

Research on the Negative Emotional Effects of Information Fragmentation on Adolescents

Yinghe Gui^{1,a,*}

*1School of Business, Macao University of Science and Technology, Macao, 999078, China
a. hakunamipaka@163.com*

**corresponding author*

Abstract: On the basis of the intertwined development of information technology, globalization, and intelligence, the sudden advance of digital media has modified the livelihood of digital natives, and also continuously affects the dissemination and acquisition of information. The influx of massive information fragmentation has generated prosperity in economy and culture, while providing a relatively accessible and accelerated pathway for adolescents to explore new knowledge. Through an extensive literature review, this paper systematically summarizes the negative effects of fragmented information on adolescents, including information anxiety, attention deficit and depression. Adolescence is a unique developmental stage characterised by significant cognitive and emotional growth. However, within their limited cognitive abilities, the inundation of excessive information tends to result in information anxiety. Constant exposure to fragmented information can disrupt the continuity of adolescents' thought processes, causing frequent thought interruptions and making it increasingly difficult for them to concentrate on coherent and comprehensive thinking. In addition, depression has emerged as one of the most prevalent mental health problems among this population. Depression is often exacerbated by negative emotions such as low self-esteem and insecurity resulting from information overload and chronic unfavourable comparisons with others.

Keywords: Fragmented information, information anxiety, adolescents, attention deficit, depression

1. Introduction

Fragmented information refers to the phenomenon of originally complete information being split into scattered content and short information fragments, which is characterised by diversified information sources, dispersed audiences and fragmented communication content. Among them, the common carriers of fragmented information include short articles and videos disseminated through social media platforms [1]. Through the dissemination of various social media platforms, fragmented information enables the audience to obtain short and interesting information in the interval of life. Since consuming such information requires minimal cognitive effort, it has gained a wide reach and a diverse audience, including adults, teenagers, the elderly, and college students. However, from the essence of the communication content, these contents are superficial, disorganised and lacking in clear logic. The sheer volume of such fragmented information, which is difficult to grasp and integrate, can have a directly or indirectly effect on daily life and a significant

psychological and emotional impact, especially on teenage users. As teenagers are in a critical period of rapid development and their cognitive functions are not yet fully mature, making it difficult for them to effectively filter and synthesise fragmented information. They are more likely to be attracted to and addicted to such content. Meanwhile, teenagers' emotional regulation ability is relatively weak, and are easily affected by external information. The emotional content embedded in the fragmented information can easily affect their mental state and behavior. In addition, the sense of instant gratification and satisfaction provided by fragmented information can generate dependence in adolescents, further intensifies their sensitivity and susceptibility to the fragmented information. Therefore, through a comprehensive literature review, this paper explores the specific negative effects of information fragmentation on adolescents and examines the underlying causes of such negative effects from multiple perspectives. This analysis aims to acquire a more profound understanding of the fact of how fragmented information affects the psychological development of adolescents. With the rapid development of digital media and artificial intelligence, fragmented information has become an integral part of adolescents' lives. Through in-depth understanding, we can more intuitively and clearly recognize the psychological harm caused by fragmented information to teenagers, so as to guide them to properly use fragmented information for communication and broaden their cognition.

2. The impact of fragmented information on adolescents

2.1. Information Anxiety

Bacon believed that through the learning and accumulation of knowledge, people gradually realize that their understanding of the world is limited, and that this limitation leads to the anxiety of not being able to solve all problems. The idea that increased knowledge increases anxiety laid the foundation for the concept of information anxiety [2]. Information anxiety is a state of perceived anxiety caused by factors such as information overload, information inconsistency, information lack or information difficulty to understand. Wurman argues that in the era of information explosion, it is often difficult to obtain useful, accurate and reliable information from a large amount of information, resulting in feelings of anxiety and confusion. Information anxiety is also referred to as "the black hole between data and knowledge" [3]. Consequently, there are five main sub-components to information anxiety: not understanding information, being overwhelmed by the amount of information, not knowing if certain information exists, not knowing where to find information, and knowing where to find information but not having access to it [4].

As digital natives, teenagers demonstrate remarkable adaptability and curiosity in navigating and utilizing social media platforms such as Tiktok, Twitter, Instagram and other social media platforms. These platforms are characterized by their non-linear and often disjointed information flow, exposing adolescents to a vast array of fragmented content on a daily basis. Adolescence is a transitional period of individual development, and a very special period in a person's life development. During this period, people's physiological, cognitive and social aspects will undergo great changes respectively. The rapid pace of physical development often outstrips psychological growth, creating a state of disequilibrium between the body and mind. This imbalance can lead to significant psychological conflicts, as adolescents find themselves in a semi-mature yet semi-naive state of mind. (maturity mainly refers to the strong pursuit and feeling of maturity)[5].

