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Abstract

This research presents several aspects of anonymous social media postings using an anonymous social media application (i.e., Yik Yak) that is GPS-linked to college campuses. Anonymous social media been widely criticized for postings containing threats/harassment, vulgarity and suicidal intentions. However, little research has empirically examined the content of anonymous social media postings, and whether they contain a large quantity of negative social content. To best understand this phenomenon an analysis of the content of anonymous social media posts was conducted in accordance with Deindividuation Theory (Reicher, Spears, & Postmes, 1995). Deindividuation Theory predicts group behavior is congruent with group norms. Therefore, if a group norm is antisocial in nature, then so too will be group behavior. In other words, individuals relinquish their individual identity to a group identity, while they are a part of that group. Since the application used in this study is limited to a radial distance around specific college campuses, we predicted the anonymous social media users would identify as students, and behave closer to the norms expected of a student. Our results confirm that while deindividuation did occur among the college students, it did not exceed what is considered normal behavior for the social identity of a student.

Keywords: anonymous, social media, deindividuation, social identity

Deindividuation in Anonymous Social Media

In electronic forms of communication used today, anonymity is often thought of as being primarily used by individuals seeking to conceal their participation in crimes, immoral behavior, or offensive communication (New York Times, 2015). However, according to Mullan (2007) anonymity has historically also served benevolent purposes, such as protecting individuals from persecution, allowing authors to publish under pseudonyms to protect their identity, and to allow the dissemination of unpopular positions and ideas. With the advent of computer-mediated communication, using pseudonyms, false names, or random names has brought anonymity to much a larger audience (Christopherson, 2007). Along with the popularity of anonymous communication came a resurgence of interest into the impact of anonymity on our communication with each other, particularly regarding if it has a negative impact on our communication. However, no studies have analyzed the deindividuation of individuals using anonymous social media applications. The current study seeks to analyze the content, linguistic differences, and ratings of deindividuation of anonymous social media in order to ascertain if users are experiencing the disinhibiting effects of deindividuation through increases in non-normative behavior.

Anonymous Social Media: What is Yik Yak?

Anonymous social media is only one piece of social media utilized by the average American consumer. Although the defining characteristic of this subcategory of social media is anonymity, the anonymity provided by various social media platforms varies from no anonymity (e.g. Facebook) to complete anonymity (e.g. Yik Yak, 4chan). In order to investigate the impact of anonymity in social media, a social media application that provides anonymity of users was

needed. One such popular program, used among college students across the United States, is Yik Yak.

Yik Yak is a location-based, social media application used to read and write anonymous social media postings. Yik Yak aspires to become a mainstay in the arsenal of social media applications among today's youth and young adults. However, Yik Yak has developed a reputation in the media as an outlet for anonymous users to harass others. Critics argue Yik Yak's content is ripe with cyberbullying, harassment, and antisocial acts (Columbia Chronicle, 2014; Ha, A., 2015). While the media portrays Yik Yak as a tool used to be vulgar and offensive, a recent scientific examination painted a different picture.

Black, Mezzina, and Thompson (2016) investigated the content of Yik Yak posts and found a large percentage of Yik Yak postings, 45.1%, focused on campus life, announcements, and proclamations. In the same study, contrary to Yik Yak's media portrayal, only 13.5% of posts contained profanity and vulgarity, and 9.2% related to sex, drugs, and sexuality. The authors concluded from their analysis that, while Yik Yak is a tool with the potential for abuse and misuse, the anonymous postings themselves were not a significant threat to young adults (Black, Mezzina, & Thompson, 2016). In the present study, we expect similar results from an analysis of the content of Yik Yak. While Black, Mezzina, and Thompson's (2016) study only looked at the content of Yik Yak posts, the present further samples content, linguistic conventions, and deindividuation elements of posts.

Deindividuation

Individuals in a crowd or group, which they feel a member of, will change their behavior to act similar to the group norm (Reicher, Spears, & Postmes, 1995). This behavior has long been described by the concept of deindividuation (Festinger et al., 1952; Zimbardo, 1969; Deiner, 1976, 1977, 1980; Prentice-Dunn and Rogers, 1982; Dodd, 2002). The more an individual feels part of the group, and is unidentifiable and anonymous, the stronger the group's norms will influence his/her behavior. Up until Zimbardo's (1969) research, this influence was thought to be purely negative. More recently, deindividuation refers to not only negative influences on behavior, but any type of influence on behavior which is part of the group norm, in the 'Social Identity Model of Deindividuation Effects' (SIDE, Reicher, Spears, & Postmes, 1995).

SIDE

According to SIDE, deindividuation is the increased salience of a group identity that can result from the manipulation of situational factors, such as group immersion, anonymity, and reduced identifiability. The main difference from previous work on deindividuation is the prediction that deindividuation manipulations reinforce conformity to group norms whether they are positive, negative, or neutral, rather than a general norm for human behavior. For example, deindividuation has been found to foster group identification and to induce greater opinion polarization in small groups communicating online (Lee, 2007). SIDE stays in line with earlier research on group conformity in that it argues anonymity, group cohesiveness, and group immersion reinforce group salience and conformity to group norms (Postmes & Spears, 1998).

