Public Outreach for Fetal Alcohol Spectrum Disorder in London, England

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Abstract

In the United Kingdom (UK), about 6% of the population has been diagnosed with Fetal Alcohol Spectrum Disorder (FASD), and still 26% of the population thinks drinking alcohol during pregnancy is harmless. This project created a public health campaign comprised of educational cartoons to inform younger generations, ages 15 to 20, of the risks of drinking during pregnancy. The design and content of the cartoons were based on feedback from responses to a survey and focus groups. We developed an Instagram dissemination strategy to reach teenagers during peak social media times and ensure the post will get the maximum amount of views.

Acknowledgements

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Table of Contents

List of Tables

List of Figures

1. Introduction

FASD is an umbrella term that refers to several disorders, including Fetal Alcohol Syndrome, partial Fetal Alcohol Syndrome, and Alcohol Related Birth Defects, among others. Conditions under the FASD umbrella are all caused by alcohol consumption during pregnancy. FASD can refer to over 400 different health conditions and can affect almost every system of the body (Centre for Addiction and Mental Health, 2016). These conditions include physical and neurological defects, cognitive and sensory processing issues, and heart defects, to name a few. In the UK, about 6% of the population has been diagnosed with Fetal Alcohol Spectrum Disorder (FASD) (University of Bristol, 2019).

The most challenging part of diagnosing a child with FASD is that the symptoms are similar to both Autism and Attention Deficit Hyperactivity Disorder (ADHD), as well as its own symptoms. FASD is most commonly recognized by the body defects that are present after birth, but not all cases have patients who exhibit the physical traits associated with the disorder. In fact, only 10% of people with FASD have different facial features (National Organization for FASD, 2020). The symptoms vary depending on the specific disorder, but they can range from mental disabilities to physical deformations (Helgesson, 2018). FASD also has secondary effects, causing those diagnosed to be more likely to have mental health problems, substance addiction, and be involved in the criminal justice system later in their lives (Zizzo & Racine, 2017). Due to the similarity in symptoms, doctors may misdiagnose children with FASD. In order to be diagnosed, their mothers also have to disclose to doctors that they were drinking while pregnant. Many mothers do not want to disclose that they were drinking while pregnant as they don't feel that it is necessary to disclose private information, or they don't believe that drinking while pregnant can cause this disorder.

Babies born with FASD all show different symptoms. Depending on when a mother drinks during her pregnancy can result in different effects on the baby (Healthcare Improvement Scotland, 2019). Alcohol is a teratogen that can cross into the fetus's placenta and cause malformations in the fetus and interfere with its development (National Organization for FASD, 2020). Researchers and clinicians studied the development of almost 13,500 children born in the early 1990's to assess the symptoms relevant to FASD. They found that up to 79% of the children in the sample were exposed to alcohol in pregnancy, and up to 25% of those children

were exposed to binge levels of alcohol. Of those children screened in the study, up to 17% showed symptoms of FASD (University of Bristol, 2019).

There is also miscommunication between midwives and pregnant women in regards to alcohol consumption. One possible reason for miscommunication is misinformation about what qualifies as binge drinking. According to the National Health Service, a binge is considered 6 units of alcohol for women (NHS website, 2019). In the UK, alcohol is measured by units, where one pint of lower strength cider or beer is 2 units and a large glass of red wine is 3 units. This shows that drinking two large glasses of wine is considered a binge. Culturally, citizens in the UK tend to think of a binge as having more than 2 drinks, as well as mixing drinks. When asked if they have had a binge lately, many women misunderstand the question, thinking that a binge is considered more than two drinks. This miscommunication can cause the wrong information or lack of information to be given to pregnant women.

FASD is a prevalent disorder in today's society and some research has been done on the effects of a child being diagnosed with the disorder. However, there are limited educational methods that have been produced in order to prevent FASD. Although there is research on the effects of FASD and the impacts of public health campaigns, there are few public health campaigns that promote awareness for FASD. Furthermore, limited knowledge is being produced to educate the real effects of drinking while pregnant in order to encourage sober behaviors and prevent FASD. Our team created a series of cartoons that educated teenagers about FASD prevention. FASD is a lifelong disorder that can only be managed, not cured, but with increased awareness, public health campaigns, and education for future young adults, this project can help decrease the amount of children that will have to live with this disorder.

This project worked in partnership with the National Organization for FASD (NOFASD) to create a public health campaign targeting teenagers and young adults ages 15-20 that will promote awareness and help prevent FASD. By educating our target age group, not just women, we hope that occurrences such as social peer pressure with drinking, accidental pregnancies, and drinking while pregnant are less common among the younger generation. Research was conducted on topics such as behavior change, previous public health campaigns, social media habits, and drinking to accurately determine how to create a successful public health campaign. Using this information, we talked with individuals in the target age group using focus groups and a survey to get feedback on cartoons we created. We then refined our cartoons to better reflect

the feedback we got from the focus groups and survey. The cartoons were then put on various social media platforms and the National FASD website in the hopes of educating them on the topic. In what follows, we discuss behavior change models, public health campaigns, and ethical considerations taken into account while creating these cartoons. We then describe our methods to complete our goal of creating a public health campaign. Finally, we present the results from our focus groups and survey and discuss our recommendations for the next steps that can be taken to expand upon our educational cartoons.

2. Literature Review

In this literature review, we describe behavior change models that can be used to create public health campaigns that aim to educate and motivate a target audience on healthier choices. There are benefits in educating the public to make healthy choices not only for their individual health, but for broader societal benefits. We've evaluated public health campaigns such as those that educate audiences on the negative health impacts of smoking and unsafe sex. There are numerous behavior change models that have been theorized. In what follows we discuss three relevant models that have been effectively used in the creation of previous health campaigns.

2.1 Behavior Change Models

Behavior change models are used as a blueprint to guide successful public health campaigns by creating an approach that will motivate healthy behavior. Each behavior model has a set of elements that factor into how the campaign will be structured and delivered to the public. These models are designed to persuade a target audience to change the attitude that is behind that unhealthy behavior. The following behavior change models have been theorized by health practitioners and community leaders to be successfully utilized in mass public health campaigns.

The models include the Health Belief Model (HBM), the Social Cognitive Theory (SCT), and the Theory of Planned Behavior (TPB) (Introduction, n.d.). Evaluating behavior change models allows researchers and clinicians to understand the link between behavior and the attitudes behind the behavior. Each behavior change model has elements that contribute to the success of their campaigns, however the intention and approach behind each model varies.

2.1.1 Health Belief Model

In the 1950s, the HBM was theorized by social scientists to understand why individuals do not adopt prevention strategies for diseases. The HBM states an individual will not change their behavior unless a risk to their health is presented. The intention behind this behavior change model is to understand the behavior of an individual when avoiding a sickness or inversely attempting to become healthy if already sick (Introduction, n.d.). The six factors of HBM (see

Table 1), are perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cue to action, and self-efficacy (Introduction, n.d.). This model is geared toward an individual's perception rather than the common feelings of a mass audience. This model is used mostly to develop questionnaires and verbal questions that are delivered in clinical settings and one-on-one counseling.

