Designing for Disorder: Instagram's Pro-eating Disorder Bubble

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childhood beyond brands

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To adequately highlight the problems of eating disorder content on Instagram, this report includes images and text that may be triggering. An image/text free version of this paper is available on request at info@fairplayforkids.org. We use real life stories and examples in this report but these have been anonymized as necessary.

Executive Summary

This report documents how Instagram grows and promotes an extensive pro-eating disorder 'bubble', and how they turn a small but steady profit from this bubble. It finds:

- The pro-eating disorder bubble on Instagram includes 90,000 unique accounts and reaches **20 million unique followers on the platform**. This could be one in 75 Instagram users who follow someone in this bubble.
- The bubble is young. This research found children as young as 9 and 10 following three or more eating disorder accounts, with a median age of 19. **One third of Instagram's pro-eating disorder bubble is underage,** and they have over half a million followers.
- Meta derives an estimated $2 million revenue a year from this bubble and $227.9 million from all those who follow this bubble. This revenue includes that derived from underage users – Meta directly makes $0.5 million a year from the underage pro-eating disorder bubble and $62 million in revenue from the people who follow these underage pro-eating disorder accounts.

In addition to being profitable, this bubble is also undeniably harmful. Algorithms are profiling children and teens to serve them images, memes and videos encouraging restrictive diets and extreme weight loss. And in turn, Instagram is promoting and recommending children and teen's eating disorder content to half a million people globally. The promotion and reach of this content is clearly not in the best interests of children and teenagers.

Meta's pro-eating disorder bubble is not an isolated incident nor an awful accident. Rather it is an example of how, without appropriate checks and balances, Meta systematically puts profit ahead of young people's safety and wellbeing. Meta's decisions around hosting and recommending eating disorder content may deliver small but steady profits to shareholders, but it has significant real life consequences for children and young people.

Documents revealed in the Facebook Files suggest Meta have been aware of this problem since at least 2019 and have failed to act. It is time that lawmakers and regulators around the world demand action.

Proposals in front of the California Assembly (the California Age Appropriate Design Code Act, AB 2773), and Congress (the Kids Online Safety Act, and Protecting the Information of our Vulnerable Children and Youth Act), could help ensure that platforms are designed and operate in a manner that prioritizes children's best interests. These bills do not regulate for content, rather they address the design and systems of digital services. These are long overdue, and are demonstrably necessary to incentivize action against algorithms that promote eating disorder content. This sort of regulation can introduce requirements to assess and mitigate risks posed by algorithms, and prohibit the use of children's data to train algorithms that harm.

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Foreword

Professor Hany Farid, Head of School, School of Information, University of California, Berkeley, co-creator of PhotoDNA.

We can't pretend that the internet has not had a phenomenally positive impact on some aspects of our lives, societies, and economies. We also can't pretend that the internet has not led to real harm in the form of child exploitation, terrorism, the sale of deadly drugs, small- to large-scale fraud, invasions of our privacy, and the spreading of dangerous disinformation campaigns.

In part, this is because the titans of tech are built around an ad-driven business. It is said that if the product is free, then you are not the customer, you are the product. Revenue in social-media's ad-driven model is maximized by maximizing user engagement which means that, more often than not, privacy and security take a back seat in the name of engagement-based metrics.

While reasonable people can agree on what safeguards, if any, should be put in place to protect consenting adults from online harms, most reasonable people will also agree that special care should be given to children.

From the global yearly distribution of tens of millions of pieces of child sexual abuse material, to child grooming and sextortion, screen-time addiction, age-inappropriate advertising, and unhealthy body images, we must think more carefully about the impact of powerful technologies placed in the hands of children for every waking movement of their young lives.

There has been a tendency to talk separately about our online and offline lives. The boundaries between online and offline, however, have been obliterated and what happens online has real-world consequences. As such, we need to think about today's online safety the same way we have thought of yesterday's offline safety.

There are practical, measured, and reasonable safeguards that can be put in place to protect children. Many of these measures begin — but do not end — with ensuring that products are, by design, safe for children and ensuring that services do not intentionally or unintentionally market age inappropriate content to children, or connect children with adult predators.

The technology sector has proven that it is unable or unwilling to prioritize children's welfare and so the time has come for our state, federal and international regulators to step in. Modeled after the United Kingdom's Age-Appropriate Design Code, for example, the California Age-Appropriate Design Code Act (ADCA) would require businesses to "consider the privacy and protection of children in the design of any digital product or service that children in California are likely to access." Senator Blumenthal's Kids Online Safety Act (KOSA) would "require social media platforms put the interests of children first by requiring platforms to make safety the default and to give kids and parents tools to help prevent the destructive impact of social media."

These proposed legislations are a step in the right direction and are worthy of serious deliberation.

Introduction

Algorithms drive much of what we see on social media platforms. For example, in 2018, YouTube outlined that around 70% of what people viewed on that platform was a result of their recommender algorithm[1]. Algorithms drive recommendations of what content to see, watch, who to follow, or who to friend. While they may sound impenetrably technical, at the end of the day algorithms are just simply pieces of code; written and developed by humans, that can be changed by humans.

Algorithms shape the creation of 'bubbles' and networks on social media platforms by recommending what and who users should follow, and they define the reach of content. This includes the creation of troubling bubbles and the reach of harmful content.