One of the primary drivers of information anxiety is the phenomenon of information overload, which is exacerbated by the dissemination of fragmented information. such as the generalization of online learning, the diversification of knowledge sources, and the dispersion of reading methods, which appear under the dissemination of fragmented information. A large amount of uncomprehended and unverifiable information will lead to various negative emotions such as

irritability, restlessness, tension and even fear among teenagers. The essential reason of negative emotions is that teenagers are in the stage of perfecting cognition, and the active or passive information processing in this stage will consume and occupy their limited cognitive scope., which is exacerbated by the dissemination of fragmented information. The "human difference equation" proposed by Wundt and Bessel reveals that people can only cognitively process the same object at a specific time. Furthermore, people will only move on to another object when they have finished processing one object [6]. Therefore, the cognitive range of each adolescent is limited. When the information processing in the brain exceeds their mental capacity, information anxiety caused by information overload will appear.

2.2. Attention deficit

Cognitive psychology regards human beings as an information processing system, in which cognition is an important part of information processing. The continuous receiving of fragmented information is the continuous interruption and establishment of the cognitive process of an object [7]. Consequently, prolonged exposure to fragmented information can lead to fragmented thinking, which is manifested in the interference or interruption of the connection between thought and action. According to Reason's model of human error, interrupted thinking leads to temporary loss of attention, which can induce a specific type of error called post-interruption omission [8]. The occurrence of interruption is the manifestation of a combination process of four conditions, the temporary suspension of the main task, the intention to return to and complete the main task, the new task introduced by an event, and the event can be external or internal. Such interruption can create interference with the ongoing objective and thus incur costs in terms of speed and accuracy [7]. Thus, cognitive disruptions triggered by fragmented information can increase the cost and difficulty of focusing attention. On the other hand, teenagers' use of smartphones to obtain fragmented information during fragmented time increases the possibility of distraction, as it leads to constant interruption and switching of attention [9]. Each shift in attention incurs additional cognitive costs, and it takes time and energy to reconfigure attention to refocus on the current task [9].

Therefore, the intake of fragmented information acts as a catalyst in the process of teenagers' exploration of the world. Although it greatly accelerates the speed at which teenagers receive information within their tolerance range, it overlooks the fact that teenagers need more adequate reaction and digestion time. This leads to the problem of increasing the range of teenagers' information but low quality. At the same time, because of the inertia of long-term receiving fragmented information, the interruptions in thinking have become a normalized state, making attention distraction more likely to occur. Consequently, attention deficit has become the normal state of teenagers.

2.3. Depression

Depression is one of the most common mental disorders at present. Adolescence, a critical shaping period for individual growth and development, is also a formative stage for brain, cognitive and emotional development. As such, it represents a high-risk period for the emergence of psychological problems in adolescents [10]. In the digital age of information explosion, teenagers are confronted with the constant updating and obsolescence of fragmented information. This situation, coupled with the emotional challenges of confusion, pressure, and anxiety stemming from information overload, severely impacts their overall sense of well-being. In addition, when dealing with information that is diverse in sources, fragmented in form, and lacking in systematism and coherence often struggle to effectively filter and integrate it, becoming overwhelmed by the sheer

volume of fragmented information. Information overload can lead to a range of negative outcomes, such as psychological stress, exhaustion, and anxiety, which are important predictors of depressive symptoms. In turn, depressive symptoms can further erode an individual's happiness over time [11].

On the other hand, research has demonstrated that problematic social media use (PSMU) is significantly associated with adolescent mental health problems [12]. The information presented by social media users is fragmented, where users selectively showcase the most favorable aspects of their lives such as economic status, appearance, body shape, achievements, etc.. These portrayals are often glamorized and idealized. The visually oriented nature of social media facilitates rapid comparisons between individuals and strangers, and this constant unfavorable comparison can lead to chronic stress [13]. Because adolescents are in the process of development, they are particularly susceptible to perceiving disparities between themselves and these idealized standards. This can result in lower self-esteem, doubts about personal value, feelings of insecurity, and a sense of inferiority [12]. Studies have shown a significant correlation between adolescents' self-esteem and depression [14], so the low self-esteem and insecurity caused by continuous intake of fragmented information can further increase the probability of depression in adolescents.

3. Discussion

Contemporary teenagers are digital natives born into an era defined by the pervasive influence of technology. The impact of fragmented information on their lives is multifaceted. On one hand, the constant influx of fragmented content can induce anxiety among adolescents. On the other hand, its diversity and interactivity offer a fresh perspective, enriching their online experiences and sparking innovative ideas. Cognitive interruptions, which are often seen as a downside of fragmented information, can also serve as a catalyst for inspiration. A brief pause in thought can sometimes lead to a breakthrough in thinking. Therefore, fragmented information does not need to be avoided completely, and the correct use of it can produce multiple benefits.

