

Identifying Patterns of Conformity on a Social Network for Children

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Abstract

Over the last decade, cyberbullying (bullying that takes place through electronic devices) has become a concern among young citizens of the "virtual world". Usually, the bully is not the only participant; more likely than not, there will be a group of people that will also take part in the bullying. Prior research has shown that an individual's ideas are likely to be influenced by previous examples. To explore the conformity effects that these examples can have over children in an online setting, we conducted an experiment with participants between the ages 7 through 12. We asked the participants to go on a digital adventure — a "quest" — in which they filled in details of the story (via sketching) to help the characters succeed in their goals. We presented three activities: one with no examples; one with examples, but no identity markers; and one with examples and identity markers. Our goal was to identify whether participants would be more subject to similar ideas when shown examples versus not being shown examples. Our research team agreed on attributes and themes to include in the first three priming images for each activity within the quest. As expected, activities in which the participants were primed resulted in sketches with attributes and themes similar to those in the priming images. Interestingly, the conformity effect increased when identity markers were provided, indicating that conformity factors may be influenced by social relationships. Meanwhile, activities that were not primed at all resulted in images that were very different in terms of style. This work's analysis of children's patterns of online conformity will inform and inspire the development of algorithms to identify cyberbullying activity and potentially make the Internet a safer place for children.

1 Introduction

As technology continues to become an essential part of our lives, even children are becoming active citizens of the "virtual world". Unfortunately, as a result, bullying has gone digital in the form of cyberbullying. According to a survey offered by NoBullying.com to visitors ages 12 and up, almost 47% of the respondents said they were bullied more times than they could remember and 17% said they were bullied at least 2-5 times. Additionally, when asked whether well-known social media providers were doing enough to prevent cyberbullying, 42% said that these social networks were not even close to do-

ing enough to prevent cyberbullying [5]. This is an important observation, because young users themselves are aware that this is a problem that is not being taken care of.

In contrast to in-person bullying, cyberbullying can cause the victim to have a harder time escaping their reality because it can happen at any time; there does not have to be physical presence between the bully and the victim for it to occur. Additionally, there is nothing that the victim can do to prevent it; online bullying can happen unexpectedly. This has serious psychological implications on the victim. Prior research has found an association between depression and suicidal ideation and indirect bullying on children ages 9 to 13 [7]. Another study on students in the sixth, ninth and twelve grades determined that suicidal thinking or a suicide attempt was reported by 22% of perpetrators only, 29% of victims only, and 38% of bully-victims [2]. As sad- dening as it is, this should not be shocking. Often, there are news reports on these tragedies, and many of them are happening as a result of bullying.

Technology has evolved and continues to improve. Through the development of software, computer science has solved many of our daily problems and, though it has not been explored as much as it should, it can certainly be used to prevent cyberbullying. While there are ways to manage the situation once the damage has already been done, presently there are no reliable ways to prevent it from happening. In order to do this effectively, our research team decided to first study the behavior of a bully. When it comes to the constant harrassment of an individual, the bully is usually not the only participant; more likely than not, there will be a group of people that will also take part in the bullying. This influence that one child can have over other children — which reaffirms that bullying is related to conformity — is the primary focus of our experiment.

2 Previous Work

Prior research on cyberbullying has mostly focused on the psychological effects that it has over victims. Researchers have examined cyberbullying and have determined that there should be something done to prevent it. In an attempt to control the situation, social media websites allow victims to report harrassment. Unfortunately, this does not prevent the bullying from happening, but rather attempts to make the harrassment stop. Another method that has been used is that of automated detection or "fil-

tering”, which simply blocks profanity words. This method is not accurate, as it can “flag” un hurtful content or, on the contrary, miss passive-aggressive attacks.

Little thought has been given to utilizing computer science knowledge and statistical models for the development of algorithms that can help protect children from attacks in a way that is reliable and more precise. While true solutions rest on teaching youth to have healthy personal relationships, few have considered innovative design of social network software as a tool for mitigating this problem [4]. Mitigating cyberbullying involves two key components: robust techniques for effective detection and reflective user interfaces that encourage users to reflect upon their behavior and their choices [4]. Unfortunately, there have been little to no reports on success. As of present, there is little published research on social networks for children. Likewise, there is not published research available in the study of conformity patterns on children in an online setting. However, there are publications available on the study of conformity patterns on young adults in an offline setting, and children participating in social applications.

