

The Dynamics of Group Risk Perception in the US After Paris Attacks

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Abstract. This paper examines how the public perceived immigrant groups as potential risk, and how such risk perception changed after the attacks that took place in Paris on November 13, 2015. The study utilizes the Twitter conversations associated with different political leanings in the U.S., and mixed methods approach that integrated both quantitative and qualitative analyses. Risk perception profiles of Muslim, Islam, Latino, and immigrant were quantitatively constructed, based on how these groups/issues were morally judged as risk. Discourse analysis on how risk narratives constructed before and after the event was conducted. The study reveals that the groups/issues differed by how they were perceived as a risk or at risk across political leanings, and how the risk perception was related to in- and out-group biases. The study has important implication on how different communities conceptualize, perceive, and respond to danger, especially in the context of terrorism.

Keywords: risk perception, terrorist attacks, risk analysis, immigrants, group identity, in- and out-group bias, social media, mixed methods

1 Introduction

In recent years, terrorist attacks, particularly plotted and carried out by the self-declared Islamic groups such as Al-Qaeda and Islamic State (ISIS), have complicated the policies and politics of immigrant issues globally. In an immigrant society like the U.S., its immigration policy is sensitive to disruptive events that signal potential threat of any particular group of immigrants to its national security. The recent rising "Islamic terrorism," in which terrorists proclaim their identity of being Islam believers and justify their motives and actions by Islam [1], has complicated people's attitudes toward Muslims who practice Islam.

This research aims to disentangle *risk perception* – that is, how people perceive and judge a potential harm [2], and how such risk perception changes through a major terrorist event. Characterizing risk perception is important because the collective perception drives the public's felt need of reducing the perceived danger, which leads to demanding the government's actions as policy makers need to respond to the public's perceived risk [2]. Nevertheless, quantitatively measuring perceived risk is a challenge. Risk is not a neutral, objective, fixed concept, but a psychological perception and sociocultural construct, created and shaped through social processes [2, 3]. Understanding the nature of risk perception, what factors would affect people's perception toward a specific

risk target, and how these perceptions differ is fundamental to facilitate policy communication and formation.

Risk perception is particularly sensitive in the context of terrorist attacks. The terrorist incident in France occurred on a scale comparable to 9/11 attacks on New York City, altering the public perception of threat toward terrorism. In the U.S., perceived threats toward immigrant groups have been well documented [4, 5], and political ideology has been studied as a determinant role in differentiating societal members' views and opinions on immigration issues [6]. After Paris attacks, in responding to this significant terrorist incident, U.S. politicians, especially the candidates for 2016 presidential election, spoke to the public. While the perceived threat toward terrorism rose high in general, their remarks conveyed distinct views of how terrorism, Muslims, and Islam should be concerned as a risk issue.

In this social process of co-constructing particular group or issue as risk, politicians are not the only persons who contributed. Differing from 9/11 a decade ago, during the Paris attacks, social media has now enabled people around the globe to participate in and contribute to, the disaster response. In the hours and days after the attacks, people in Paris and worldwide used social media, including Twitter, Facebook, Instagram and many other platforms, to serve a variety of immediate needs and supports for how we can make sense of, understand, survive and recover from such surprising, disruptive events. While these collective processes have always operated on populations impacted by terrorism, social media now makes them observable. Moreover, these expressive, communicative and conversational artifacts left on social media allow us to look deeply into how people respond to terrorism through how narrative and discourse of perceived risk is shaped and co-constructed in a social process over time.

In this study, we focus on examining *group risk perception*, referred as *how a group of people was morally judged and perceived as risk*. We develop a novel framework, utilizing both qualitative and quantitative methods, to analyze group risk perception by leveraging social and cultural psychology theories, including *moral dyad theory* [7], *moral foundation theory* [8], and *social identity theory* [9]. Our analysis is based on data collected and extracted from Twitter conversations covering the Paris attacks occurred on November 13, 2015. We are interested in the variety of patterns of ascribing and perceiving a cause of terrorism as risk, how the issues of terrorists are understood to be entangled with other social concerns, and the role of external disruptive events in shaping collective group risk perception. Our study is guided by the following **research questions**:

1. How did the public's interest of discussing a particular group of immigrants and immigrants in general change, before and after Paris attacks?
2. How were particular groups of immigrants and immigrants in general perceived as risk? Did the risk perception change before and after Paris attacks?
3. Did users with different political leanings perceive particular groups of immigrants and immigrants in general as risk differently? Did their risk perception change before and after Paris attacks?

This study uses a mixed methods approach that integrates both quantitative and qualitative analyses. Our study shows that Paris attacks boosted the public’s conversations regarding Muslims and Islam. Responding to Paris attacks, people who held distinct political ideologies contributed to the construction of risk discourses distinctively. A key ideological difference revealed in our study is whether Muslims were perceived *as risk* or *as risk victims* through a development of “Islamophobia,” and whether such risk concern was purveyed toward other immigrant communities.

This present work has several **key contributions**: First, it is the first empirical research on *risk perception* and *group risk perception* in the context of terrorism. Second, we propose a novel framework to investigate the construct of risk perception – which is grounded on social and cultural psychology theories, extracted by Lexicon method, and validated and expanded by an in-depth qualitative analysis on collective risk discourses through social media as platforms of social processes. Third, our findings, particularly the distinctions of risk perception between political leanings offer valuable insights for policy makers regarding what psychological mechanisms drive the public’s opinions and have implications on the public’s acts toward terrorism and response to relevant policies.