Factors	Definitions
Perceived susceptibility	The individual's feeling of risk to contract the illness
Perceived severity	The individual's feeling of impact the disease or health risk will have on their life
Perceived benefits	Whether the health benefits outweigh the course of action to improve health
Perceived barriers	The level of difficulty to overcome obstacles in making the change
Cue to action	The internal or external catalyst needed for an individual to think about making a health behavior change
Self-efficacy	The individual's ability to carry out the changes needed

Table 1: Six Factors of the Health Belief Model

2.1.2 Social Cognitive Theory

In the 1980s, the SCT was theorized based on the idea that external factors influence behavior more than internal factors. The SCT model evaluates the psychology of social norms,

and how to change behaviors relating to environmental influences. This model differs from the HBM model because the influential factors come from the environment and observational learning. For example, television commercials, your peers, role models or influencers, and social media. The six factors of SCT (see Table 2), are self-efficacy, outcome expectations, self-control, reinforcements, emotional coping, and observational learning (Introduction, n.d.).

Factors	Definitions
Self-efficacy	The individual's ability to carry out the changes needed
Outcome expectations	Whether the desired outcome can be expected
Self-control	The willingness to carry out the behavior as instructed
Reinforcements	Consistency with repetition of the healthy actions
Emotional coping	The ability for an individual to react to an emotional message or trigger
Observational learning	The ability to learn how to make the desired behavior change by watching others

Table 2: Six Factors of the Social Cognitive Theory

2.1.3 Theory of Planned Behavior

In the 1980s, the TPB model was theorized to understand an individual's motivation to engage in unhealthy behaviors. The TPB has been used to explain and understand a wide variety of health behaviors and intentions including drinking, smoking, and others. For example, a study used the TPB model to understand an individual's desire to speed while driving (Stead et al., 2004). The TPB model uses specific factors to predict and explain the motivation an individual has to speed. The TPB model is considered the best predictor of human's behavior and was used

in this study to predict over a period of time speeding intentions and behavior changes (Ketphat et al., 2013). Figure 1 shows the elements of the TPB model that contribute to an overall intended behavior change.

Figure 1: The Theory of Planned Behavior Model

The TPB model has six factors including attitude toward the behavior, behavioral beliefs, subjective norms, normative beliefs, control beliefs, and perceived behavioral control (see Table 3).

Factors	Definitions
Attitudes	An individual's feelings toward the outcome of the behavior
Behavioral intention	The more motivated a person is to behave a certain way, the more likely the behavior will change.

Subjective norms	The perception of whether other individuals will accept this behavior.
Social norms	Whether the behavior is customary within community culture
Perceived power	An individual's feeling to be able to control factors that make changing behavior easier or more difficult
Perceived behavioral control	The individual's thinking about how easy or difficult the change will be

Table 3: Six Factors of the Theory of Planned Behavior Model

The TPB model is the most widely used for health behavior changes and has documented success for changing behaviors related to drinking. The success of this model is based on the idea that behavior is not always controlled or voluntary. This model is designed to be used in health behaviors, individual interventions, peer influences, and mass campaigns. This model is unique because the six factors are designed to be divided into three categories including, attitude, subjective norms, and perceived behavioral control. These main components shape the overall behavioral intention of an individual or group of people that can be used in the creation of a campaign (Ryan & Carr, 2010).

Over the years, behavior change models have been modified and improved, but some factors within the models tend to stay the same. Even though the HBM was created in the 1950s, it still has factors that correspond to elements in the SCT and TPB models. The factors that tend to be consistent are social norms, attitudes toward the behavior, abilities, and behavioral intentions. These specific factors have been important in the success of previous public health campaigns, and ultimately in the behavior changes of the future (Norman, 2011). For example, The Truth campaign, which we discuss in the next section, have utilized the TPB model to conduct media research and behavior change theories. The Truth campaign used three specific

factors pertaining to the target audience including beliefs, social norms, and attitude associated with the behavior change the campaign is aiming for (Allen et al., n.d.).

Although the behavior models have similar factors of behavior change, each model has a unique intention on how the campaign will be created. The HBM has a clear focus on health-related risk perception and the physical evidence that the proposed outcome will be successful. The SCT uses psychology to observe one's attitude on the undesirable behavior and directly correlate it to the social norm of the community. The TPB is used within social and environmental psychology to determine intentions and attitudes of the subjects and ultimately aid the understanding of certain behaviors (Neighbors & Fossos, 2013). All of these behavior change models are used within public outreach campaigns, but the SCT and HBM are commonly used in small clinical groups or focus groups, whereas the TPB is widely used for mass media campaigns (Allen et al., n.d.).

The TPB was chosen as a foundation for our public health campaign because this model is widely known as a blueprint for mass media public health campaigns, rather than small clinical groups. Also, research and information from our sponsors, NOFASD, suggested that factors such as behavioral intention, social norms, subjective norms, and attitudes influences behavior around alcohol and teenagers in the UK. Teenage drinking in the UK is an integral part of the culture. Our team's campaign utilized behavioral intention factors, such as the acceptance or approval of peers, to educate teens in the UK about drinking during pregnancy with FASD consequences. It also considered attitudes and social norms to address the social acceptance of teenage drinking while pregnant and to encourage teens to change that behavior to reduce the risk of FASD.

2.2 Public Health Campaigns

In this section we will discuss the main themes of creating a successful public health campaign. Over 20 campaigns were reviewed, but only three related the most to our own campaign and were successful. A successful public health campaign is able to educate and positively alter their target audience's behavior. The TPB model is an established tool that campaigns utilize to positively affect behavior. This review will discuss the three themes that were drawn from each campaign and how they used pieces of theTPB. The first theme was to

research the desired target population, second was to post on a multitude of platforms, and the third was to review the interaction with the campaign if it needs to be altered. In order to understand these themes a brief explanation of each campaign will be described in the following paragraphs first, and then the themes will be discussed.

The first successful campaign we reviewed was The Truth campaign. The Truth was created by the American Legacy Foundation from a settlement agreement of tobacco companies. From the campaign's formation in 1997 it has directed its methods at the young adult and teenage generations to prevent them from smoking cigarettes, and in more recent years the use of e-cigarettes. The campaign consists of different media to display the message of prevention, awareness, and tools to quit. The campaign has been able to bring down cigarette use from 23% in 2000 to less than 5% today, and helped more than 910,000 people quit smoking (Truth, 2021).

Next a campaign produced by the Center for Disease Control and Prevention called *Tips from Former Smokers* was aimed to persuade an older demographic to quit smoking. The campaign primarily utilizes 30-second video clips in order to convey their message. It consists of personal narrated stories where they urge people to quit smoking because of the medical impacts that they have now and how they thought it would never happen to them. Through the use of the behavioral intentions model the stories acknowledge how it is difficult to quit smoking, but the health effects are greater than what each of these people perceived (Prochaska et al., 2018).

The last campaign discussed is the United Kingdom's safe sex education and pregnancy prevention campaign that was produced in 1999. The campaign targeted young adults to provide the necessary education on safe sex practices and decrease stigmatization against teenage pregnancies. The campaign was also targeted towards educating parents to be able to provide support and educate their children as well, called *Time to Talk* (Hadley et al., 2016). This campaign can be considered a successful tool to learn from since its creation in 1999 the teenage pregnancy rate had dropped by 51% in 2016 (Hadley et al., 2016).

