process varies between Islamist and far right extremists using social learning as a theoretical framework. The results indicate no significant difference regarding the role of social media in radicalization between Islamists and far rightists. Additionally, the odds of having radical friends and family were much lower for Islamists than far rightists, suggesting only partial support for social learning theory as an explanation of radicalization.

This thesis is dedicated to my Mom and Dad, Kristen and James. Without your boundless love and support, this document would have never come to fruition.

ACKNOWLEDGEMENTS

I would like to thank the members of my thesis committee, Scott Decker, Jacob Young, and Cody Telep. Your guidance through this process has helped me grow not only as a researcher, but as a person as well.

TABLE OF CONTENTS

Page

LIST OF TABLES

Table Page

Introduction

In the last decade, social media has become an omnipresent feature of American life with 94% of American young adults being active users of YouTube, 80% having a Facebook account, 45% on Twitter, and 70% on Instagram and Snapchat (Smith and Anderson, 2018; Wolcott, 2008). Social media has forged a pathway to a young global audience and has proven to be a useful tool for a variety of social and anti-social groups interested in generating support for their cause, including terrorist organizations. Extremists from various ideological milieus have established a strong presence in cyberspace. This does not come as a surprise given the capability of the internet to connect like-minded individuals to each other on a global scale.

Islamist terrorist organizations such as ISIS (Islamic State in Iraq and Syria) have adopted the use of social media for radicalizing and recruiting new members in the West, which has proven to be an effective strategy (Gates and Podder, 2015; Halverson and Way, 2012; Kirby, 2007; Picart, 2015; Thompson, 2011). While there has been a recent surge in research examining the relationship between radicalization and social media, most of it focuses solely on Islamic terrorism. This is problematic given that between 1954 and 2000, right wing terrorism accounted for 31.2% of terrorist related incidents and 51.6% of terrorism related deaths (Taylor, Currie, and Holbrook, 2013). While knowledge concerning the radicalization process of individuals belonging to a single ideology is critical to our in-depth understanding of terrorism, it is imperative that different types of extremists are compared to determine where, if any, overlaps exist.

This thesis addresses the need for research comparing disparate extremist groups by using a data set of hundreds of extremists who radicalized in the United States to determine if the presence of social media in the process of radicalization varies between Islamist and far right extremists. A primary feature of social media is the ability to interact with anyone, anywhere; thus, this study takes the opportunity to further test the influence of interaction with radical others online or offline by applying social learning theory. By doing so, perhaps we can better understand the mechanisms of radicalization.

This paper adopts definitions of key terms from the data used for the current analysis. Radicalization is the "psychological, emotional, and behavioral processes by which an individual adopts an ideology that promotes the use of violence for the attainment of political, economic, religious, or social goals" ("PIRUS," n.d., para. 6). Jihadism is defined as:

> A militant methodology practiced by Sunni Islamist-Salafists who seek the immediate overthrow of incumbent regimes and the non-Muslim geopolitical forces which support them in order to pave the way for an Islamist society which would be developed through martial power. (START, 2018, p. 4)

Lastly, the far-right is designated:

> The ideology of the far-right is generally exclusivist and favors social hierarchy, seeking an idealized future favoring a particular group, whether this group identity is racial, pseudo-national or characterized by individualistic traits. The extremist far-right commonly show antipathy to the political left and the federal government. As a result of this heterodoxy, this category includes radical

> individuals linked to extremist religious groups, non-religious racial supremacists, tax protestors, sovereign citizens, militias, and militant gun rights advocates. (START, 2018, p. 4)

The first section of this paper reviews the literature on the radicalization process, extremist online content, and social learning theory and its application to radicalization. This is followed by a description of the data set, the application of multiple imputation using chained equations (MICE) to cope with missing data, and the variables included in the regression models. Finally, the results are reported, and implications and future research directions are discussed.

Literature Review

The Process of Radicalization

Currently, a few risk factors for radicalization have been consistently found across research. Many argue that the presence of a grievance—either directed at one's personal life, society, or government—is common among radicals (Hafez & Mullins, 2015; McCauley & Moskalenko, 2008; Precht, 2007). In their examination of Colleen LaRose—A white American woman who became a jihadist and was embroiled in an international assassination plot—Halverson and Way (2012) chronicle LaRose's feelings of marginalization at the hands of Western society, and how those emotions lead her to connect with radical Islamists who shared her views of the West. Feelings of isolation are thematically frequent among cases of radicalization as well (Omotoyinbo, 2014; Picart, 2015). In the same Halverson and Way (2012) study, the authors highlight the feelings of solitude experienced by LaRose, Eric Harris and Dylan Klebold (the Columbine

shooters), and Terry Lynn Nichols (the Oklahoma City bomber) preceding their extremist acts. Aspiring to change or reshape one's identity is also a common motif. Though, current research suggests not everyone is looking to alter their identity in the same way. LaRose saw becoming a jihadist as transforming her identity into that of a warrior; an identity that better resembles those of action heroes in fantasy films she was obsessed with (Picart, 2015). Alternatively, Precht (2007) argues in his review of academic and government literature that many radicalize as a part of an Islamist movement as a means to strengthen their Muslim identity. Lastly, a desire for significance often precipitates radical thought and action (Picart, 2015; Precht, 2007).

While similar mechanisms of radicalization have been found between different cases, it is not clear how they fit together within the broader process. While various models have similar elements, they vary based on measurement level, included variables, and time order among others. McCauley and Moskalenko (2008) propose that radicalization can occur at three levels: individual, group, and mass. At the individual level, they argue radicalization is the result of personal or identity group grievances. Radicalization at the group level is the product of small group face-to-face interactions. Political groups and public masses can become radicalized through conflict with other bureaucratic groups and states. They contend that radicalization at the individual level is rare; even "lone wolves" such as Ted Kaczynski (the Unabomber) were associated with a larger ideological movement. This observation is common among studies on terrorism; radicalization in ideological isolation seems the exception rather than the rule. McCauley

and Moskalenko (2008) believe feelings of camaraderie serve to pull individuals into radical movements and keep them there.

