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# Meme culture and suicide sensitivity: a quantitative study

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People worldwide are bogged down with a multitude of issues, many of which may need some form of coping mechanism to counteract the negative beliefs that accompany those issues. For many, memes have become that coping mechanism. Looking at memes, the present study ascertained the effects that constant viewing of memes has on sensitivity when dealing with one of the most difficult concerns anyone can face, suicide. Using a pre-test/post-test design, participants ( $n = 51$ ) were given a questionnaire to see how familiar they are with certain memes and to create a baseline for reactions to key phrases. The level of familiarity is broken down into three groups to understand the long-term effects of memes. The short-term effects were decided based on the intervention phase. During the intervention phase, the experimental group saw memes about suicide and depression, while the control group saw generally themed memes before the post-test was taken. Data is analyzed looking for a change between baseline and post-test results. The findings have shown that there are no long-term effects of memes which is a good sign, but there is a short-term effect and that is where the danger lies. Authors believed that findings would show a decrease in suicide sensitivity after participants view the suicide/depression-themed memes. In the end, the study found that the effects of memes are not long-term, but in fact only affect viewers for a limited time. Further research needs to be conducted in order to arrive at a more representative sample and subsequent conclusion.

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The purpose of this research study is to understand the effect of memes on suicide sensitivity. ‘Sensitivity’ is used in this study as a term for awareness and understanding of contributing factors and the overall impact of suicide. In this research, suicide sensitivity is defined as the understanding that suicide can have multiple explanations and that all cases of suicide, lethal or not, have their own stories. The sensitivity aspect relates to how well someone understands and reacts to the concept, or act, of suicide. The researchers believe that as more memes are viewed, people can become desensitized to harrowing issues that may afflict themselves or others including suicide, and suicidal ideation. The goal is to examine the possible correlation between memes and a more comical view of suicide. As meme culture permeates into their lives, people are frequently interacting with their worlds through the lens of memes. From Heylighen (1997, 1998) as cited by Mazambani et al. (2015) “when individuals encounter information through reading, listening, or observation, the information is transmitted from one person to another, leading to the transfer of information. Thus, manipulating and sharing a picture on the Internet and imitating the language of another user in a post are examples of information transmission and transfer.” These memes can be about a wide variety of topics, but the present study focused on memes related to mental health issues including depression and suicide. According to the World Health Organization (WHO), “every 40s, a person commits suicide in the world and calculated that for every person who commits suicide, 20 others attempt it” (WHO, 2019, 2020 as cited by Aquila et al., 2020). During the current pandemic, these numbers may increase, and so we must examine all possible risk factors for suicidal behaviors. For this purpose, the researchers believe that the examination of memes and their impact on suicide sensitivity is of ever-increasing importance due to their comical nature toward depression and suicide.

Background research focuses on three main themes, and was used to create a bridge for the current research question: Does meme culture impact suicide sensitivity? Currently, while there is research discussing memes, suicide in graduate students, and depression in graduate students separately, there is no research combining all three topics together to analyze how memes are connected to suicide or depression. The choice to focus on Social Work (SW) graduate students is due to the researchers wanting to study a group who faces a lot of stress, and will eventually need to cope to perform well in their chosen profession. In this study, we looked to fill in the gap in the literature by examining how memes may affect views on suicide and depression, either increasing or decreasing suicidal sensitivity. The researchers hypothesized that as meme culture permeates the worldview of Social work students, there will be a decline in suicide sensitivity in that the students will become more desensitized when they are presented with issues related to suicide.

## Literature review

**Meme culture in literature.** A meme is defined as a “cultural replicator that gets passed from human to human via imitation” (Dawkins in Jenkins, 2014). As these replicators are passed, they include information about what is funny, or interesting in the dominant culture. The more people consume a specific meme, the more likely it is that the meme will be replicated across “speech and writing” (Mazambani et al., 2015) and can even evolve to create new versions of the original. This replication is important because as soon as a meme is no longer passed on in some form, it becomes a dead meme. These dead memes fall off and can be likened to a product that consumers no longer wish to purchase. On the other hand, a popular meme will usually kill off other meme formats as the “increase in replication must come at the expense of the

replication of another meme format” (Roy, 2017). In a more physical sense, memes are typically pictures that include words relating to the picture in a way to create a joke, sometimes at the expense of the picture or a topic. Memes have also evolved to include videos and gifs allowing for a wider audience to interact with them. Since the creation of memes there have been many types of memes including the current moth/lamp meme (Supplementary Graph 1) ([Untitled moth meme], 2018), car salesman meme (Supplementary Graph 2) ([Untitled car salesman meme], 2018), and even older memes including Ebola-chan (Supplementary Graph 3) ([Untitled Ebola-chan meme], 2014), and the classic win/fail memes (Supplementary Graph 4) ([Untitled win/fail meme], 2010).

Using specific examples of meme culture allows for a more in-depth analysis of how a certain meme can be spread and how it can affect culture. Cultural studies in particular aspire to derive meaning and significance from what many academics would find to be absent of academic rigor (Szeman, 2002). Jenkins (2014), and Marcus and Singer (2016) discuss the examples of win/fail and Ebola-chan, respectively. Win or failure modes are a popular meme format where a situation is analyzed for its intrinsic value either positively or negatively. The win or fail mode can be applied to a multitude of situations including being a bad parent (parenting fail), or even to other memes such as Ebola-Chan. In 2014, Ebola-chan was created in response to the Ebola outbreak worldwide. Marcus and Singer (2016) conclude that she represents a multi-vocal perspective in that she is a voice for those afraid of and those amused by the mortality of people. By creating the Ebola-chan meme, both modes can be applied in that those who create her are meme failures, but those that love her would see Ebola-chan as a meme win. As Ebola-chan spread, her many forms (created by artists) gave rise to new versions of the original meme. From a small child to a voluptuous woman and back, Ebola-chan has evolved to include new forms of speech and writing as proposed by Mazambani et al. (2015).

As we see the modes of win or fail in different types of memes, we must also see that memes can alter and affect behavioral responses to a great many topics. Whether this is acceptance or disgust at the creation of Ebola-chan, memes may possibly affect their own propagation. In different groups of people, memes may affect the behavior of group members leading to a greater attachment to a group, or the ideals of that group. “Memes are typically unique to each individual community and are created to mark the group as different from others in an easily identifiable fashion (Mina, 2018; Nissenbaum and Shifman 2017 as cited DeCook, 2018). As the community grows, the memes that members send out become a rallying cry for new members to join. As they join, they are indoctrinated under the memes affecting their behavior and ideas. When attachment to the group increases, the behavior of members may be affected leading to an increase in meme distribution and an uptick in connectivity between members (Chen, 2012).