One of the most important pieces in creating a campaign is to research and understand the target population. In understanding the target population, the campaign will be able to attract their attention and lead to the desired behavior change. The Truth campaign in 1997 initially targeted millennials and smoking cigarettes, while now it is focused on e-cigarettes and towards a new generation called Generation Z, born between 1997 and 2021. The campaign has taken advantage of social media to further behavior changes around smoking. Through appealing to

the belief and attitude models through two different hashtags, "#finishit" and "#safe≠safer", the campaign has been able to appeal to Gen Z (3 Lessons, 2017). The "#finishit" campaign attracts this generation through its need to be a part of something bigger and encourages them to work together to finish smoking. The "#safe≠safer" hashtag appeals through the belief that even though this new method of smoking is considered to be safe, it does not mean that it is what teenagers should be doing (Castronuovo, 2020). The campaign was awarded a silver medal in the 2020 Reggie Awards for its ability to effectively market towards a specific age (Truth, 2021).

The Center for Disease Control and Prevention conducted research into their target population of smokers from 18-54 through the use of rough-cut ads aimed at low socio-economical individuals (Zier, 2019). All the rough-cut videos were tested for believability, clarity, and the potential for it to motivate a smoker to quit. They were tested by sending out a survey before and after the campaign was produced in 2016. From the beginning stage of research, they found that their target population was too broad and it needed to be broken down to more specific groups (Zier, 2019). Each of the 40 videos shot were then divided to each of the four subcategories based on which audience would respond to the content (Prochaska et al., 2018).

Next, all the campaigns produced their materials on a multitude of platforms to where their target population would have the highest interaction. For a campaign to be successful in different media, it is important to string them all together with a general theme and symbol as an identifier (3 lessons, 2017). All three of these campaigns utilized television commercials, advertisements online, a platform website and social media platforms in order to disseminate their campaigns. At the end of their campaign materials there is a link to their website or a number to their help hotline. One section of the safe sex campaign called *RUthinking about it enough?* directed towards 13- to 17-year-olds had a helpline called Sexwise that was available from 7 am to midnight, 7 days a week. The commercials produced on all outlets like television and radio avoided using an accusatory tone. Rather they showed common conversations that should be occurring between young people, parents, professionals, about different safe sex and contraception topics. The government's link to this campaign was particularly useful due to its ability to influence diplomacy directly and to diffuse information on a larger scale. Diplomatic topics like contraception were changed to allow better health and knowledge outlets for a younger age group (Hadley et al., 2016).

The Truth campaign found that it was most interactive through television commercials during a popular and culturally relevant program (Hair et al., 2017). Research based on Super Bowl advertisements helped to form the idea to post during a specific time where people will be watching. The opportunity is there to directly reach the intended audience on channels for the age group and it further increases brand awareness, and future ad recall (Hadley et al., 2016). Social media was then used to support those advertisements that were shown on television, like tweeting during a finale of a popular television show with related content. The key here is that the audience is already engaged with the episode, tweet, or video so that when they see the advertisement they are more likely to interact and remember due to that linkage of material (Hadley et al., 2016). The *Tips from Former Smokers* main media was focused on the video monologues from former smokers and families of those smokers, and then began to follow that campaign with the images and photos, along with social media content. It is important to note that, like the other campaigns, all of the media ended with or included the box symbol with *Tips From Former Smokers* on it including a link and phone number to the CDC in order for a direct way for smokers to receive help (CDC website). This increases their awareness and builds a platform of recognition. As all the campaigns are posted on different media, that small symbol or phrase at the bottom is what connects the campaign together. This produces a higher recognition and recall of the campaign that in turn aids the behavior change with this constant influx of materials.

The third theme that was found from the literature was after the campaigns were produced, they were reviewed and altered to better reach their audiences. The Truth campaign was able to alter their materials in order to appeal to the Gen Z instead of the Millenials (3 lessons, 2017). They shifted from network to cable television and then took advantage of social media to make it more versatile. The Truth campaign identified that the "just say no" approach was not effective towards this age group, and that talking to the audience was more effective (Allen et al., ND). The "just say no" approach used authoritative language that had the opposite effect on the audience's behavior and led to risky behavior. The campaign utilized peer-to-peer language to capture the target population's attention as opposed to authoritative language where a teenager hears a lesson they are not going to listen to (Castronuovo, 2020). The United Kingdom also altered their approach after the campaign was produced. The mid-review in 2005 also showed how there was a wide range of results where in some places the rates increased

while others decreased (Hadley et al., 2016). A more in depth dissemination report was sent to the local areas with ten key factors for effective change including a self-assessment which was required to be sent in to the government every six-months. The campaign discovered that contraceptives were not as available to teenagers and women were only allowed to talk about contraceptive methods until they were over 18. From this the campaign used their ties with the government to impact legislation to allow Women's Clinics to provide more information to younger girls that need it (Hadley et al., 2016). The campaign also redesigned their *RUThinking* campaign and created the *Want Respect?: Use a Condom*, which was focused on impacting boys behavior (Hadley et al., 2016). The new alteration to the campaign utilizes social norms in order to elicit the behavior change of this audience. The name change allowed for a positive response to empowering the audience rather than shaming them for not thinking. The *Tips from Former Smokers* campaign was able to evolve from promoting their videos through commercials and through partnering with companies like these listed in order to increase their interaction with the population: The National Center for Health in Public Housing, National Association of Social Workers, American Dental Hygienists Association, American Psychological Association, National Association of Community Health Centers, and Smoking Cessation Leadership Center (Zier, 2019). These partnerships were to help get information to those directly impacted by smoking.

The important lessons learned from researching these campaigns are to (1) research the target population; (2) have a designated symbol or format that is easily recognizable through all the platforms used; and (3) utilize feedback to determine the effectiveness of the campaign so that it maximizes the amount of the population reached. Throughout the entirety of a public health campaign it is crucial to keep in mind those affected by the topic being discussed, and to be as respectful as possible while also making

2.3 FASD Ethical Considerations

There are several ethical factors to consider when discussing FASD. One possible consideration is how the campaign may come across to certain feminist groups. In past attempts made by NOFASD, trying to relay the potential dangers of drinking alcohol while pregnant to the public incited these feminist groups to push back. They believed that telling women not to

drink while pregnant was a way of trying to strip them of their bodily autonomy. Communicating that women should never drink while pregnant can be interpreted as paternalistic and potentially become an obstacle for women's informed choice (Zizzo & Racine, 2017).

Additionally, it is essential that the messaging does not perpetuate any stigma surrounding mothers that have children with FASD, and those diagnosed with FASD. Current FASD prevention focuses mostly on the behavior of mothers and their role in the development of FASD, which leads to the perception that the mothers are irresponsible (Zizzo & Racine, 2017). This focus on the mother puts blame solely on them, and ignores the societal factors that may lead women to drink and contribute to the development of FASD (Zizzo & Racine, 2017). Zizzo and Racine (2017) found that a contextualized, patient centered, compassionate approach is best for health campaigns.

The serious consequences of prenatal alcohol exposure need to be communicated, while also acknowledging there are still gaps in the knowledge about alcohol consumption levels (Zizzo & Racine, 2017). The messages should also be tailored to specific audiences, and show hope instead of perpetuating stigma. What should be promoted is an understanding of how communities, partners, families and friends can all play a role in preventing FASD, not just women (Bell, 2015). The public health outreach materials created spread information to prevent FASD and through methods that will not lead to stigmatization.

3. Methodology

The National Organization on Fetal Alcohol Spectrum Disorder (NOFASD), a non-profit organization located in London, England, aims to prevent Fetal Alcohol Spectrum Disorder (FASD) by encouraging women not to drink while pregnant and ultimately lowering the rate of FASD cases in the UK. Assisting NOFASD, our team created a public health outreach campaign that educates and encourages behavior change in young adults in the UK from ages 15 to 20 on FASD prevention. To accomplish our goal, we developed three objectives that were completed sequentially.