Regarding specifically Islamists, Precht (2007) further asserts the notion that radicalization more often occurs in group settings. He identified four overlapping phases of radicalizing into an Islamist movement that group members move through together: Pre-radicalization, conversion and identification, conviction and indoctrination, and action. Pre-radicalization involves the many background factors that may make an individual more susceptible to radicalization. Precht (2007) found these factors to be a "Muslim identity crisis, experience of discrimination, alienation and perceived injustices, personal traumas, neighborhood, living conditions, family, and relative absence of Muslim public debate on Islamic terrorism in the community" (p. 34). In the conversion and identification phase, an individual's religious identity and behavior shifts. This can mean one who previously did not practice a religion now does, a shift from a socially acceptable form of practicing religion to a more radical variation, or a move from one religion to another. In phase three—conviction and indoctrination—the individual isolates themselves from most non-radical others and further roots themselves in extremist Islam ideology and its cause. It is in this phase that associations with radical others plays a significant role, serving to reinforce each other's radicalization. In the final phase of action, "each member accepts the obligation of carrying out a terrorist attack" (p. 37); attack plotting and preparation occurs in this phase (Precht, 2007). Similar to other proposed models, the process described by Precht (2007) is not entirely linear (Sageman, 2008). Individuals can stop their progression through the process within any

phase, or re-enter previous phases. Also, the time it takes to reach the critical fourth phase varies, with some moving through the whole process in a few months, and others taking years.

Many assert a fully linear process of radicalization does not exist; rather, individual pathways are unique (Picart, 2015; Precht, 2007). Hafez and Mullins (2015) suggest the best way to think about radicalization is not as a linear process, but as a jigsaw puzzle: focusing on the "pieces" with the understanding how they fit together is contextual. In their review of the literature on Islamist radicalization, they found the pieces of the puzzle to be grievances, radical networks, ideology, and enabling environments and support structures. Much research has worked within a similar framework: not focusing on the creation of a universal and linear radicalization process, but on the mechanisms within the process, with the understanding that the weight and placement of each mechanism varies from case to case. While terrorism researchers have identified grievances, isolation, identity, and desire for significance as consistent predictors of radicalization, there are most likely many more variables to be tested and added to this minute list. Nevertheless, researchers generally agree the process of radicalization is mostly non-linear and varies from person to person.

Extremism Online

The Internet has made radicalization possible on a scale never seen before. The voices of radicals that were once only heard in the most isolated corners of the world can now be broadcast to a global audience in multiple languages (Decker & Pyrooz, 2011; Liepman, 2009; Thompson, 2011). Al-Qaeda's website for example is designed to host

individuals from over two-hundred countries (Omotoyinbo, 2014). Westerners who were once barricaded from extremists and their recruiting attempts now find themselves within their grasp. Utilizing the internet to radicalize seems to have become the principal method of recruitment given the difficulty of physically connecting with far-away individuals in an era of heightened global security (Kirby, 2007). While there is not nearly enough evidence to suggest online radicalization has effectively replaced face-to-face radicalization, research indicates the Internet provides individuals innumerable opportunities to be exposed to extremist content, and persons struggling to find their place in the real-world stumbling across radical messages emphasizing purpose and belonging can prove to have deadly consequences (Picart, 2015; Precht, 2007).

Extremist websites.

On the internet, radical groups have largely relied upon their official websites and non-member generated sites to radicalize and recruit new members and to rally the current membership (Conway, 2019; Omotoyinbo, 2014). Websites associated with the far-right often contain racist symbols such as swastikas and burning crosses, as well as entire texts or passages from foundational pieces of racist literature like *The Turner Diaries* and *Mein Kampf* (Gerstenfeld, Grant, and Chiang, 2003). An analysis of the mission statements from six white supremacist websites revealed efforts to bolster a collective white identity through rhetoric arguing for the supremacy of Whites and the existence of conspiratorial "others" attempting to undermine the White race, as Adams and Roscigno (2005) succinctly explain:

> Broadly, white supremacist organizations are concerned with the perceived white political deprivation and the possibility of becoming a numerical minority. These concerns are routinely articulated through rhetoric representing whites as victims of systematic governmental, legal, and societal abuses. These problems are often attributed to 'liberalism' or 'multiculturism,' essentially code words for any manner of thought which does not inherently privilege a white status quo. (p. 772)

A considerable amount of online extremist content is aimed at younger audiences, including children (Bott et al., 2009; Gates & Podder, 2015). *Inspire*, an online magazine published by Al-Qaeda, is tailored to appeal to young, English-speaking men in an effort to create home-grown terrorists (Thompson, 2011). Picart (2015) argues Islamist radicals attempt to make their online content look "cool" through youthful language and rap lingo. Also, themes of heroism are regularly used by Islamist groups to motivate purpose-seeking youths to join the movement and mobilize. This often involves portraying organization members as soldiers fighting valiantly against their enemies, an attractive image to adventurous youths (Hafez & Mullins, 2015; Liepman, 2009). While much of the contemporary research has focused on Islamist group's utilization of this tactic, far-right groups are not alien to its use (Burris, Smith, & Strahm, 2012).

Beyond publishing hateful media content and radical discourse, both far-right and Islamist sites have been known to promote and provide manuals for violence (Gerstenfeld et al., 2003; Levin, 2015). Instructions for foreign travel and the manufacturing of suicide vests are frequently found on Jihadi sites (Hafez & Mullins, 2015). In his analysis of the London Bombers (also known as the 7/7 Bombers)—home-grown Islamist extremists

who detonated multiple bombs in London, killing 52 and injuring over 700—Kirby (2007) argues it is likely the bombers used the internet to gain knowledge on the making of explosives. He goes on to describe how the perpetrators of the London attacks represent a new form of terrorism, "Through online operational instruction, groups like the London Bombers can be actively inspired by Al-Qaeda, execute attacks to emulate and mimic Al-Qaeda, without ever having formally joined the network" (p. 425). While some radical far-right sites have encouraged the use of violence, they rarely provide how-to guides like their Jihadist counterparts (Gerstenfeld et al., 2003).

A good deal of research has explored the plethora of extremist content on websites, but its role in radicalization has yet to be conclusively determined. Some believe its primary function is to reinforce already existent extremist views (Archetti, 2015; Conway, 2017; Von Behr, Reding, Edwards, & Gribbon, 2013). In the case of the 7/7 Bombers mentioned previously, Kirby (2007) suggests extremist online content may have played a part in the disintegration of the bomber's compliance with British norms. Further, there has been debate on the magnitude of the Internet's influence. Some researchers contend that passively absorbing radical content online is not enough to radicalize on its own (Liepman, 2009). The most common perception is interaction with other extremists is a critical component of the radicalization process, but the internet has utility in this regard as well.