The basis for SIDE is provided by research on group relations, Social Identity Theory and Self-Categorization Theory (Reicher, Spears, & Postmes, 1995). According to social identity theory, subjects define themselves in terms of the groups to which they belong. These groups are

given meaning through their relation to other groups, and group members will attempt to surpass other groups on valued dimensions (Tajfel, 1978, 1982). Rather than seeing the self as a unitary construct, Social Identity Theory's premise is that the self is a system consisting of a personal identity and social identity(s). For deindividuation, this means an individual does not lose all sense of self as previously thought, but shifts in saliency between their personal and social identities. The behavioral consequences of deindividuation manipulations will therefore vary between groups as a function of their norms (Reicher, Levine, & Gordijn, 1998). Self-Categorization Theory further describes the influence of groups on our identity. The Self-Categorization Theory is defined by Spears, Postmes, Lea, and Watt (2001) as a theory of group influence in which the group forms the link between others and the self. The idea is that we, as social creatures, belong to and identify ourselves with many social groups and categories. Not only are we part of these groups, but our feelings and thoughts are influenced by the groups, depending on how greatly we identify with them. An easy example of our tendency to shift toward the group norm is seen in group polarization. Group polarization refers to the finding that, following a group discussion, individuals tend to endorse a more extreme position in the direction already favored by the group (Hogg, Turner, & Davidson, 1990; Turner, 1991). For more information on the roots of Deindividuation Theory and the current ties to Social Identity Theory and Self-Categorization Theory, see (Reicher, Spears, & Postmes, 1995; Tajfel, 1978; Tajfel & Turner, 1986; Turner, 1985, 1987).

Earlier research on deindividuation provides content categories for what would be considered positive, negative, and neutral deindividuation. Dodd (2002) illustrated deindividuation by asking students to imagine and anonymously reporting behaviors for which they might engage in if they were anonymous and there were no repercussions for their actions.

Dodd grouped the responses into four intent categories: prosocial, antisocial, non-normative, and neutral. Negative deindividuation categories included antisocial or non-normative responses of aggression, academic dishonesty, crime, escapism, social disruption, interpersonal spying and eavesdropping, and sexual behavior. Positive deindividuation, or prosocial actions, included helping or charitable behaviors, while neutral responses consisted of any responses not included in the other three categories. His results indicated that 36% of the responses were antisocial, 19% were non-normative, 36% were neutral and only 9% were prosocial. The most frequent responses recorded were criminal acts (26%) followed by sexual acts and spying behaviors (11% each). Providing support to the concept of deindividuation, Dodd found he was able to show behavior changes from what would be normal to anti-normative behavior. Utilizing Dodd's (1985) deindividuation categories, it may be possible to determine the amount of deindividuation an individual is experiencing through analyzing their communication through anonymous social media.

SIDE and CMC

SIDE has also been extended and applied to computer-mediated communication (CMC) which is relevant to our analysis of anonymous social media (Postmes, Spears, & Lea, 1998). The unique aspect of CMC not present in other deindividuation research on crowds is the high degree of isolation provided along with the anonymity of group members. The first study conducted with SIDE on computer-mediated communication examined whether anonymity in the group would result in more polarization, and whether it was due to conformity to group norms or deregulated behavior as suggested by the earlier work on deindividuation (Lea & Spears, 1991; Spears, Lea, & Lee, 1990). The study used computers for a group discussion in a 2 x 2 design (group vs. individual; anonymous vs. identifiable), where the students were provided feedback

representative of the views of the students in the previous group. Results were congruent with those predicted by group polarization. Polarization was strongest when group identity was salient and participants were anonymous. When communicators share a common social identity, they appear to be more susceptible to group influence, social attraction, stereotyping, gender typing, and discrimination in anonymous CMC (Postmes, Spears, & Lea, 1998). The social influence a group exerts on its members restricts and restrains behavior, therefore imposing boundaries on group members, but group members also place these boundaries on themselves. These social boundaries define where the in-group ends and the out-group begins, as well as what is appropriate conduct within the intragroup and intergroup context. The boundaries that define the group are created and maintained through the processes of social validation and social influence (Turner, 1991). The current findings in CMC were summarized quite well (Postmes, Spears, & Lea, 1998, p. 689): "although CMC may provide the freedom to traverse social boundaries, this does not mean that people routinely use this freedom to escape the pull of the group".

The fully anonymous nature of the social media application used does not provide information on the levels of group saliency. However, to the extent that students socially identify themselves as members of the school, it is predicted they will act within the group norms expected of college students. Thus, contrary to media portrayals, the content of fully anonymous posts would contain a majority of normative behavioral statements with a low rate of deindividuation in the yaks corresponding to Dodd's (2002) categories. Expanding on a more descriptive analysis and categorization of Yik Yak postings, we also conducted a linguistic comparison of the two campuses' postings to provide further insight into the similarities and/or differences between the schools sampled in the study, and potentially gain insight into group saliency within the sampled campuses. Our first prediction for this study follows:

1. H1: Individuals who use anonymous social media will post in congruence with the most salient group norm, that will: (a) *be in accordance with the student group norms outlined by the university/college*, (b) *contain few posts that may be identified as negative deindividuation*, and (c) deindividuation ratings will *be similar across campuses*.

Linguistic Inquiry and Word Count

"Language is the most common and reliable way for people to translate their thoughts and emotions into a form others can understand" (Tausczik & Pennebaker, 2010, p. 25). Understanding of the psychological aspects of language use comes from research on enormous volumes of text-based materials, where researchers link our daily language to behavioral and self-reported personality measures. The words people use in their daily lives provide information on their beliefs, fears, thinking patterns, social relationships, and personalities (Weintraub, 1989). Along with the research on language, many new computerized text analysis programs have been developed. One of the most popular for use in psychology is the Linguistic Inquiry and Word Count, or LIWC (pronounced "Luke") by Pennebaker, Booth & Francis (2007). LIWC has been updated since 2007 and the most recent edition of LIWC comes from 2015. For a full review of the development of LIWC, see Pennebaker, Boyd, Jordan, and Blackburn (2015).

Content and Function Words.