**Graduate students in literature.** Post-undergraduate degree, the decision to continue forth toward a graduate degree comes with a new set of factors. Among graduate students, there are increased feelings of entrapment, lowered self-worth, and increased enjoyment of self-deprecation (Ask and Abidin, 2018). The culmination of all three creates a sort of reciprocal determinism in which the environment (graduate classes) affects the individual (entrapment/ lowered self-worth) who then behaves (self-deprecation) in a way that makes them feel the environment is normal. Self-deprecation is mostly shown in the idea of one-downmanship where the individual willingly makes fun of their own bad situation trying to out-manuever their peers to prove whose life is worse (Ask and Abidin, 2018).

As the student creates a meme based on one-downmanship, they are adding to the pool of meme culture predominantly based on relatability. As fellow graduate students relate to the meme, all are acknowledging and denying their own feelings of lowered self-worth and entrapment. Social comparison among graduate students may lead to these feelings as they are either trapped by their classes, lack of funds, guilt, or the success of their peers in comparison to themselves (Longfield et al., 2006; Sturman and Mongrain, 2008). These feelings hinder graduate students from enjoying time in their programs while increasing mental health issues. Chief among the issues are depression and suicide which have been shown to be increasingly more rampant in graduate communities.

**Suicide in literature.** Mental health in graduate students has been on the decline in recent years and under such high stress, thoughts of suicide are likely to seep into the mind. It is fascinating to note that suicide rates are highest for graduate students and those over the age of 25 (Moffitt et al., 2014). “Among graduate students, the rate of suicide per 100,000 was 9.1 for women and 11.6 for men, compared to 3.4/100,000 for undergraduate women and 9.1/100,000 for undergraduate men.” As many graduate students are around this age either before starting or during their programs, this statistic is quite alarming. Using the Interactive Screening Program (ISP) in colleges has been very useful in finding graduate students who are at risk of suicide attempts or ideation. Implemented by Moffitt et al. (2014), the program was designed to find students with untreated mental health issues. Following up, Garcia-Williams et al. (2014) used the ISP to administer the Patient Health Questionnaire (PHQ-9) to find a greater breakdown of the issues affecting graduate students. The decision to focus on graduate students is an attempt to fill in the gaps in research, related to the study of memes, left by other sources.

Previous research lacked the exploration of the difference between undergraduate and graduate students which left a gap in research to be exploited. Brownson et al. (2011) analyzed the differences and found that graduate students are less likely to attempt or ideate suicide when compared to undergraduate students. Paradoxically though, graduate students were more likely to die by suicide. The paradox created is yet another gap in research waiting to be filled in leading to Garcia-Williams et al. (2014) and Moffitt et al. (2014). Many of the factors associated with suicidal feelings in graduate students harken back to the previously discussed topic “Graduate students” which include entrapment, guilt, and lowered self-worth. Additionally, feelings of depression, hopelessness, and lack of control were reported by many of the graduate students.

**Methodologies of literature.** The purpose behind sampling these articles is to gather information on topics that surround the memes, the students, and suicide. By taking information from these sources, we can begin to close the gap in the literature.

Some of these articles sampled for graduate students, others sampled for chat forums with people discussing topics within entertainment and politics, and a few focused on sampling different memes and their reactions to them. To further understand the articles selected, we have analyzed them for similarities, differences, and limitations in their sampling, data collection, and testing methods. This section specifically details the methodologies employed in existing literature (mentioned throughout the literature review), not our own.

**Sampling in literature.** A variety of sampling methods were used in the existing literature. Web-based or internet-based

(e.g. Marcus and Singer, 2016) method of sampling was used as well as simple random and stratified random sampling (e.g. Brownson et al., 2011). Internet sampling used emails to reach out to participants as well as a “web crawler” (Mazambani et al., 2015) to find websites and participants. The sampling technique of emailing students is called convenience sampling, which limits external validity, or generalizability. The “web crawler” is based on convenience sampling in that once the program was created, researchers simply let the program find convenient websites.

Simple random and stratified random sampling allows for more generalizability from the articles. Simple random sampling takes a population and, without creating boundaries, finds as many participants as possible. In stratified random sampling, boundaries are created in the form of categories or schools, and then researchers will attempt to find a specific amount of participants from each category. Studies using stratified random sampling chose to have 70 categories: 70 college campuses (Brownson et al., 2011), and choosing a specific college, Emory College (Moffitt et al., 2014), and the categories were different departments within the school including art history, anthropology, behavioral sciences, etc.

**Data collection in literature.** Existing studies generally elected to use two separate categories of data collection. First was the use of websites across the internet including Facebook, and second was the use of in-person interviews, surveys, and questionnaires, others were a mix of the two (Ask and Abidin, 2018): Facebook and in-person interviews to collect data.

Studies using the internet collected memes as their data, either through Facebook, or through random websites found to fit into certain categories including politics, and special interests. Once the memes were gathered, they were coded on a variety of factors including who posted the meme, and what was the content of the meme. The study that used Facebook to gather memes took a step further and used students to get anecdotal data related to the relatability of the meme content. The anecdotal data came from an in-person workshop which connects to other studies found in the existing literature. Studies using surveys or questionnaires can further be broken down to being focused on quantitative studies including the Patient Health Questionnaire (PHQ-9), Stress and Depression questionnaire, Entrapment scale, etc. Existing studies have also used qualitative data collection to gain opinions and beliefs expanding beyond a simple Likert-type scale. The information gained included how relatable a meme is, and feelings related to finances, social activity, guilt, etc.

**Testing in literature.** Existing studies used qualitative approaches to testing in that the open-ended questions were coded based on recurring themes and analyzed. Other studies used quantitative techniques like ANOVA, Mixed methods, Chi-squared, and regression analysis.

Qualitative research methods “allow research procedures to evolve as more observations are gathered...generating deeper understandings of the meanings of human experiences” (Rubin and Babbie, 2016). Studies using this type of research are aiming to find out the real, in-depth responses of their participants instead of simply finding a numerical value to attribute to a question. While this method is useful to flesh out responses, there are also drawbacks including the possibility of biasing the responses. Other studies use focus groups to gather data which is helpful to gather a large amount of information all at once, but principles of conformity proposed by Solomon Asch show that in group settings we consciously desire to be similar to other people especially when we are the fourth or fifth person to present our thoughts (Lilienfeld et al., 2018). This desire to be similar to others can bias our responses in that we may say something

completely different than what we actually think because we “want to fit in.” A qualitative study (Moffitt et al., 2014) used an online source to find participants willing to come in for a therapy session. The sessions were one on one, which can reduce the risk of conformity, but working one on one with a counselor can also introduce a bias. The counselor’s reactions and tone of voice alone can affect the responses of the participant as they may try to alter their answers to make the counselor happy. In both cases of qualitative research, the risk of bias was present and needed to be reduced. Bias can be removed by switching to a quantitative approach (e.g. Garcia-Williams et al., 2014) to research which will be the basis of the current study.