For users, including young users, this means algorithms can create 'bubbles' around them. Algorithms use all the data a platform has about a young person – including their browsing history in a platform, data tracked about them from other websites via cookies, and demographic data young people have shared with platforms among others – to profile them and decide what content to recommend to young people and who to suggest they follow.

This report documents the shape and reach of one troubling bubble – those in the pro-eating disorder bubble on Instagram. It documents the size, reach and demographics of users in this bubble, capturing a glimpse at an algorithmically amplified community that captures many young users.

The existence of this bubble should be unsurprising to those at Instagram and Meta, their parent company. In 2019, Meta (then Facebook) commissioned internal research to explore the impact of Instagram on teengers. The results were damning. Meta's own research found that Instagram made body issues worse for one third of teen girls. Again in 2020, Meta's own internal research found that Instagram could push teens toward eating disorders, an unhealthy sense of their own bodies and depression. That research noted that the Explore page, which serves users photos and videos curated by its own algorithm, often sends users deep diving into content that can be harmful[2].

Despite knowing these risks, Meta has not taken adequate action. They are still using all of the data they hold about young people – their browsing history, their tracking data and demographics – to fine tune algorithms that are pushing young users into harmful bubbles. This research documents one potentially harmful bubble that Instagram's algorithm has amplified, but many others exist.

[1] Ashley Rodriguez 2018 'YouTubes recommendations drive 70% of what we see' *Quartz* https://qz.com/1178125/youtubes-recommendations-drive-70-of-what-we-watch/

[2] Georgia Wells, Jeff Horowitz and Deepa Seetharaman 2021 'Instagram is toxic for teens' *Wall Street Journal* *https://www.wsj.com/articles/facebook-knows-instagram-is-toxic-for-teen-girls-company-documents-show-11631620739*

Methods & Identifying the Pro-Eating Disorder Bubble

This research involved four methodological steps:

1. Identifying ‘seed’ accounts. Researchers selected 153 popular Instagram profiles that post content that normalizes, celebrates or promotes eating disorders and extreme weight loss. Seed accounts were selected that were public, had over 1,000 followers and met two of the three criteria:

    - They posted visual content that celebrated "thinspiration” or “bonespiration", such as positive imagery of extremely underweight people or other eating disorders memes;
    - They had an underweight body mass index as indicated in their biography. Often BMI was mentioned in bio, or a user’s height and current and goal weight were stated in bio allowing their BMI to be calculated;
    - Their biography, username, or description of the content or comments contained Eating Disorder community-relevant vocabulary, such as ed (eating disorder), tw(trigger warning), ana (anorexia), mia (bulimia) etc.

    No accounts that appeared to be ‘recovery journals’ or health awareness accounts were included in the seed accounts.

2. Detailed analysis of the followers of these 153 seed accounts. These seed accounts had a total of almost 2.3 million followers (2,286,849 in total). However, many Instagram users followed more than one of these seed accounts. Using publicly available information from account biographies we were able to estimate that 69.96% of these followers were unique users. This means in total, an estimated 1.6 million unique users follow the 153 seed accounts we identified.

3. Of these 1.6 million unique users, we identified those as “within the pro-eating disorder bubble” if they followed three or more of our seed accounts. Each of these seed accounts normalizes, glamorizes or promotes eating disorders. For this research, we identified 88,655 members of the ED community. These 88,655 accounts were used for this research.

4. Analysis of the available data about these 88,655 users, and sub-samples of them, to better understand their ages, geographies and reach.

More details about the method can be found in the Appendix.

Figure 1: Examples of content from the three of the larger seed accounts. In this research, users that followed three or more of these seed accounts were included as in the pro-eating disorder bubble.

About Instagram's Pro-Eating Disorder Bubble

Instagram's algorithm has given the pro-eating disorder bubble huge reach: One in every 75 accounts may follow content from them.

There are 88,655 unique users in Instagram's pro-eating disorder bubble. They have a huge reach, with a total of 28,158,398 million collective followers.

Analysis indicates that 69.96% of accounts following this sort of content are unique, which means there are around 20 million individual users following and receiving content from Instagram's pro-eating disorder bubble (19,699,615 in total).

This means that 20 million Instagram users are fed content from Instagram's Pro-Eating Disorder bubble; content that often normalizes, glamorizes and promotes eating disorders and extreme weight loss in their feed. This presents a potential health risk every time 20 million users log in.

This is a problem: the latest data suggests that Instagram has 1.393 billion monthly users worldwide[3]. Reaching 20 million of them, the pro-eating disorder bubble could be reaching around 1.4% of Instagram's user base.