1. Create a series of educational cartoons directed at young adults in the UK ages 15 to 20.
2. Create a survey to evaluate and revise the effectiveness of our cartoon materials.
3. Develop a dissemination strategy to post the revised campaign materials on the NOFASD social media outlets.

3.1 Creation of the Educational Cartoons

Based on secondary research about how to change human behavior and previous public health campaigns that have found success with our target age group, we developed a series of educational cartoons that promote sober pregnancies. This became the theme of our public health campaign. We created twelve characters, half being female eggs and the other half male sperm (see Figure 2).
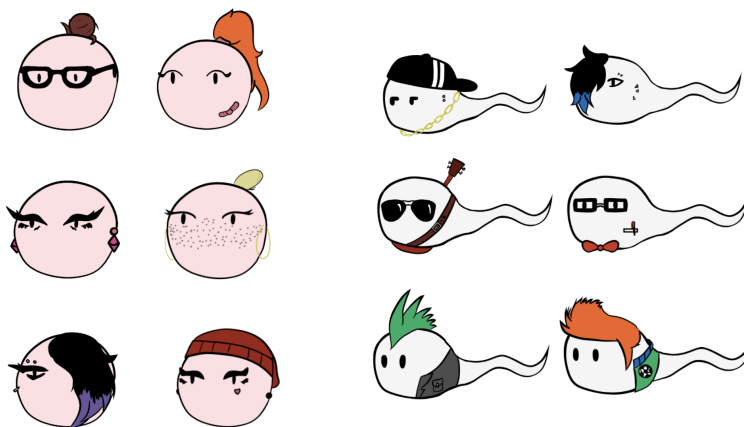
Figure 2: Revised Drawings of Sperm and Egg Characters.

The rationale behind our character approach was to catch the reader's attention by creating something that is unusual to see on social media. Instead of having regular human characters, we thought portraying a male and female using sperm and eggs would make the reader curious and interested to keep reading. We thought by using these characters, more conversations could be had about the risks of drinking during pregnancy, especially between young adults, without the discomfort of using the terminology.

Each character had a unique appearance and personality that portrayed a stereotypical British high school student in the UK. The characters consisted of an athlete, musician, chav*[1] nerd, popular teen, and an indie. To design these characters, we utilized the software Clip Studio Paint, a 2D animation and digital art program that allowed us to create designs into storyboard form. Each cartoon was designed to have six pictures including the last picture directing the reader to the NOFASD website for more information. Using the behavior change models discussed previously, we created three scenarios of common places to drink in the UK along with dialogue between the characters.

We used four factors of the TPB model to create these scenarios, including attitudes, social norms, subjective norms, and behavioral intentions. We created each cartoon by first discovering the attitudes young adults in the UK have on drinking during pregnancy. We spoke

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[1] *A young person of a type, characterized by brash and loutish behavior.

to our sponsors in London about the social and subjective norms in the UK so we could use the correct scenery and language. Lastly, we used behavioral intention to create dialogue between the characters that portrayed disapproval by their peers. These factors assisted in making the cartoon relatable to young adults in the UK based on common social situations. The cartoons also included educational information such as an explanation of FASD, health risks, and a link for more information. Each cartoon was created in a format that would be ideal for sharing and distribution through social media.

3.2 Evaluate and Revise our Cartoons

After establishing the theme for our public health campaign we analyzed each cartoon's message and effectiveness to be shared on social media. The success of our cartoon being able to resonate with a UK teenage demographic was tested through the use of a survey. The main purpose of the survey was to determine how relevant the material was to young adults in the UK, and to understand if the brief dialogue within the pictures would spark the reader to want to learn more about FASD. The survey consisted of three questions about the reader's demographics, a question to gauge the reader's prior knowledge on FASD, and a storyboard picture of two cartoons followed by a series of questions asking for feedback (see Appendix A).

After the creation and revision of our cartoons, we sent them to our sponsors for review. They gave us insightful feedback on the cultural aspects of the cartoon and how to best include their slang into the dialogue. We had them cross check our dialogue to ensure the ethical side of this project was taken into consideration. We also used the FASD Prefered Language Guide to make sure that we had worded our posts respectfully. We then sent the final version of our cartoons to our sponsors with instructive steps they could take to post these cartoons on social media.

The survey was distributed to our sponsors, both focus groups (discussed below), our 13 person IQP cohort for E term, and various clubs and organizations we have connections with in the US. With assistance from our sponsors, we received 69 total responses to our survey. The survey was targeted at individuals between the ages of 15 and 20, but we wanted to receive as many responses as possible. Out of 69 respondents, 41 were part of our target audience in the 15 to 20 year old age range. We utilized Qualtrics software to create this survey because of the tools

it offers to analyze results. The results of the survey were broken down by question and percentage of answers chosen. We were able to transform the results into a report that we coded into categories of similar responses and demographics.

In addition to the survey, we conducted two focus groups of students between the ages of 15 and 17. The purpose of these focus groups was to receive live feedback on our cartoons from our target demographic. A typical focus group only asks a few spurring questions and allows for the conversation to flow, rather than be directed. We had to skew away from our original plan and conversation points since the groups were smaller and younger than we had initially expected. Our first focus group was conducted over Microsoft Teams. The second was over Zoom, both lasting roughly 45 minutes. The first consisted of five students, and the second of only two students. With the limitation of carrying out this project remotely, the focus group participant numbers were lower than expected. Our original goal for the focus groups was to have 6 to 7 participants. However, there were some advantages to having less people. We were able to ask follow-up questions to allow for a more detailed dialogue. Also, because the focus groups were small we were able to spend time listening to the opinions of every individual. We displayed our cartoons first, and allowed time for the cartoon to be read aloud and digested before asking questions. Once time was up, we asked for initial responses first and then we asked specific questions for feedback we desired. We observed body language and facial expressions as the cartoons were displayed on the screen. The focus groups we utilized to receive more in depth and genuine responses than what was provided in the online survey. Refer to Appendix B for the focus group questions and conversation points.

The participants of both the survey and focus group were acquaintances of our sponsors, so it was not a surprise when most people already knew what FASD was. This limited the variety of results we would have got if more people who took the survey did not know what FASD is. If more people who are not familiar with FASD took our survey, we would have a better understanding if our cartoon was enough to educate them.

3.3 Dissemination Strategy

After creating our cartoons it was important for us to understand how we will share the materials. We initially wanted to post the cartoon on Instagram, but since the campaign had not yet been completed we shared the cartoon for feedback through our sponsors and family. The cartoon was put onto a survey using Qualtrics and shared through emails and word of mouth. We did not want to publicly release the survey, as we were not ready for the general public to see our cartoons yet.

To help our sponsors for the future of our campaign we researched how best to share it when it is completed. Similar to how we conducted research into public health campaigns to create our own campaign, we reviewed public relations campaigns to follow their strategies. We researched how these campaigns used Instagram and others algorithms, features, and posting times to reach their designated audience. Social media is an effective way to get information out into the world quickly. It can be an interactive space for science dissemination, support health policies by distributing informative content, and promote healthy behaviors with education (Mendoza-Herrera et al., 2020). Through the use of our survey we better understood the social media habits and preferences of our target audience, so we decided to focus on Instagram and the NOFASD website to display our cartoons. These platforms are able to post multiple pictures and with a caption to describe the content.