*Quantitative research in literature.* Quantitative research methods “typically seek to produce precise and generalizable findings” (Rubin and Babbie, 2016, p. 46). Quantifying information in research can usually be performed using a Likert scale involving choices. Usually better to choose an odd number of choices, such as 1–5, a Likert scale will gather information using choices such as 1—“Not at all” and 5—“All the time.” The scale can be increased to include more options, such as 1–10, or even pictures instead of words (i.e. a pain chart using faces to rank pain). Like qualitative research, quantitative research includes both positive and negative factors that can either improve or jeopardize any study.

*Pros.* Besides reducing biases, as mentioned previously, there are a few benefits to choosing quantitative research. As questionnaires will usually use Likert scales with numbered responses, instead of open-ended questions, coding the responses is a lot simpler leading to more breadth of information gained. Researchers will simply need to take the number which relates to the response instead of reading through an entire response. This leads to the benefit of time saved; without the need to read everything stated by a student, the researchers are able to reduce the amount of time it takes to collect and analyze data. Finally, quantitative research lends itself more to statistical testing as it uses numbers generated by the participant instead of coding generated by the researchers which allow for a simpler transition into analyzed data.

*Cons.* Quantitative research works almost as the opposite of qualitative when it comes to the pros and cons of the two methods. The lack of a personal touch in quantitative research limits the amount of data that can be gathered. Simple numbers cannot fully engross the depth of information that qualitative research garners. This type of research is also subject to the possibility of acquiescence or naysaying which is strongly agreeing to all questions, or strongly disagreeing with all questions, respectively, on purpose. Participants are subject to boredom or fatigue which may lead to the desire to finish a task as soon as possible resulting in this behavior (Morling, 2018). Finally, questions are limited in that there will be no editing of the questionnaire/survey once it is created. In qualitative research, an interesting response can spawn new questions, but there will be no interesting responses when the answers must fit within the ratings of a Likert scale.

*Exploratory research in literature.* In social work, an exploratory research aims to fill in the gaps of previous research. “This purpose is typical when a researcher is examining a new interest, or when the subject of study is relatively new and unstudied (Rubin and Babbie, 2016). For the current study, no direct research has breached the topic at hand, but the research presented here is relatable. Existing research relates to meme culture for graduate students and discussions of suicide in graduate students. The creation of the current study and its subsequent results will hopefully open the path for more research to be performed relating memes to a variety of topics.

**Limitations in literature.** As most research, if not all, includes limitations of some sort, it is worth analyzing those sections of the supporting research. The limitations have been sorted into two categories: “Sampling” and “Data collection.” These categories allow us to see the majority of the limitations of those articles. No meta-analysis is included in the methods of the current study.

*Sampling.* Studies that used either the internet or the web crawler to find their samples are strong with internal validity but focused on nonrandom sampling which leads to low external validity. They are unable to generalize as they are skewed towards specific populations including certain websites, and genders. Through the use of random sampling, a study can boost its external validity but as they are two sides of the same coin, internal validity will be decreased. Without internal validity, a study risks being unable to prove that it is testing what it claims to be testing. By using the methods of randomly selecting participants, you may find people who do not qualify for the study, or you may introduce factors that may confound your variables risking a skew in the data. Finally, one article chose to use stratification as its sampling technique, which can lead to higher levels of sampling error.

*Data collection.* Existing research used Facebook, or the internet, to collect data which can help with the amount of time it takes to gather data, but there are issues here as well. Online questionnaires and surveys offer anonymity which allows for the possibility of pretending to be another person with no oversight. Additionally, being unable to see the person responding to the survey removes the aid of body language to make sure the answers are clear and the participant is not lying. Other studies that used in-person focus groups, questionnaires, or surveys have their own limitations. By interacting with the participant, a researcher’s behavior, or tone of voice, can bias an individual’s responses to the questions. It is also possible that participants will alter their responses to the questionnaires. If a participant believes they know what the researcher wants to hear, they may change their answers to make sure they are a “good” participant or in some cases, a “bad” participant. “This phenomenon is known as socially desirable responding, or faking good/bad” (Morling, 2018, p. 162).

Within the studies choosing to use an in-person method of data collection, there are limitations to the question of qualitative versus quantitative. Studies that used qualitative data collection are limited by the need for high interrater reliability. Requiring multiple people to agree on the topics introduced in response before it can be coded takes time and effort away from other responses, or participants. Other studies using quantitative data collection methods did not allow for variation in responses or depth of information. While breadth is gained, losing depth reduces the ability to gain insight into the answers given by participants.

**Results in literature.** As the research question of the current study has not already been explored, it is important to analyze the results based on the original three major themes presented. Existing research discusses meme culture which shows that memes are spread based on a cultural understanding. Studies also discuss the mental health status of graduate students and the last three articles focus on the suicidal ideation/attempts by graduate students. Some memes are spread based on rhetoric such as winning or failing, while others may be passed along because they relate to a group of people. There is humor in the one-downmanship displayed by students trying to relate to one another, while the Ebola-chan meme tries to alienate and scare other meme consumers, which is to say that some memes are

created for comedy, while others may be created for the sake of harming others. This alienation may be the desired effect of Ebola-chan as it may make others feel despair at the rise of Ebola, but may also bring joy to other consumers who find it funny with no other way of expressing that humor. Graduate students have displayed feelings of depression, suicide, anxiety, etc., and while the scores are lower than undergraduate students, the suicide rates are highest for graduate students over the age of 25 (Moffitt et al., 2014). The results of the existing research reviewed paint a picture of increasing rates of depression and suicide along with the increase and spread of memes. As there may be an illusory correlation between memes and suicide, the current study aims to find out how desensitization to suicide in graduate students may be due to the spread of meme culture.

## Methodology

**Overall design.** A quantitative research design is employed for this study to find a baseline and then post-intervention data. The choice for quantitative methods was simple as the researchers want to promote easily analyzed data while reducing the chance of biasing responses. As we looked at how participants responded to emotionally charged statements and rated them on their level of agreement, biasing responses could lead to skewed results causing the possibility of type I or II errors. Likert scales were employed to gather data on meme familiarity and agreement/disagreement on feelings about suicide. The participants were students enrolled in the College of Staten Island's (CSI) Social Work program and were recruited using purposive convenience sampling during the 2019 Spring semester.

## Participants and sampling

**Participants.** For the purposes of the study, the researchers used purposive convenience sampling to find participants. In quantitative research, more participants are needed and as such, it is beneficial for the researchers to pull participants from the population of SW students enrolled at CSI. Participation in the study was entirely voluntary, did not impact any students if they decided not to participate, and there was no benefit to participating if they decided to be in the study. All of the students in the program are above the age of 18 and all either have or will have bachelor's degrees in various fields which can be assumed because they are enrolled as social work majors, or are in an accredited master's level program. All other demographic data will be obtained using a questionnaire to be discussed later.