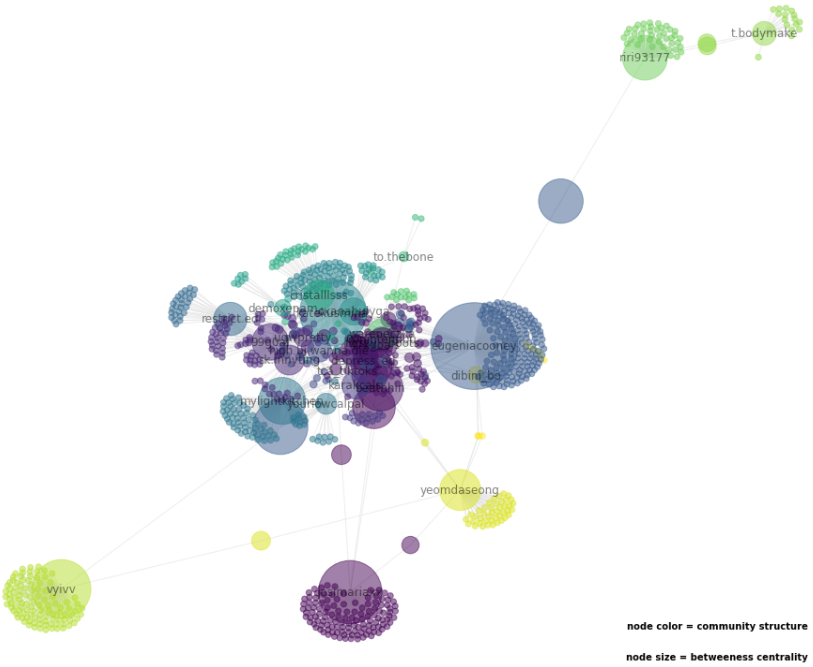

Figure 2: A network analysis showing the followers of the seed accounts on Instagram. The analysis documents the clusters of accounts that cross-follow each other, documenting multiple nodes. Nodes that are close together represent following a lot of similar accounts, while nodes that are further apart clusters are less interconnected. Larger nodes have more cross-connections than smaller nodes. Of this network, the 'bubble' analyzed is the 88,655 of the most cross connected accounts that are central to these nodes.

[3] Jason Wise 2022 'How many people use Instagram in 2022' https://earthweb.com/how-many-people-use-instagram/. Meta has not released up to date figures for a number of years now, but these are the last figures that report to have been confirmed by the company

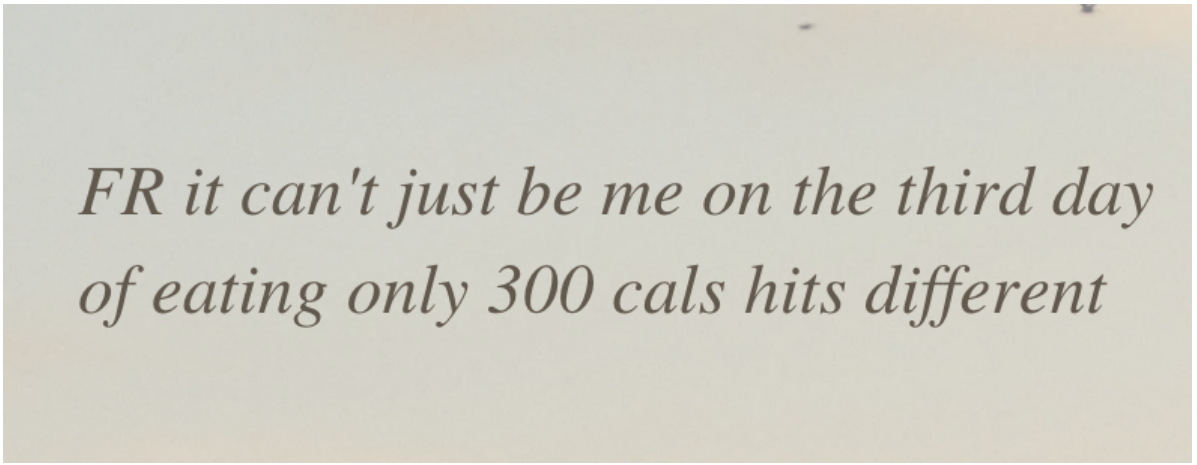

Figure 3: Types of available content posted within Instagram's pro-eating disorder bubble. Not all content posted within the bubble will be pro-eating disorder content, but much of the content of what researchers saw normalized, glamorized or promoted extreme weight loss and restrictive diets. For example the first image is of a calorie counting app, documenting the user's calorie intake ranging from 55 to 1378 calories per day, and the second image is a call out from a user asking if after other users find the third day of a 300 calorie a day diet harder. Fr = for real

A first hand account

My name is Kelsey and I am currently a 17 year old high school student in Southern California and I am an eating disorder-survivor-turned-activist. I've struggled with disordered eating and body image really since the start of public schooling, when I was around 6 years old. I have only recently embarked on the journey of understanding what a healthy relationship with my body and food really is supposed to look like.

Social media platforms are filled with content that seems to promote or normalize eating disorders or using unhealthy methods to lose weight. For example, on Instagram and Tik Tok there have been and continue to be viral trends that promote ingesting weight loss supplements or diet products which are supposed to "help you get your dream body". When youth see this supposed "simplistic, quick, and cheap" way to lose weight, they are enticed to capitalize on this deal, not knowing the detrimental impacts ingesting these products can potentially have on them.

To make matters worse, trends such as the "symmetry" trend or the "side profile" trend spread toxic beauty standards that are often ractist, non-inclusive, and extremely destructive to not just youth, but all users on the platform.

On top of this, there are all the beauty filters that have marketing slogans such as "This filter makes you look thin", "You're attractive if you have eight to 10 teeth showing you smile," "this filter gives you the perfect nose". All of these things and more collectivize to either promote eating disorders or even to normalize disorder eating behaviors in order to lose weight.