The development of LIWC was intended to achieve a system that could not only divulge the psychological processes and content of people's writing, but do so efficiently (Tausczik & Pennebaker, 2010). During development, two different broad categories of words with different psychological and psychometric properties revealed themselves: content words and function words. Content words are the nouns, verbs, adjectives, and adverbs which show the content of

communication, or what we are saying. Function words, on the other hand, are the pronouns, prepositions, articles, conjunctions, and auxiliary verbs, which are in between the content words and reflect how we are communicating by expressing the grammatical relationships with other words in a sentence or even specifying the attitude or mood of the speaker (Klammer, Schulz, & Volpe, 2009). Function words make up a large portion of the variables analyzed by LIWC, but only make up 0.05% of the words in our vocabulary; even so, function words make up 55% of all the words we hear, speak, or read. Additionally, the two different categories of words, content and function words, have been shown to be processed in the brain differently (Miller, 1995).While content words evolve with changes in an individual's world, function words have remained relatively fixed in the history of the English language (Pennebaker et al., 2014). For LIWC, function words are more reliable markers of psychological states than content words, and pinpoint how people are thinking more than what they are thinking about (Pennebaker, 2011; Pennebaker et al., 2014). As appealing as it sounds to reveal the psychological processes through analysis of language, linguistic analysis programs are not without flaws. Linguistic analysis programs, such as LIWC, are not yet able to understand idioms, irony, sarcasm, or even context. For example, the word 'crying' is coded as a sadness word, so when a person says "For crying out loud, recycle your soda cans!" the word 'crying' will be miscoded. While linguistic analysis is not always able to detect a person's "true" self, it is able to detect a host of emotional states, analytical thinking, honesty, and many individual differences. Most of those differences can be ascribed to the linguistic dimensions and psychological processes as well as the summary variables. Analysis of function words within the anonymous social media posts can potentially provide information on the psychological state of the person, revealing how people are communicating (Tausczik & Pennebaker, 2010).

Differences between Male and Female.

Although there are numerous LIWC word categories, we focus our review on categories which we believe will present differences in Yik Yak postings for the two college campuses because they contribute to the collective culture of each college (for a more extensive review of LIWC categories, see Tausczik and Pennebaker, 2010). The major difference between our two groups was gender. One of our campuses is 80% male students, while the other is 58% female students. Gender does play a part in how we use our language. A linguistic analysis conducted by Newman, Groom, Handelman, and Pennebaker (2008) used LIWC to analyze over 14,000 text files from 70 separate studies. They found multiple differences in language between men and women. Differences included the findings that women using greater amounts of pronouns, social words, emotion words, and intensive adverbs, while men used more numbers, articles, words greater than six letters, and swear words. Overall, women used more words related to psychological and social processes, while men referred more to object properties and impersonal topics (Newman et al., 2008). Advantageous to the identification of factors which contribute to deindividuation, LIWC's analysis of variables includes more than differences among individuals. LIWC includes possible identifiers of group differences. Our second and third prediction follows:

2. H2: Individuals who post using anonymous social media from the liberal arts college will: (a) *contain more pronouns*, (b) *use more emotion words*, and (c) *contain more intensive adverbs*.

3. H3: Individuals who post using anonymous social media from the technical university will: (a) *contain more complex words*, (b) *use more swear words*, (c) *use a higher frequency of numbers*, and (d) *contain more articles*.

Group Salience.

Differences in group immersion, along with anonymity and reduced identifiability, contribute to differences in group salience, which results in deindividuation (Reicher, Spears, & Postmes, 1995). In order to investigate possible group salience indicators in language, we reviewed literature on group processes and immersion. However, group processes have not been as consistent as gender in their linguistic analysis findings (Tausczik & Pennebaker, 2010). Regarding group performance, more communication (higher word count) promotes better group performance and group cohesion (Sexton & Helmreich, 2000; Gonzales et al., 2010). Group cohesiveness has not had as consistent findings; while first-person plural, such as *we*, *our*, or *us*, has been found to be related to group cohesion, the direction has not been consistent. Sexton and Helmreich (2000) found that more first-person plural increased group cohesion, Gonzales, Hancock, & Pennebaker (2010) found the opposite: less first-person plural increased group cohesion. To explain this unexpected result, it is thought that the context of first-person plural pronouns may be important. For example, if "we" is being used to promote interdependence such as in "we can do this," it may increase group cohesiveness, but if it is being used to indirectly assign tasks, the use of "we", as in "we need someone to answer question 2", may lead to resentment (Tausczik & Pennebaker, 2010). Beyond group processes, degree of immersion has been found to relate to the use of emotion words. In a study conducted on women trying to cope with intimate partner violence, using more positive and negative emotion words showed more

immersion into the event (Holmes et al., 2007). Therefore, a greater amount of emotion words

may indicate more immersion into the relevant in-groups. Our fourth prediction follows:

4. H4: Individuals who post using anonymous social media will display increased levels

of deindividuation when: (a) group immersion is higher, indicated by *more emotion*

words, and (b) group cohesiveness is higher, indicated by *higher word count and*

more first person plural.

Present Study

In the present study, we sought to further the understanding of anonymous social media

postings through Yik Yak by analyzing the content and linguistic differences between two

separate campuses. Often portrayed as a medium for harassment, we hypothesize based on the

SIDE that the content of our collected yaks will also contain few vulgar or harassing yaks. For

the present study, situated within modern deindividuation theory,(i.e. SIDE), we predict that the

students will perceive themselves as a part of an in-group and, though anonymous, will remain

salient to their social identity as students, posting mainly in adherence to in-group norms (see

Table 2). Thus, the majority of deindividuation ratings based on Dodd's (2002) categories will

fall into neutral or normative behavior at the two schools studied, such as behaviors which intend

to neither benefit nor injure others (i.e. talking about daily activities, commenting on current

events). Definitions used for deindividuation categories are shown in Table 1. Last, we will

investigate the details of the language used in yaks to further investigate any deindividuation

differences, utilizing a computerized text analysis: LIWC. Because of the differences in language

of females vs males, we expect to see more pronouns, emotion words, intense adverbs, words

greater than six letters, and social words for the liberal arts college, as well as fewer numbers,

articles, and swear words compared to a majority male, technical school. In summary our four hypotheses are as follows:

1. H1: Individuals who use anonymous social media will post in congruence with the most salient group norm what will: (a) *be in accordance with the student group norms outlined by the university/college*, (b) *contain few posts that may be identified as negative deindividuation*, and (c) deindividuation ratings *will be similar across campuses*.