The following sections explore both areas.

2.1 Conformity

Cyberbullying can be greatly affected by groupthink. Because members of a group affected by groupthink have the desire for acceptance and conformity, little thought is given to the consequences of their actions. This type of behavior where an individual seeks approval from a peer regardless of their intentions can be dangerous, and is often the stage for cyberbullying attacks on innocent victims.

Previous experiments have confirmed that prior experience can be beneficial. As children, we begin to learn through examples and assimilation. From an academical point of view, prior experience is often key to solving problems. Once we are adults, prior experience allows us to become wiser and avoid undesirable situations. Although prior experiences can provide the expertise needed to fully explore and develop ideas into creative products, it may be that such experiences limit creative thinking when ideas are originally being generated [6].

In our experiment, we relate a peer from whom groups desire acceptance to examples and prior experiences in the conformity paradigm because, certainly, both have an influence over an individual’s choices, even if subconsciously. While there are not many studies on conformity on a children’s social network available, the conformity hypothesis—that subjects’ ideas are likely to conform to examples—has been tested on a group of young adults (offline). In a study conducted by S. M. Smith et al., that gave participants the task of drawing creatures and toys, it was determined that conformity induced by introducing examples can constrain creative generation of imaginative ideas [6].

2.2 Social Networks and Children

Because we are exploring cyberbullying, it is crucial to examine the participation of children on social

networks, where this digital form of the behavior usually takes place. It is important to note that, because of the Child Online Privacy Protection Act (COPPA) —which prohibits online services from collecting personal information about children under the age of 13—, many mainstream adult social media sites do not allow users within this age group in their network. Unfortunately, children are joining these social networks illegally by falsifying their real age. This practice is so common that Facebook, a very popular adult media site, revealed that it removes nearly 20,000 underage users per day [3].

This situation is of great concern for parents, who are usually unaware of this happening, as their children are exposed to adult content and the possibility of interacting with ill-intentioned strangers. At this age, children are not mature enough to make thoughtful decisions and are easy to deceive. Stepping into an online social network at such a young age might be overwhelming and dangerous. However, the problems cannot be resolved by forbidding children from engaging in social networking activities altogether [1]. Before moving on to an adult-focused site like Facebook, children should be taught proper digital socializing practices in a safe, monitored environment. It is for this purpose that a social network exclusively for this younger audience, KidGab, was created.

2.2.1 KidGab

KidGab is a social network for children between the ages 7 through 12. As a way to introduce KidGab to smaller groups of children and begin receiving feedback from its target audience, it is currently exclusive to Girl Scouts of Central Texas. The girls are introduced to the website by attending a Digital Friendship Workshop in which they are taught safe online practices. KidGab connects the girls by automatically “friending” all of the members of a cohort, including their troop leader if they decide to do so. The site features fun activities like earning virtual badges through various activities such as creating their personal avatars, sketching and posting updates. Girl Scouts can also participate in a chatroom exclusive to their cohort or a chatroom where they can bond with Girl Scouts from other cohorts. The website offers activities such as quizzes and personality tests that can help girls discover more about themselves. Most importantly, KidGab offers “Choose Your Own Adventure” stories with the goal of teaching girls the consequences of being careless online and how to stay safe.

KidGab was considered an appropriate medium to perform our experiment because it has active participants at a crucial age for bullying activity. While it is not possible (and highly unethical) to have participants bully each other, there are other unintentional behaviors that can be taken into consideration. At this age, children do not think much about the consequences of their actions and are very likely to act according to previous examples. They are not actively looking for individuality, but rather, acceptance from the people that surround them (especially other children their age). KidGab’s sketching technology also proved to be useful to conduct our experiment, which received inspiration from S.

M. Smith’s previous experiment.

3 Implementation

Inspired by S. Smith, et. al.’s conformity experiment, we designed a plugin that presents a digital adventure — a “quest” — to KidGab users and asks them to draw elements of the story to aid the characters in their quest. The storyline was presented in the style of a dialogue between two characters, both moderators of the website whom the girls are familiarized with by having attended the Digital Friendship Workshop in which they are introduced to KidGab.



Figure 1: Interface of the first activity of the plugin.