4. Results and Discussion

By analyzing the results of our data, we were able to measure and refine the messaging and relevancy of the educational cartoons used as our public health campaign. This chapter contains results we investigated from our survey and focus groups pertaining to demographics, social media, and lack of cartoon comprehension. Based on the results of our analysis, we made modifications needed to improve the cartoons to better resonate with 15 to 20 year olds in the UK. This chapter concludes by demonstrating the revisions that were made to our cartoons based on feedback from our methods. Our three themes discussed below demonstrate the complexity of creating a cartoon that will resonate with all demographics. Providing NOFASD with these themes will assist them in evaluating their current curriculum and with developing the campaign materials further. Out of sixty-nine responses received through the survey and responses from focus groups, the following three themes arose:

1. Male responses to the survey questions differed from that of female responses.
2. Participants 21 years or older were less interested in reading the entire cartoon.
3. Instagram was validated as the most popular social media site for young adults in the UK.
4. The character drawings needed to be more cohesive and the characters being portrayed as sperm and eggs needed to be introduced.

4.1 Gender Defined Responses

From our survey, the male responses to the questions about prior knowledge of FASD, interest in the cartoons, and visiting the NOFASD website differed from how female participants responded. Overall, female participants were more likely to have prior knowledge about FASD compared to the male participants. As shown in Figure 3, women were more likely to read the entire cartoon and visit the NOFASD website. This is unsurprising as FASD prevention and not drinking while pregnant is widely viewed as a women's issue. Women are directly affected by FASD, so they are more likely to learn about the effects of drinking during pregnancy, whether it be from their peers, research, the internet, or even movies and television shows. Of the 27 males that responded to our survey, 81% of them said the cartoon kept their interest the entire time. However, 56% of males said that even though it was interesting, they would not visit the

NOFASD website because it was not relevant to them (see Figure 3). This may be due to women being more likely to look up this information when they become pregnant.
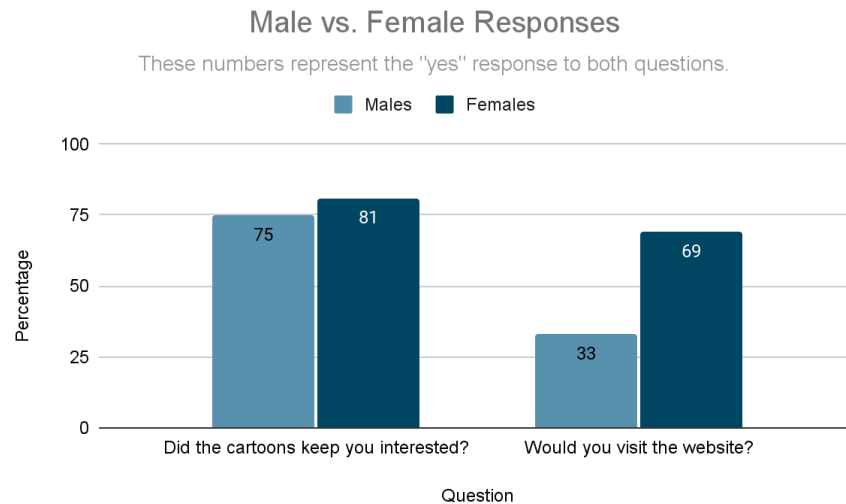

Figure 3: Male vs. Female Responses to the Survey.

In order to encourage the male population to visit the website, it would be beneficial to create a page on the NOFASD website giving advice on how to support someone who is pregnant and how FASD can potentially affect children exposed to alcohol prenatally. This information could include suggestions like abstaining from drinking during pregnancy, how to ask someone not to drink during pregnancy, or giving them information on FASD on ways to relay this information to the person who is pregnant. In addition to adding the page, it will also be important to include cartoons that appeal to the male population in the future. They should include conversations and information that will positively impact the male mindset on using contraception and supporting their pregnant partners through this time period.

We also saw similar results in our focus groups. In one focus group we had five total participants, one male and four females. The other focus group had two participants, both were female. When each focus group was asked if the cartoon kept them interested, they all agreed that it did. When asked if they would visit the NOFASD website, three of the five in the first focus group said they would. The remaining two said that even though they wouldn't at the time, it was good to have the information in case they need it in the future, or to pass it on to a friend who may need it. In the second focus group, both participants said that they would visit the

website. However, the second focus group consisted of teenagers who were advocates for NOFASD.

4.2 Age Defined Responses

Age was also a factor that influenced the survey responses. Since our cartoons were intended for a target audience of 15 to 20 year olds, they were meant to be fatuous and eye-catching. The individuals that were 21 or older were less interested in the cartoons. This may be from the difference in maturity levels and prior knowledge on drinking during pregnancy. As shown in Figure 4, only 16% of women and 38% of men did not know what FASD was.
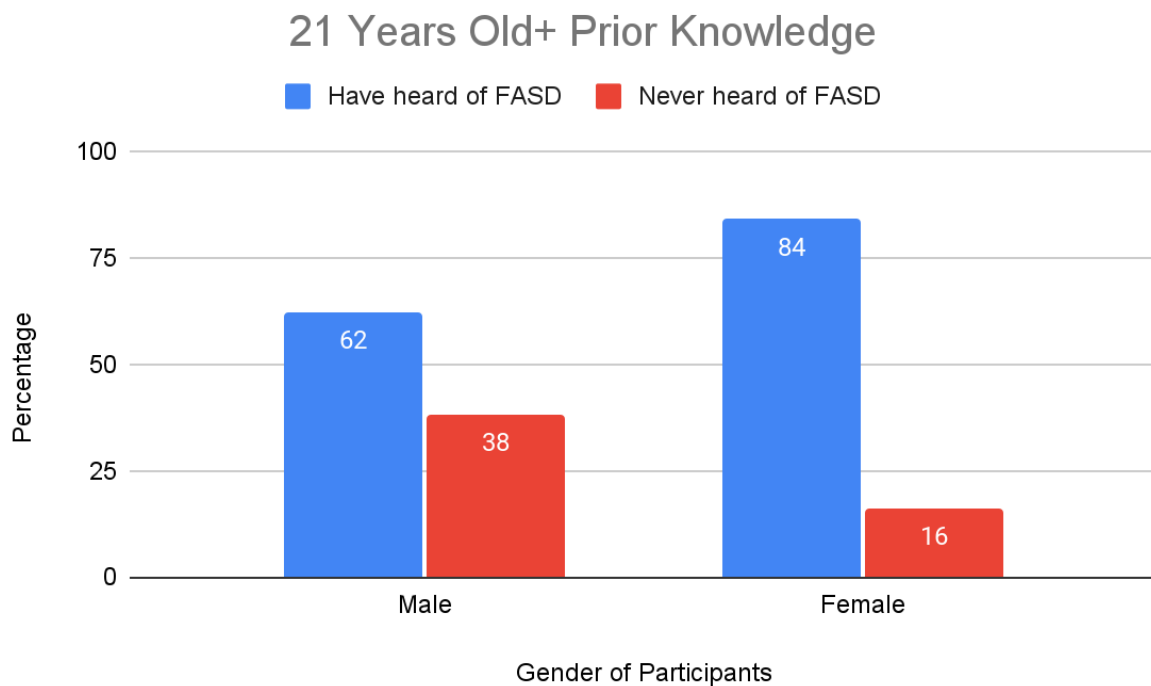

Figure 4: Respondents Prior Knowledge on FASD, 21 Years or Older.