2. H2: Individuals who post using anonymous social media from the liberal arts college will: (a) *contain more pronouns*, (b) *use more emotion words*, and (c) *contain more intensive adverbs*.

3. H3: Individuals who post using anonymous social media from the technical university will: (a) *contain more complex words*, (b) *use more swear words*, (c) *use a higher frequency of numbers*, and (d) *contain more articles*.

4. H4: Individuals who post using anonymous social media will display increased levels of deindividuation when: (a) group immersion is higher, indicated by *more emotion words*, and (b) group cohesiveness is higher, indicated by *higher word count and more first person plural*.

Table 1.

Deindividuation Content and Intent Category Definitions

Category	Definition
Content Category	
Aggression	Any behavior enacted with the intention to harm another person who is motivated to avoid that harm.
Charity	The voluntary giving of help to those in need.
Academic Dishonesty	Any type of cheating that occurs in relation to a formal academic exercise.
Crime	Any behavior involving Illegal activities.
Escapism	Mental diversion by means of entertainment or recreation, as an "escape" from perceived unpleasant, boring, arduous, scary, or banal aspects of daily life.
Political Activities	Activity or discussion directed toward the success or failure of a political party, candidate, or group.
Sexual Behavior	Any behavior or activity that induces sexual arousal, or the expression of sexuality through various sexual acts.
Social Disruption	The alteration or breakdown of one's social life.
Interpersonal Spying and Eavesdropping	Secretly listening to or watching the private conversations or actions of others without their consent.
Travel	To go on a trip or journey, typically of some length or abroad.
Miscellaneous	Not pertaining to any other category
Intent Category	
Prosocial	Any behavior intending to benefit others.
Antisocial	Behavior intending to injure another or deprive others of their rights.
Nonnormative	Violating social norms, but neither helping nor hurting others.
Neutral	Does not fit in any of the other three categories.

Table 2.
Student Group Norms

Norm	Definition
TU	
Integrity	Students use honesty, honor, and a respect for the truth in all their dealings.
Community	Students build and enhance their community.
Social Justice	Students are just and equitable in their treatment of all members of the community and act to discourage and/or prevent unjust and inequitable behaviors.
Respect	Students show positive regard for each other, for property, and for the community.
Responsibility	Students are given and accept a high level of responsibility to self, to others, and to the community.
LAC	
Misson	Develop leadership, cultivate teamwork, embrace diversity, endorse service, and above all, preserve excellence in all our endeavors.
Leadership	Listen, take initiative, and accept personal accountability. Strive to maximize potential as effective leaders and followers.
Teamwork	Work together to achieve success. Value ideas and input from each classmate. Act with integrity to build relationships that actively enhance learning.
Diversity	Respect, appreciate, and embrace cultural differences. The multiplicity of backgrounds and experiences strengthens the student community.
Service	Share time, talents, and knowledge gained with the college, student community, and global community.
Excellence	Do not accept carelessness or complacency. As a community of scholars, each will capitalize on their strengths; strive to overcome weaknesses, and contribute our personal best in all undertakings.

Methods

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Samples

In our study, anonymous social media posts, called "yaks," were examined on two college campuses. The two college campuses sampled were a private technical university (TU) and a private liberal arts college (LAC). TU is a private technical university which is primarily male (80% male), ethnically diverse (53% white), and had a total enrollment of 5774 in fall of 2015. LAC, conversely, is a private liberal arts college which is primarily female (58% female), less ethnically diverse (60% white), and had a total enrollment of 3260 in fall of 2015. Yik Yak separates its users into location-based groups (a five mile radius), so that the content of yaks is primarily from users at the same school. The participants in this study were completely anonymous, therefore no exact demographic information regarding the participants was available. A total of 559 Yik Yak postings were collected at a private technical university (TU) using screen captures. In order to collect a second set of data, a total of 380 Yik Yak posts were collected from a separate private liberal arts college (LAC) in the region.

Procedure

Yik Yak posts were collected in random intervals across a 24-hour day for a 3-day period at each college sampled, total time capturing for each campus was equivalent. Yik Yak was accessed through the Android version of the application. The application allows users to create or view discussions within a 5 mile radius. The yaks were viewed and captured using screen captures of the viewable discussions. Prior to analysis, each yak was transcribed into Microsoft Excel by a research assistant.

Analyses

First, a word cloud was generated for each school using www.jasondavies.com (2016) and

a ranked list of the top 50 most frequent words posted via Yik Yak was compiled. 'Stop words,'

such as *the*, *and*, or *or,* were removed by the word cloud generator and from the top 50 word list

in order to reduce the appearance of unimportant words. This word cloud site provides detailed

information about the algorithm used to generate the results and can be accessed at

www.jasondavies.com. In order to sort the yaks into Dodd's (2002) deindividuation categories,

four undergraduate students were trained in the definitions as a group prior to assigning ratings.

The definitions for each category were based on social psychology literature and commonly used

definitions (see Table 1 for definitions). Each student was randomly selected to examine an excel

spreadsheet containing drop down bars (to eliminate typing errors) in each cell to categorize the

yaks into content and intent categories. The order of the yaks was randomized for each rater and

the raters were randomly assigned in pairs to each university's yaks. Last, Linguistic Inquiry and

Word Count (LIWC) was used to analyze the language of the postings (Tausczik & Pennebaker,

2010). Afterward, an independent samples t-test was conducted on the LIWC results to analyze

the differences between the colleges, if any.