3.1 Technology

The plugin was developed using web development technologies. The script languages PHP, JavaScript and JQuery were used to handle functionality such as mouse events. The storyline was written in an XML file that was parsed by a PHP function, which allows adding more content in the future to be simple; only the XML file has to be edited while the PHP functions remain untouched.

3.2 Deployment Design

The experiment was conducted within a frame of three days and there was a total of nine activities. Each day, we presented three activities. One with no examples (no prime); one with examples, but no identity markers (prime with no username); and one with examples and identity markers (prime with username). The examples that users were primed with were their friends’ responses to the activity. The order in which the priming (or not) occurred was not the same every day. A schedule of all activities and their priming type can be seen in Figure 2.

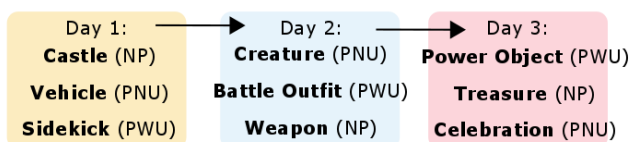


Figure 2: Activities and their distribution.

As mentioned previously, girls that join KidGab are automatically made friends with others from their cohort. Additionally, they are made friends with administrators and moderators of the site. We took advantage of this when designing our work plan; knowing that the first sketches that the girls

would be able to see would be ours, our research team agreed on attributes and themes to include in the first three priming images for each activity (for example, using characters from popular culture as sidekicks). This would allow us to observe whether girls would conform to the ideas that were projected in our examples, or if they would come up with their own. Having an activity with identity markers each day would allow us to observe if social priming would produce different conformity effects than anonymous priming. The attributes and themes of these priming images were as follows:

- Vehicle - an item of clothing with wings
- Sidekick - a character from popular culture
- Creature - green skin (every researcher had a different shade), wearing shoes, bloodshot eyes
- Battle Outfit - a cape, any item of clothing had to be colored rainbow, wearing high heels
- Object of Power - different kinds of silver jewelry with a gemstone (specifically, researchers chose a necklace, ring and crown)
- Celebration - blue background (every researcher had a different shade), balloons in the background, food (specifically, researchers chose candy, cake and cupcakes)

4 Preliminary Results

Because users chose to not participate in some of the activities that were offered, it is important to note that there were uneven numbers of participants in our activities. Additionally, since KidGab is a rising social network, we did not have a large group of girls in the experiment. However, the results obtained may be a good indicator about the feedback that may be obtained in the future in the case that this experiment is repeated with a larger pool of participants. Tables 1 through 3 represent the number of similarities (we refer to the similarities as “links”) that were found between the participant’s sketches and the researcher’s sketches (which, as mentioned previously, were used to prime the girls in the corresponding activities). The number of “links” are calculated as a group, because this group behavior is what we are focusing on in this experiment. It is important to note that similarities between the research team’s sketches were not taken into account.

No Priming	Number of “links”
Castle	19
Weapon	10
Treasure	12
Total	41

Table 1: “No priming” activities links results.

The upcoming subsections go into more details of our findings.

Priming without Usernames	Number of "links"
Vehicle	19
Creature	22
Celebration	20
Total	61

Table 2: "Priming without Usernames" activities links results.

Priming with Usernames	Number of "links"
Sidekick	30
Battle Outfit	23
Object of Power	20
Total	73

Table 3: "Priming with Usernames" activities links results.

4.1 No Priming

Activities in which the participants were not primed at all resulted in sketches that were very different in terms of styles. Figure 3 shows the results for the "Weapon" activity, which was offered during the second day of our experiment. As it can be seen in the following diagram (Figure 4), there are little similarities between the sketches that the research team drew and the responses from KidGab users. Out of the three activities that did not prime the girls with examples, the "Castle" activity had the most similarities with the drawings that the researchers drew (19 "links"). In the case of this "Castle" activity, the reason behind this higher number of similarities could be due to previous examples. Because of popular fairy tale movies, we have been conditioned to picture castles as grey buildings made out of bricks with a certain amount of towers. This was the case in most of the sketches that were drawn both by the participants and the research team and may be the reason why similarities still existed even though no one had access to other sketches.