Being in the same program, or working with professors in the program, made the population of students available to the researchers. SW students offer a rare trait that needs to be analyzed making them perfect candidates for this study. They are based in a caring field designed to create professionals who care deeply for other people, sometimes at their own expense. When the student becomes licensed, they are fully able to work in this field helping others deal with intimate traumas and difficulties where other professionals may not be able to perform. One would imagine that these SW students are highly sensitive to the plight of others including feelings of depression, suicide, and suicidal ideation. What happens when that sensitivity decreases? What could cause that sensitivity to decrease?

Memes have become vehicles to spread ideas, jokes, and beliefs among the vast majority of people using social media, or simply the internet. SW students are not immune to spreading memes, and these memes can encompass many different topics including politics, food, movies, or even suicide and depression. The interaction between suicide/depression memes and Suicide sensitivity is the basis of this research, but could memes be the reason for a decrease in sensitivity? The current research is

designed to answer this question, and the researchers believed that findings would show that memes would highly correlate with a decrease in sensitivity as viewership rises. The implications of decreased sensitivity in SW students may highly impact their ability to correctly treat a client in future interactions. In worst-case scenarios, intervention strategies may need to be discussed before final licensure.

**Sampling.** Knowing the population of SW students is available to the researchers, purposive convenience sampling will be used to narrow down the participants. Over 100 students are enrolled in the MSW program alone and we looked for about 50–60 participants to join the study, eventually finding 51 participants. The researchers visited multiple lectures in an effort to personally introduce the study to the SW student population. The introduction of the study is limited so as not to give away the main hypothesis of the study, but with enough detail to let participants have a broad understanding of what is expected of them when they volunteered to join the study. Before coming to conduct the study, the researchers had the professor of the course email the link to the study to the class. All students in the program are required to have email addresses registered with the school and so it is safe to assume that the entire population will have access to a computer. If not, the participants were able to access the link using their phones. Participants were broken down into experimental and control groups based on the order of classes visited where experimental group members were tested first in one class and then followed by another class devoted solely to the control group.

## Data collection

**Procedure.** When participants clicked on the link they were brought to a page where they read over the informed consent and needed to agree before being given the link which lead to the questionnaire. The questionnaire given is the same regardless of the assigned group and included 25 questions. The first eight questions are demographic ranging from race, age, religiosity, etc. Following demographic questions, there were five memes using a Likert scale to determine familiarity with memes (Supplementary Graphs 5–9). The scales were measured from one to three where one is "Not at all familiar" and three is "Very familiar." The memes used in this part are combinations of new, old, common, or obscure such as the spider-man meme archetype which is common, yet old. Meanwhile, in contrast, the car salesman meme archetype is new/common and the Loops cat meme archetype is new/obscure. These memes are part of the general culture of memes and can reliably show familiarity.

The final 12 questions, or phrases, use a different Likert scale which is rated from one to seven, where one is "Strongly disagree" and seven is "Strongly agree." Each question is a specific phrase or belief in which the participant is to rate their feelings about suicide. These are special as only these 12 questions were used as part of the pre and post-test, while the first 13 were only used before the intervention phase. Once the first 25 questions were answered, participants in both groups saw a stop sign telling them to wait for further instructions. Once all participants were ready, the researchers showed a presentation of memes as the intervention phase. The intervention phase has two versions depending on which group you were assigned. Both groups were shown 10 memes for 30s each for a total of five minutes; the control group was shown generally themed memes while the experimental group is shown 10 suicide/depression themed memes. After the 5 min were up, both groups were brought back to a post-test which consisted of the same 12 questions/phrases used at the end of the pre-test. Here they responded in the same Likert scale system of one to seven that they used prior. The researchers hoped to find a difference in scores

for the experimental group after viewing the suicide/depression-themed memes.

**The Suicide Sensitivity Scale.** The Suicide Sensitivity Scale is comprised of the 12 questions mentioned at the end of the questionnaire. The goal of the scale is to determine how sensitive a person is to the topic of suicide by asking specific questions created by the researchers. The 12 phrases include ideas such as “I find it unpleasant to think about suicide,” “Suicidal ideation needs to be addressed regardless of the situation,” and “The only outcome of depression is suicide.” The questions were designed to show high and low sensitivity to suicide, as well as positive and negative views of the topic. To test the reliability of the scale, the researchers will be using a Cronbach alpha, and an exploratory factor analysis (EFA).

**Memes.** Both groups were shown memes, chosen by the researchers, which have been sourced from multiple internet locations such as Instagram, Facebook, and Reddit. The experimental group’s suicide/depression memes (Supplementary Graphs 10–19) and the control group’s general memes (Supplementary Graphs 20–29) come from social media and image-sharing websites. When looking at suicide/depression memes, the goal is to poke fun at the topic by mentioning death and partnering it with a picture. These can include phrases like “I want to die” at the end of a sentence to rhyme with pie and “I no longer wish to Bee alive” with a picture of a cartoon bee. The general memes used are also trying to elicit humor, but in a way that focuses on lighter-hearted topics such as wanting to get food before other people and pushing them out of the way, or making puns about older phrases like “he’s the bee’s knees.” The memes used were chosen, not for their relation to the participants or the field of social work, but because they are essentially found at random.

**Data analysis.** Data is analyzed using quantitative methods, including correlations between pre- and post-test answers for short-term effects, and using a one-way ANOVA testing familiarity and pre-test answers for long-term effects. The Likert scales used numbers to represent ideas instead of having the participant write out an entire response. By using quantitative data, we reduced biasing by both the researchers and the participants as everyone must fall within set responses. It is worth using demographic questions to understand the scope of our participants, but the main data to analyze started at question 9, the start of meme familiarity. As there were five memes in familiarity, each rated one to three, the highest score is 15 while the lowest score is five. Scoring between five and eight is considered low familiarity, nine to 12 is considered medium, and 13–15 points is rated as highly familiar with memes. The basis of the first part of the hypothesis would state that the more familiar a participant is with memes, the lower their sensitivity to suicide/depression will be at pre-test showing a long-term effect.

The last 12 questions/phrases were scored on a one to seven scales but some of the phrases were scored in reverse. For these questions, sensitivity is defined as an understanding of the multifaceted idea of suicide, meaning that there are sometimes hidden reasons one may commit suicide and we may never know the whole story. Questions one, two, four, five, six, and nine were scored going forward in that higher agreement leads to more sensitivity. In comparison, questions three, seven, eight, 10, 11, and 12 were scored in reverse where higher disagreement leads to more sensitivity. The lowest possible score is 12, while the highest possible score is 84. Scoring closer to 12 shows someone is highly desensitized to suicide and depression while scoring closer to 84 shows someone who is highly sensitive to the issue. The range of scores in sensitivity would be 12–30 (low), 31–48 (mild), 49–67

(medium), and 68–84 (high). Sensitivity scores were calculated for pre- and post-intervention to see the differences and to test the second part of the hypothesis that showing suicide/depression memes will cause short-term desensitization.