Extremist social media.

In the last few years there has been a marked decrease in online Islamist and far-right activity outside of social media. Many web-based magazines, which were once a

significant part of the Islamist propaganda machine, have largely disappeared. Al-Qaeda in the Arabian Peninsula's popular *Inspire* magazine went dark in 2016 and *Gaida Matani*, a magazine published by al-Shabaab, disappeared in 2017 (Conway, 2019). Rather, extremist groups seem to be increasingly relying on social media sites such as Facebook, Twitter, Reddit, and YouTube to spread propaganda, radicalize, and recruit new members (Choi, Lee, and Cadigan, 2018). Social media comes with numerous advantages in terms of spreading radicalizing content and propaganda, including the ability connect with other people, the capacity to share one post across different sites, and users' ability to spread posts further (Hafez & Mullins, 2015); this makes it exceptionally difficult for authorities to remove such material.

Original content creation is not limited to bona fide members either; for example, while media items put out by ISIS on the internet decreased between 2017 and 2018, user-generated content from supporters increased (Conway, 2019). ISIS leaders have taken notice and circulated videos supporting and instructing followers on the creation and dissemination of radical content. They also have expanded recruitment efforts: targeting adept social media users as well as soldiers (Gates & Podder, 2015). As to the suggested role of social media in radicalization, Sageman (2008) suggests, "…online forums… promote the image of terrorist heroes, promote extremist ideas, link users to the virtual social movement, give them guidance, and instruct them in tactics" (p. 227). This fragment of the internet allows for the completion of a myriad of tasks beyond recruitment with practically no resources (Marcu & Balteanu, 2014); for example, Hezbollah uses Facebook to monitor the activities of Israeli soldiers. Social media also

allows propaganda designed to generate fear, such as videos of threats and beheadings, to be spread to a wide audience (Akins & Winfree, 2016; Choi, Lee, and Cadigan, 2018).

It is a similar story for the far-right. While websites such as the Daily Stormer maintain healthy traffic, most far-right hate content comes in the form of text posts and memes on social media sites like *Reddit* and *4Chan. Gab*, a recently launched Reddit-like site strongly associated with the far-right, has 450,000 users who have generated 30 million comments; pro-Trump sentiments, anti-immigration, conspiracy theories, and white nationalism are common themes found there (Conway, 2019).

What separates websites where users spend their time passively consuming content and social media sites are the levels of social interaction and community (Coulson, 2013; Picart, 2015), as Akins and Winfree (2016) explain:

> Active participation in Facebook groups focusing on conspiracy theories, white supremacy, anti-government ideology, fundamentalist religions, jihadism, inter alia, provides the participant with access to ideology, instant 'friends' in the group, a social network, justifications and mandates for violence, and explanations for the participant's unhappiness. (p. 142)

In her thematic analysis of *Stormfront*, a far-right social media site, Bowman-Grieve (2009) describes it as a community of practice, which is defined as, "A social learning environment where members share their experiences and opinion, their ideologies and outlooks; over time such communities develop their own set of norms and have the potential to contribute to the creation of very real values" (p. 1,005). Principally, social media can provide a sense of belonging and relationships with like-minded others, which

in turn plays a role in shaping and reinforcing one's beliefs in the direction of extremism; in some cases, radical thought leads to radical action. As mentioned previously, there is a current ongoing debate on the ability of online radicalization to efficiently replace in-person radicalization, even with social media in the picture. Some contend the Internet is succeeding face-to-face interactions as the primary method of radicalization (Sageman, 2008). Others believe there is peer pressure associated with being a member of a physical group that motivates individuals to participate in extremist activities that cannot be recreated in a virtual setting (Bostdorff, 2004). Presently, there is not enough evidence to swing the pendulum decisively in one direction versus the other.

Learning Extremism

With literature consistently naming extremist others, in online or offline settings, as a vital component of radicalization, it is beneficial to test social learning theory's (SLT) aptitude for predicting it. Further, it is difficult to make predictions when a preponderance of the literature is case studies; SLT serves as a guide in this sense. With roots in Skinner's (1959) work on behavior, social learning theory was conceived by Bandura (1969) and popularized within criminology by Akers (1973). SLT asserts "the same learning process in a context of social structure, interaction, and situation produces both conforming and deviant behavior" (Akers & Jensen, 2008, p. 38). There are four primary elements of SLT: differential association, definitions, differential reinforcement, and imitation. Differential association concerns interacting with others who behave a certain way or are supportive of such behavior. The more an individual's associations lean towards deviancy, the more likely deviant behavior is to occur. Associations with

family and friends are often the most important to consider due to them developing earlier, occupying more of one's time, happening more frequently, and involving those an individual has close relationships with (Akers & Jensen, 2008); but, interaction with other groups, such as those on the internet, can influence behavior as well (Warr, 2002). Through differential associates, individuals learn definitions favorable or unfavorable to deviance; definitions being defined as, "One's own orientations, rationalizations, justifications, excuses, and other attitudes that define the commission of an act as relatively more right or wrong, good or bad, desirable or undesirable, justified or unjustified, and appropriate or inappropriate" (Akers and Jensen, 2008, p. 39); the more one accepts attitudes that approve of or justify deviant behavior, the more likely aforesaid behavior will occur. Differential reinforcement refers to the balance of actual or anticipated rewards and punishments that result from behavior. The initial deviant act and the probability of it and analogous behaviors being repeated in the future partly depend on this balancing act, with deviancy being more likely when rewards outweigh punishments. Lastly, imitation is behavior that occurs after its direct or indirect observation; the individual performing the behavior, the behavior itself, and the observed consequences of the behavior are all factors that determine whether or not the behavior will be copied. Sequentially, SLT contends these concepts and the variables encompassed within will precede the initial deviant act more often than not and will continue to predict future behavior based on accumulated learning history. Though, the theory recognizes this will not always be the case. Sometimes people apply definitions ex post facto in an attempt to justify the behavior to themselves or others; in which case, differential

association, definitions, differential reinforcement, and imitation (to a lesser degree after onset) will predict whether or not the behavior will be repeated (Akers and Jensen, 2008).

