Roots and Remedies: Impacts of Social Media Misinformation on Adolescents' Cognitive Perceptions and Belief Systems

—featuring the example of intensified gender antagonism online

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Abstract

This paper discusses the pressing problem of adolescents' cognitive perceptions and belief systems becoming negative shaped by a plethora of misinformation on social media, leading to potential social behaviors that verge on being poorly informed, highly controversial, or downright extreme. Before delving into the very discussions, the paper spare two sections justifying our special focus on the adolescents as opposed to other age groups, as well as examining the intrinsic appeal of social media to teenagers, hence their extra-potent influences on them. Psychological concepts such as filter bubble, echo chamber effect, and mere exposure effect help elucidate the almost inescapable outcome of adolescent social media users forming a rigid, one-sided perception of the world; whereas the two psychological theories, the moral emotion theory and social identity theory, combine to illustrate the far-reaching consequences of teenage girls' belief systems tweaked towards an unhealthy understanding of gender equality, ultimately translated into potential behaviors of gender antagonism.

Introduction

The Internet is held by many as one of the most era-defining creations, and social media, the jewel on the crown. Indeed, the omnipresence of social media has become a characteristic of modern life, where most people never spend a day without messaging their friends and commenting under videos. Ideally, this would facilitate communication and self-expression, thereby strengthening interpersonal ties and facilitating mutual understanding. However, what comes to transpire, especially among the adolescent community, is a negative online environment fraught with erroneous notions, toxic ideas, shallow slogans, vicious remarks, and, above all, statements that are misleading or instigating. For example, instead of words of love and compassion, we often see misogyny and misandry fiercely butting each other under gender-related contents, implying users' aversion to and discrimination against the other sex.

More appallingly, when we look at the age distribution of these radical commenters, a significant part of them belong to the adolescent category (13–19 years old). It is hard to believe that the world-weary line "marriage is the kidnapping of women" would be lamentably typed out by an average teenage girl who has neither experienced nor witnessed any marital tragedy. The moral of the story is that, while the instant and broad dissemination of *information* made possible by the Internet may have expected to bring harmony and positivity to the world—and especially that of the adolescents—the outcome turns out to be the exact opposite when the word "information" is ominously replaced by "misinformation". This paper, then, aims to investigate the significant impacts that Internet misinformation can have on adolescent cognitive perceptions and belief systems, before suggesting a handful of preventative measure to be taken by the social media platforms.

Why Adolescents? A Neuropsychological Explanation

A quick look at the brain development as well as the dopamine system of adolescents, the interest of this paper, might shed light on our special focus on this age group when discussing misinformation on the Internet. Despite ongoing controversies regarding the precise age span of the term "adolescence", consensus agrees that the concept is dealing with a phase characterized by prominent physiological transformation, cognitive development, and emotional awakening (Steinberg, 2014). This period of rapid brain growth culminates in the full maturity of the frontal lobes, which are associated with the desire of attention (Johnson et al., 2019). In other words, teenagers' capacity of self-control and critical thinking is distinctly weaker than that of the adults, hence more susceptible to external influences like misinformation on social media. Additionally, it has been observed that, as compared to adults, adolescents experience a greater increase in the dopamine level upon receiving external stimuli, especially positive ones or "rewards" (Laviola et al., 2001). The corollary to such an ample dopamine release would be "a reinforcing feedback cycle that motivates additional reward-seeking behavior" (Galvan, 2010). The neuropsychological evidences of teenagers' hyper-malleability with respect to their cognitive development, therefore, make it an imperative trace and analyze the implications of online misinformation, so as to better protect the world's future generations.

Why Social Media? A Socio-Behavioral Perspective

With the necessity of focusing on adolescents duly established, it is equally important to note the extra potency of social media on teenagers. The following several behavioral factors contribute to the observed reality that, compared to adults, teenagers appear to use, overuse, and abuse social media more frequently, leading to their greater exposure to misinformation.

instant gratification

As mentioned earlier, adolescent level of dopamine release in face of external stimuli is higher than that of adults. With features such as "likes" and "subscribes", social media grant teenagers continuous rewarding experiences, triggering dopamine release in brain areas like the *nucleus accumbens*, which easily gives rise to social media addiction.

space of freedom

Driven by a need for privacy and autonomy, teenagers may find social media a comforting place where they can express their individuality and declare independence from parental and school control.

identity laboratory

Teenagers attach great importance to self-, peer-, and societal recognition. Social media's ever-accessible platform for social interactions gratifies this desire, allowing them to experiment and develop a unique identity (Valkenburg & Peter, 2008).

strengthened connections

Social media facilitate the maintenance of existing, especially long-distance relationships and the making of new ones, which proves significant for teenagers who often feel a stronger yearning for connections (Allen et al., 2014).