### Ethics and human subject considerations

**Information coding.** For the purpose of the study, the names of the participants are available to the researchers only. As participants were sorted into one of two groups, they received numerical coding to hide their identity either being E1-29, or C1-22. Each participant was coded after their responses were recorded, and then all of their data was deleted. Participants who wished to continue with the study had their responses saved on a USB drive, hidden behind a password, and anonymized. Identifying information was saved on a laptop in the possession of the researchers using a different password to lock away the information. In total, there were two passwords, and the USB drive and laptop were stored separately. When the study has been published, data will be deleted electronically from both the laptop and the USB drive. No traces will be left electronically, and no traces will have been created physically.

**Participation.** There are no potential benefits to participating in this study and there are also no consequences for not participating, however, there may be potential risks to participation. The questionnaire asked questions related to suicide and depression, and the intervention phase showed suicide/depression-themed memes that may elicit feelings that need to be addressed. At the end of the post-test, before logging off the study, participants were given time to speak with the researchers gathering data to ask questions related to the study and processing their emotions. The researchers always made mentions of the counseling services offered on campus and took the time to make sure all participants were satisfied with their questions. Participants were not paid for their volunteering and knew that they could withdraw consent, ceasing participation, at any time.

### Results

**Sample.** The sample used in the study included 51 participants where 43 were female, 6 were male, and 2 either refused to answer or stated “other” (Supplementary Table/Graph 1). Of the 51, they identified their ethnicities as 7 Asian, 13 Black or African American, 6 Hispanic, Latino, or Spanish, 2 Middle Eastern, 19 white, 2 preferred not to answer, and 2 used “other” (Supplementary Table/Graph 2) based upon the classifications created for the study. Their ages ranged from 20 years old to 49 years old, but three participants were missing from the data which could skew the range (Supplementary Table/Graph 3). Most of the participants came from Staten Island (36), while 12 are from Brooklyn, 1 were from queens, and two either did not answer or used “other” (Supplementary Table/Graph 4). Most participants identified as Spiritual (8), but most answers were scattered as they were allowed to fill in any religious choice they had (Supplementary Table/Graph 5).

It is interesting to note that most participants are in a relationship with one partner (37), and this was followed up by 11 who were not in a relationship (Supplementary Table/Graph 6), and most were unmarried (23) (Supplementary Table/Graph 7). It would be a great follow-up to see if relationship status also increases the effects of memes on sensitivity. What is most important from the sample is to note that most of the students will graduate in two years (29), followed by 11 not answering, 10 graduating in 3 years, and 1 in 4 years time (Supplementary Table/Graph 8). Additionally, 18 participants were in the MSW clinical track, 14 MSW foundation students, 13 BSW students,

and 5 MSW Macro students (Supplementary Table/Graph 9). A further study could analyze the effects of the program of study, and the speed at which students complete the degree.

On an analytical level, the use of students as participants holds both pros and cons. The benefits of utilizing a student population may include their interaction with the internet and memes. Most students are engaged at some level with social media and the internet raising their likelihood of interacting with memes. While the general population may also interact with memes, a large proportion of the student population includes a younger crowd, roughly 18–21 years of age, who are considered to be more avid consumers of social media (Mazambani et al., 2015). On the other hand, the negative effects of utilizing a student population may be the lack of representativeness. While campuses do include many races, ages, ethnicities, and a great many different factors, they do only include those who are able to attend or afford to attend. In performing an analysis, a lack of representation could cause a potential limitation.

**Descriptive statistics.** Scores were analyzed based on the group assigned to the participants where 29 were in the experimental group and 22 subjects were in the control group. It is worth noting that the two groups have an uneven number of participants due to the issues with scheduling and time constraints of the college semester. For the 12 questions asked, the mean score is taken separating the two groups, both before and after the intervention phase. This is done to compare the actual choices made between groups on each individual question. Supplementary Tables 10 and 11 show the difference between before and after the intervention phase for the experimental group, while Supplementary Tables 12 and 13 are for the control group. Starting with the experimental group, and looking at Supplementary Table/Graph 14a–d, shows one participant shifting towards desensitization, but mostly towards sensitivity for “unpleasant.” The next question in Supplementary Table/Graph 15a–d shows a change towards sensitivity for “family” where one participant changes a response from disagreeing to somewhat agree. “Selfish” is in Supplementary Table/Graph 16a–d, and shows a shift towards both directions, while Supplementary Table/Graph 17a–d, “understand,” shows mostly desensitization. Supplementary Table/Graph 18a–d, “easy,” shows a pooling of responses around neutral, and Supplementary Table/Graph 19a–d, shows more sensitivity for “ideation.” “Should” is recorded in Supplementary Table/Graph 20a–d and shows more sensitivity, and “happy” in Supplementary Table/Graph 21a–d has participants going in both directions. There is pooling into the middle for “help” in Supplementary Table/Graph 22a–d, but Supplementary Table/Graph 23a–d for “getover” showed no real difference. Supplementary Tables/Graphs 24 and 25a–d for the questions “annoy” and “depressicide” both show a pooling toward the neutral response. Finally, “sensitivity” in Supplementary Table/Graph 26a–d showed no overall change at all for the experimental group.

In the control group, Supplementary Table/Graph 27a–d, “unpleasant,” shows a pooling towards the middle, while “family” in Supplementary Table/Graph 28a–d, showed no real difference. “Selfish” in Supplementary Table/Graph 29a–d, saw a shift towards sensitivity, and Supplementary Table/Graph 30a–d for “understand” showed a pooling of responses towards neutral. “Easy” showed a shift towards desensitization in Supplementary Table/Graph 31a–d, and “ideation” in Supplementary Table/Graph 32a–d, had participants answering more sensitively. In Supplementary Table/Graph 33a–d, “should” shifted towards sensitivity, and “happy” showed no real difference in Supplementary Table/Graph 34a–d. For the question “help,” participants shifted in both

directions shown in Supplementary Table/Graph 35a–d, while “getover,” “annoy,” and “depressicide” have no real difference in Supplementary Tables/Graphs 36, 37, and 38a–d. Finally, Supplementary Table/Graph 39a–d for “sensitivity” showed an overall decrease in sensitivity for the control group with some people shifting into the medium category.

### Inferential statistics

**Bivariate correlations.** Bivariate correlations were used to analyze the short-term effects of memes on suicide sensitivity. The participants were broken down into two groups: experimental groups who viewed memes on suicide/depression, and a control group who viewed memes on general ideas. Responses were recorded for the 12 questions using a Likert-type scale from one to seven, and scores were compared before and after the intervention phase. Correlations were chosen to see how the effect of memes changed the scores towards sensitization or desensitization. Once all scores were compared pre- and post-intervention, a sensitivity score is created by combining the scores of all 12 questions where 12 is the lowest score and 84 is the highest possible score. The 13 tests were run to see how the intervention worked on the 12 questions independently, and then as an aggregate score. The experimental and the control group are compared simultaneously to see where the stronger effect took place.