Although terrorism has not been in the eye of criminology for long, several studies have tested, and validated social learning theory's application to this phenomenon (Becker, 2017). The presence of radical peers is regularly found to be significant in terrorism research, and these interactions do not have to take place within formalized groups, as explained by Gilperez-Lopez, Torregrosa, Barhamgi, and Camacho (2017): "Having a relationship with a same-minded individual, not necessarily as a part of a group (and sharing material, information, or even opinions with that close radicalized friend) can become a critical factor to become radicalized" (p. 14). In one of the few quantitative analyses examining extremists, LaFree, Jensen, James, and Safer-Lichtenstein (2018) found radical peers to be the strongest predictor of political violence among other social learning and social control measures. Other studies not specifically applying social learning theory have found radicalization to most often occur within networks of radicalized others (Precht, 2007). Of the utmost importance to the present study, these interactions are not limited to face-to-face encounters; they occur online as much as they do offline (Akins & Winfree Jr., 2016).

Upon reviewing the body of work on radicalization and social media's role in it, two gaps became apparent. First, much of what is believed to be known about this process is based on studies looking at one or a handful of extremists, which makes it difficult to generalize the findings beyond those individuals. Second, the population of interest for most studies has been all extremists or extremists of a single ideological

movement; while informative, it is crucial that similar and disparate patterns of radicalization between extremists of different movements and even similar movements (for example, neo-Nazis and Ku-Klux-Klan members) are examined (Decker & Pyrooz, 2011). This paper aims to address both of these voids by using a large data set of individuals radicalized within the United States to answer the question, does the presence of social media in the process of radicalization vary between Islamist and far-right extremists? With much of the research highlighting the strategic use of social media by Islamists to radicalize and recruit, and literature on far-right extremism painting a picture of a less organized and tactical approach to social media, the first hypothesis is as follows.

> H1: The odds of social media playing a role in radicalization will be higher for individuals radicalizing as a part of an Islamist movement than those radicalizing as a part of a far right movement.

Akers and Jensen (2008) argue SLT "Is a general theory that offers an explanation of the acquisition, maintenance, and change in criminal and deviant behavior that embraces, social, nonsocial, and cultural factors operating both to motivate and control criminal behavior and both to promote and undermine conformity" (p.38). Inarguably, extremist acts—regardless of ideology—are forms of criminal and deviant behavior, thus SLT should explain Islamist and far right radicalization. hypothesis 2 states:

> H2: There will be no significant difference in the odds of having radical friends and family between those radicalized as a part of an Islamist movement and those radicalized as a part of a far right movement.

Methods

Data

This study uses data from Profiles of Individual Radicalization in the United States (PIRUS)[1] to test its hypotheses (START, 2018). PIRUS contains information derived from public sources on 804 Islamist and far right extremist men whose radicalization took place within the United States between 2005 and 2017[2]. To have been included in the data set, an individual had to meet a variety of criteria. First, one had to have been one of the following: arrested, indicted of a crime, killed as a result of his or her ideological activities, a member of a designated terrorist organization, or associated with an extremist organization whose leader(s) or founder(s) have been indicted of an ideologically motivated violent offense[3]. Second, an individual had to be radicalized in the United States, meaning the process began in-country and all or most of their radicalization also occurred in the U.S. Last, an individual had to have espoused ideological motives that were linked to the behavior(s) of interest. The data was collected

[1] PIRUS is publicly available on the National Consortium for the Study of Terrorism and Responses to Terrorism (START) website.

[2] PIRUS originally contained 2,148 individuals who had radicalized as parts of Islamist, far right, far left, or single issue movements from 1948-2017. Social media variables were only coded for cases that occurred in or after 2005, so 1,109 pre-2005 cases were dropped. Females comprised only 8.18% of the resulting data set, meaning gender differences would have been driven by only a handful of cases; thus, females were dropped from the analysis. There were few far left (7.23%) and single issue (8.49%) cases in the next iteration of the data set; since the results would primarily be driven by differences between Islamists and far rightists, far left and single issue cases were dropped so the analysis could better serve as a direct comparison between Islamists and far rightists.

[3] Note that an individual's radical activities did not have to be violent.

by investigators utilizing a multi-stage approach ("PIRUS," n.d., para. 2). First, they gathered names and information on roughly 4,000 individuals using open-sources such as "court documents, online newspaper articles, newspaper archives, open-source nongovernment reports" and START assets such as the Global Terrorism Database (LaFree, Jensen, James, & Safer-Lichtenstein, 2018, p. 244). Second, all individuals were coded on select variables to determine their inclusion in the data set based on the previously mentioned criteria. Third, in an effort to increase representativeness, researchers took a random sample from those chosen for inclusion and fully coded them. PIRUS's primary advantage is it is one of few systematically collected data sets on radical individuals publicly available. With alternatives lacking, PIRUS is the best dataset to test the present hypotheses.

Missing Data Procedure

Problematically, not all information on the subjects is complete. While some variables have no missing information, others are missing at nearly 62% (See Table 1 for proportions of missing data for each variable). Why data is missing can rarely be precisely determined; one of three mechanisms is often assumed: missing completely at random (MCAR), missing at random (MAR), and missing not at random (MNAR) (Johnson & Young, 2011; "Multiple Imputation in Stata," n.d.). MCAR presumes neither the missing value itself or the other variables in the data set predict missingness, a very strong assumption. Given the information in PIRUS was pulled almost entirely from open sources, an assumption of MCAR is indefensible (Becker, 2017). A more realistic presumption and the one utilized in the present analysis is MAR, which states other

variables in the model but not the variable itself can predict missingness on the latter. Proceeding under the assumption of MAR, multiple imputation using chained equations (MICE) was used to fill in missing observations. Put simply, MICE runs a series of regressions where each variable with missing information is modeled conditional on the other variables in the imputation model[4] to predict missing data points; this process is repeated *m* number of times, generating multiple data sets (Azur, Stuart, Frangakis, & Leaf, 2011). The generation of multiple predictions for each unobserved value accounts for the uncertainty in the imputed values and results in accurate standard errors, something that cannot be achieved using single imputation techniques.

To evaluate the effectiveness of MICE, both the fraction of missing information (FMI)[5] and relative efficiency (RE)[6] were examined for each variable after using imputed data to run the analysis. Determination of the number of imputations that should be performed to achieve accurate standard errors is chiefly derived from the variable with the highest FMI percentage. The largest FMI value in this case was *Christian* at 67%, thus PIRUS should be imputed at least 67 times. To maximize the likelihood of correct standard errors, the data set was imputed 100 times. With each variable's RE value being greater than .99, adding more imputations would provide little benefit.

---

[4] Only the variables in the analytical model were included in the imputation model; no auxiliary variables were used.

[5] The FMI (fraction of missing information) is the "proportion of the total sampling variance that is due to missing data" ("Multiple imputation in STATA," n.d., Imputation Diagnostics section, para. 7)

[6] Relative efficiency is "an estimate of the efficiency relative to performing an infinite number of imputations ("Multiple imputation in STATA," n.d., Imputation Diagnostics section, para. 8).

Variables

Dependent variables.

To test the hypotheses, a multivariate logistic regression model was run in STATA (pre-imputation descriptive statistics for all variables are in Table 1, post-imputation descriptive statistics are in Table 3).

Table 1

Pre-Imputation Descriptive Statistics for all Variables

Variable	Code	Distribution /Mean (SD)	N	% Missing Values
Islamist	No (0)	52.99%	804	0%
	Yes (1)	47.01%		
Social Media	No (0)	39.70%	466	42.04%
	Yes (1)	60.30%		
Radical Friend	No (0)	23.92%	510	36.57%
	Yes (1)	76.08%		
Radical Family	No (0)	74.87%	386	51.99%
	Yes (1)	25.13%		
Age	Numerical	33.48(13.83)	795	1.12%
White	No (0)	42.20%	763	5.10%
	Yes (1)	57.80%		
Criminal History	No (0)	54.04%	594	26.12%
	Yes (1)	45.96%		
Education	Numerical	3.79(1.46)	388	51.74%
Mental Illness	No (0)	82.96%	804	0%
	Yes (1)	17.04%		
Christian	No (0)	69.91%	329	59.08%
	Yes (1)	30.09%		
Grievance	No (0)	42.46%	452	43.78%
	Yes(1)	57.74%		

Note. All distributions and means do not include missing data.

Islamist is two variables combined into one dummy, with "0" meaning an individual became radicalized as a part of a far right movement and "1" meaning they were radicalized as a part of an Islamist movement.

Table 2

Pre-Imputation Comparisons Between Islamists and Far Rightists

		Islamist		Far Rightist	
Variable	Code	Distribution /Mean(SD)	N	Distribution/ Mean(SD)	N
Social Media	No (0)	31.99%	272	50.52%	194
	Yes (1)	68.01%		49.48%	
Radical Friend	No (0)	29.54%	325	14.05%	185
	Yes (1)	70.46%		85.95%	
Radical Family	No (0)	79.39%	296	60%	90
	Yes (1)	20.61%		40%	
Age	Numerical	27.97(9.15)	374	38.38(15.38)	421
White	No (0)	82.20%	354	7.58%	409
	Yes (1)	17.80%		92.42%	
Criminal History	No (0)	65.23%	302	42.47%	292
	Yes (1)	34.77%		57.53%	
Education	Numerical	3.82(1.49)	254	3.72(1.41)	134
Mental Illness	No (0)	83.86%	378	82.16%	426
	Yes (1)	16.14%		17.84%	
Christian	No (0)	82.31%	260	23.19%	69
	Yes (1)	17.69%		76.81%	
Grievance	No (0)	31.48%	216	52.12%	236
	Yes (1)	68.52%		47.88%	

Independent variables.

To determine the prevalence of *social media* in radicalization, it was collapsed from a categorical variable into a dummy, with "0" indicating social media did not play a role in an individual's radicalization and "1" meaning it did. Two variables were included to test social learning theory's application to radicalization. *Radical friend* was collapsed

Table 3

Post-Imputation Descriptive Statistics for all Variables (n=804)

Variable	Code	Distribution /Mean(SD)
Islamist	No (0)	52.99%
	Yes (1)	47.01%
Social Media	No (0)	41.40%
	Yes (1)	58.60%
Radical Friend	No (0)	22.45%
	Yes (1)	77.55%
Radical Family	No (0)	66.18%
	Yes (1)	33.82%
Age	Numerical	32(.69)
White	No (0)	42.60%
	Yes (1)	57.40%
Criminal History	No (0)	53.84%
	Yes (1)	46.16%
Education	Numerical	3.83(.08)
Mental Illness	No (0)	82.96%
	Yes (1)	17.04%
Christian	No (0)	52.47%
	Yes (1)	47.53%
Grievance	No (0)	41.10%
	Yes (1)	58.90%

from a categorical variable into a dummy; an individual who had no close friends involved in radical activities was coded "0" and those with friends engaged in such activities, illegal or not, were coded "1". The presence of *radical family* members was transformed and captured similarly, with "0" signifying an individual did not have a family member involved in illegal or legal radical activities and "1" indicating they did.

Control variables.

Age is included as a continuous variable capturing an individual's age at the time they were publicly "outed" as an extremist. Race is controlled for using a dummy, *white*, that was collapsed from a categorical variable: "0" indicates an individual is non-white while "1" means an individual is white. With *criminal history*'s prominence as a predictor of crime, it was included in the model. It was transformed from a categorical into a dummy: "0" means an individual has no history of criminal activity and "1" signifies they were previously involved in non-ideological criminal activity. *Education* was collapsed, reordered, and treated as a continuous variable: "1" indicates the individual did not attempt high school, "2" indicates some high school, "3" indicates a high school diploma, "4" indicates some college or vocational school, "5" indicates a college or vocational school degree, "6" indicates some master's school, "7" indicates a master's degree, "8" indicates some doctoral/professional degree, and "9" indicates a doctoral/professional degree. *Mental illness* was collapsed from a categorical into a dummy where "0" signifies an individual had no history of mental illness and "1" meaning a history was present. Given many extremist groups adhere to a particular religion, an individual's religious background is taken into account; *Christian* was collapsed into a dummy from a categorical variable with "0" meaning an individual did not practice or was not exposed to Christianity prior to radicalization and "1" indicating they were. Lastly, due to its importance in current literature, *grievance* was collapsed into a dummy variable and included in the models (Hafez & Mullins, 2015; McCauley & Moskalenko, 2008; Precht, 2007); "0" means an individual never expressed identification

or attachment to a specific group that was believed to be under threat or had been subjected to injustice, "1" indicates aforesaid emotions were asserted. Descriptive statistics comparing Islamists and far rightists are included in table 2, showing a few notable similarities and differences. Based on non-missing data, it seems social media is common within both Islamist and far right radicalization: 68% and 49% of cases respectively. The presence of a radical friend(s) also seems to be typical in both processes; 70% of Islamists and 86% of far rightists had at least one radical friend. Radical family members are less common in both processes, but are more prevalent in far rightists cases (40%) than Islamist cases (21%).

Results

Table 3 displays the results of the dependent variable being regressed on each independent variable separately. Significant relationships result across the board with the exceptions of *education* and *mental illness*. The odds of social media being present in the process of radicalization are much higher for Islamists than far rightists. Also, Islamists have significantly lower odds of having radical friends and family members compared to far rightists. Moving on to the main analysis, including all the variables in a logistic regression model (shown in Table 4) reveals a lack of support for both hypotheses, but the findings are intriguing nonetheless. Recall the first hypothesis:

> H1: The odds of social media playing a role in radicalization are higher for individuals radicalizing as a part of an Islamist movement than those radicalizing as a part of a far right movement.

Table 4

Bivariate Logistic Regression Models

	Ideology	
Variable	Odds Ratio	SE
Social Media	2.09***	.39
Radical Friend	.48**	.12
Radical Family	.34***	.08
Age	.96***	.01
White	.02***	.004
Criminal History	.39***	.07
Education	1.05	.07
Mental Illness	.89	.17
Christian	.10***	.03
Grievance	2.25***	.44

*p ≤ .05. **p ≤ .01. ***p ≤ .001.

With other variables accounted for, social media loses significance. With no considerable difference in the presence of social media in radicalization between Islamists and far rightists, Hypothesis 1 is not supported.

H2: There is no significant difference in the odds of having radical friends and family between those being radicalized as a part of an Islamist movement and those being radicalized as a part of a far right movement.

Both *radical friend* and *radical family* are significant and negative. Islamists have 72% (p = .002) lower odds than far rightists of having a friend who participates in radical activities. Their odds of having radical family members are also 75% (p = .001) lower when compared to far rightists; therefore, hypothesis 2 is not supported.

Age is negative and significant, with an increase of one year equaling 5% lower odds of being radicalized as a part of an Islamist movement compared to a far right

Table 5

Multivariate Logistic Regression Model

	Ideology	
Variable	Odds Ratio	SE
Social Media	1.84	.65
Radical Friend	.28**	.12
Radical Family	.25***	.11
Age	.95***	.01
White	.03***	.01
Criminal History	.94	.31
Education	1.10	.14
Mental Illness	.90	.34
Christian	.17***	.09
Grievance	1.70	.60

*p ≤ .05. **p ≤ .01. ***p ≤ .001.

campaign. Unsurprisingly, race and religion achieved statistical significance; the odds of whites being radicalized in an Islamist movement are 97% lower than their odds of radicalizing as a far rightist, and Christian's odds are 83% lower respectively. Criminal history, education, mental illness, and grievance all failed to achieve significance.

Discussion

This study set out to answer the question, how does the presence of social media in the process of radicalization vary between Islamist and far right extremists? The answer is, it does not seem to differ; no significant difference was found between Islamists and far rightists. This is a little surprising given Islamist groups' almost total reliance on social media to radicalize and push individuals to action (Choi, Lee, & Cadigan, 2018; Conway, 2019; Gates and Podder, 2015). While the far right has a healthy social media presence, contemporary research suggests it lacks the structure and purpose

of Islamist content (Conway, 2019). In other words, the current picture painted is one of like-minded far rightists socializing in online spaces sharing discourses and reinforcing each other's extremist beliefs, but rarely with the calls to action and instructions in tactics so common in Islamist content (Sageman, 2008). The results of this study suggest those radicalized to the point of committing some form of action likely had social media present in their radicalization process, regardless of ideological movement. It is likely that similar to Islamist content, far right social media posts serve to generate and reinforce radical thought as well as assist in leading individuals to radical action[7]. Possibly, far right social media looks more similar to Islamist social media than previously believed; meaning far right posts go beyond simple discourse and portray action as one's duty, similar to Islamist strategies. This study is only able to scratch the surface of social media's role. While it determined the presence of social media is not significantly different between Islamist and far right radicalization, it could not define what that role is. Does social media serve to both radicalize thought and motivate action? Or is it just one or the other? Does social media's precise role vary according to ideological movement? Better data is needed to answer these questions.

The results regarding social learning theory proved to be just as intriguing. Significant differences were found regarding radical friends and radical family; the odds of Islamists having either were much lower compared to far rightists. It seems that the presence of radical others is a much more substantial mechanism in the far right radicalization process than in the Islamist process, lending only partial support to social

[7] It is important to remember all individuals included in PIRUS radicalized to the point of action, beyond being radical only in thought.

learning theory as an explanation of radicalization. A few different things could explain these results. First, it is likely the presence of radical friends is underestimated, especially in online settings; it is probable such personal information was not accessible by reporters. Second, given the prevalence of far right ideology and culture in the United States, far rightists likely had more opportunities to interact with like-minded others in offline settings. Coupled, these could clarify the difference in SLT's explanatory power in Islamist and far right radicalization. Regardless, more studies must test SLT's application to all forms of terrorism. Based on the results of the present analysis, it is likely such research will signal the need for SLT's refinement. Age's significance indicates Islamists tend to be younger than far rightists. Additionally, with white supremacists and various groups adhering to a radical Christian theology placed under the umbrella of the far right, it is not bewildering that Islamists' odds of being white or Christian are significantly lower than far rightists.

This study is not without significant limitations. First, most of the data comes from open sources. While this strategy is efficient when done thoroughly—especially in the field of terrorism studies where the population of interest is difficult to reach—it is not without its problems. Although investigators utilized random sampling techniques to increase representativeness, PIRUS is more than likely a victim of news reporting trends over time (LaFree, Jensen, James, & Safer-Lichtenstein, 2008); that is, as reporters begin to spotlight one ideological movement, it becomes easier to detect and document individuals of that ideological milieu and harder to identify extremists with disparate

ideologies[8]. Second, the data set only contains those who had radicalized in the United States, thus the results are not generalizable to extremists in other countries. Third, the prevalence of missing data is considerable. While not all variables had missing information, most did. Missing values ranged from less than 1% on *age* up to almost 62% on *Christian*. MICE requires unobserved values to be missing at random, an assumption that becomes increasingly difficult to make as the proportion of missing data goes up ("Multiple imputation in STATA," n.d.). Given the high proportions of missing, it is suggested readers interpret the preceding results and interpretations with caution. Last, the data only allowed the capture of one dimension of social learning theory: differential association. PIRUS in its current form is unable to efficiently capture the other elements of definitions, differential reinforcement, and imitation.

The findings from this study suggest various directions for policy and future research. First, courses in cyber literacy should be commonplace in schools in the United States (Gurak, 2001; Omotoyinbo, 2014; Precht, 2007). While the enormous amount of radical content online makes it exceptionally difficult for authorities to remove it, cyber literacy courses would serve to educate youths on the strategies and lies extremists use to pull them in, leaving them better equipped to properly interpret radical posts they stumble across online. Huey (2015) suggests political jamming—the practice of using social media posts that are attractive to youths, such as memes, to counter radical messages—

[8] LaFree, Jensen, James, & Safer-Lichtenstein (2008) highlight 9/11, explaining a bias towards reporting on Jihadists in the years following. Due to the magnitude of the attacks, reporters focused more attention on Islamist extremists and less on far right, far left, and single issue individuals, leading to an underestimation of the number non-Islamist extremists within this time frame..

could be an effective method of making joining an extremist movement look unappealing.

Future research endeavors should continue to define similarities and differences between extremists; for as this study shows, they are not all the same (Choi, Lee, and Cadigan, 2018; Gill, 2015). The field of terrorism studies would benefit from comparisons within (ex. Neo-Nazis versus multiculturalists) and without ideology. Also, comparisons to other criminal groups could bear research and policy related fruit; for example, there is much we already know about entering and exiting street gangs which could prove to be applicable to radicalization (Decker and Pyrooz, 2011; Reid & Valasik, 2018; Valasik & Reid, 2018). Finally in this regard, some studies have found similarities between radicalization and the process of joining legal movements and organizations (Haggerty & Bucerius, 2018)[9]; such analogies would prove insightful.

Additionally, scholars should turn their attention to what precisely individuals are doing and experiencing in extremist online settings so the mechanisms of online radicalization can be better understood (Conway, 2017). To better access radical populations, researchers must get creative; some have suggested using radical social media pages to contact extremists (Sikkens, van San, Sieckelinck, Boeije, and de Winter, 2017). Lastly, given the inaccessibility of the population, it is unlikely that complete individual level data will become the norm in the near future, necessitating the further use

[9] Haggerty and Bucerius (2018) compared radicalization and martialization (the process of becoming a soldier) and found six elements that are similar between radicalization and martialization: (1) a sense of vicarious injustice, (2) a sense of belonging/identity, (3) meaning, excitement, and glory, (4) active recruitment, (5) indoctrination, and (6) group solidarity.

of multiple imputations techniques. While these strategies generate accurate coefficients and standard errors, they rely on often untenable assumptions about the nature of the missing data. In the words of Safer-Lichtenstein, LaFree, and Loughran (2017), “It is incumbent upon the researcher to be as transparent and thorough as possible regarding the assumptions they are making, and then allow for reasonable debate as to the validity of such assumptions” (p. 286). The importance of understanding how individuals become extremists cannot be exaggerated. If such mechanisms can be documented and accounted for through policy, countless lives will be spared.

REFERENCES

Adams, J. & Roscigno, V. J. (2005). White supremacists, oppositional culture and the world wide web. *Social Forces*, 84, 759-778.

Akers, R. L. (1973). *Deviant behavior: a social learning approach*. Belmont, CA: Wadsworth.

Akers, R. L. and Jensen, G. F. (2008). The empirical status of social learning theory of crime and deviance: the past, present, and future. In F. T. Cullen, J. P. Wright, and K. R. Blevins (Eds.), *Taking stock: the status of criminological theory* (pp. 37-76). New Brunswick, NJ: Transaction Publishers.

Akins, J. K. & Winfree Jr., L. T. (2016). *Social learning theory and becoming a terrorist: new challenges for a general theory*. Unpublished manuscript.

Archetti, C. (2015). Terrorism, communication and new media explaining radicalization in the digital age. *Perspectives on Terrorism, 9*, 49-59.

Azur, M. J., Stuart, E. A., Frangakis, C., and Leaf, P. J. (2011) Multiple imputation by chained equations: what is it and how does it work. *International Journal of Methods in Psychiatric Research, 20*, 40-49.

Bandura, A. (1969). Social-learning theory of identificatory processes. In Goslin, D. A. (Ed.), *Handbook of socialization theory and research* (pp. 213-262). Rand McNally & Company.

Becker, M. H. (2017). Control, learning, and vulnerability: An interactional approach to engagement in violent extremism (Master's thesis). Retrieved from Digital Repository at the University of Maryland.

Bott, C., Dickens, R., Moffitt, J., Smith, E., Rowley, T., Lark, R., & Thompson, G. (2009). *The internet as a terrorist tool for recruitment & radicalization of youth* (HIS Publication No. RP08-03.02.17-01). Arlington, VA: Homeland Security Institute.

Bostdorff, D. M. (2004). The internet rhetoric of the Ku Klux Klan: A case study in web site community building run amok. *Communication Studies, 55*, 340-361.

Bowman-Grieve, L. (2009). Exploring "Stormfront": A Virtual Community of the Radical Right. *Studies in Conflict & Terrorism, 32*, 989-1007.

Burris, V., Smith, E. & Strahm (2012). White supremacist networks on the Internet. *Sociological Focus, 33*, 215-235.

Choi, K., Lee, C. S., and Cadigan, R. (2018). Spreading propaganda in cyberspace: comparing cyber-resource usage of Al Qaeda and ISIS. *International Journal of Cybersecurity Intelligence and Cybercrime, 1*, 21-39.

Conway, M. (2017). Determining the role of the internet in violent extremism and terrorism: six suggestions for progressing research. *Studies in Conflict & Terrorism, 40*, 77-98.

Conway, M. (2019). *Violent extremism and terrorism online in 2018: The year in review.* Retrieved from VOX-Pol website: https://www.voxpol.eu/year-in-review-2018/

Coulson, D. C. (2013). Dynamics of social media, politics and public policy in the Arab World. *Global Media Journal*, *12*, 1-20.

Decker, S. and Pyrooz, D. (2011). Gangs, terrorism, and radicalization. *Journal of Strategic Security, 4*, 151-166.

Gates, S. and Podder, S. (2015). Social media, recruitment, allegiance and the Islamic State. *Perspectives on Terrorism, 9*, 107-116.

Gerstenfeld, P. B., Grant, D. R., & Chiang, C. (2003). Hate online: A content analysis of extremist Internet sites. *Analyses of Social Issues and Public Policy*, 3, 29-44.

Gill, P. (2015). Toward a scientific approach to identifying and understanding indicators of radicalization and terrorist intent: eight key problems. *Journal of Threat Assessment and Management, 2*, 187-191.

Gilperez-Lopez, I., Barhamgi, M., & Camacho, D. (2017). An initial study on radicalization risk factors: towards an assessment software tool. *28th International Workshop on Database and Expert Systems Applications*, 11-16.

Gurak, L. J. (2001). *Cyberliteracy: navigating the internet with awareness*. New Haven, CT: Yale University Press.

Hafez, M. and Mullins, C. (2015). The radicalization puzzle: a theoretical synthesis of empirical approaches to homegrown terrorism. *Studies in Conflict & Terrorism, 38*, 958-975.

Halverson, J. R. and Way, A. K. (2012). The curious case of Colleen LaRose: social margins, new media, and online radicalization. *Media, War & Conflict, 5*, 139-153.

Huey, L. (2015). This is not your mother's terrorism: social media, online radicalization, and the practice of political jamming. *Journal of Terrorism Research, 6*, 1-16.

Johnson, D. R. & Young, R. (2011). Toward best practices in analyzing datasets with missing data: comparisons and recommendations. *Journal of Marriage and Family, 73,* 926-945.

Multiple imputation in STATA. (n.d.). Retrieved from UCLA Institute for Digital Research & Education website: https://stats.idre.ucla.edu/stata/seminars/mi_in_stata_pt1_new/

Kirby, A. (2007). The London bombers as "self-starters": a case study in indigenous radicalization and the emergence of autonomous cliques. *Studies in Conflict & Terrorism, 30,* 415-428.

LaFree, G., Jensen, M. A., James, P. A., and Safer-Lichtenstein, A. (2018). Correlates of violent political extremism in the United States. *Criminology, 56,* 233-268**.**

Levin, B. (2015). The original web of hate: revolution Muslim and American homegrown extremists. *American Behavioral Scientist, 59,* 1609-1630.

Liepman, A. (2009). Violent Islamist extremism: Al Shabaab recruitment in America (S. Hrg. 111-678). Washington, DC: Government Printing Office.

Marcu, M. & Balteanu, C. (2014). Social media-a real source of proliferation of international terrorism. *Annales Universitatis Apulensis Series Oeconomica,* 16, 162-169.

McCauley, C. and Moskalenko, S. (2008). Mechanisms of political radicalization: pathways towards terrorism. *Terrorism and Political Violence, 20,* 415-433.

Omotoyinbo, F. R. (2014). Online radicalization: the net or the netizen?. *Social Technologies, 4,* 51-61.

Picart, C. J. (2015). "Jihad cool/jihad chic": the roles of the internet and imagined relations in the self-radicalization of Colleen LaRose (Jihad Jane). *Societies, 5,* 354-383.

PIRUS - FAQ (n.d.). Retrieved from https://www.start.umd.edu/pirus-frequently-asked-questions

Precht, T. (2007). Home grown terrorism and Islamist radicalisation in Europe. Copenhagen, Denmark: Danish Ministry of Justice Research and Documentation Unit.

Reid, S. E. & Valasik, M. (2018). Ctrl + ALT-RIGHT: reinterpreting our knowledge of white supremacy groups through the lens of street gangs. *Journal of Youth Studies,* 1-21.

Safer-Lichtenstein, A., LaFree, G., and Loughran, T. (2017). Studying terrorism empirically: what we know about what we don't know. *Journal of Contemporary Criminal Justice, 33*, 273-291.

Sageman, M. (2008). A strategy for fighting international Islamist terrorists. *The Annals of the American Academy, 618*, 223-231.

Sikkens, E., van San, M., Sieckelinck, S., Boeije, H., and de Winter, M. (2017). Participant recruitment through social media: Lessons learned from a qualitative radicalization study using Facebook. *Field Methods, 29*, 130-139.

Skinner, B. F. (1972). *Cumulative record: a selection of papers (3rd ed.).* East Norwalk, CT: Appleton-Century-Crofts.

Smith, A. & Anderson, M. (2018). *Social media use in 2018*. Retrieved from Pew Research Center website: https://www.pewinternet.org/2018/03/01/social-media-use-in-2018/

START. (2018). *Profiles of individual radicalization in the United States (PIRUS)* [Data file and code book]. Retrieved from https://www.start.umd.edu/data-tools/profiles-individual-radicalization-united-states-pirus

Taylor, M., Currie, P. M., & Holbrook, D. (2013). *Extreme right wing political violence and terrorism*. New York, NY: Bloomsbury Academic.

Thompson, R. L. (2011). Radicalization and the use of social media. *Journal of Strategic Security, 4*, 167-190.

Valasik, M. & Reid, S. E. (2018). The Schrodinger's cat of gang groups: can street gangs inform our comprehension of skinheads and alt-right groups? *Deviant Behavior*, 1-15.

Von Behr, I., Reding, A., Edwards, C., & Gribbon, L. (2013). Radicalisation in the digital era: The use of the internet in 15 cases of terrorism and extremism. Retrieved from the RAND Corporation website: https://www.rand.org/pubs/research_reports/RR453.html

Warr, M. (2002). *Companions in crime: the social aspects of criminal conduct*. Cambridge, England: Cambridge University Press.

Wolcott, M. (2008). What is Web 2.0? Retrieved from https://www.cbsnews.com/news/what-is-web-20/