To effectively harness fragmented information, it is essential to transform the way we approach and process it. First and foremost, it is necessary to determine the reliability of the information source before using it. The wrong information source may lead to misleading or inaccurate results. Therefore, it is necessary to verify the information from multiple sources before relying on the information to make decisions. The second is the need to maintain a critical mind, to think deeply about and analyze information, and to understand its possible biases and limitations. Actively seek out additional relevant details by consulting reputable sources, engaging in discussions with others, and conducting in-depth research. Then become adept at sifting and filtering information, selectively focusing on, preserving, and sharing pieces of valuable information according to your needs. In addition, utilizing organizational tools such as bookmarks, folders, and labels can significantly enhance your ability to manage and retrieve useful information efficiently. These tools help in creating a structured and personalized information management system, making it easier to access and utilize the information when needed.

Digital natives should have the flexibility to use fragmented information according to their own needs and contexts. On the one hand, fragmented information can be used to quickly acquire new knowledge and participate in social discussions. On the other hand, it is also necessary to seek deeper resources and information when necessary to gain a more comprehensive understanding.

4. Conclusion

Through a comprehensive literature review, this paper introduces the negative emotional effects of fragmented information on adolescents from three aspects: information anxiety, attention deficit and depression. Studies have shown that fragmented information can lead to significant problems such

as anxiety, attention difficulty and depression among adolescents. However, the impact of fragmented information on adolescents is extensive, and adolescents need to effectively and correctly use fragmented information as a tool to explore the world.

This paper also has certain limitations. First of all, the three problems summarized in this paper are one-sided on the impact of fragmented information. At present, there are relatively few studies on the direct effects of fragmented information on adolescents' depression, making it challenging to accurately analyze its impact. In addition, the discussion on fragmented information is limited to its negative effects, without considering its positive effects, such as increasing learning opportunities and channels for acquiring knowledge, stimulating exploration, and fostering creativity. Future research should comprehensively analyze the emotional impact of fragmented information on adolescents, as the advancement of digital media is continuous. Compared with avoiding fragmented information, it is more conducive to the physical and mental health of adolescents to use it to select the essence and discard the dregs.

References

- [1] Yang, B., Zhang, R., Cheng, X. & Zhao, C. (2023). Exploring information dissemination effect on social media: an empirical investigation. *Pers Ubiquit Comput* 27, 1469-1482. <https://doi.org/10.1007/s00779-023-01710-7>
- [2] Bacon, F. (1878). *Novum organum*. Clarendon press.
- [3] Wurman, R. S. (1989). *Information anxiety*. New York, NY: Doubleday.
- [4] Girard, J., & Allison, M. (2008). Information anxiety: Fact, fable or fallacy. *Electronic Journal of Knowledge Management*, 6(2), pp37-50..
- [5] Lin C. (2018). *Developmental Psychology*. 3rd Edition. Beijing People's Education Press, pp 350-356
- [6] Wang X. (2021). How to cope with generalised anxiety caused by information overload[J]. *People's Tribune*, (5):138-140. DOI:10.3969/j.issn.1004-3381.2021.05.038.
- [7] Hunt, R. R., & Ellis, H. C. (1999). *Fundamentals of cognitive psychology*. McGraw-Hill.
- [8] Couffe, C., & Michael, G. A. (2017). Failures due to interruptions or distractions: A review and a new framework. *The American journal of psychology*, 130(2), 163-181.
- [9] Siebers, T., Beyens, I., & Valkenburg, P. M. (2024). The effects of fragmented and sticky smartphone use on distraction and task delay. *Mobile Media & Communication*, 12(1), 45-70.
- [10] Servidio, R., Soraci, P., Griffiths, M. D., Boca, S., & Demetrovics, Z. (2024). Fear of missing out and problematic social media use: A serial mediation model of social comparison and self-esteem. *Addictive Behaviors Reports*, 19, 100536.
- [11] Wu H., Gan M., Yin X., Ma Y., Hou Y., Zhang X., Li Y., Wang J., Deng T., Zhang Y., Liu. (2023) Research progress on influencing factors of depressive symptoms in adolescents [J]. *Chinese Journal of School Health*. 44(5):786-790. DOI: 10.16835/j.cnki.1000-9817.2023.05.033
- [12] Samra, A., Warburton, W. A., & Collins, A. M. (2022). Social comparisons: A potential mechanism linking problematic social media use with depression. *Journal of Behavioral Addictions*, 11(2), 607-614. <https://doi.org/10.1556/2006.2022.00023>
- [13] Chae, J. (2017). Virtual makeover: Selfie-taking and social media use increase selfie- editing frequency through social comparison. *Computers in Human Behaviors*, 66, 370-376. <https://doi.org/10.1016/j.chb.2016.10.007>
- [14] An, D., Thuan, N. H. M., & Kim, Y. (2024). Associations between Physical Activity, Depression, Self-Esteem, and Suicide Ideation in Adolescents. *International Journal of Mental Health Promotion*, 26(10). <https://doi.org/10.32604/ijmhp.2024.055568>.