“I find it unpleasant to think about suicide” shows significance in both groups, and moderate correlational strength. The experimental group has a statistical significance of  $p = 0.012$  and a correlation of  $r = 0.460$ . The control group shows significance as well with  $p = 0.026$ , and a correlation of  $r = -0.472$ . The experimental group shows more significance and a weaker correlation than the control group (Supplementary Tables 40 and 41). The next question “If someone in my family committed suicide I would be upset,” showed a slight difference in results (Supplementary Tables 42 and 43). Significance was found in both groups, but the correlation between the two groups varied. The control group showed a correlation of  $r = 0.985$ , while the experimental group showed a correlation of  $r = 0.421$ . Both showed a significance where the control group ( $p < 0.000$ ) has a greater significance than the experimental group ( $p = 0.023$ ).

Supplementary Tables 44 and 45 showed the significance and correlation of the question “People who commit suicide are selfish.” This question showed a reverse scoring where the highest choice is “strongly disagree” leading to more sensitivity. The experimental group has a statistical significance of  $p = 0.001$ , while the control group showed  $p < 0.000$ . Once more, a stronger correlation is found in the control group ( $r = 0.779$ ) while the experimental group has a correlation of  $r = 0.605$ . Both were strong relationships, but the experimental group is weaker in both categories. “I can understand why people would want to commit suicide,” in Supplementary Tables 46 and 47, is the first question where both groups showed a significance of  $p < 0.000$  although it is important to note that they may not be exactly equal when showing a  $p$  of 0.000. The correlations for the experimental group ( $r = 0.672$ ) were weaker than the control group's correlation of  $r = 0.781$ .

The experimental group for the question “I would consider suicide to be the easy way out” has a moderately positive correlation of  $r = 0.639$ , and the control group showed an  $r$  of 0.576. This is the first question where the correlation is stronger for the experimental group and both groups showed a statistical significance where the experimental is  $p < 0.000$  and the control is  $p = 0.005$  (Supplementary Tables 48 and 49). No significance ( $p = 0.563$ ) was found for the experimental group when asked to rate “Suicidal ideation needs to be addressed regardless of the situation,” while there was significance again for the control

group ( $p < 0.000$ ). This non-significance for the experimental group transferred to the correlations as well since the control group ( $r = 0.706$ ) has a strong positive correlation while the experimental group showed a weak positive correlation of  $r = 0.112$  (Supplementary Tables 50 and 51).

For the statement “Some people should commit suicide,” which is coded in reverse, the experimental group held more significance ( $p < 0.000$ ) and a stronger correlation ( $r = 0.717$ ). The control group's correlation of  $r = 0.657$ , and significance of  $p = 0.001$  is the first question where the control group has weaker results (Supplementary Tables 52 and 53). In Supplementary Tables 54 and 55, there is another reverse coding for the statement “People would be happier if I were dead.” Opposite of the previous question, the experimental group has a lower significance ( $p = 0.006$ ) and a weaker correlation of  $r = 0.494$  which is moderate. The correlation of the control group ( $r = 0.973$ ) is considered very strong, and the significance found is  $p < 0.000$ . Both groups showed significance, but there is more strength in the control group.

“People who commit suicide are just depressed and needed help” is the second question where the experimental group showed no significance ( $p = 0.103$ ) while the control group is not only significant ( $p < 0.000$ ), but also showed a strong positive correlation of  $r = 0.727$  (Supplementary Tables 56 and 57). The experimental group and control group of the statement “People who are depressed need to just get over it” showed an equal significance of  $p < 0.000$ , and is scored in reverse (Supplementary Tables 58 and 59). There is a stronger correlation of  $r = 0.987$  for the experimental group, but the control group is almost as strong with a correlation of  $r = 0.901$ . In Supplementary Tables 60 and 61, we reverse scored the statement “I find it annoying to deal with people who have depression.” The experimental group showed a strong positive correlation of  $r = 0.952$ , while the control group showed an almost equally strong positive correlation of  $r = 0.921$ . Both groups showed an equal significance of  $p < 0.000$ .

The last statement, “The only outcome of depression is suicide,” is scored in reverse and also showed no significance for the experimental group. The control group on the other hand is significant ( $p < 0.000$ ) and has a strong positive correlation of  $r = 0.892$  (Supplementary Tables 62 and 63). The final correlation looked at all of scores on statements added up to create the sensitivity score for each participant. Based on the groups, the sensitivity score should show how participants were affected overall instead of based on individual questions. Supplementary Tables 64 and 65 show the strong significance of the experimental group ( $p < 0.000$ ), and the control group ( $p = 0.007$ ). The correlations of the two groups are not too far apart with the control group being of moderate strength ( $r = 0.554$ ) and the experimental group showing a strong positive correlation of 0.724.

**One-Way ANOVA.** A one-way ANOVA is designed to test multiple levels of one independent variable (IV) against the mean of the dependent variable (DV), but for the purpose of the study, the IV is used to test an effect on 13 means. The levels of familiarity were low, medium, and high and were tested against the 12 questions on their own, with sensitivity as the 13th mean, to test if familiarity with memes makes a person desensitized long term. Most of the participants rated themselves as being low familiarity (27), followed by 17 participants scoring as medium, and only seven of the 51 participants were rated as having high familiarity (Supplementary Table/Graph 66) Experimental or control groups were no longer taken into account because we are looking for only long-term effects, and not what happens depends on which memes the participant is shown. This is simply to take pre-intervention data and compare it to ratings of meme familiarity. In Supplementary Table 67, the 12 questions were shown to

have no significance across all familiarities. In line with the individual questions, sensitivity scores for every participant also showed no significance regardless of familiarity (Supplementary Table 68). No Post-hoc testing was performed as they are generally computed only for finding the exact point of significance, but in this case, no significance was found.

**Scale Reliability Statistics.** The Suicide Sensitivity Scale was created by the researchers for this study and is designed to determine the sensitivity that a person has towards the topic of suicide. For analytical purposes, the questions titled “Selfish,” “Should,” “Happy,” “Get over,” “Annoy,” and “Depressicide” were re-reversed to match the other six questions. When creating a new scale, it is important to determine reliability. The researchers used Cronbach's alpha and an EFA to judge the reliability of The Suicide Sensitivity Scale, which showed a low internal consistency,  $\alpha = 0.407$  (Supplementary Table 69). With 12 items included, this is low reliability, but when looking at the Item-Total Statistics (Supplementary Table 70), it is revealed that deleting six specific items on the questionnaire would bring upon a more acceptable internal consistency,  $\alpha = 0.624$  (Supplementary Table 71), and Inter-Item Correlation Mean of 0.216 (Supplementary Table 72). The six specific items removed were “Understand,” “Should,” “Happy,” “Get over,” “Annoy,” and “Depressicide.”