This sort of content used to fill my feed. I can't remember when it started, it feels like it's always been there, somehow or someway. As someone who had grown up with Instagram, it's hard not to imagine a time when the app didn't have the sort of content that promotes disordered eating behavior. I felt like my feed was always pushed towards this sort of content from the moment I opened my account.

That type of content at one point even got so normalized that prominent figures such as the Kardashians and other female and male influencers were openly promoting weight loss supplements and diet suppressors in order to help lose weight. I have never searched for these things and yet they pop up on my screen, whereas images or reminders of positive things such as body positivity influencers etc, I have to actively search for them in order for them to appear on my phone. It's telling that trends such as the A4 challenge (to see if you are thinner than a piece of a4 paper) or the jawline and symmetry trend (to see how symmetrical your jawline is) are able to go viral on Tiktok, instagram, etc, but trends that are related to the body positivity and food freedom movement have never been able to get that same attention.

Having achieved recovery of an eating disorder and currently actively working to better my relationship with me body, I can say that at this point whenever I see instagram or Tiktok recommend this kind of content, I immediately tell Instagram to not show me this kind of content and I'm able to move on. I have to take active steps to stop the algorithm recommending this content – Instagram pushes me towards this content, and I have to actively pull myself away from it.

But that wasn't possible for me 2 years ago. At the height of my eating disorder, I used social media as a fuel for my obsession with weight loss. I took the content they recommended to me of perfect toned bodies and tips for weight loss religiously, it motivated me when I was at my worst to continue down that destructive path of destroying my health. It was only when I learned to distance myself from social media could I then use my outside perspective to see just how horrible the impact was. But it was up to me to actively try and change my social media feeds, I had to do the hard work. This content was just always in my feed already, and somehow it was *my* responsibility to get it out.

Being a part of the generation that has grown up with social media I know first hand how harmful it's effects can be on teens who are just becoming accustomed to life. Because we grew up with social media, my generation has often learned to have their life evolve around it, and the effects have been largely horrible. Generation Z holds the record high amount in terms of mental heath issues and suicide rates. We feel more stressed, anxious, and lonely than any other generation. I feel that much of this truly is due to the recommendation and content of social media.

The pro-eating disorder community is alive in many of the fads and trends that are blowing up on kids phone's today. Almost 90% of the trends on Tik Tok and Instagram are in some way or form appearance related. People promote apps that help you lose weight, weight loss products, tricks and tips to have a jawline, etc, and Instagram's algorithm gives them a push. I think that action needs to be enacted immediately in order to address the issue right now. If not, this situation can and will blow out of control, legislators and lawmakers have the power to make this situation better, they just need to exercise their ability to do so.

Instagram's algorithm has promoted and grown this bubble

Instagram's algorithm is responsible for the wide reach of the pro-eating disorder bubble. Test accounts developed during an earlier phase of this research series[4] demonstrated how Instagram recommends users follow these accounts. Researchers created experimental accounts that showed an interest in pro-eating disorder content. Using vocabulary like "Thinspo" and "TW" (Trigger warning) in the biographies, and followed pro-eating disorder influencers and content, these accounts gave the algorithm all the data it needed to push them into the pro-eating disorder bubble.

Using one account as an example, it was 'active' for 5 days gaining 88 followers in that time. In a subsequent five weeks of inactivity, this account gained seven times as many followers (686 more). This growth of inactive accounts can only be down to Instagram's algorithm, which was recommending that people from the pro-eating disorder bubble follow this experimental account.

[4] Tech Transparency Project 2021 Dangerous by design: Thinstagram
https://www.techtransparencyproject.org/articles/thinstagram-instagrams-algorithm-fuels-eating-disorder-epidemic

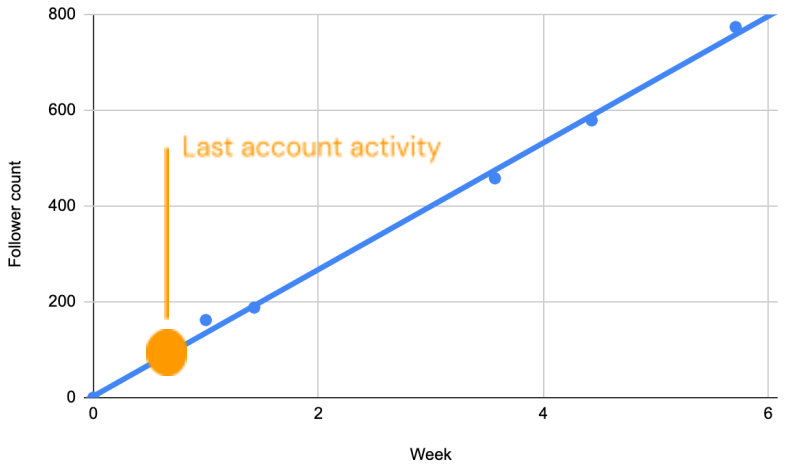

Figure 4: The algorithmically amplified growth of our experimental account. Over five inactive weeks, it gained on average 132 followers per week (R^2 = 0.997)

The pro-eating disorder bubble is worryingly young: the average age of users is only 19.