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Results

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Most Frequent Words Used

Each set of yaks was processed to generate word clouds of the top 50 words for the TU

and the LAC. Figure 1 and Figure 2 display the results of the word cloud generator. For quick

comparison, Table 3 includes the top 50 words which were placed in rank order according to

frequency of occurrence. The top three words (Just, I'm, and Like) for both schools were the

same, however looking at the remaining words, there are differences between the campuses. TU

posts talked more about class (n = 39), "TU" (using name of the University) (n = 28), and today

(n = 29), while LAC talked more frequently about girl (n = 26), guy (n = 15), love (n = 19), and

people (n = 25). Interestingly, the frequency of "class" and "TU" at that campus indicates a focus

on education that was not reflected at LAU. While LAC was generally more interested in the

social aspects of college life, the words "fuck," "love," and "sex" made it into the LAC list,

indicating a possible increase in sexual behavior ratings compared to TU. The only swear words

to make it into either word cloud were variations of "fuck." Both campuses had similar usage of

the words Go (TU n = 22, LAC n = 19), someone (TU n = 19, LAC n = 21), and good (TU n =

15, LAC n = 15). The double capital word "GO" pertained to sports teams and college

competitions. The word cloud results are congruent with our prediction that neither campus will

have a strong presence of anti-normative behavior for college students.

Figure 1. Technical University Word Cloud

Figure 2. Liberal Arts College Word Cloud

Table 3.
Top 50 Words Generated from Word Cloud for TU and LAU.

TU			LAC		
Word	n	Rank	Word	n	Rank
Just	49	1	Just	53	1
Im	44	2	Like	41	2
Like	43	3	Im	37	3
Class	39	4	Girl	26	4
Get	38	5	People	25	5
Don't	30	6	Youre	23	6
One	29	7	Fuck	22	7
Today	29	8	Get	22	8
Know	28	9	Someone	21	9
"TU name"	28	10	Don't	20	10
Want	27	11	Love	19	11
Day	26	12	GO	19	12
People	26	13	Time	18	13
Going	23	14	Life	16	14
GO	22	15	Good	16	15
Got	22	16	"LAC name"	15	16
Fuck	20	17	Guy	15	17
Girl	20	18	Know	15	18
Right	19	19	Going	15	19
Someone	19	20	Really	15	20
Getting	18	21	Today	13	21
Need	18	22	Want	13	22
Campus	17	23	Stop	12	23
Fucking	17	24	Better	12	24
Now	17	25	Sex	12	25
Good	15	26	Feel	12	26
Professor	15	27	Day	11	27
That's	15	28	First	11	28
Time	15	29	Got	11	29
Cant	14	30	Cant	10	30
Rain	14	31	COME	10	31
Anyone	13	32	Ever	10	32
Best	13	33	Make	10	33

Table 3. (continued)

	TU			LAC	
Word	n	Rank	Word	n	Rank
Classes	13	34	Fucking	10	34
Make	13	36	Finally	9	36
Morning	13	37	Need	9	37
Rave	13	38	Still	9	38
Really	13	39	Cute	9	39
School	13	40	Class	9	40
Take	13	41	Much	9	41
Think	13	42	Think	9	42
Around	12	43	Never	9	43
Back	12	44	Isn't	8	44
Cold	12	45	Library	8	45
Ever	12	46	Sleep	8	46
Something	12	47	One	8	47
Yak	12	48	Getting	8	48
makes	11	49	McKean	8	49
Still	11	50	Girls	7	50

Deindividuation Categorization

The posts were then categorized into Dodd's (2002) deindividuation categories (Table 1). For TU, the raters agreed on 79% of the content categories and 86% agreement for intent categories. The pair of raters for LAC agreed 70% for content categories and 76% for intent. The yaks which the raters did not agree on were eliminated from the content analysis and analyzed. For TU, shown in Table 4, 5.0% of postings fell into categories reflective of negative deindividuation, such as aggression, escapism, social disruption and sexual behavior, 0.0% of behaviors were rated as prosocial, and the remainder (95.1%) were neutral or miscellaneous. The highest rate of negative deindividuation was sexual behavior (3.4%). Postings from TU were consistent with previous findings: the majority of posts were not reflective of anti-social or harassing behavior. LAC, Table 4, had a higher rate of negative deindividuation, with 14.2% of

postings falling categories reflective of negative deindividuation, a higher rate of prosocial

postings, 0.4% of behaviors, a lower rate of miscellaneous behavior, 84.6% compared to TU at

94.6%. For LAC, the highest rate reflective of negative deindividuation was aggression (6.4%)

followed by sexual behavior (5.2%) and social disruption (1.1%). Analysis of rater disagreement

revealed the majority of disagreement for content categories occurred between rating

miscellaneous versus sexual behavior (37.2% TU, 19.4% LAC), and miscellaneous versus social

disruption categories (21.2% TU, 39.8% LAC) together accounting for over 50% of the

disagreement for each university. While each rater had a manual to reference for definitions of

categories along with the training, each rater may have been influenced by rater bias. The social

media posts contained idioms, sarcasm, irony, and context clues that could be interpreted by the

raters inconsistently. Intent of the Yik Yak posts were rated as overwhelmingly neutral at 98.8%

(TU) and 96.9% (LAC). A chi-square test of independence was performed to examine the

relation between the universities and deindividuation categories. The percentage of yaks rated as

aggressive (χ^2 (1) = 22.33, p < .01) were found to be significantly different. The differences for

all other categories were not significant (Table 4). These results were as predicted in hypothesis

one; the posts were (a) in accordance with the student group norms outlined by the

university/college, (b) contained few posts that may be identified as negative deindividuation,

and (c) deindividuation ratings were similar across campuses. Aggression for LAC was higher

than for TU, occurring more than twice as much (6.4%), and Charity was higher (0.4%). The

absence of academic dishonesty and crime deindividuation categories indicates both groups of

students are behaving within dictated student norms. These results seem to echo the word cloud

results, with LAC focusing more on the social aspects of college: social disruption and sexual

behavior, while TU reflected student behavior related to classes and referencing the university

itself.