As for the EFA, it is revealed that there are four components to this scale, Factor 1 has an Eigenvalue of 2.451 and accounted for a variance of 20.421. Subsequently, Factor two has an Eigenvalue of 2.001, the variance of 16.675; Factor three has an Eigenvalue of 1.673, the variance of 13.640, and Factor four has an Eigenvalue of 1.297, the variance of 10.810 making these four factors account for 61.546 percent of the total variance (Supplementary Table 73). Factor 1 consists of three items and is called “Low Sensitivity to suicide,” Factor 2 consists of four items and has been dubbed “Negative view of suicide.” Factor 3 holds four items and is considered “High sensitivity to suicide” and Factor 4 has one item and is the only “Positive view of suicide” (Supplementary Table 74). It is also worth noting that if the same six items were removed, there would only be two factors accounting for 57.739 percent of the total variance (Supplementary Table 75), where Factor 1 (“Sensitivity”) consists of four items, and Factor 2 (“Views”) consists of two items (Supplementary Table 76). Further research needs to be conducted in order to arrive at a more representative sample and subsequent conclusion.

## Discussion

### Findings explained

**Short term.** In the correlations of the 12 questions, nine out of the 12 showed significance for the experimental group, but the control group showed significance for all 12 questions asked. The questions based on ideation, help, and depression were found to be non-significant for the experimental group, and four of the questions have a stronger correlation. The control group showed a stronger correlation for the other eight questions, and sensitivity has a stronger correlation for the experimental group. Most questions for the experimental group (4) were either more sensitively answered, or pooled towards the neutral responses, but only one question (“understand”) became more desensitized after the intervention. Conversely, the control group has most questions (5) showing no difference after the intervention with only one question (“easy”) being desensitized and three (“selfish”, “ideation”, and “should”) being more sensitive. Sensitivity is scored on a rating of low, mild, medium, and high based on adding up the scores of each participant. The experimental group showed no change in sensitivity, but the control group showed a decrease.



The study is designed with the hope that suicide/depression memes would cause a decrease in sensitivity, but the results are showing either a pooling of answers toward neutral or sensitization, which is the opposite of what was hypothesized. The individual questions related to “unpleasant”, “family”, “ideation”, and “should” became more sensitive, but because of the differences in the questions, it is hard to say that the individual questions really determine anything besides that some will be more sensitive, and others will become desensitized. On the other hand, the most often result of no difference for the control group’s questions showed that general memes do less for the social worker. Individually, the questions showed that suicide/depression memes will more likely make a social worker more sensitive when compared to general memes, but sensitivity as a whole is more important.

The most interesting result from the correlations comes from the sensitivity score as that looks at the overall differences in a person based on the meme type they saw. The experimental group showed a stronger effect of memes, but the control group is the only one that actually changed post-intervention. The experimental group showed no real difference between pre and post-intervention, but the decrease in the control group’s sensitivity is the main statistic to explore. This decrease in sensitivity shows that general memes have an effect on social work students that make them less caring and possibly worse in their ability to work with and empathize with clients. These results are understood in a way that fails to reject the null hypothesis of the second part of the hypothesis that suicide/depression memes cause desensitization. In fact, suicide/depression memes, overall, have no effect while general memes are really leading to desensitization. The small effect of sensitization of suicide/depression memes on individual questions makes sense if it is understood to be simply bringing up the issue makes one more susceptible to the negative feelings associated with it. Meanwhile, general memes are simply funny and that comical power protects a social work student from negative feelings like a guardian angel, but both of these effects are only short-term.

*Long term.* The 1st part of the hypothesis is to find a long-term effect of memes based on the familiarity scored by individual participants. When a participant is more familiar with memes, we proposed that they would be more desensitized to suicide/depression, and if they rated themselves with less familiarity, they would be more sensitive. The memes that were shown to test familiarity were general memes based on being new, old, common, or obscure and we found that most participants rated themselves as having low familiarity, so they should be more sensitive according to our hypothesis. After running the ANOVA and seeing a complete lack of significance between familiarity and the 12 questions individually, or when the scores are combined into the sensitivity score, we can conclude that the results fail to reject the null hypothesis. No level of familiarity led to a more sensitive or desensitized response to the pre-intervention answers which shows a lack of a long-term effect of memes. While this does fail to reject the null hypothesis, this is good news in that social work students can freely browse memes without fear of being affected when working with clients.

**Implications.** As a cultural replicator, memes are not regulated in any way and the sharing of ideas can run rampant in the meme community. Anyone with internet access can view memes and this includes professional Social Workers who may enjoy memes in their spare time. The small short-term effect of suicide/depression memes on individual questions may mean that bringing up the topic of suicide or depression before a session

with a client can lead to more sensitivity to the issue. On the other hand, Social Workers may need to be wary of general memes as those led to an actual decrease in sensitivity overall. The worry here is that general memes are more accessible than suicide/depression memes, so there needs to be cautious when viewing these memes before working with a client.

As mentioned previously, the memes gathered for the study come from social media and it is on these platforms that people can engage with both general and suicide/depression memes. Now while it is true that social media sites come with algorithms to determine the content that you see, it is also true that once the algorithm determines your likes and dislikes, you are most likely not breaking out of that pattern. This means that once we start to see any type of meme mentioned in this study, we are more likely to continue seeing those memes. As we continue the upward trend of internet usage, social media use increases as well leading to a possible increase in meme viewership or behavioral changes. With either effect, increased viewership could lead to a higher likelihood of being affected by either type of meme.

As the study focused on Social Workers, it is worth mentioning that they are not immune to these effects and can be influenced by them in the same way as anyone else viewing the memes. The behavior of social workers may be impacted as well, potentially increasing the frequency of sharing and viewing of memes, subsequently impacting the connectivity among members of the group. The connection between the memes, and the Social Work profession, may lead to new behaviors in a professional setting. That is to say that it may be worthwhile for Social Workers to examine these behavioral changes before engaging with clients, just as they would show caution for the simple viewing of the meme types. Further research needs to be conducted in order to arrive at a more representative sample and subsequent conclusion.