FOMO no more

Plaguing adults and adolescents alike, the Fear of Missing Out (FOMO) can be alleviated, if not eliminated, by the prompt notifications on social media, which afford the affirmation that one is not missing out on any news among friends or in the world (Przybylski et al., 2013).

The Effects of Social Media Misinformation on Adolescents' Cognitive Perceptions

One feature of social media is that they are usually designed to retain users by entertaining them. When a user shows a certain interest in one video, for example, the big data will feed them similar or relevant ones, a mechanism known as the "Filter Bubble" (Pariser, 2014). Two opposite situations arise when one is repeatedly recommended the same type of information, resulting, nonetheless, in a selfsame outcome. On the one hand, if an individual happens to be interested in this topic in the first place and agree with the opinion expressed in these videos, it leads to the "Echo Chamber Effect", which describes how someone, fed with a single type of ideas excessively, forms a distorted judgment of the reality due to their heeding to no other perspectives. (Cinelli et al., 2021). On the other hand, even if the person starts by not concurring with the messages in the prompted videos, the "Mere Exposure Effect" takes place as repeated exposure to this particular idea gradually informs the person's growing acceptance of and preference of it, thereby tweaking their cognitive perception despite initial indifference (Bryant & Zillmann, 2019). Naturally, the latter situation evolves into the former over time.

The Impacts of Social Media Misinformation on Adolescents' Belief Systems

In a similar fashion, social media misinformation can impact on adolescents' belief system, primarily accountable by two psychological theories. First, the "Moral Emotion Theory" maintains that emotions play an important role in moral judgments—as much as people often feel compelled to approach the weak with empathy (Haidt, 2002). Second, the "Social Identity Theory" argues that social classification makes individuals identify with their group and therefore develop in-group preferences and out-group biases (Brewer, 1999). Accordingly, teenagers surfing online are prone to taking sides; and, once misinformed, they might very well come to side with narrow thinking and extreme actions. Consider the incited gender antagonism alluded to at the opening of the paper. Because of the two aforementioned psychological theories, teenage girls naturally identify with and feel sympathy for the suppressed women when they scroll to watch videos about domestic abuse. However, bombarded by the attention-seeking and money-grubbing influencers' controversial claims—fake evidences, concocted statistics, photoshopped pictures, and AI-generated videos will do the trick—the girls may easily deviate from a healthy understanding of gender equality and instead believe in the hopelessness of marriage and of humanity in its entirety. Ultimately, a platform originally dedicated to making women (and all the oppressed and marginalized) heard ends up pushing young girls to reject marriage and hate men altogether, which are real actions that can palpably harm our society.

Potential Solutions

A list of preventative measures of such misinformation to be taken by social media platforms is given below:

AI authenticity verification

Some platforms have already started using robot fact-checkers, a method worth popularizing and able to complement human checkers (Guess et al., 2019). Platforms can then more precisely label contents as potentially misleading (Pennycook et al., 2020).

algorithm adjustment

The algorithm used by social media is shown to magnify the extent of misinformation (Cinelli et al., 2020). The platforms need to refine its operation pattern by recommending videos of different types, exposing users to a variety of opinions and thus diverse perspectives.

educational programs

Platforms can collaborate with educators and schools to create engaging media programs aimed at adolescents, teaching them how to think critically, verify sources, and identify misinformation before believing or sharing the contents (Mihailidis & Viotty, 2017).

age and time limit

Lastly, seeing that technological advancements and educational initiatives are long-term endeavors, what can see immediate results is a time limit as well as age-appropriate guidelines restricting teenagers' online exposure (Livingstone & Helsper, 2010).
Through a combination of these strategies, social media platforms can create a safer and more informed online environment for adolescents, helping them explore the digital world more critically and responsibly.

Conclusion

Adolescence is a stage where teenagers are still developing critical thinking and decision-making skills, and the immaturity of the corresponding brain regions makes them particularly vulnerable to misinformation online. As such misinformation as flooding the Internet nowadays can have irreversible consequences on adolescent cognitive perceptions, belief systems, and social behaviors, tailored strategies are urgently needed. While the section above has surveyed a few helpful methods, further research is still necessary for better addressing the issues at stake.

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