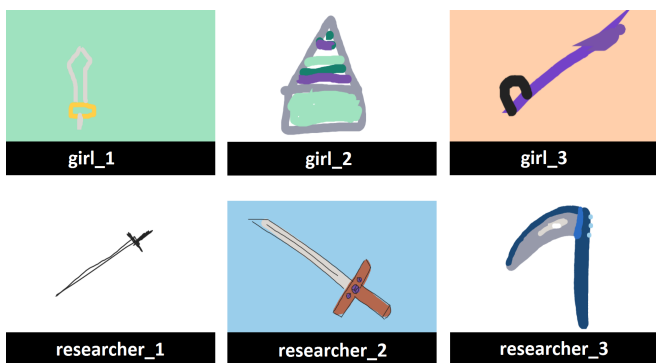


Figure 3: "Weapon" activity sketches.

Our findings coincide with Steven M. Smith et al.'s results from their conformity experiment, where they were able to conclude that participants that were not given any examples produced more creative and diverse sketches of creatures and toys compared to the group that was given examples.

4.2 Priming

As expected, activities in which the participants were primed resulted in sketches with attributes

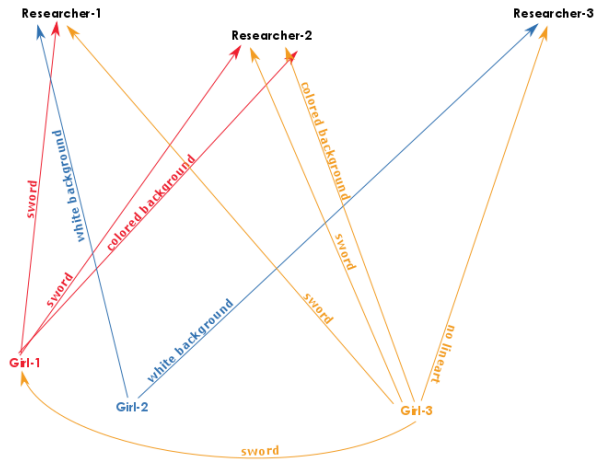


Figure 4: "Weapon" activity similarities diagram.

similar to those in the priming images. This is a clear example of cognitive fixation, where prior experiences can have a damaging, counterproductive effect on the outcome of cognitive processing [6]. In this particular experiment, the participants were simply asked to draw a sketch and the consequences of conforming to their peers were not damaging. Yet, when taken out of this context and examined from a cyberbullying point of view, the consequences can be serious. It is important to note that most girls conformed to the examples shown regardless of usernames being provided or not. However, there was a difference in conformity levels between activities that had identity markers and those that did not.

4.2.1 Priming without Identity Markers

Activities that primed the girls with images proved to cause a conformity effect, as their sketches had very obvious properties that were similar to the researcher's submissions. Figure 5 shows the responses to the "Creature" activity. Our last participant (first row, third column) drew a sketch shockingly similar to two of the research team's sketches (second row, second and third column). What is peculiar about this is that, being the last participant, she had many "options" to conform to, and she chose to take properties from those two images in particular. This may have been because these two sketches were a "majority", meaning that while everyone else's sketch is quite different, these two sketches were similar and could have stood out.

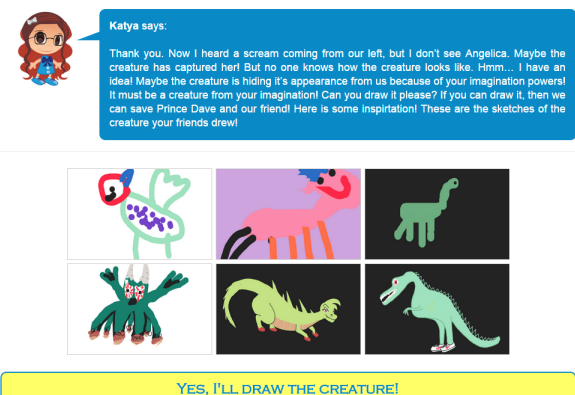


Figure 5: "Creature" activity results.

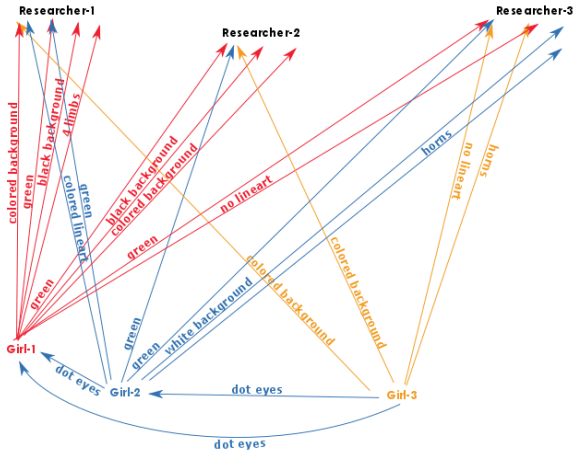


Figure 6: "Creature" activity similarities diagram.

4.2.2 Priming with Identity Markers

Interestingly, the conformity effect increased when identity markers (usernames) were provided, indicating that conformity factors may be influenced by social relationships. As an example, for the "Sidekick" activity, the research team agreed to draw characters from popular culture with the character's name written on the sketches. Because the girls are automatically made friends with KidGab administrators, this meant that as soon as the plugin was launched, they would have access to the sketches that the administrators drew. For that particular activity, 3 out of 4 participants not only drew other characters from popular culture, but they also wrote the name of their chosen character. It is very curious how only one girl chose not to conform, and it would be interesting to know why she decided not to do so. In a similar way, the researchers had agreed to draw a cape for their "Battle Outfit" and also incorporated a rainbow-colored clothing item. Out of 3 participants, 1 chose to have a rainbow-colored clothing item and 2 chose to have capes.

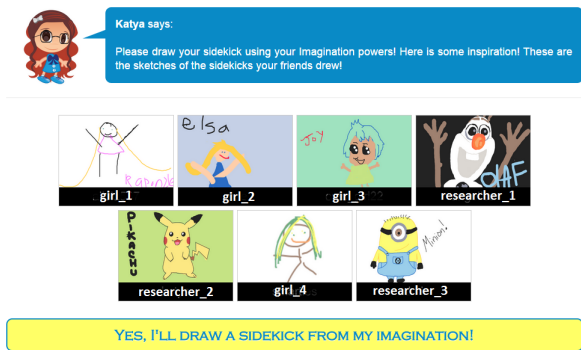


Figure 7: "Sidekick" activity results.

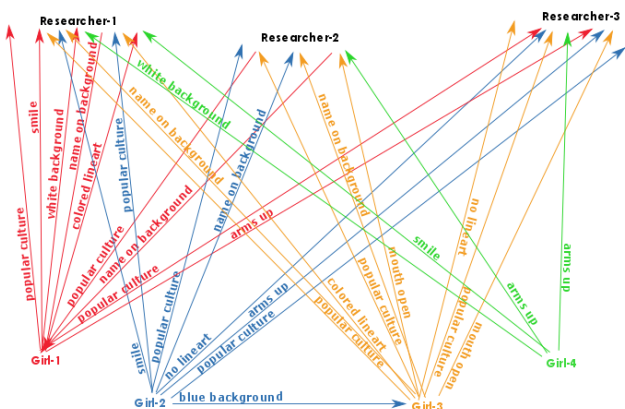


Figure 8: "Sidekick" activity similarities diagram.

5 Future Work

As previously mentioned, because we did not have a large audience participating in our experiment, it is crucial to repeat this procedure with a greater amount of KidGab users in order to reach a conclusion. Additionally, a future execution of this experiment should not include predetermined priming images from the research team. By not doing this, we would obtain a more "realistic" result, because we would not be provoking the conformity effect from our creations intentionally. This would allow us to observe if there are certain users that tend to cause others to conform. If there are such users, we can pay closer attention to what characteristics these girls have (personality traits, "popularity", etc). If, for example, we find that girls that have influence over other girls tend to be "popular" (have a lot of friends on the site), a mechanism to prevent a cyberbullying attack could consist of flagging these "popular" users. If, in the future, these flagged users and their friends suddenly send continuous messages to a particular user, it may be possible that this particular user is under a cyberbullying attack.

Another factor is that our audience consists of young girls. In reality, most social media sites are not gender-exclusive. It would be interesting to know if the tendencies that were seen in our experiment would also happen if boys are included. This way, our results can be generalized to a wider, inclusive audience and would be more practical to reality. Once concrete results have been obtained, we can examine with more caution whether these patterns of conformity translate to the patterns of cyberbullying. All of this information will inform and inspire the development of algorithms to identify cyberbullying activity and potentially make the Internet a safer place for children.

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