**Limitations.** There are five limitations that should be examined within the structure of the research. The memes chosen for familiarity and for both versions of the intervention were chosen based on the humor of the researchers, and may not be inherently funny to all participants. This lack of comedy can lead participants to disconnect from the memes. Another possible disconnect may have come from the timing of the slides. Each meme is shown for 30 s, and if the participant is a fast reader, or did not care for the meme, then waiting for 30 s may be too long. The participant may become disinterested whilst waiting for the next meme. Next, the 12 statements that needed to be rated were very intense, and as participants had to give their names so that they can be sorted into groups, participants may have felt uncomfortable answering some of the scales. It is the hope of the researchers that participants answered honestly, but the worry that providing responses to statements such as “Some people should commit suicide” would become polarizing is always of concern. The limited sample size and representativeness may have also influenced the found results of both short-term and long-term effects. An increase in sample size and a focus on representation may increase the chances of the effects. Finally, the lower internal consistency revealed through Cronbach’s alpha is disconcerting for the reliability of the scale. If questions do need to be deleted to improve the internal consistency, this may be a possible future direction

**Future directions.** As there are short-term effects of memes, both increasing and decreasing sensitivities, the next step for the research is to focus on the duration of the short-term effects. Since long-term effects are not significant, then at what point do Social Workers need to stop viewing memes before a session with a client? As this study is focused on social work students, we cannot generalize to other professions or even majors within a

school. Another study could look into how memes affect teachers, lawyers, doctors, or any profession that involves sensitivity to suicide or depression. Additionally, can memes be adopted for therapeutic use? As they increase or decrease sensitivity in Social Workers, can memes also make it easier for clients to open up in a session? Finally, as previously mentioned, it may be worthwhile to re-run this study with an updated version of The Suicide Sensitivity Scale with only the six items included.

### Conclusion

Memes have become such a part of daily life that everyone with access to the internet has either seen a meme, shared a meme, or created a meme at least once. Humans have always been social and the usage of memes is just another way for us to spread information and ideas to as many people as possible. Social workers are not immune to the spread of memes but unlike other professions, they are in a position where the effect of memes could be potentially hazardous to others. The findings have shown that there are no long-term effects of memes which is a good sign, but there is a short-term effect and that is where the danger lies. The effects found may also be attributed to the sample size itself and it may be possible for a greater effect to show itself should the sample size be increased. General memes, which cause desensitization, should not be viewed before working with a client, although the time frame is not yet known for when the viewing of memes should stop prior to a session. Research on memes is still a new concept, but hopefully, we will eventually understand the full effects of meme culture. Further research needs to be conducted in order to arrive at a more representative sample and subsequent conclusion.

### Data availability

The datasets analyzed during the current study are available in the Dataverse repository: <https://doi.org/10.7910/DVN/VRJT5T>.

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### References

- Aquila I, Sacco MA, Ricci C, Gratteri S, Montebianco Abenavoli L, Oliva A, Ricci P (2020) The role of the COVID-19 pandemic as a risk factor for suicide: what is its impact on the public mental health state today? *Psychol Trauma: Theory Res Pract Policy* 12(S1):S120–S122. <https://doi.org/10.1037/tra0000616>
- Ask K, Abidin C (2018) My life is a mess: self-deprecating relatability and collective identities in the memification of student issues. *Inf Commun Soc* 21(6):834–850. <https://doi.org/10.1080/1369118x.2018.1437204>
- Brownson C, Drum DJ, Smith SE, Denmark AB (2011) Differences in suicidal experiences of male and female undergraduate and graduate students. *J College Student Psychother* 25(4):277–294. <https://doi.org/10.1080/87568225.2011.605692>
- Chen C (2012) The creation and meaning of Internet memes in 4chan: popular Internet culture in the age of online digital reproduction. *Habitus* 3(1):6–19
- DeCook JR (2018) Memes and symbolic violence: #proudboys and the use of memes for propaganda and the construction of collective identity. *Learn Media Technol* 43(4):485–504. <https://doi-org.csi.ezproxy.cuny.edu/10.1080/17439884.2018.1544149>
- Garcia-Williams AG, Moffitt L, Kaslow NJ (2014) Mental health and suicidal behavior among graduate students. *Acad Psychiatry* 38(5):554–560. <https://doi.org/10.1007/s40596-014-0041-y>
- Jenkins ES (2014) The modes of visual rhetoric: circulating memes as expressions. *Q J Speech* 100(4):442–466. <https://doi.org/10.1080/00335630.2014.989258>
- Lilienfeld SO, Lynn SJ, Namy LL (2018) *Psychology: from inquiry to understanding*. Pearson, New York, NY
- Longfield A, Romas J, Irwin J (2006) The self-worth, physical and social activities of graduate students: a qualitative study. *College Student J* 40(2):282–292.

- Marcus OR, Singer M (2016) Loving Ebola-chan: Internet memes in an epidemic. *Media Cult Soc* 39(3):341–356. <https://doi.org/10.1177/0163443716646174>
- Mazambani G, Carlson MA, Reysen S, Hempelmann CF (2015) Impact of status and meme content on the spread of memes in virtual communities. *Hum Technol* 11(2):148–164. <https://doi.org/10.17011/ht/urn.201511113638>
- Moffitt LB, Garcia-Williams A, Berg JP, Calderon ME, Haas AP, Kaslow NJ (2014) Reaching graduate students at risk for suicidal behavior through the interactive screening program. *J College Student Psychother* 28(1):23–34. <https://doi.org/10.1080/87568225.2014.854675>
- Morling B (2018) *Research methods in psychology: evaluating a world of information*. W.W. Norton & Company, New York
- Roy D (2017) Myths about memes. *J Bioecon* 19(3):281–305. <https://doi.org/10.1007/s10818-017-9250-2>
- Rubin A, Babbie ER (2016) *Essential research methods for social work*. Cengage Learning, Boston, MA.
- Szeman I (2002) The limits of culture: the Frankfurt School and/or. In: Nealon JT, Irr C (eds.). *Rethinking the Frankfurt School: alternative legacies of cultural critique*. State University of New York Press, p. 59
- Sturman ED, Mongrain M (2008) Entrapment and perceived status in graduate students experiencing a recurrence of major depression. *Can J Behav Sci/Rev Can Sci Comport* 40(3):185–188. <https://doi.org/10.1037/0008-400x.40.3.185>
- [Untitled Ebola-chan meme] (2014) <https://knowyourmeme.com/memes/ebola-chan>
- [Untitled car salesman meme] (2018) <https://knowyourmeme.com/memes/slaps-roof-of-car>
- [Untitled moth meme] (2018) <https://knowyourmeme.com/photos/1413800-moth-lamp>
- [Untitled win/fail meme] (2010) <https://knowyourmeme.com/memes/win-epic-win-for-the-win>

### Competing interests

The authors declare no competing interests.

### Ethical approval

Ethical approval for this project was given by University Integrated Institutional Review Board 205 East 42 Street, New York, NY 10017 [IRB File #2018-1411]. The authors declare that all research was performed in accordance with relevant guidelines/regulations applicable when human participants are involved and was granted an exempt status for ethical approval. The study was granted exemption because it does not allow for participant data to be revealed and because disclosure of the data does not put any participant at risk of criminal or civil liability or damage to the subjects' financial standing, employability, or reputation.

### Informed consent

For this study, informed consent was collected for all participants by including it in the link provided to the participants once they had agreed to join the study. Once the link was accessed, participants were shown a page where they could read through the informed consent before accepting and beginning the questionnaire.

### Additional information

**Supplementary information** The online version contains supplementary material available at <https://doi.org/10.1057/s41599-022-01320-3>.

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