4,115 users self-identify their ages in their account biographies, providing an insight into the age range of the pro-eating disorder bubble. They were worryingly young. The median age of users was 19, and one in three (33.75%) accounts in the bubble belonged to someone under 18 years old. This means that in total, 28,000 minors have been drawn into Instagram's pro-eating disorder bubble.

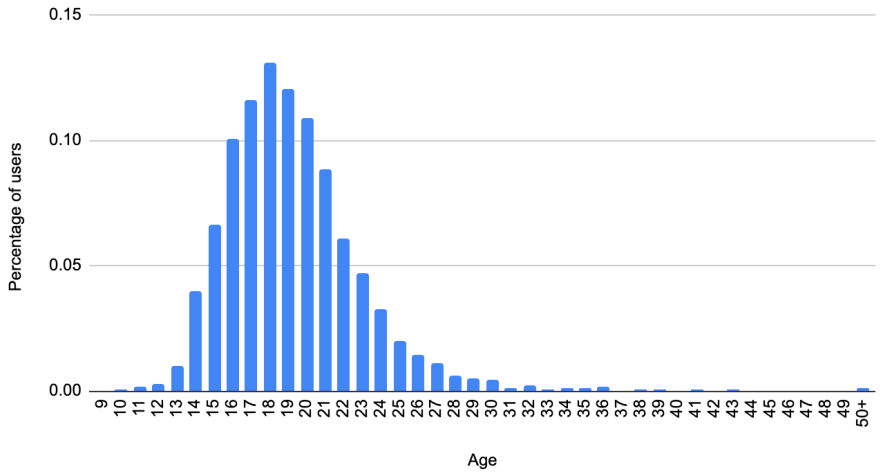

Figure 5: Self-declared ages of accounts in Instagram's pro-eating disorder bubble. n=4,115