This figure shows that people who are older are more likely to have prior knowledge of FASD. Additionally, the three comments about using humans instead of sperm and eggs and making it more adult friendly were given by these older respondents. Five of the respondents that were older also suggested that the cartoon be less childish and more informational. Although these comments were beneficial to altering our cartoon, it was difficult to decipher how to add

these elements into our cartoon since there was a more positive response from our target audience. Since people over 21 have a greater understanding of FASD, they are less likely to visit the website. In fact, 73% of people over 21 said that they would not visit the website (see Figure 5).
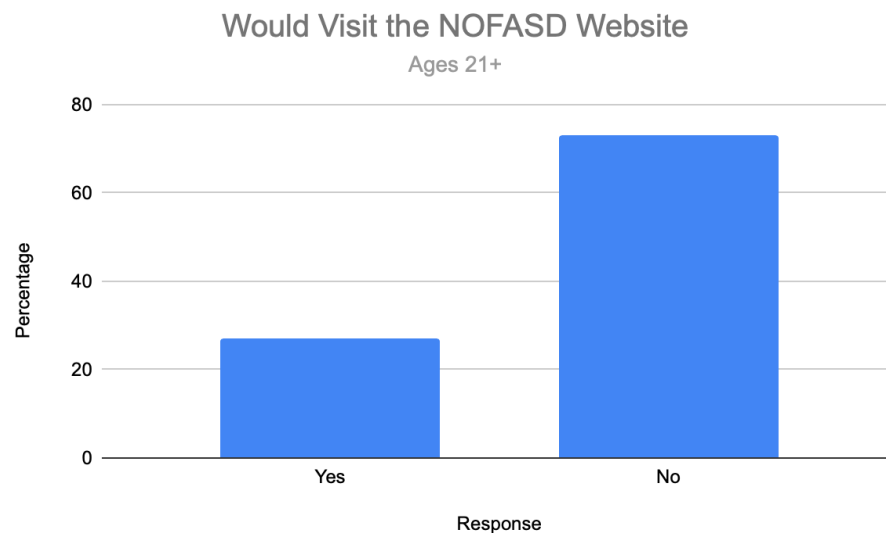

Figure 5: Respondents That Would Visit the NOFASD Website, 21 Years or Older.

4.3 Social Media

As part of our research when creating a strategy for our public health campaign, one of the focuses for our dissemination strategy was social media. We found that Instagram was the most popular social media site for our target audience during our literature review of previous campaigns, and our survey and focus groups confirmed this finding.

In Figure 6 below, out of the 42 people from the UK who took the survey, 54% preferred Instagram as their social media of choice. When we asked participants in our focus groups what their preferred form of social media was, all seven participants responded that they preferred Instagram. Instagram is a perfect place for our cartoons to be posted because of the features it offers. The platform gives us the ability to make each panel of the cartoon separate pictures so that it gives viewers the ability to swipe and read at their own pace. Instagram can also be linked up with Facebook so when we post on one platform, it automatically posts on the other.
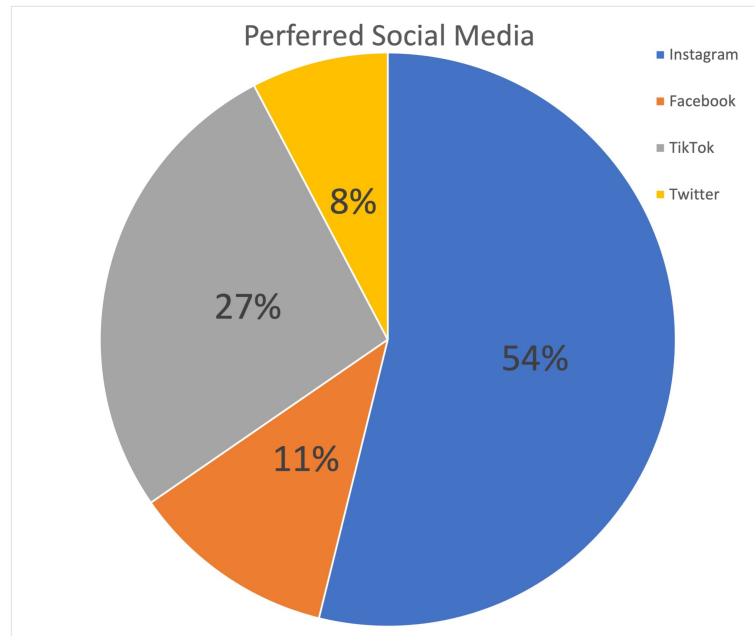
Figure 6: Social Media Usage of UK Participants.

Social media is a complex tool because of how difficult it can be to post content that impacts your followers. Post too much, you lose followers, post too little you also lose followers, and going viral is rare. Since we did not want to preemptively post our materials, we have created a dissemination strategy for NOFASD to follow once they continue the materials. We recommended posting the introduction to the FASD sperm and egg world on their Instagram story and following that up with the personal introductions to each character. Instagram stories are only up for 24 hours, so the introduction should be posted twice in one week to capture attention, once on a Wednesday during midday and then again on Friday at around the same time. These days and times are when there is the highest traffic on Instagram, along with the best times for the algorithm to promote the material, based on a chart of highest engagement times (Barnhart, 2020). The following week the characters should begin to be introduced two a day, three times a week. Following that week, the interest and concepts will be understood, so the cartoons can finally be posted on the page (see Figure 7). The cartoons should be posted on Monday mornings with popular FASD trending hashtags to also increase traffic to the FASD page. For example, potential hashtags could be "#alcoholduringpregnancy", or "#noamountissafe". The characters should also continue to be posted on Wednesday's and

Friday's but decrease to one cartoon a day followed along with a story. The consistency and spread-out schedule of information is an approach to posting just enough to keep the cartoon in people's minds, but not flood their social media pages (Barnhart, 2020).
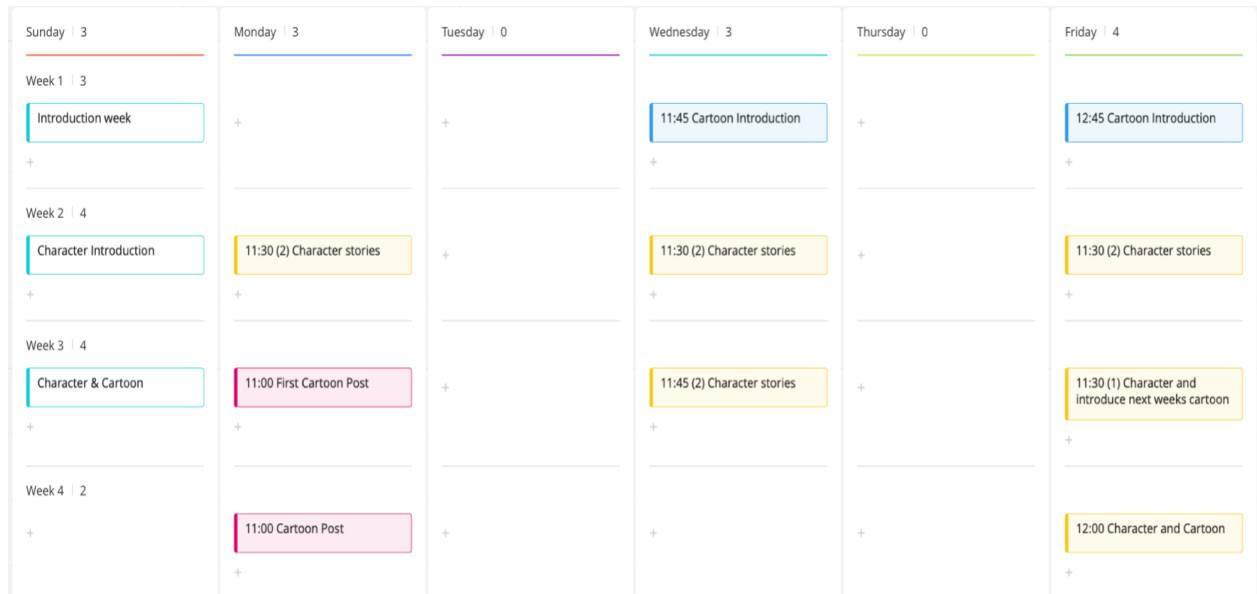

Figure 7: Popular Social Media Usage Times to Post Our Cartoon.