Table 4.

Technical University and Liberal Arts College Content Category Frequencies

Content Category	Example	TU		LAC	
		n	% of Total	n	% of Total
Aggression	"This blonde haired pimply bitch of a guy needs to get smacked."	2	0.5%	17	6.4%
Charity	"Folded 2 random people's laundry in McKean earlier... I figured I could use some good karma in my life"	0	0.0%	1	0.4%
Academic Dishonesty	"Essential Math project will pay $60 cash for someone to do it or for the answers"	0	0.0%	1	0.4%
Crime	"Get blazed and eat all the free candy in SGA"	3	0.7%	0	0.0%
Escapism	"I have so much work but napping sounds so much better"	1	0.2%	2	0.7%
Political Activities	"I <3 President Cornwell."	0	0.0%	1	0.4%
Sexual Behavior	"I just want to find a nice athletic girl I can go to the gym with, and then proceed have hot, passionate, hormone driven sex."	16	3.4%	14	5.2%
Social Disruption	"My dad died 9 years ago today. Having the anniversary come up never bothered me before but today I can hardly keep it together. I don't know how to cope and just go to class."	1	0.2%	3	1.1%
Interpersonal Spying and Eavesdropping	"Today in class I watched someone in front of me enter their phone password" "1738". God help this generation"	0	0.0%	1	0.4%
Travel	"anyone else driving home for break? I've got 1,300 miles ahead of me on Sunday"	2	.5%	1	0.4%
Miscellaneous	"anyone else playing smash bros on wiiU?"	417	94.6%	226	84.6%
Total Content Categories Identified		442		267	

Table 5.

Technical University and Liberal Arts College Intent Category Frequencies

Intent Category	Example	TU		LAC	
		n	% of Total	n	% of Total
Prosocial	"free oreos in the college of arts and craft"	1	0.2%	2	0.7%
Antisocial	"Sometimes I wish we could install a gas tank under the entrance to the library so that when people decide they're going to smoke in that smoke free area they'll just blow themselves up"	2	0.4%	6	2.1%
Nonnormative	"That moment when you and your crush are alone and she shits on your chest"	3	0.6%	1	0.4%
Neutral	"fluffy Aint that funny"	476	98.8%	279	96.9%
Total Intent Categories Identified		482		288	

Linguistic Analysis

For further analysis, the yaks were run through the Linguistic Inquiry and Word Count (LIWC). An independent samples t-test was conducted, with equal variances assumed, to compare LIWC scores for TU and LAC, as seen in Table 6. There was a significant difference for TU (M = 84.9, SD = 15.3) and LAC (M = 88.4, SD = 13.3) for dictionary words used (percentage of all words captured by the program); t(957)= 3.64, p < .01. LAC used more dictionary words than TU, indicating more informal and nontechnical language at LAC. Another significant difference for TU (M = 13.6, SD = 10.2) and LAC (M = 16.8, SD = 11.2) was for total pronouns used; t(957)= 4.55, p < .01, capturing personal pronouns and indefinite pronouns. There was also a significant difference for TU (M = 46.7, SD = 15.6) and LAC (M = 50.7, SD = 15.9) for function words used; t(957)= 3.89, p <.01. We can assume this significance results from the function category containing the total pronouns category, as well as personal pronouns,

impersonal pronouns, articles, prepositions, auxiliary verbs, common adverbs, conjunctions, and

negations., There was also a significant difference for TU (M = 50.6, SD = 40.1) and LAU (M =

56.8, SD = 38.9) for authentic words used; t(957)= 2.37, p < .05. This result indicates that

postings at LAC were more authentic than at TU, as indicated by lower cognitive complexity,

fewer self-references, fewer references to others, and more negative emotion words. Finally,

there was a significant difference for TU (M = 6.8, SD = 8.3) and LAC (M = 8.1, SD = 10.0) for

affective processes words used; t(957)= 2.20, p < .05. LAU showed a greater use of affective

processes, indicating a larger degree of emotionality consistent with the difference in gender

composition at the two campuses. All other linguistic analyses were non-significant or equal

variances could not be assumed.

Table 6

Independent Samples t-test of the Linguistic Analysis of Yik Yak posts using LIWC

Category	Example	TU		LAC		t-test
		M	SD	M	SD	
Word Count		14.32	8.32	14.87	8.05	ns
Summary Language Variables						
Analytical thinking		55.41	36.57	48.51	38.55	nv
Clout		51.70	34.28	51.94	37.00	nv
Authentic		50.58	40.15	56.79	38.93	2.37**
Emotional tone		39.84	36.92	40.54	37.87	ns
Words/sentence		11.10	6.45	11.52	6.25	ns
Words > 6 letters		15.49	12.86	14.99	12.49	ns
Dictionary words		84.91	15.26	88.39	13.31	3.64*
Linguistic Dimensions						
Total function words	it, to, no, very	46.67	15.64	50.72	15.94	3.89*
Total pronouns	I, them, itself	13.62	10.15	16.80	11.20	4.55*
Personal pronouns	I, them, her	8.52	8.35	12.28	9.92	nv
1st person singular	I, me, mine	4.52	6.35	6.99	8.69	nv
1st person plural	we, us, our	0.63	2.50	0.37	1.68	nv
2nd person	you, your, thou	2.35	4.85	3.57	6.34	nv
3rd person singular	she, her, him	0.59	3.13	0.71	2.74	ns
3rd person plural	they, their, they'd	0.42	1.73	0.64	2.52	nv