14 🦄
sw: 53
cw: 49
gw: 47
~~~ weigh ins & stories ~~~
STRICT ANA COACHES HMU 🤨

🌷🌻weight journal 💐
67 lbs 🔓🤍
61 lbs 🔓🖤
51 lbs 💜
41 lbs 💙
~Age~ 13

I want to be able to say my weight out loud with no shame
Length: 174 cm
Current weight: 59.8 kg🐖
Age: 13 years old

❕tw❕
💜🌷💜
Height: 164.5cm
Age: 14
SW: 91kg
CW: 85kg
HW: 93kg
GW1: 76kg
GW2: 56kg
UGW: 41kg
ed [not pro-ana] block don't report

Figure 6: Example of account biographies in Instagram's pro-eating disorder bubble that identify age (anonymized). 'tw' is short for trigger warning, 'sw' for start weight, 'cw' for current weight, 'gw' goal weight, 'hw' is heaviest weight, 'ugw' is ultimate goal weight. 'HMU' is short for hit me up (or contact me). 'Ana' is short for anorexia. An 'Ana Coach' is someone who coaches you to lose more weight.

Instagram's terms and conditions state that a user must be at least 13 years old to create an account. The platform relies on children 'self declaring' their age when they sign up and there are few subsequent checks to ensure that young people under 13 years are not on the platform. There is much evidence to suggest that young people under 13 years join the platform, with a 2020 survey finding that 40% of 9-12 year olds use the platform at least once a day[5].

This research was able to identify 21 young people in the pro-eating disorder bubble who stated that they are under 13 years, including users as young as 9 years[6]. It is likely that this vastly undercounts the number of children under 13 years in the bubble given that most children would not want to include their real age in their bio for fear of having their account reported. In fact, given Instagram's announcement in 2021 that it would use machine learning to identify and close the account of users under 13 years, it is noteworthy that we found any accounts that openly identified the users as under 13 years.

[5] Thorn 2021 *Responding to Online Threats* https://info.thorn.org/hubfs/Research/Responding%20to%20Online%20Threats_2021-Full-Report.pdf
[6] Researchers reported these accounts to Instagram where possible

age: 11
I hate food
ana lives inside my head

12 years old
Starving for perfection 💔

💜I am 11 years 🍉
And this is my weight loss vlog 🍎

~hi~
- 12 years old 😘
- Maximum weight: 106 lbs 🐱
- Minimum weight: 95 lbs
- Current weight: 99 lbs 🌻
- Goal weight: 81 lbs 🌈
- Weight loss diary 🐰💚

Figure 7: Example of account biographies in the bubble that identify ages under 13 (anonymized). 'Ana' is short for anorexia

Instagram's underage pro-eating disorder bubble has a disturbingly large reach: half a million accounts follow them

Instagram's algorithm amplified the reach of the underage pro-eating disorder bubble equally. Together, the minors within this bubble had 760K followers. If 69.96% of these are unique, that is over half a million users worldwide who follow children from within Instagram's pro-eating disorder bubble.

America's pro-eating disorder bubble

Using information available in account biographies, we were able to identify regional affiliations of 3,719 users. These included descriptions like 'Californian 🇺🇸', '📍Perth, WA' or '🇬🇧 Bristol'. These may be descriptions of origin or current location. More than 40 countries were mentioned in biographies, demonstrating the global reach of the bubble. Some biographies mentioned geography and age, allowing an estimate of the age range of the Eating Disorder community in the United States.

The median age of Instagram's pro-eating disorder bubble in the United States is 20 years old, and one quarter of users in the bubble self declare that they are minors.

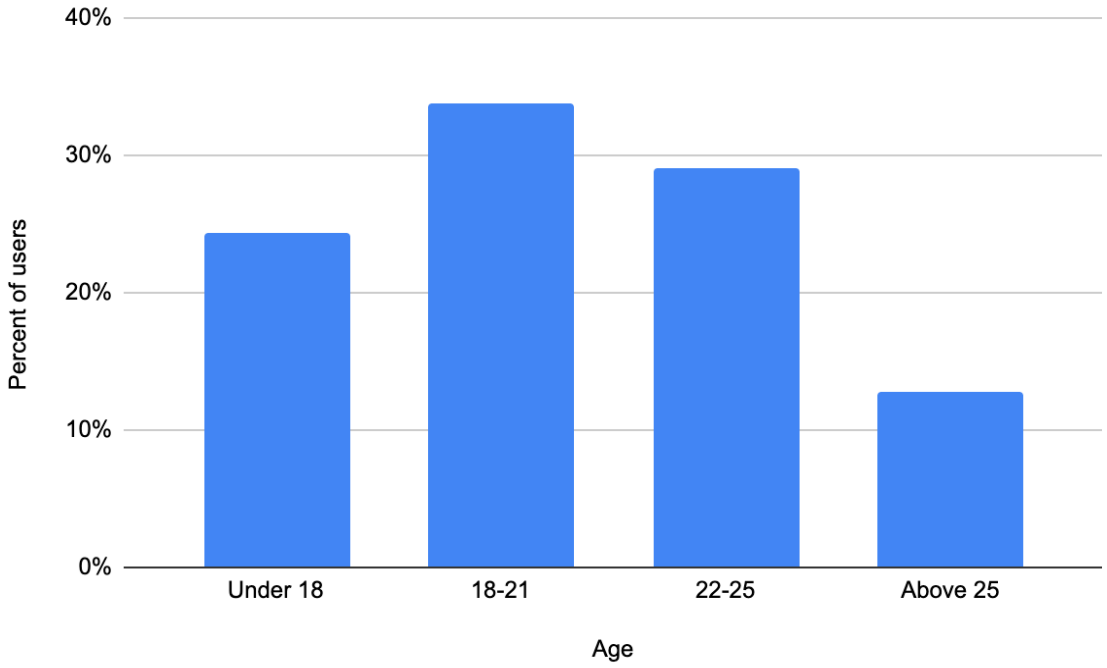

Figure 10: The self-declared ages of Instagram's pro-eating disorder bubble, USA. n=86

sugar free mountain dew addict
don't report just block
🇺🇸/ 🇦🇷
•15•
5'1
CW: 101 goal: 83
⚠️TW ED⚠️
lifestyle and recipes 😆

•eating disorders, self harm
•15 y.o.
• 🇷🇺
•max 131
•min 101

15/4'11/california
sw 96 lbs
cw 85 lbs
gw1 90 lbs
gw2 86 lbs
gw3 81

general ed content
16 yo | h: 161 cw: 126 gw: 100
🇺🇸

Figure 11: Example bios in the American pro-eating disorder bubble (anonymized). 'Don't report just block' is the user encouraging others not to report the account, rather to just block it from their feed. 'TW' is short for trigger warning, 'cw' for current weight, 'gw' goal weight, 'ed' for eating disorders. 'h' represents height or heaviest weight

Many young people in the pro-eating disorder bubble describe wanting to recover, but they will still be in the algorithm's bubble.

"The algorithms are very smart in the sense that they latch onto things that people want to continue to engage with. And unfortunately, in the case of teen girls and things like self harm, they develop these feedback cycles where children are using Instagram to self-soothe, but then are exposed to more and more content that makes them hate themselves."

- Frances Haugen Oct 4 2021, Testimony to US Senate Committee on Commerce, Science & Transportation

Many of the biographies of users in the bubble talk about wanting to or being in recovery, wanting to get 'better', to 'heal' or being aware of how unwell they were. However, these users are still in Instagram's algorithmically curated bubble. They will still be feeding content from other accounts in the bubble, including the seed accounts, that normalizes, glamorizes or promotes eating disorders.

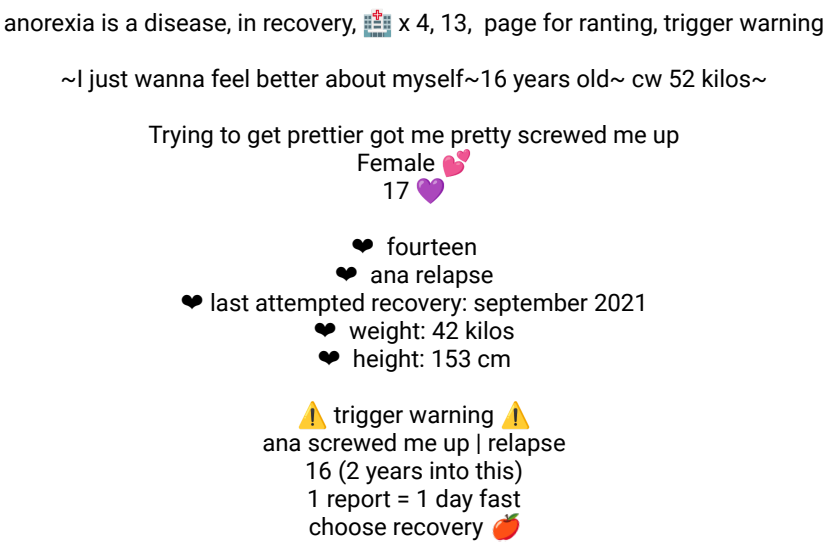

Figure 8: Example of biographies in the bubble that speak about wanting to recover or heal (anonymized). The hospital emoji indicates how many inpatient spells a user has had. '1 report = 1 day fast' is the user's attempt to discourage people from reporting their account, by indicating that if their account is reported, they will not eat for one day.

Instagram's Revenue from the Pro-Eating Disorder Bubble

Meta's policies outline that they will "remove content that promotes or encourages eating disorders" while allowing people to "share their own experiences and journeys around self-image and body acceptance".[7]

This is a difficult fine line for content moderators to police and allows much pro-eating disorder content and borderline content to be hosted on the platform. This might not be such a problem in

[7] Instagram 2021 'Help Center' https://help.instagram.com/567449254552862/?helpref=search&query=eating%20disorder&search_session_id=ecb7b2c02b7d32bb8c9d66bd2c203104&sr=2

itself if it wasn't for Instagram's algorithm; the algorithm goes on to promote the content that their moderation fails to detect to a huge amount of users worldwide.

Meta is inherently disincentivized from downgrading this content in their algorithm, and otherwise addressing the pro-eating disorder bubble that its algorithm has created. The scale and size of the community means it delivers an unhealthy profit. Any bubble that reaches 1.4% of its user base forms part of their business model, even bubbles that present significant health risks to users.

Each quarter, Meta releases a key metric called Average Revenue Per Person (ARPP) for Facebook. While Meta does not release an AARP for Instagram, Facebook's figures are the most comparable estimates available and potentially underestimate Instagram's ARPP. Instagram contributes over half of Meta's ad revenue (52.6%)[8], despite having only around a third of the users of Facebook (Instagram had 1.074 billion monthly users worldwide in Dec 2021, while Facebook had 2.912 billion). Instagram potentially has a higher ARPP than Facebook, so using Facebook' ARPP to estimate for Instagram produces a conservative estimate.

Facebook's ARPP in Q4 2021 stood at $11.57 per user globally, or $60.57 per user in the US and Canada, $19.68 per user in Europe and $4.89 per user in the Asia Pacific region[9].

Using these figures and the geographic regional affiliations in biographies allows us to estimate Meta's total revenue from the pro-eating disorder bubble: $1.8 million per year. The revenue generated from all users following this bubble is $227.9 million per year.

Meta's underage pro-eating disorder bubble is also profitable. They bring in $0.5 million annual revenue alone, or $62 million revenue from the people who follow those in the underage eating pro-disorder bubble. Again, all of these figures are conservative estimates and likely would be significantly higher if Meta released ARPP for Instagram users.

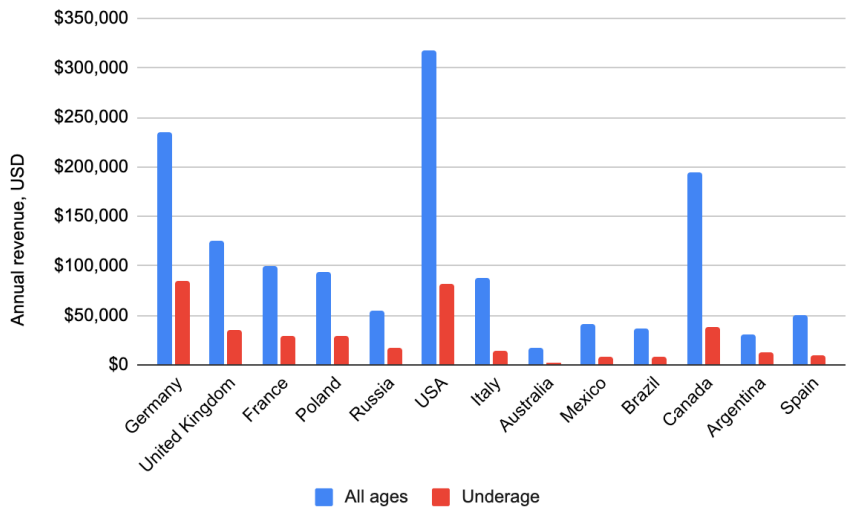

Figure 12: Meta's annual revenue from the pro-eating disorder bubble by country

[8] Sara Lebow 2021 'Instagram contributes over haf of Facebooks US ad revenue' https://www.emarketer.com/content/instagram-contributes-over-half-of-facebook-us-ad-revenues

[9] Meta 2021 *Meta Earnings Presentation Q4 2021* https://s21.q4cdn.com/399680738/files/doc_financials/2021/q4/Q4-2021_Earnings-Presentation-Final.pdf

Conclusions

Instagram is profiting from the promotion of a harmful Pro-Eating Disorder Bubble. Children and teens are being fed accounts (and content) encouraging restrictive diets and extreme weight loss, and in turn, Instagram is regularly promoting and recommending children and teen's pro-eating disorder accounts (and content) to half a million people globally. The algorithm is clearly not functioning in young people's best interests.

This is an example of how Meta systematically and repeatedly prioritizes profit over young people's safety and well-being. Meta's decisions around recommending eating disorder accounts and content may deliver small but steady profits to shareholders, but it has significant real life consequences for children and young people.

The Facebook Files revealed Meta has been aware of this problem since at least 2019 and have failed to act. We cannot wait for or depend on Meta to do the right thing. It is time that lawmakers and regulators around the world to take action by setting guardrails on what social media platforms can and cannot do.

Introducing regulations that require platforms like Instagram to consider the safety and well-being of young people in the way they design and operate their systems and processes is essential. Requirements to only use minor's data in their best interests must be a first step.

Proposals in front of the California legislature and Congress would require platforms to do this. These regulations are long overdue, and are demonstrably necessary to incentivise action against algorithms that promote eating disorder content.

Appendix

A note about the biographies represented in this report:

All biographies represented in this report have been anonymized. While these are not 'searchable' in search engines nor on Instagram itself, and are publicly available, they have still been anonymized in the following ways:

- Any names have been removed
- Emojis and other grammatical features have been altered
- The ordering of language has been changed
- In some instances, geographies have been 'shifted' where they would be identifiable
- Some start weights and goal weights have been altered

The meaning and intent of each biography has been maintained.

Methods used in this report:

1. Data collection
2. Data mining
3. Natural language processing
4. Statistical analysis

Timeframe of research collection:

13 December 2021 – 14 January 2022

Approach:

Step 1 - Selecting seed accounts. This involved the manual selection of Instagram profiles that post content normalizing body-image problems or promoting eating disorders and extreme weight loss. Accounts were selected where an account was public, had over 1000 followers and two of three criteria were met:

- They posted visual content that celebrated "thinspiration" or "bonespiration", such as positive imagery of extremely underweight people or other eating disorders memes;
- They had an underweight body mass index as indicated in their biography. Often BMI was mentioned in bio, or a user's height and current and goal weight were stated in bio allowing their BMI to be calculated;
- Their biography, username, or description of the content or comments contained Eating Disorder community-relevant vocabulary, such as ed (eating disorder), tw(trigger warning), ana (anorexia), mia (bulimia) etc.

No accounts that appeared to be 'recovery journals' or health awareness accounts were included in the seed accounts.

Step 2 - Data collection about followers of seed accounts. The 153 seed accounts had a total of almost 2.3 million followers (2,286,849 in total as an arithmetic sum of followers). However, many of these 2.3 million followers were following more than one of these seed accounts.

Cross referencing publicly available information from account biographies, such as usernames, suggested that 69.96% of these 2.3 million followers were unique users. This 69.96% calculation is

used throughout the research as an estimate of the proportion of unique users within a pool of followers.

Of these 2.3 million followers, an estimated 1.6 million unique users follow the 153 seed accounts (1,599,880 in total).

Step 3 - Identifying those within Instagram's pro-eating disorder bubble. Among these 1.6 million users, we identified those following three or more 'seed accounts' as within Instagram's pro-eating disorder bubble. In total 88,655 users were estimated to be within the bubble.

Step 4 - Analysis of the available data about the accounts within the bubble. We collected and analyzed the following data points about the 88,655 user's accounts:

- username
- biography
- followers count
- private account
- language

This analysis included creating estimates of:

- The age of those within the bubble. Using natural language processing searching for age by specific templates, combined with human coding, we were able to identify that 4,115 users self-identify their ages in their account biographies. These self-declared ages were used to estimate the age range of users. Age templates were multilingual, included numbers as well as words, emojis and different terms and are available upon request.
- The geography of those within the bubble. Using natural language processing searching for age by specific templates, combined with human coding, we were able to identify that 3,719 users had identified a regional affiliation in their biography. These regional affiliations were used to estimate age geographies. Regional affiliation templates were multilingual, included emoji flags as well as words and different terms and are available upon request.
- Follower counts of those following users within the bubble. The arithmetic sum of the followers of these 88,655 users is 28,158,398. The estimate of unique users with a follower count is 69.96%. This means that around 20 million (19,699,615) unique accounts follow 88,655 profiles assumed to be in the ED community on Instagram.

Creating estimates of Instagram's revenue from this bubble used publicly available information about Facebook's Average Revenue Per Person (ARPP) from Q4 2021[10]. Facebook's AARP was applied to the geographic regional affiliations in biographies to allow an estimate of Meta's total revenue from users within the pro-eating disorder bubble.

As geographic information was not analyzed about the followers of those within the bubble, the global average ARPP was used to generate the total estimate. This global figure includes all users for whom content from within the bubble forms *part of* their experience on the platforms. This research did not attempt to explore how much of their content came from within the bubble, or the centrality of 'the bubble' to any user's experience on the platform. Rather, this figure attempts to highlight the sum total of Meta's revenue that the pro-eating disorder bubble is a part of.

[10] Meta 2021 *Meta Earnings Presentation Q4 2021* https://s21.q4cdn.com/399680738/files/doc_financials/2021/q4/Q4-2021_Earnings-Presentation-Final.pdf