4.4 Cartoon Revisions

In this section, the feedback from the survey and focus groups discussed is based on revisions we made to the contents of the cartoon. The key critique from our survey and focus group respondents was the confusion on the egg and sperm characters. Since the idea was created by us and we understood the concept, we kept the drawings simple to spark curiosity. Rather than using people, sperm and egg characters were used since we were talking about pregnancy and the unconventional and unusual subject matter would cause someone scrolling on social media to stop and follow the story. The responses from all age groups and genders showed that the idea was not obvious to our audience, and it was necessary to introduce these characters before the actual cartoon. For example, most of the comments we received were "Why are the characters blobs?", "You should make the characters look more like people." These responses were valid, as we did not introduce the concept of the sperm and egg being portrayed as male and female beforehand and expected our audience to automatically understand. To make our concept more apparent to the viewer, we created a cover photo for each cartoon that introduces the concept (see Figure 8).

Figure 8: Cover Photo of Cartoon.

In total, the survey received 69 responses. The results highlighted how important it was for the cartoon characters to be explained and expanded on further. Of the 69 responses we received, 38 did not answer the open ended questions and in turn could not be coded. The 31 remaining responses were coded into categories that were based on cartoon related content. Five categories were created, but only two categories suggested relatable material for our target audience. The most popular was how confused the respondents were about the sperm and egg characters, which was 58% of those who gave constructive feedback. Of those responses, one thought that the characters were ghosts, which convinced us even further to make the characters clearer. This percentage was unfortunately high and a number that we did not expect. Around 12% (8 respondents) stated that the text was too small and difficult to read (see Table 4). Although this is a key piece of information to keep in mind, it was a limitation of using qualtrics. We had to place the entire cartoon on a single collage, rather than on individual slides like we envision their use through Instagram and Facebook.

Categories	Number of Responses	Percentage
Blank responses	38	55%
Text was too small	8	12%
Character confusion	18	26%
Cartoon dialogue was too judgemental	5	7%

Table 4: Coding of Survey Responses Regarding the Educational Cartoons.

Similar results about the egg and sperm characters were produced from the focus groups. Of the seven participants in our two focus groups, all of them were initially confused about the concept of the egg and sperm. Also, during the focus group the respondents had to have us read the cartoons out loud because it was difficult for them to see the text. This was a similar limitation for the second focus group, as we had to utilize the collage cartoon rather than the single pictures. In the first focus group the limitation was that they were seated further away and the projection screen was not working so it was on the teacher's laptop screen.

The response was positive from those who did understand the concept, and the cartoon was still able to hold the interest of those who understood. From this feedback, we decided to create a more complete cartoon with an initial introduction of our sperm and egg characters through use of a title card before the actual comic. In addition, posters were created for each character to introduce their personalities. These character introduction posters will be posted prior to the posting of the cartoons, to give viewers a base understanding of the characters and concept. The initial cartoon is a campaign that introduces the characters as a whole and introduces viewers to a world populated by eggs and sperm instead of human people. Then following this, each individual egg and sperm has their own personality traits that help to educate the audience. In order to further clarify the egg and sperm concept, female characters were changed from having the same slightly off-white color that the male characters have to a light pink. This was to differentiate the egg and sperm from each other, and because feedback from focus groups stated that they visualized eggs as pink rather than white. Overall, this feedback

allowed our cartoons to grow into a supportive and interactive way young adults in the UK can view FASD (see Figures 9 and 10).
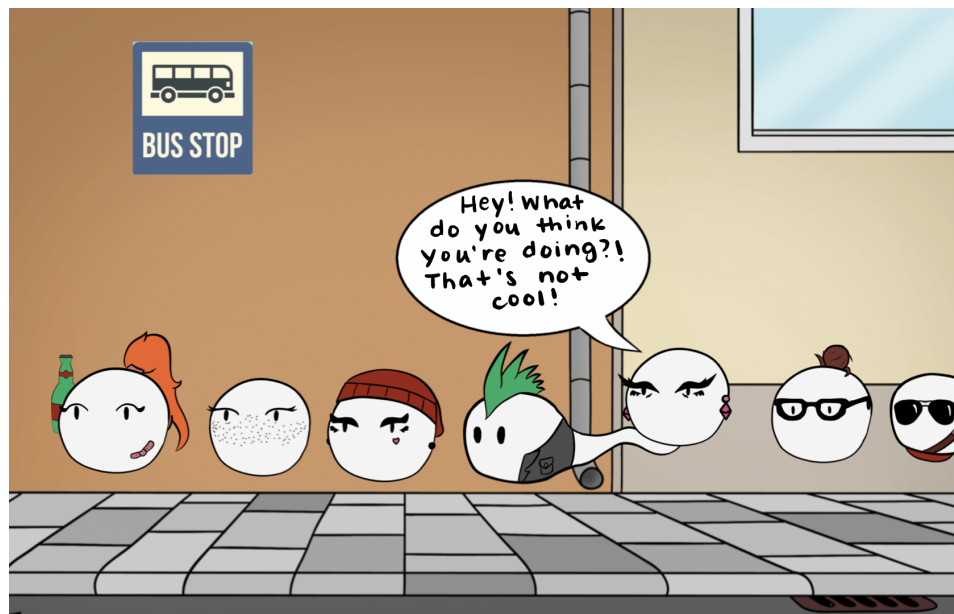

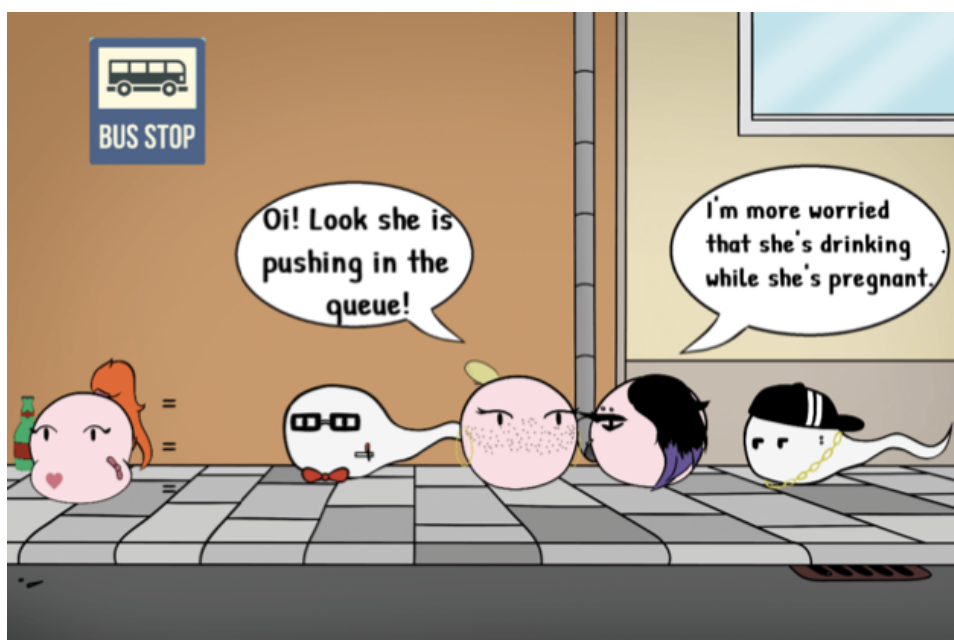Figure 9: Cartoon Panel Before the Revision Process.