Impersonal pronouns	it, it's, those	5.10	6.97	4.52	5.77	nv
Articles	a, an, the	5.76	6.10	6.14	6.65	ns
Prepositions	to, with, above	11.34	8.41	11.08	8.40	nv
Auxiliary verbs	am, will, have	8.63	8.34	8.90	7.74	nv
Common Adverbs	very, really	5.35	7.07	5.79	6.37	nv
Conjunctions	and, but, whereas	4.87	5.75	5.48	6.56	ns
Negations	no, not, never	1.84	4.18	2.08	4.02	ns
Other Grammar						
Common verbs	eat, come, carry	17.89	10.36	18.38	10.00	ns
Common adjectives	free, happy, long	4.98	6.90	5.28	7.93	ns
Comparisons	greater, best, after	1.91	4.00	2.39	5.13	nv
Interrogatives	how, when, what	2.01	3.86	2.15	3.92	ns
Numbers	second, thousand	1.95	4.87	1.23	3.72	nv
Quantifiers	few, many, much	1.70	3.96	1.81	3.88	ns
Psychological Processes						
Affective processes	happy, cried	6.82	8.29	8.13	10.04	2.20**
Positive emotion	love, nice, sweet	3.50	5.96	4.17	6.46	ns
Negative emotion	hurt, ugly, nasty	3.29	6.30	3.89	8.13	ns
Anxiety	worried, fearful	0.29	1.74	0.65	5.44	nv
Anger	hate, kill, annoyed	1.73	4.67	1.64	4.36	ns
Sadness	crying, grief, sad	0.35	1.97	0.89	3.84	nv
Social processes	mate, talk, they	9.00	9.79	12.00	10.89	nv
Family	daughter, dad, aunt	0.18	1.32	0.27	1.39	ns
Friends	buddy, neighbor	0.57	2.46	1.00	3.08	nv
Female references	girl, her, mom	0.94	3.30	1.17	4.07	ns
Male references	boy, his, dad	0.73	3.35	1.13	3.29	nv
Cognitive processes	cause, know, ought	10.28	9.78	11.27	10.12	ns
Insight	think, know	1.89	3.94	2.07	4.12	ns
Causation	because, effect	1.37	3.30	1.42	3.42	ns
Discrepancy	should, would	1.92	4.36	1.94	4.20	ns
Tentative	maybe, perhaps	2.52	4.94	2.59	4.53	ns
Certainty	always, never	1.40	3.55	1.62	3.54	ns
Differentiation	hasn't, but, else	2.46	4.86	2.98	4.65	ns
Perceptual processes	look, heard, feeling	3.36	6.04	2.98	5.30	ns
See	view, saw, seen	1.26	3.85	1.10	3.25	ns
Hear	listen, hearing	0.69	2.49	0.82	2.64	ns
Feel	feels, touch	1.05	3.30	0.96	3.04	ns
Biological processes	eat, blood, pain	4.71	9.78	4.92	7.81	ns
Body	cheek, hands, spit	1.94	6.62	1.55	4.59	ns
Health	clinic, flu, pill	0.55	2.34	0.80	2.89	nv

Sexual	horny, love, incest	1.59	7.09	1.47	4.32	ns
Ingestion	dish, eat, pizza	1.10	4.19	0.92	3.25	ns
Drives		7.71	9.03	7.69	8.02	ns
Affiliation	ally, friend, social	1.90	4.93	2.56	4.69	nv
Achievement	win, success, better	1.30	3.79	1.30	3.22	ns
Power	superior, bully	2.64	5.29	2.29	5.35	ns
Reward	take, prize, benefit	2.24	4.64	1.69	3.66	nv
Risk	danger, doubt	0.60	2.31	0.65	2.74	ns
Time orientations						
Past focus	ago, did, talked	2.50	5.14	2.61	4.83	ns
Present focus	today, is, now	13.58	10.15	13.56	9.27	ns
Future focus	may, will, soon	1.31	3.44	1.36	3.39	ns
Relativity	area, bend, exit	15.53	12.75	14.48	11.20	ns
Motion	arrive, car, go	1.92	4.31	2.47	4.84	nv
Space	down, in, thin	7.46	8.12	6.15	7.27	nv
Time	end, until, season	6.20	9.44	6.04	7.74	ns
Personal concerns						
Work	job, majors, xerox	3.39	6.35	2.57	5.21	nv
Leisure	cook, chat, movie	1.73	4.88	1.71	4.30	ns
Home	kitchen, landlord	0.58	2.32	0.57	2.20	ns
Money	audit, cash, owe	0.41	1.88	0.44	2.20	ns
Religion	altar, church	0.27	1.55	0.12	1.39	nv
Death	bury, coffin, kill	0.18	1.43	0.36	2.70	nv
Informal language		3.17	7.13	3.18	5.93	ns
Swear words	fuck, damn, shit	1.99	6.31	1.62	4.10	nv
Netspeak	btw, lol, thx	0.87	3.22	1.11	3.69	nv
Assent	agree, OK, yes	0.17	1.13	0.23	1.41	ns
Nonfluencies	er, hm, umm	0.16	1.14	0.12	0.82	ns
Fillers	Imean, youknow	0.05	0.57	0.03	0.39	ns

*p<.001, **p<.05, N for TU = 579, N for LAU = 380.

Note. M = Mean, SD = Standard Deviation, ns = not significant, nv = non-equal variances.

Discussion

The primary goal of this study was to examine how deindividuation occurs in anonymous social media, and determine the amount of negative deindividuation present leading to non-normative behavior. The work addressed and tested the media-based assumption that anonymous

social media postings reflect negative and antisocial behaviors. The results of this study indicate

that while anonymous social media does provide an avenue students could use to harass and

attack others, the majority of anonymous social media posts are typical of normal college student

behavior, and are neither negative nor anti-social. According to the SIDE, it was hypothesized

(H1) that the students would behave in congruence to their most salient social identity while

using anonymous social media. Within the limitation of a 5 mile radius, the posts are almost

solely composed of the respective student communities and students understand their behavior

should fall within the rules of the university, which it primarily appears to do.

A word cloud analysis was conducted to represent the frequency of the words used

between each college campus. Both colleges had very similar word clouds; furthermore, the top

50 words do not particularly indicate anonymous social media's negative reputation was well-

earned. The only major difference between the two word clouds was the stronger focus on the

social aspects of college life in the LAC word cloud compared to the TU's word cloud. This

could be due to the increased social aspect of a predominantly female liberal arts college when

compared to a majority male technical university.

Deindividuation ratings presented in the study, based on Dodd's (2002) categories,

identified the types of deindividuation prevalent within each campus. While LAC did have

higher total ratings of negative deindividuation than TU, LAC also had more charity. This

difference may be attributable to a higher percentage of female students at LAC than at TU. The

majority of deindividuation at LAC was reflective of a high rate of aggression and sexual

behavior, which may not be anti-normative for a college-age population at a liberal arts college.

Importantly, neither LAC nor TU had a high rate of postings related to crime or academic

dishonesty. This is congruent with the idea that the most salient social identity among the

anonymous social media posts is the student identity of each respective university. Hypothesis one was supported, the individuals who used anonymous social media posted within the school norms outlined by the university/college, contained few posts identified as negative deindividuation, and were similar across campuses.

Linguistic analysis of the anonymous posts using LIWC (Tausczik & Pennebaker, 2010) revealed a higher rate of authenticity, affective processes, total pronouns, and more dictionary words used for LAC. These results support hypothesis 2, individuals from the liberal arts college who posted used more pronouns and more emotion words (affective processes). While affective processes and total pronouns are largely correlated with the gender differences (Newman et al., 2008), many of the other expected linguistic gender differences were not significant. Hypothesis 3 was not supported. Hypothesis 4 was partially supported, the colleges examined in this study displayed similar levels of group cohesiveness indicated by non-significant differences in word count and first person plural. However, LAC did post using more emotion words and were rated higher in negative deindividuation, indicating increases in group immersion led to an increase in deindividuation by increasing the salience of a possibly negative social identity. Dictionary words reflect the more social and informal nature of LAC posts, whereas the higher rate of authenticity is the most interesting. If LIWC was more accurate at detecting false statements, one could argue the reason deindividuation may be higher for LAC is that the LAC students are more honest in their postings. An argument could be made that the salient social identity for LAC reflects stronger negative deindividuation than TU, but in the same sense, you could argue LAC may be less salient toward social identity, allowing for greater personal autonomy and, therefore, more openness in postings. Less focus on the student social identity and more focus on the personal identity of the individuals at LAC may allow anonymous social media posters, behind

the shroud of anonymity, more freedom to express statements they would not normally make otherwise.

A major advantage of this study was the very natural setting and high external validity of the analysis. As we only captured posts randomly from the two campuses, we were not able to manipulate or gather additional information due to the anonymous nature of the posts. However, for the same reasons, there were several limitations apparent in the data. Without the ability to gather social identity variables, perceived group norms, and saliency, it is difficult to determine the underlying reasons for deindividuation shown in postings. With Yik Yak's level of anonymity, while providing the full power of its influence, it is impossible to determine the exact demographics of the sample or follow-up with any individuals for further analysis. Future studies could extend the analysis provided through developing a social identity dictionary for LIWC analysis, allowing for a clearer picture of deindividuation in anonymous social media posts. A simpler route could be to use some of the upcoming features of Yik Yak, such as private chat, to follow-up with willing posters and gather psychological variables directly from them.

The present study provided information about the content of anonymous social media postings and how they may differ across contexts, based on unique characteristics of the campuses from which postings are done. It is important to note that the present study found relatively little of the negativity and antisocial intent in anonymous social media postings that has been focused on in the popular media. Although much of the present study used descriptive information, it also utilized respected theory and accepted analytical techniques in reaching the results presented. This type of research is needed in examining the actual, rather than purported, content of social media platforms and could be used to more accurately inform the general public about social media platforms as they arise and become popular.

Appendix A

Content and Intent Category Definitions

- Content Categories
    - o **Aggression:** Any behavior enacted with the intention to harm another person who is motivated to avoid that harm.
    - o **Charity**: The voluntary giving of help to those in need.
    - o **Academic Dishonesty**: Any type of cheating that occurs in relation to a formal academic exercise.
    - o **Crime**: Any behavior involving illegal activities.
    - o **Escapism**: Mental diversion by means of entertainment or recreation, as an "escape" from perceived unpleasant, boring, arduous, scary, or banal aspects of daily life.
    - o **Political Activities**: Activity or discussion directed toward the success or failure of a political party, candidate, or group.
    - o **Sexual Behavior**: Any behavior or activity that induces sexual arousal, or the expression of sexuality through various sexual acts.
    - o **Social Disruption**: The alteration or breakdown of one's social life.
    - o **Interpersonal Spying and Eavesdropping:** Secretly listening to or watching the private conversations or actions of others without their consent.
    - o **Travel:** To go on a trip or journey, typically of some length or abroad.
    - o **Miscellaneous:** Not pertaining to any other category.
- Intent Categories
    - o **Prosocial:** Any behavior intending to benefit others.
    - o **Antisocial:** Behavior intending to injure another or deprive others of their rights.
    - o **Nonnormative:** Violating social norms, but neither helping nor hurting others.
    - o **Neutral:** Does not fit in any of the other three categories.

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