2 Related work

2.1 Social media and risk studies

Social media has been utilized to understand collective sense-making process during crises. In an earlier study, Cheong and Lee [10] proposed a micro-blogging-based approach to study civilian response to a terrorist attack. In the study, they followed the 2009 Jakarta and Mumbai terrorist attacks and demonstrated the utility of Twitter in terms of analyzing potential response to terrorist attacks. Following the 2013 Woolwich attack, Awan [11] examined 500 tweets from 100 users to investigate islamophobia (a sense of fear or hatred towards Muslim) on Twitter after the attack and created the typology describing group attributes for those who perceived Muslims as threats. Williams and Burnap [12] took a case study approach and studied the escalation, duration, diffusion and de-escalation of hateful speech on Twitter following the Woolwich attack. Following 2015 Paris attacks, researchers investigated attitudes towards Muslims by using crowd-sourcing to classify tweets into defending, neutral, and attacking categories, in which they found that a considerable number of tweets blaming Muslims were from western countries, such as the U.S. [13]. Researchers started to investigate the relationship between users’ news sharing behaviors on Twitter and its potential relationship with their positions on issues such as Islam and immigration [14]. Most recently, researchers also started to explore ways that could potentially achieve automatic detection of cyber-hate speech from pre-defined hateful words related to race, disability and sexual orientation [15].

These previous studies have provided important insights regarding quantifying islamophobia [13], on-line hateful speech [15, 12], and the influence of new exposure on attitudes [14], with the majority analyzing post-event response to Muslim group. However, few studies have examined the dynamics of perceptions towards specific groups (e.g., Latino immigrants) with respect to terrorist at-

tacks. While there has been an arguable connection between terrorist attacks and an elevated risk perception [16], few research has provided evidence on how risk perception is manifested in different immigrant groups.

2.2 Risk perception

The analysis of risk perception addresses how people perceive and judge a potential harm [2]. The perceived risk can be natural disaster such as tsunami, man-made hazards such as nuclear waste, or of mixed causes of nature and human such as the spreading of epidemic disease. We humans ourselves—individuals or groups can be concerned as risk, too. Kemshall [17] argued that human societies have developed into a risk culture, in which a philosophy of “better safe than sorry” has dominated how we conceptualize, perceive, and respond to danger.

Our conceptualization of *group risk perception* is grounded in social and cultural psychology studies – in particular, *moral dyad theory* [7], *moral foundation theory* [8], and *social identity theory* [9]. Moral dyad theory suggests that while evaluating a harm, humans spontaneously enact a cognitive template of dyadic morality in which we look for *an intentional agent who does harm and a suffering moral victim* to make sense and ascribe causes of harm. What criteria do people rely upon when judging immorality? Moral foundation theory suggests that morality across cultures varies but shares at least five foundations of “intuitive ethics” that our moral judgements are based on: Harm/Care, Fairness/Cheating, Loyalty/Betrayal, Authority/Subversion, and Sanctity/Degradation. The five foundations reflect the five virtues—the capacity to feel others’ pain, altruism that concerns others’ rights and autonomy, patriotism and self-sacrifice for the group, leadership and followership, and nobleness—that if being violated, we humans perceive immorality. It is argued that the violation of all of these moral virtues is a perceived harm while the violation of Harm/Care foundation would be perceived the most serious harm [7]. In cases that the judged harmful target is a person, however, group identity matters [3].

Social identity theory [9] suggests that people categorize social groups as in-group or outgroup, depending on how they identify themselves as a belonged group member. People tend to favor their identified ingroup over outgroup, referred as in-group favoritism or in-group bias [18], risk perception is hence captured by how distinct groups of people within a society identify the *Self* and the *Other*, as the other is often more likely to be perceived as a dangerous threat and potential harm [3]. It is notable that the group risk perception, hence, may not relate to real harm or harm fact; yet the selection of risk is a social process reflecting a collective psychological need, e.g., to maintain particular social solidarity or a means for achieving specific political agendas [3].

Based on these theories, we developed an analysis framework through analyzing group risk perception using Twitter conversations before and after Paris attacks.

3 Method

3.1 Data collection

To examine the group risk perception and its co-construction in social processes, we collected Twitter data over a period covering the Paris attacks. We

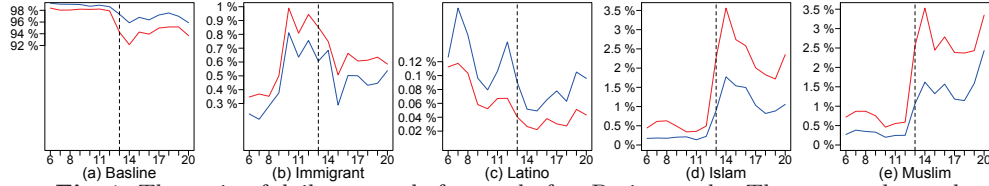


Fig. 1. The ratio of daily tweets before and after Paris attacks. The x -axes shows the dates from November 6th to 20th. The red/blue lines represent conservative/liberal tweets. The black vertical line represents the time that the attacks happened.

are interested in how users change their expression reflecting the group risk perception. To mitigate the selection bias, we adopted a quasi-experiment method called *computational focus group* [19, 20]. Based on the idea, we created our user panels containing users whose prior behavior showed them to be interested in information relevant to the study, and the relevant information we utilized is their political preference. The political preference was identified based on their *exclusive* interest in the party candidates for the U.S. 2016 presidential election. Specifically, users in the Democrat panel only followed candidates in the Democrat Party but not a single candidate in the Republican Party; likewise, users in the Republican panel only followed Republican candidates. Then, for every user in our panels, we collected his/her full historic tweets through the Twitter REST API. In total, we obtained 30,804 unique users (Dem: 5,426; Rep: 25,378). Tweets from the Democrat panel were assigned with a “liberal” leaning, and tweets from the Republican panel were with a “conservative” leaning.

The Paris attacks occurred at 21:20:00 Paris Time (15:20:00 Eastern Standard Time) on November 13, 2015. We extracted data from our user panel historic tweets in the two weeks (one week prior and one week following the attacks), and organized data into *before* and *after* time intervals. Since we are interested in users’ original expression, we removed retweets and duplicates. We identified the tweets related to specific groups (“Muslim”, “Latino”) or issues (“Islam”, “Immigrant”) using a set of selected keywords (search terms)– “immigra*”, “latino(s),” “muslim(s),” and “islam*”. Tweets containing any of these terms were assigned to the corresponding (non-exclusive) groups. For example, the query containing “immigra*” represents the tweets related to immigrants in general. For comparison, we created a *baseline* group containing tweets that did not match any of the search terms. Measures associated with the baseline group was used as a base rate for measures associated with all other specific groups/issues. This study included a total of 5,164,914 tweets. Table 1 summarizes the data for the five groups.

3.2 Defining and Extracting Data for Risk Perception

To quantitatively capture group risk perception from the tweets, we employed the moral foundation lexicon [21] based on moral foundation theories [8]. The lexicon was curated based on the psycho-linguistic lexicon LIWC (Linguistic Inquiry and Word Count) [22, 23] and created specifically for the expression involving moral perception. The dictionary includes a total of 318 words that are categorized into 10 types of moral foundations: Harm vice/virtue, Fairness vice/virtue, Ingroup vice/virtue, Authority vice/virtue, and Purity vice/virtue.

Table 1. Number of tweets before and after the Paris Attacks

	Before Attacks		After Attacks		Total
	Liberal	Conservative	Liberal	Conservative	
Baseline	539,808	1,859,802	541,848	2,031,708	4,973,166
Immigra*	2,917	13,160	2,732	13,873	32,682
Latino(s)	673	1,441	401	708	3,223
Muslim(s)	1,547	12,530	8,519	61,546	84,142
Islam*	1,096	9,090	7,027	54,488	71,701
Total	546,041	1,896,023	560,527	2,162,323	5,164,914

We used these moral words as a proxy for capturing tweet expressions indicating a group/issue was morally judged or perceived as a risk issue.

For quantitative analysis, we use *odds ratio* (OR) to measure (1) *change* in discussion about groups/issues after the attacks: the extent to which the panel users tend to mention a specific group/issue, and (2) *moral association* with groups/issues: the extent to which the panel users tend to morally associated a specific group/issue as a risk concern. For measuring the change, let $O_{s,t,d}$ be the *odds* of tweets from ideological leaning $s \in \{Liberal, Conservative\}$ that mention a particular target group/issue $t \in \{Muslim, Latino, Islam, Immigrant, Baseline\}$ in two time interval $d \in \{Before, After\}$, i.e. the probability of having the group terms against the probability of not having the group/issue/baseline terms. The odds ratio for mentioning any of the target groups after the attacks is calculated against the mentioning prior to the attacks, i.e., $\frac{O_{s,t,d=After}}{O_{s,t,d=Before}}$.

Similarly, for the measuring moral association in a particular time interval, let $O_{s,t,c}$ be the *odds* of tweets from ideological leaning s mentioning a particular target group t that contain any moral words in the 10 moral types, i.e. the probability of having the moral words against the probability of not having those words. The odds ratio for any of the target groups are calculated against the baseline group. For example, the odds ratio of “*Conservative*” tweets for the “*Muslim*” group along the “*HarmVice*” dimension is $\frac{O_{s=Conservative,t=Muslim,c=HarmVice}}{O_{s=Conservative,t=Baseline,c=HarmVice}}$, where the denominator indicates the odds of baseline group.

For qualitative analysis on the discourse of tweet contents, we randomly sampled 200 tweets from each moral category and for each group and ideological leaning. If the total tweets were less than 200, we sampled all the tweets in the category. The total sampled tweets for qualitative in-depth analysis were 17,913.

4 Analyses and Results

4.1 Changes in discussing groups after the attacks

As an overall trend, Fig. 1 shows the ratio of daily tweets mentioning the group/issue terms before and after Paris attacks, indicating there were sudden increases in the ratio of Islam- and Muslim-related tweets.

To examine whether the interest of discussing a particular group/issue changed before and after Paris attacks, we computed odds ratios, using before the attacks as an unexposed group and after the attacks as an exposed group for baseline tweets, immigrant, Latino, Islam, and Muslim-related tweets. Fig. 2 shows the changes of mentioning groups in terms of odds ratio.

After Paris attacks, there was a significant decrease of tweets related to Latinos (Liberal: $OR = 0.58, p < 0.001$; Conservative: $OR = 0.43, p < 0.001$) and immigrants (Liberal: $OR = 0.91, p < 0.001$; Conservative: $OR = 0.92, p < 0.001$), a pattern consistent with baseline tweets (Liberal: $OR = 0.34, p < 0.001$; Conservative: $OR = 0.30, p < 0.001$). However, a significant increase was observed among tweets related to Muslims (Liberal: $OR = 5.43, p < 0.001$; Conservative: $OR = 4.40, p < 0.001$) and Islams (Liberal: $OR = 6.31, p < 0.001$; Conservative: $OR = 5.37, p < 0.001$).

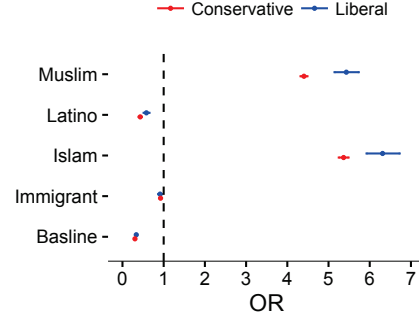


Fig. 2. The odds ratios of group/issue and baseline tweets before and after the attacks.

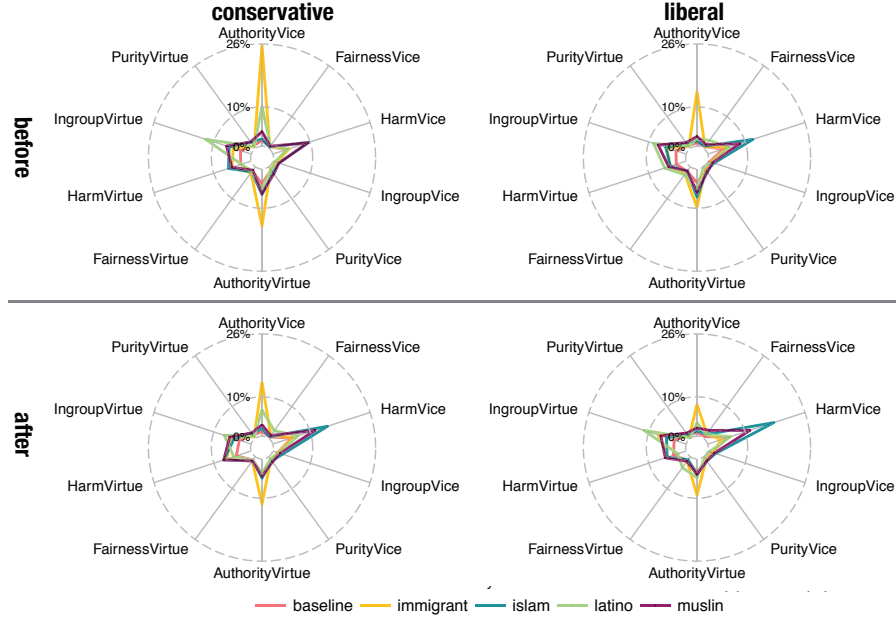


Fig. 3. Risk perception profiles. The five top-ranked dimensions are Harm vice/virtue, Authority vice/virtue, and Ingroup virtue. Group/Issue profiles differ by the significance of these dimensions and the associated political leanings, and changed after the attacks. The first leading dimension for Muslim, Islam, Latino, and immigrant were HarmVice, HarmVice, IngroupVirtue, and Authority vice/virtue, respectively.

4.2 Risk perception profiles

For each group/issue, we created a *risk perception profile* to capture how a specific group/issue was perceived as risk through being morally judged by the 10 distinct moral dimensions. These risk profiles are visually summarized using radar charts (see Figure 3), where each spoke shows the percentage of tweets

Table 2. Statistics of group/issue risk profiles.

Category	Liberal		Conservative	
	Before % tweets OR	After % tweets OR	Before % tweets OR	After % tweets OR
Muslim	AuthorityVice	2.46% 2.82 **	2.07% 2.26 **	3.70% 2.65 **
	AuthorityVirtue	5.95% 1.76 **	3.93% 1.16 *	6.26% 1.70 **
	FairnessVice	1.16% 2.31 **	2.50% 4.55 **	0.68% 1.35 **
	FairnessVirtue	1.29% 0.92 **	1.44% 1.28 *	1.08% 0.82 *
	HarmVice	8.60% 2.16 **	11.25% 2.15 **	9.37% 2.63 **
	HarmVirtue	4.65% 1.79 -	5.56% 1.68 **	5.18% 1.89 **
	IngroupVice	1.29% 2.45 **	1.74% 1.82 **	1.62% 2.27 **
	IngroupVirtue	7.50% 2.90 **	6.78% 2.19 **	6.59% 2.39 **
	PurityVice	1.62% 1.70 *	1.33% 1.24 *	2.20% 2.25 **
Islam	PurityVirtue	1.81% 2.16 **	1.64% 1.84 **	2.03% 2.41 **
	AuthorityVice	1.28% 1.45 -	1.31% 1.42 **	1.86% 1.30 **
	AuthorityVirtue	7.12% 2.13 **	4.03% 1.18 **	6.50% 1.77 **
	FairnessVice	0.73% 1.44 -	1.27% 2.28 **	0.41% 0.81 -
	FairnessVirtue	1.37% 0.98 -	0.94% 0.83 -	1.60% 1.24 *
	HarmVice	12.04% 3.14 **	17.65% 3.63 **	9.70% 2.74 **
	HarmVirtue	4.20% 1.60 **	5.08% 1.53 **	6.06% 2.23 **
	IngroupVice	1.64% 3.12 **	2.05% 2.15 **	1.65% 2.32 **
	IngroupVirtue	5.47% 2.07 **	5.27% 1.68 **	5.91% 2.13 **
Latino	PurityVice	1.37% 1.44 *	1.37% 1.28 *	1.84% 1.87 **
	PurityVirtue	1.55% 1.85 *	1.12% 1.25 *	1.88% 2.23 **
	AuthorityVice	2.00% 3.97 **	3.42% 2.18 *	10.13% 7.76 **
	AuthorityVirtue	4.99% 1.39 -	4.75% 1.48 -	5.14% 1.38 -
	FairnessVice	2.49% 2.36 *	1.19% 4.54 **	0.76% 1.52 *
	FairnessVirtue	2.49% 2.50 **	3.42% 2.23 *	1.60% 1.23 **
	HarmVice	5.74% 1.49 *	6.09% 1.03 -	4.02% 1.07 *
	HarmVirtue	5.74% 0.84 -	2.23% 1.74 *	2.64% 0.94 -
	IngroupVice	1.25% 0.84 -	0.45% 1.30 -	0.56% 0.77 -
Immigrant	IngroupVirtue	8.73% 4.56 **	11.29% 2.88 **	12.21% 4.72 **
	PurityVice	0.00% 0.31 -	0.30% 0 *	.97% 0.98 -
	PurityVirtue	0.75% 0.17 -	0.15% 0.83 -	0.56% 0.65 -
	AuthorityVice	13.92% 18.12 **	8.09% 9.43 **	25.62% 23.72 **
	AuthorityVirtue	9.80% 3.02 **	9.19% 2.86 **	14.46% 4.30 **
	FairnessVice	0.55% 1.08 -	1.39% 2.50 **	0.47% 0.93 -
	FairnessVirtue	2.33% 1.68 **	1.39% 1.23 -	1.90% 1.46 **
	HarmVice	5.38% 1.30 **	3.59% 0.63 **	4.38% 1.17 **
	HarmVirtue	4.32% 1.65 **	5.01% 1.51 **	5.17% 1.88 **
Immigrant	IngroupVice	0.82% 1.55 **	1.35% 1.41 *	1.09% 1.53 **
	IngroupVirtue	5.18% 1.95 **	7.39% 2.41 **	4.79% 1.71 **
	PurityVice	0.79% 0.82 -	1.06% 0.99 -	0.79% 0.80 *
	PurityVirtue	0.62% 0.73 -	0.48% 0.53 *	0.52% 0.61 **

** indicates $p < .01$; * indicates $p < .05$

mentioning the specific group/issue that is associated with a corresponding moral dimension. Table 2 shows the detailed statistics of these profiles.

The results show that among all of the 10 moral dimensions, the following five stand out: two are vices, HarmVice and AuthorityVice; three were virtues, HarmVirtue, AuthorityVirtue, and IngroupVirtue. Except for Latino, these are the five top-ranked dimensions for the profiles. To examine whether those tweets mentioning Muslim, Islam, Latino, and Immigrant (referring as group/issue tweets hereafter), compared with baseline tweets, are more likely to use moral words, we calculated odds ratios that indicate the odds of a group/issue tweet involving moral judgment words in type X against a non- X tweet, compared to the odds of a baseline tweet involving moral words in type X against a non- X tweet. The results confirm this pattern with a few exceptions (especially for Latino group) that both conservatives and liberals are more likely to engage

moral judgement expression when discussing the four groups/issues, compared when discussing the topics irrelevant to the four groups/issues.

While the aforementioned five dimensions are prominent across profiles, the profiles differ by the order of the significance of these dimensions. Muslim and Islam are judged by HarmVice the most; Latino by IngroupVirtue the most; and Immigrant by Authority, either vice or virtue, the most. The following sessions discuss the profiles in details.

4.3 Group risk perception in relation to leanings and the attacks

To examine the risk perception toward each group/issue in depth, we conducted qualitative discourse analysis on tweet contents. We adopted inductive approach to identify themes. The following discussions are based on both quantitative and qualitative analyses. We organize our discussions by group/issue.

Muslim

HarmVice as the first leading dimension. For both conservative and liberal tweets, HarmVice was the first leading dimension for Muslim risk profile, either before or after Paris attacks. The top used HarmVice words for both political leanings, in the order of frequency, were “kill* (kill, killed, killing),” “war,” and “fight.” A prominent concern was whether Muslims were perceived as either being *a risk* (potential moral agents who impose harm to others), or *at risk* (potential moral victims who are harmed by terrorists or other groups).

While Muslims were argued as a risk, the tweets involved discussions that Muslims kill, have war, and fight against others. The moral judgment toward Muslims was inclined to ascribe blame on them and suggested eliminating and excluding them all. In contrast, while Muslims were argued to be at risk, the tweets involved the discussions that other groups or agents who have intent to kill, have war, or fight against Muslims, e.g., Muslims being killed by Islamic State (ISIS) and the suffered victims too; the moral judgment toward Muslims was hence inclined to offer them care, empathizing Muslims in general.

Difference between political leanings. The two views, Muslims being either a risk or at risk, were found in both conservative and liberal tweets. However, among conservative tweets, more discussions addressed Muslims, or particularly, *all* Muslims, as a group risk who to kill Americans or destroy the world, rather than at risk; e.g., “*You are Muslim. Today not a terrorist. Tomorrow asked to kill innocent people called infidels. Quran 5:32 translated #ParisAttacks #tcot.*” Moreover, conservative tweets were more likely to ascribe blames to those who were not Muslim but rejected the idea of declaring war at Muslims after the attacks and further considered those who refused to recognize a need of declaring war to Muslims as non-ingroup members.

Liberal tweets appeared more likely to decline the idea of treating all Muslims as a risk; instead, liberal tweets focused more on the Islamic religion, ISIS, or certain Muslim values and customs conflicting with other groups such as children, women, and LGBT. Compared with conservative tweets, liberal tweets were more inclined to disseminate the information indicating that terrorists or other groups do do harm to Muslims as a hate crime, and recognized Muslim immigrants as members of the U.S., who contributed to the nation as well. For example, “*There*

are 1.6 billion Muslims in the world, #Daech numbers @ best 30,000. They kill more Muslims than Westerners. They don't represent Islam," and "Are you living in a bubble Muslims are serving in the us military Muslim countries are fighting Isis what are you doing @dbtcollector."

Change before and after Paris attacks. Before Paris attacks, HarmVice, the first leading dimension, was followed by IngroupVirtue, AauthorityVirtue, HarmVirtue, and AuthorityVice, which applied to both conservative and liberal tweets. After Paris attacks, HarmVice was still the first leading dimension. In both conservative and liberal tweets, there were increasing concerns in general of either other groups killing Muslims or being killed by Muslims. Among all the dimensions, only the tweets in three dimensions, HarmVirtue, FairnessVice, and FairnessVirtue, were more likely to appear after Paris attacks compared with baseline tweets. For conservatives, HarmVirtue, originally the fourth, became the second leading dimension, followed by IngroupVirtue, AuthorityVirtue, and AuthorityVice. For liberals, IngroupVirtue remained the second dimension, followed by HarmVirtue and AuthorityVirtue, while FairnessVice replaced AuthorityVice as the fifth dimension. To sum up, HarmVirtue became more prominent among conservatives, and Fairness, both vice and virtue, among liberals.

Muslim co-mentioned with Islam

"Islam" was frequently co-mentioned when the tweets mentioning "Muslim." There existed distinct patterns between liberals and conservatives in terms of how these tweets were related to the moral dimensions.

For liberals, before Paris attacks, the rate of co-mentioning of Muslim and Islam was only 0.02%; after the attacks, the rate increased to 10.09%. For conservatives, the rates before Paris attacks had been 9.3%; after the attacks, the rates increased 2.2% to 11.5%. These statistics indicated that before the attacks, conservatives had related Islam to Muslims when talking about Muslims and the probability of doing so slightly increased after the attacks. Instead, liberals seldom related Muslim to Islam before attacks, yet the probability of doing so increased to the level of what conservatives did after the attacks. For both conservatives and liberals, after the attacks, these co-mentioning tweets were mostly likely to be related to the HarmVice dimension (liberal: 13.99%; conservative: 14.12%), while before the attacks, the co-mentioning tweets from conservatives were most likely to be related to AuthorityVirtue dimension (15.03%).

Our qualitative analysis on tweet contents shows that in the co-mentioning discussions, there appears a spectrum of how the tweeters differentiated Muslim group, Islam religion, ISIS, and terrorism/terrorist from one another – on one end, Muslim, Islam, and ISIS were discussed as if they equated to one another and were the terror itself; on the other, it was argued that Muslims and Islam did not equate to ISIS, and ISIS was not real Muslim but the terrorists claiming a Islam religious root.

Among conservatives, a majority of the co-mentioning tweets did not show explicit differentiation between Islam and Muslim and in some cases, equated the risk of ISIS to the risk of all Muslims and to the risk to Islam religion; a majority of co-mentioning tweets among liberals expressed or advocated their

views of distinction, and discussed the issue of “Islamophobia,” an extreme fear of the whole Muslim group. Conservatives and liberals had some fights regarding the phobia issue, e.g. “@ArcticFox2016 @BarracudaMama you are an infidel (civilized), Muslims are reaised to kill you! Your fear of Islam is rational, NOT phobia.” Moreover, after the attacks, there appeared a distinction between Muslims/Islamist and Radical Muslims/Islamic extremist when discussing what was the source of risk, which was not found before the attacks. Conservatives and liberals shared a more common view regarding such distinction, and expressed that “extremists” or “radicals,” and a perceived high risk of them.

Islam

While Islam was mentioned, it mostly referred to Islam religion or certain Islam groups (e.g., Islam Group, or Islam State). Islam profile is similar to the profile of Muslim, in which HarmVice is the first leading dimension; however, AuthorityVice, which is the fifth dimension for Muslim, is much less likely to appear. Also, the significance of each dimension differs between conservative and liberal tweets and is influenced by the attacks too.

Before Paris attacks, for both conservatives and liberals, the second leading dimension was AuthorityVirtue (In Muslims profile, it was IngroupVirtue). For conservatives, HarmVirtue came the third and IngroupVirtue the forth; for liberals, the vice verse. In AuthorityVirtue, the top used moral words were “leader(s),” which concerned the acts and ascribed responsibilities to the leaders of primarily two sides – ISIS and anti-ISIS countries including the U.S. and Australia. The tweets concerned that the ingroup leadership of the U.S. and other anti-terrorism allies were not tough enough to defeat the ISIS leaders who schemed detrimental harms successfully; for example, “*How can the so-called leaders of the free world FALL for these psychopathic murderers? It’s CLEAR they are soldiers of Islam! @DesignerDeb3;*” and “*Islamic radicals know who their enemies are. It is some of our leaders who have forgotten who is under attack. <https://t.co/7Q76vQlOMW>.*”

Latino

IngroupVirtue as the leading dimension. IngroupVirtue was the first leading dimension in Latino profile, for both political leanings, either before or after Paris Attacks. The tweet contents had to do with how the Latino as an immigrant group/community fought against being perceived as threatening immoral community and negotiated to be recognized as an Ingroup member of the U.S. Most of the discussions were related to the Republican presidential candidate, Donald Trump. Among conservatives, there were 31% of the IngroupVirtue tweets mentioning Trump; among liberals, there were 21%. There was a common call for the Latino to “unite,” not voting for “racist.” There was no discussion among liberal tweeters supporting Trump, while conservative tweets had diverging attitudes, both in supporting and criticizing the candidate’s statements about the Latino issues, e.g., “*people say trump is a threat to latino communities but those communities will be fine they just have to go be fine in another country;*” and “*@esd2000 The violence that #OperationWetback carried continued on Latino community for decades, #Trump’s embrace of it is OFFENSIVE! #GOP.*”

Difference between political leanings Before Paris Attacks, for liberal tweets, IngroupVirtue was a prominent dimension while other dimensions were about a half or less than a half of IngroupVirtue tweets. For conservatives, the second leading dimension, AuthorityVice, was prominent dimension as IngroupVirtue. In AuthorityVice tweets among conservatives, the most used two groups of words were “illegal* (illegal(s) and illegally)” and “protest.” The words “illegal*” was mostly used in referring to undocumented Latinos as “illegal immigrants,” who were judged as immoral and threatening agents with unjustifiable status, and to differentiate Latinos who had authorized immigrant statuses from those who did not; for example, “*Arrest the Latino Kids’ Parents and deport them if they are illegal immigrants; and a large majority of Latinos are law abiding citizens who dislike ILLEGAL immigration as much as anyone.* @AJDelgado13 @BradThor.”

Change before and after Paris attacks. After Paris attacks, in both of the liberal and conservative tweets, IngroupVirtue remained the first leading dimension but the percentages and odds decreased significantly (the before-after difference of odds ratio for conservatives and liberals were -2.35 and -1.68, respectively). For conservatives, tweets in HarmVice dimension increased and became as significant as AuthorityVice dimension, followed by HarmVirtue and AuthorityVirtue.

The increasing HarmVice tweets among conservatives started relating Latino to terrorists/terrorism, which is not found before Paris attacks in both conservative and liberal and only found after the attacks among conservative tweets, e.g., “*Everytime a Mexican, or other illegal Latino kills an American in the #USA, we should look at it as an act of Catholic terrorism.*” Such connection entails a rising perceived risk toward Latino group after the Paris attacks among conservatives. Also, while addressing Syrian refugee issue, Latino was being commented, in some cases together with blacks as perceived trouble groups for the U.S.; for example, “*Democrat Big Plan: First they tried with blacks and Latinos to stir a race war, now they invited Muslim terrorists to create chaos #tcot.*”

For liberals, the profile changed little. It is notable that FairnessVice tweets increased to about twice to be mentioned, which related the discrimination of Latino to a larger phenomenon in the society against particular groups including Muslims immigrants or refugees within the U.S. society; e.g., “*@allinwithchris The GOP Racism and Bigotry toward Blacks Latinos Gays women and now WAR TORN Refugees is DESTROYING this COUNTRY and World.*” The increased moral judgment among liberals relevant to Latino was not toward Latino but conservatives who considered Latino as a threat.

Immigrant

Authority Vice/Virtue as the leading dimensions. Authority, both vice and virtue, were the most significant leading dimensions in Immigrant profile, for both conservative and liberal tweets. Particularly for conservative, about one out of every four immigrant-relevant tweets were AuthorityVice tweets (25.62%, while for liberals, the percentage was 13.92%). The odds ratios in AuthorityVice dimension were the highest ones to appear across all profiles (before Paris attacks: 23.72 and 18.12 for conservative and liberal, respectively; after Paris attacks: 12.70 and 9.43, respectively.)

Difference between political leanings, before and after Paris attacks. Before the attacks, the contents were mostly immigrant issues in general or Latino relevant since the primary immigrant issue in current time has been of Latino in the U.S. For conservatives, 40.0% of the tweets used Authority (both vice and virtue, relevant to legal concerns); for liberals, 23.7%; however, after the attacks, the rates decreased to 25.3% and 17.3%, respectively.

Among conservatives, after Paris attack, FairnessVice was the only dimension in which the tweets increased both of the percentages and odds (odd ratio increased from 0.93 to 2.29). 15% of the tweets after the attacks were relevant to Syrian refugees, while none of tweets before the attacks relevant to refugees. Before the attacks, FairnessVice tweets primarily focused on arguing that anti-illegal immigrants were not a bias, discrimination, or a bigotry; e.g., “@20142 @ConnieHair *There is nothing racist or bigoted about opposing illegal immigration and open borders.*” After the attacks, a rising perceived risk was that terrorists would utilize the U.S.’s refugee policy sending camouflages as refugees into the U.S. to enact attacks; however, there were also counter arguments against such view among conservative tweeters; e.g., “@spongefile *Plenty of anti immigration people do have a bias against Muslims and other immigrants but not me. My grandparents fled Hitler;*” and “*Syrians can immigrate to the U.S. the same way others do. No special visas for Syrians only. That’s discrimination.*”

Among liberals, Fairness tweets increased too but were in Virtue dimension not in Vice; the likelihood to appear increased (odd ratio increased from 1.10 to 2.50). Before the attacks, the discussions in FairnessVirtue covered justice and human rights for immigrants who have been in the U.S., concerning that all immigrants in the U.S., documented or undocumented, deserved equal and fair treatments; no specific groups of people were stressed. After the attacks, concerns of Muslims and Syrian refugees appeared; a call for equal rights to these specific groups was advocated. For example, “@adirado29 *Muslims aren’t guns. ISIS attacks do not equal Islam. Immigrants aren’t evil because they are Muslims.*” To sum up, in the context of terrorism, confounding with Refugee issue due to Syrian Civil War, Muslims were not perceived as risk by liberals as much as by conservatives. The perceived risk of immigrants divided its focus from immigrants as illegal entities that would impose harm to the U.S. to Muslim newcomers who could impose death threat to Americans, of which the perceived risk was far beyond an legal issue.

5 Discussion and Conclusion

Our study shows that in the context of terrorism, how people who hold distinct political ideologies contribute differently to the construction of risk discourses. Prior research on moral foundations of human societies [21] has indicated that people holding distinct political ideologies engage in moral judgment differently. For liberals, Harm/Care—moral concern of people in pain as immoral, and empathy as moral—is the one that is primarily being relied upon to make moral judgment and justification, and Fairness/Cheating a suppurating one. Conservatives extensively use all of the five foundations, while which dimensions are primarily based upon depends on issues and contexts. Our research offered

empirical evidence of that in responding to the terrorist attacks, conservatives addressed most the perceived harm and its relation to immorality; liberals focused on perceived social bias and argued the discrimination as immoral more than conservatives did. Conservatives put more emphasis on their perception of Muslims as risk, while liberals on the concern of Muslims at risk.

In our study, we found that as the perceived risk toward Muslims raised higher in general, particularly among conservatives, the identification of ingroup and outgroup members could shift. First, while a moral judgement view is found not shared with another ingroup member and the perceived risk of an outgroup is high, the ingroup member holding distinct view could be judged as a betrayer to the ingroup and labeled as a member of the risk outgroup regardless how the ingroup member perceive his/her own identity and regardless of whether the ingroup member does do harm or not. This phenomenon is observed among both liberal and conservative users, but more common among conservatives. Such observation is consistent with prior studies in public health indicating that the selection of a risk target may be more a way in which people utilize to maintain a sense of social solidarity that could decrease the fear of the perceived risk [3] rather than to reflect a real issue or fact regarding the potential danger.

Harm and Care can be two sides of one, mediated by perceived group boundary and in-group favoritism. The stronger the categorical line drawn between the self and others, the more likely that a person analyzes a risk situation by perceiving themselves as victim, shows less empathy to the perceived outgroup concerned as potential harm, and overlooks the diversities and individual differences among outgroup members.

The topic of immigration itself is not only controversial, but also polarized. Perception towards immigrants has been strongly shaped by political ideologies [24]. During the post-1965 era, conservative ideology has been linked to the higher likelihood of perceiving immigrants as threat [25] and the tendency of blaming illegal immigration [26] and Muslims [27]. Our study further reveals that the difference in risk perception across political leanings is associated with moral intuition, and may shed light on the recent Islamophobia phenomenon.

This paper is the first empirical study on risk perception. It offers insights for policy makers to understand what psychological factors dominate the public's views on terrorism. For future work, we plan to examine our analysis framework of risk perception in the context of other terrorist attack incidents, which is to test the applicability of our conceptualization of perceived risk and meanwhile, deepen and expand the understanding of the interaction of the social and cultural theories we draw upon. One potential direction is to compare and contrast how the perceived ingroup and outgroup shifts, in relation to the terrorist attacks that have happened inside and outside of the U.S.

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