Figure 10: Cartoon Panel After the Revision Process.

4.5 Recommendations for Future Work

For further development of this cartoon, we plotted three ways to continue to build on our cartoon theme. These include making the cartoons come to life in video form, having a page on the NOFASD website dedicated to this world we have created, and creating a lesson plan for appropriately aged students, ages 13-16, using these animations.

There is software called OpenToonz where 2D animations can be converted to a video with sound features. Using this software, we could create a voice for each character as well as a longer script. The video could then be shared on popular social media platforms that have primarily video content such as TikTok and Twitter. A video would be another effective way to portray the British culture through the scenery and characters.

Our sponsors proposed the idea of allowing a page on their NOFASD website to be devoted to this brand of cartoons. Each character would have their own section of the website to introduce themselves and their personalities we created for them. Along with the characters, there could be tabs with categories and folders of the cartoons that pertain to a specific factor of the TPB model.

In addition to creating short videos from the cartoons, future teams could create a lesson plan for schools to incorporate these cartoons into their education plans. Younger children could benefit from learning about the dangers of drinking during pregnancy at an early age. Since this cartoon is aimed at catching the attention of the younger generations, it could change the attitudes children have on this topic earlier in life.

5. Conclusion

FASD is a serious disorder in society. According to the University of Bristol, the UK has the fourth highest level of prenatal alcohol use in the world. Since drinking alcohol while pregnant is so prevalent in the UK, the National Organization for FASD tasked us with creating a public health campaign to educate teenagers and young adults ages 15-20 about drinking while pregnant. Through research and conversations with our sponsors we were able to create a series of educational cartoons using male sperm and female eggs as characters. Each cartoon informs the audience there is no safe amount of alcohol and encourages them to learn more on the NOFASD website. We then released a survey and conducted focus groups that aided in the creation and revision of these cartoons. We gained 69 responses from the survey and held two focus groups, one consisting of 5 people and the other consisting of two people. The main themes we discovered from our survey and focus groups were gender and age defined responses, social media usage, and cartoon revisions. The purpose of these methods was to judge the authenticity and relevance to the cultural demographics of teenagers in the UK. Through our survey, focus groups, and meetings with our sponsors we received feedback on character confusion, cultural differences, and the judgemental aspects of our cartoon.

The feedback we gained about character confusion consisted of not understanding what the characters were portraying, the color of the eggs, and the expressions the characters have throughout the cartoon. Using this feedback we created a cover page for each cartoon that stated clearly the characters were sperm and eggs so there was no more confusion. We then changed the color of the eggs to a pink color that differs from the white color of the sperm. We also added more expressions to the characters to make the cartoons more intriguing.

We got insightful feedback on the cultural aspect of our cartoon, which was helpful in making the cartoon more relevant to the UK. We were able to not only incorporate slang from the UK throughout our dialogue, but also use scenery that resonated with young adults in the UK as well. This helped with making the dialogue less judgemental in hopes for a more supportive environment.

It is our hope that in the future a team could build on this brand and take it even further. This includes creating more cartoons that introduce new ideas such as the partners of pregnant women supporting their spouses, an example being two sperm getting a drink together and

talking about FASD prevention. Additionally, the cartoons can be animated and posted on Tiktok in the future. Our sponsors have also shown their interest in using the cartoons to help with the PR campaign that is going to be launched later this year. The cartoons will be put on the website and their social media platforms to promote safe drinking for a younger audience. Overall, we hope that these educational cartoons help teenagers in the UK have a better understanding of FASD and why they should not drink while pregnant. With this knowledge, hopefully FASD can be prevented in future generations.

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6. Appendix A: Survey Questions

<u>Preamble:</u>

The purpose of this survey is to gather data on the ability of our educational cartoons to capture the attention of the target audience and ultimately lead the audience to the National Organization for Fetal Alcohol Spectrum Disorder's website to learn more about the risks of drinking alcohol during pregnancy. Participation of this survey is completely voluntary and names are not necessary. However, gender and age are important questions to answer with respect to seeing how it impacts reactions from the cartoon and the information being provided, they will not be used for any other purpose. Furthermore as North American students we are hoping to receive feedback on these informational cartoons to make them more relatable to teenagers in London. Please be as honest as possible when filling out this survey and try to complete every question.

<u>Questions :</u>

1. What is your gender?
    1. Male
    2. Female
    3. Other: please specify _____

2. How old are you?
    14   15   16   17   18   19   20   21   22   23   24

3. What country do you live in?

4. On a scale of 1 to 3, how much do you know about Fetal Alcohol Spectrum Disorder (FASD)?
    1 - Never heard of it
    2 - Know something
    3 - Know exactly what it is

First Cartoon

4. Did the cartoon keep you interested throughout all of the pictures? Please circle one.
    Yes
    No

5. Did you learn anything new about the risks behind drinking while you are pregnant? Please circle one. If yes, what did you learn?
    Yes
    No

'

6. After reading this cartoon, would you visit the National FASD website to learn more information about FASD?
   Yes
   No
   If not, why?

7. After seeing this cartoon on Instagram or Facebook, would you share this on your own personal social media account?
   Yes
   No
   Why or Why not?

8. Was there anything unclear about the cartoon? Please explain.

9. In what way could this cartoon be more relatable to you?

<u>Second Cartoon</u>

Ask the questions above again.

7. Appendix B: Focus Group Plan

Length of time: 30-40 minutes max

Introduce ourselves: name, year, and interesting fact about yourself

Ice breaker question to ask at the beginning of the focus group. Try to keep this to 5 minutes.
- Where is your dream travel destination?

<u>Preamble:</u>

We are a group of WPI students tasked with helping the National Organization for Fetal Alcohol Spectrum Disorder to create a public health campaign. The campaign we have decided upon is to use educational cartoons in order to attract the attention of teenagers like you to the cartoon and then direct you to their website for more information. The goal of our discussion today is to hear your honest and genuine feedback, what did you like and not like about the posts. We want to hear all the ideas in your head so do not be shy to share! We are not going to record any of your names so please try not to share when talking to us in the group. We are going to share our cartoons with you and then our questions to then allow you to group off and have a discussion on your own for roughly 10-12 minutes. When we come back together please have as many bullet points as you all can for each question that we ask.

Questions to ask during the discussion to have us share on the board while they have small group discussions:

1. What are your initial reactions to this cartoon?

2. If you saw this post on your social media page would you stop and scroll through the story? Why or why not?

3. Did the cartoon keep you interested throughout all of the pictures? What did you like and what did you not like?

4. After reading this cartoon, would you visit the National FASD website to learn more information about FASD? Why or why not?

5. How could these cartoons be more relatable to you? As teenagers and especially with the cultural differences as American students.

6. Which cartoon stood out to you the most and why? Which one did not?

8. Appendix C: Cartoon Storyboards

Cartoon #1

Cartoon #2: