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Multidisciplinary Literary Review: The relationship between social media and empathy

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Abstract

This literary review examines the different psychological perspectives on the relationship between social media usage and empathy. Specifically, it discusses the association by expanding on the fields of cognitive psychology, neuropsychology, clinical psychology, and some evolutionary psychology. I define empathy and discuss its developmental journey, its cognitive functions, its neurobiological processes, its possible damage caused by social media usage, and its effects on physical and mental health. Lastly, I argue that research focusing on high levels of social media usage and its relationship with levels of empathy should focus on creating an elaborate longitudinal study to gain more information on the possible negative and positive consequences.

Keywords: empathy, social media, cognitive functions, neuropsychological processes, clinical psychology, evolutionary psychology.

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Introduction

Emotions are one of the wonders of the human mind because of their extreme complexities and how they impact our everyday lives. All emotions serve their purpose for our survival and our role in society. Empathy is prioritized in psychology because it is a needed emotion for therapists to comprehend and help clients. However, the modern generation of psychologists will have to worry about how social media has potentially changed how the world understands and experiences empathy. All fields of psychology can explain empathy, but a select few perfectly explain the complexities of it. First, cognitive psychology can explain what empathy is, the different types of empathy, the developmental milestones of empathy, and the mental processes associated with it. Secondly, clinical psychology compares individual differences and how they can influence the consequences of high social media usage. Finally, neuropsychology details the function of specific brain areas and hormones and relates them to social media and empathy. Therefore, this multidisciplinary literary review covers cognitive psychology, neuropsychology, and clinical psychology to explain empathy, the types of empathy, the origins of empathy, the different ways humans exhibit and feel empathy, and how social media affects empathy.

Empathy and its Cognitive Complexities

Empathy can be described as the action of understanding and vicariously experiencing the feelings, thoughts, and experiences of another from either the past or present (Merriam-Webster, 2023). Researchers created two categories of empathy, cognitive and emotional, to better explore the complexities of it. Cognitive empathy is defined as having the ability to identify the mental state of others (Jarvis et al., 2023). Emotional empathy is an emotional response stemming from observing another's emotional experience or condition.

Interestingly, humans start becoming aware of their emotions at an early age. According to the literature, infants as young as 18 hours old have been proven to be aware of others' distress when exposed to other infants crying (Khanjani et al., 2020). Empathy is, objectively, almost always fundamental to human nature and social interactions; therefore, children must grow and develop a strong mind to eventually find the empathetic skills needed to guarantee success in their future (Krol & Bartz, 2022). A milestone in human development commonly occurs between 15 to 18 months old, when toddlers begin to recognize their image in reflective surfaces leading to the discovery of the self (Lewis & Brooks-Gunn, 1979; McAdams, 2024).

To be aware of the self is to act with direction and purpose and to behave in goal-oriented ways. By age one, infants can observe and intentionally imitate goal-directed behaviors (Woodward, 2009; McAdams, 2024). Eventually, children come to realize that people have minds in which they have desires and goals, and that "desires and beliefs, thereby, motivate behavior" (McAdams, 2024). However, there are still many debates on empathy and its process through aging, so many theories have been created to explain the development of a theory of mind (usually developed around four to five years old), sense of self, and empathy.

Various longitudinal studies have shown that there is a significant increase in cognitive empathy and prosocial behavior starting from middle childhood to early adulthood (Eisenberg & Miller, 1999; Knafo et al., 2008). More recent examinations on age-related empathy changes have corroborated earlier findings, but they have found more detailed information. Overgaauw and colleagues (2017) found that there was a consistent increase in empathy in girls but a decrease in empathy and intention to comfort in boys across childhood and early adolescence. The differences in the results are most likely due to the gender identification hypothesis, which states that children act as their environment expects them to (Hill & Lynch, 1983; Overgaauw et

al., 2017). Through adolescence, humans develop more interpersonal relationships, become more independent, and establish a stronger sense of identity, which all lead to higher levels of self-reported empathy (Overgaauw et al., 2017). The creation of relationships and an established sense of self is critical in an individual's future because social skills are directly linked to empathy in early adulthood. Those with low social skills later in life show a decrease in empathy, while those with higher social skills demonstrate an increase in empathy. This perfectly highlights the importance of developmental milestones and individual differences.

Psychological literature has continued to delve into researching age versus empathy. Jarvis et al (2023) compared empathetic levels between younger minds (M = 27.55) and older minds (M = 68.42). They found that cognitive empathy reduces as an adult gets older and emotional empathy increases with aging because of a pattern where more older adults than younger groups showed an appropriate response to others' emotions. A similar study was done by Khanjani et al. (2020) where they experimented with one hundred and ninety-six subjects to test out the two components of empathy. Through self-report, there was no observed decline in emotional or cognitive empathy for older adults until they performed the Eye Test, which is a test that requires participants to select four words that best describe the feelings expressed in 36 pictures of strangers' eyes (Lawrence et. al., 2004). The four words are chosen from a pool of words that only include complex mental states such as dread (rather than basic emotions like happiness), to ensure participants thoroughly think about their answers. This is important because the decline in the Eye Test is a result of age-related deficits, specifically in perception, which helps corroborate the claim that older adults show reduced empathy (Jarvis et al., 2023).

Perception is the way we interpret information gathered and processed by the senses, which is essential for memory, communication, and survival (Goldstein, 2009). Specifically,

perception is when our brain automatically organizes and interprets information detected and encoded by a person's senses. This explains why there has been research proving a causal link between perceptual and cognitive decline as an individual ages (Roberts & Allen, 2016). The decline in perception might be linked to a decline in the auditory and visual senses, which prevents an older individual from properly encoding and detecting sensory information to organize and interpret. However, research has solely focused on the relationship between sensory decline and cognitive impairment, but recent literature suggests that going beyond this simple theory may reveal more of a direct link to the decline in perception and cognition (Roberts & Allen, 2016). It is easy to assume that worsening senses might directly cause a decline in perception and cognitive impairments. However, if one goes into a detailed study, results will show that even though common effects of aging do affect perception and cognition, perception and cognition likely affect each other too. Therefore, it can be assumed that older adults have more trouble perceiving social media posts in the same way younger adults do, resulting in less empathy exhibited. For the remaining part of this literature review, it's important to distinguish between young and older minds, since they may react differently to social media.

To further understand perception and its role in empathy, one must look at its types: bottom-up and top-down processes. The bottom-up process is when simpler sensations influence more complex functions (Goldstein, 2009). For example, an individual opens a social media platform, and the first picture they see is that of a stranger in distress with a burning house in the background. Through bottom-up processing, the individual will use their visual skills to observe the flames and the house to infer that the house surrounded by flames caused distress to the stranger. Contrary to bottom-up processing, the top-down process starts with complex experiences, which are then applied to further understanding. For example, an individual is

scrolling through a social media platform when they encounter a video of a stranger in distress, dressed in all black, and in a cemetery. Through top-down processing, the individual will use previously learned information to unconsciously infer that the individual is crying because they are at a funeral.

The types of processing are important to the topic of empathy because of the Likelihood Theory, which states that humans perceive the world most likely based on past experiences (Goldstein, 2009). Therefore, if a media post contains content that does not match a schema, an individual's structured framework of the perceived stimuli, the uncertainty may cause slight distress (Merriam-Webster, n.d.). Overly consistent use of social media can cause slight distress to grow into a more powerful type of stress if not dealt with correctly.

The Neuropsychology of Empathy

A good way to understand psychological concepts is through natural sciences because it expands its focus into the smaller physiological details. Neuropsychology studies the same psychological concepts as cognitive and clinical psychology, but it does so from a multilevel perspective including the study of the brain and body (Ito & Kubota, 2024). This field of psychology can be thought of as a methodological approach that uses measures of the brain to study social processes.

Research shows some people engage in destructive behavioral patterns to feel momentary pleasure. Social media provides the perfect opportunity for people as such to continue or increase their negative behaviors with the reward of staying anonymous. Neuroscience confirms such behaviors are not the norm for most people. Christian Keysers from the Netherlands Institute for Neuroscience in Amsterdam explains how witnessing what happens to others does not just activate brain areas, specifically the visual cortex, but it activates emotions and sensations “as if

we felt the same" (Armstrong, 2017). This suggests that most people will not be inclined to participate in troubling acts.

Interestingly, Rebecca Saxe from the Massachusetts Institute of Technology (MIT) has done work with developmental psychology which has confirmed the idea of young children exhibiting a sense of understanding emotions (Armstrong, 2017). Saxe monitored specific brain networks (the temporoparietal junction, posterior cingulate, and prefrontal cortex) and body systems (the secondary somatosensory cortex, insula, middle frontal gyrus, and the anterior cingulate cortex) that three- to five-year-old children used to observe a character's mind throughout a short film. Saxe found that these brain regions do work together but do not overlap between the mind and body networks' activities. Saxe scaled down this experiment to test infants as young as six months old. Under fMRI, the infants' brains were found to have many of the same regional responses that allow adults to be able to distinguish between faces and scenes; however, their brains were not able to show any regional preferences for objects and bodies. Her findings support the idea that cognitive empathy is directly related to perception, specifically the rates of recognition of facial expressions (Moret-Tatay et al., 2022).

To further emphasize the importance of the brain areas Dr. Rebecca Saxe decided to test, one should first understand their functions. James A. Kalat (2023), author of various biological psychology book, explains how the brain uses empathetic thinking to contemplate moral decisions through the prefrontal cortex (PFC), ventromedial PFC (vmPFC), and the cingulate gyrus. The cingulate gyrus stores the posterior cingulate area, which is one of the areas Saxe decided to observe in her experiment, which further corroborates the importance of the cingulate gyrus on empathy and decision-making.

Brain scans have demonstrated that contemplating moral dilemmas activates brain areas known to respond to emotions, which include parts of the prefrontal cortex and cingulate gyrus (Greene et al., 2001; Kalat, 2023). It is essential to study moral dilemmas because they give an insight into emotions, including empathetic feelings, and their processes. If an individual contemplates moral situations, they will react emotionally because they identify with the person whose suffering they caused (Kalat, 2023). However, when humans are choosing between options for moral decisions, they do not do so rationally but rather rationalize decisions after being made, but the brain still holds power over choosing options for dilemmas. An additional brain area that plays a role in moral dilemmas is the vmPFC because if it is damaged it will lead to decisions without much consideration of the emotional impact (Yu et al., 2020, Kalat, 2023). Therefore, to properly deal with morality one must be aware of any potential damage to the brain and should require emotional regulation.

Emotional regulation is the ability to modify emotional reactions and experiences, especially intense ones, through a sophisticated process that includes skills of language, reappraisal, prediction, and social interaction (Tottenham, 2017). This is critical for decision-making, especially for empathy-based decisions, because it prevents the human mind from choosing an option solely based on moods or mood swings. Emotional regulation, at its core, relies on communication between the PFC, specifically medial regions, and subcortical systems along with the amygdala, hippocampus, and basal ganglia (Campos et al., 2004; Quirk & Beer, 2006; Hare et al., 2005; Sokol-Hessner et al., 2013; Tottenham, 2017). Specifically, the medial PFC receives and coordinates signals from perceptual, semantic, and linguistic areas of the brain to facilitate the regulation of emotional reactions. Though there has been evidence of infants exhibiting awareness of others' distress, the complex neurobiological process of empathy takes

years to reach maturity (Jarvis et al., 2023). Additionally, the neurobiology of emotion regulation differs between late infancy and adolescence because adolescents use the medial PFC and infants do not (Kim et al., 2009; Tottenham, 2017). The difference in neurobiological patterns results in starkly different behaviors for infants, adolescents, and adults toward extinguishing or maintaining certain emotions, which explains the development of empathy in the human mind.

To develop strong emotional regulation, children must interact with others to learn how to use social referencing to navigate emotional and physical landscapes (Tottenham, 2017). An additional factor in achieving a mature mind and strong emotional regulation is the environment in which a child is raised. Interestingly, the PFC and its connections with other cortical and subcortical targets are very slow to develop in humans. This implies that the slow-paced development leaves the PFC and its connections vulnerable to environmental adversities but can also offer great potential for learning from positive and enriching environments. Therefore, a child growing up in an optimistic environment that fosters growth will lead to incredibly rich emotional regulation in the mature mind. Having a developed mind and strong emotional regulation will, consequently, result in well-thought-out empathetic decisions. However, what would happen if the process of emotion regulation was damaged?

A possible future threat to emotional regulation is social media, specifically platforms that bombard users with content. An example of such a platform is TikTok, a relatively new platform known for its addictive nature due to its extremely fast-paced videos and its curated content towards its viewers on the *For You* page (FYP), which has tailored videos fitting the viewers' specific interests (“What is the ‘For You’ feed, n.d.). TikTok’s curated content and its fast-paced videos keep users engaged for a considerable amount of time. Concerningly, an average TikTok user spends an average of 95 minutes on the app daily, 6.06 hours weekly, and

26 hours monthly (Vardhman, 2024). Learning about addictive social media applications is critical in the discussion of empathy because it gives an insight into one of the few factors that can negatively affect it and raises a cause of concern for users because of their unrestricted access to conflicting content.

Though social media does a relatively good job of maintaining a safe and secure FYP by removing violent content and age-restricting videos, there is still problematic content that flies under the radar due to its possible "educational" nature or due to negligence by the social media platform ("Community Guidelines", n.d.). Even if social media platforms did a perfect job of deleting violent and R-rated content, there are still a magnitude of videos posted of people talking about their stories which may include death stories, redemptive stories, or general tear-inducing stories. These types of emotionally overwhelming posts have garnered a reputation because of their juxtaposition. Users have reported situations where they have scrolled through the app for laughter when they randomly came across an emotional or overly violent post that can leave the viewer in distress. However, once the viewer scrolls out of the post, they are faced with an extremely different post that contradicts the viewer's previous emotions. This swing of emotions happens within seconds because of social media's fast-paced nature. This is important because it begs the question of whether the excessively rapid emotional rise and drop times damage emotional regulation, specifically towards empathy.

The opposite of emotion regulation is when a person does not hold full control over their emotional reactions and thoughts, otherwise known as affective instability (AI). AI, a term poorly defined but agreed by clinical psychologists to be important, is when there are frequent disturbances in emotions, excessively rapid emotion rise times, a delayed return to baseline, excessive reactivity to psychosocial cues, and overdramatic expressions (Henry, 2010; Marwaha

et al., 2014). Marwaha and coworkers (2014) conducted a systematic literary review and used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), which retrieved over 11,000 abstracts and 110 full-text articles to produce an accurately define AI as rapid oscillations of intense feelings, with difficulty in regulating these changes or their behavioral consequences, which further expands on the consequences of having a lack of emotional regulation. In the same study, there are examples of consequences of AI, such as "auto-aggression", the ability to engage in non-impulsive behaviors, and increased fears of acting violently if angry. These three examples demonstrate how inconsistent and unstable the mind can be without full control of emotions. The mind exhibiting unstable and inconsistent control over emotions is most likely due to damage to the vmPFC.

A damaged vmPFC is likely to result in decreased reports of guilt and trust, which goes to show its importance in social and cognitive functions, along with emotion regulation (Kalat, 2023; Hiser & Koenigs, 2018). If a lesion occurs within the white matter of the vmPFC, it will result in a blunted effect and diminished physiological reactivity to aversive stimuli (Hiser & Koenigs, 2018). This further supports the claim that the vmPFC has an essential role in empathy. Interestingly, recent eye-tracker data indicates that vmPFC damage will also result in reduced visual attention to the eye region of faces, which corroborates Dr. Saxe's findings of cognitive empathy's direct association with perception, explicitally the recognition of facial expressions (Moret-Tatay et al., 2022). However, there is the possibility that apathy may not be due to vmPFC damage. Instead of social media causing neural damage, it could be causing the mimicking of AI symptoms. The imitations of these symptoms, specifically fluctuating emotions, could explain the decreased reports of guilt or empathy that social media users feel after excessive media usage.

The purpose of explaining specific neural processes of empathy and brain areas that play a role in empathy was to distinguish how social media could play a role in disturbing those two things. A healthy vmPFC plays a role in emotion regulation and a damaged vmPFC plays a role in AI. Social media platforms cannot create lesions on the brain that lead to stunted empathy, but it does not mean that social media cannot inadvertently harm brain areas, like the vmPFC.

A way for social media to harm the brain is through hormones. In a cohort study of 6595 US adolescents, increased time spent on social media per day was positively correlated with increased odds of reporting high levels of comorbid internalizing and externalizing problems, even after adjusting for history of mental health problems (Rheim et al., 2019). Thus, social media can create negative stress in individuals, which releases the stress hormone, cortisol, into the brain and body.

Cortisol is present at high levels in the brain when stressed or anxious. If social media content is distressing enough to an individual, it will, theoretically, increase cortisol levels. Additionally, if said individual has behavioral patterns of addictive social media usage, the already high cortisol levels can start to cause harm to physiological systems. Unfortunately, increased stress is not the only negative consequence of social media. A study found that on-screen activities (social messaging, web surfing, TV or movie watching, and gaming) were associated with poorer sleep characteristics, more insomnia symptoms, and shorter sleep duration in adolescents (Li et al., 2019). Since the screen-based activities resulted in more problems falling and staying asleep and shorter weekday sleep duration it implies that increased social media usage can cause sleep deprivation.

Unsurprisingly, sleep deprivation is damaging to the body and mind. Wang and associates (2022) found evidence that suggests that risk-taking behaviors are affected when people are

sleep-deprived, and it is theorized the vmPFC may have a crucial psychophysiological role in this phenomenon. They created a study done on 21 healthy men, recruited from Beihnag University, to discover the possible relationship between sleep deprivation and the vmPFC. The results found total sleep deprivation affects risk-taking tendency by reducing the functional connectivity of vmPFC. This lack of control over decision-making suggests that sleep deprivation could affect emotional regulation because a sound mind is not likely to engage in impulsive behaviors. Additional results state that sleep deprivation also imposes physiological stress that impairs cognition, emotions, and behavior. This is important to note because social media causes sleep deprivation resulting in increases in the release of cortisol and hurting the vmPFC, which harms the emotional regulation that controls the levels of empathy a person exhibits or feels.

Validating the last claim, Kalat (2023) wrote in his textbook the consequences of prolonged stress include similar symptoms to depression, a weakened immune system, and potential harm to the hippocampus. This is significant because a damaged hippocampus can lead to apathy due to the proven association the hippocampus, along with the prefrontal cortex, has with social cognition, cognitive empathy, and emotional empathy (Nowacki et al., 2020). Hence, social media is harmful because it decreases empathy through multiple factors, as proven by different research tested and supported by a wide variety of disciplines and research methods.

The Clinical Mind and Social Media

A recent study found that a third of adults in the United States get their news from social media platforms (Matsa, 2023). Since many get their news on easily accessible applications, there is a high chance of daily exposure to political events, which is important because day-to-day exposure can evoke negative emotional reactions due to its association with worsening

psychological and physical well-being (Ford et al., 2023). Therefore, daily usage of social media does seem to have consequences.

However, many individuals, especially the younger ones, seem to have developed a certain level of addiction to their smartphones, which can suggest a worsening issue for future generations. Chung and coworkers (2019) did a study that proved the existence of a significant positive correlation between screen time and social media addiction. The group also found that psychopathy, one of the traits of the Dark Tetrad, was the only personality trait with a positive association with the addictive use of social media. This is important because psychopathy includes features such as callousness, impulsivity, recklessness, irresponsibility, and lack of empathy. The fact that there is a positive correlation between psychopathy and addictive social media use does not immediately imply that social media creates a shift in personality. However, it does suggest that social media applications may foster such behavior and it may provide a venue for apathy (Chung et al., 2019).

Additionally, Galica and coworkers (2017) have sought to explain the relationship between social media usage and conduct problems. They investigated if CD symptoms in early adolescence were associated with social media use during emerging adulthood in an experiment with over 500 emerging adults. In the study, a significant correlation was found between intense social media use during adulthood and CD symptoms, as well as intense social media use and ASPD symptoms. This shows how social and emotional skills can be negatively affected by the routine use of social media platforms.

Additionally, Martingano and associates (2022) conducted a data analysis and a “mini meta-analysis” to find similar results to the aforementioned sources. Their results were the same: social media use is associated with lower social and emotional skills because of the positive

correlations with lower empathy and negative correlations with measures of cognitive empathy. However, the researchers explain that research reaching to discover the correlation between empathy and social media cannot find a significant overall relationship due to its multifaceted nature.

Not only do culture, age, and society play a role in how individuals act toward an empathy-inducing event, but behavioral patterns do as well. Sassenrath et al. (2023) discovered that individuals who are commonly engaging in cyberbullying and victim blaming experience sadistic pleasure and feel apathetic when facing others' suffering because of their high levels of "everyday sadism". Oppositely, individuals with lower levels of "everyday sadism" participate in less or no cyberbullying and victim blaming. This points out that individualistic differences, like behaviors, also have a role in apathetic or empathetic responses. So, how can science ever truly explain the relationship between social media usage and empathy when it is so multifactorial?

Discussion

The abovementioned evidence has proven the harmful effect social media has on empathy. However, this does not necessarily bind humans to a solemn and hopeless future where our minds are broken by technology. As with everything else in psychology academia, the relationship between empathy and social media is multifactorial. Intense levels of social media usage could predict higher levels of apathy when compared to low levels of social media usage. However, results could depend on the person's childhood environment, their current environment, their neural activities, and their psychophysiological processes.

Additionally, the consequences rely on an individual's response to distressing posts. An individual who overconsumes negative content will have higher amounts of stress than those who do not, but outcomes would differ if the same individual encountered multiple distressing

posts and decided to educate themselves. Investigating why a person is in distress is a sign of emotional intelligence, which can be an indicator of empathetic behavior because emotional intelligence causes people to have broader access to a range of emotions and to be more sensitive to emotional cues (Fernandez-Abascal & Martin-Diaz, 2019; Double et. al., 2022). Though individual investigation of distressing media posts can prove to be a sign of curiosity and empathetic thinking, it does not eliminate the chance of feeling distressed.

Previously, the examples of people in distress have included random and fictional scenarios. Social media posts with distressing scenarios may include random real-life situations, political situations, or morally gray situations. Ford et al. (2023) emphasized in their journal article how impossible it is to separate mundane content from morally engaging content due to how it has permeated everyday life. Such content and people's core moral beliefs are intrinsically linked; therefore, events that challenge moral convictions (e.g., genocide, war, famines, racism, immigration, etc.) are met with strong negative emotional responses which may impede empathetic responses (2023). However, people are not helpless individuals who do not know how to set personal limits on the content they consume or the amount of time they consume it.

Additionally, even the most overly stressed people could still demonstrate empathic behaviors because empathy is theorized to be an innate behavior. Humans are the only species to be highly emotionally regulated (Tottenham, 2017). The human mind can control and modify emotional reactions and experiences, even the overly intense ones, through large and sophisticated emotion regulation processes. These cognitive processes are a special evolved skill in humans because of the slow development of the brain. Phylogenetically, its slow development is an advantage for the benefits through an extended period of neural plasticity, allowing neural systems to learn from their environment. Ergo, it is an evolved skill for the brain to slowly

develop to give humans time to learn from their environments, resulting in children maturing into a strong emotion regulation process, hence, having good empathetic skills.

Additionally, our empathetic nature transcends the constraints we are born into through technology. Social media does not inhibit our human nature to be cooperative with others, rather it allows for cooperation without geographical restrictions (Ng, 2020). Most modern humans use social media to share knowledge, give emotional support, share interests and hobbies, achieve common goals, and much more. The multiple reasons why humans use social media indicate the need to belong for the comfort of inclusivity and future assurance, and to satiate the innate mechanism designed to help in-group members (Hamilton, 1964; Trivers, 1971, Ng, 2020). This desire to help in-group stems from wanting to help members who carry their genes to ensure the survival of your family (Ng, 2020). Though it is more likely for empathetic behaviors to be exhibited in in-groups, there is no definite omission of out-groups. Cooperating with out-groups stems from wanting reciprocal empathy, social insurance, creation of allies, and reputation enhancement to ensure the general survival of families and beguile out-group members to join the in-group. Due to the natural need to help and understand others, the future of humankind seems bright. Humans are not doomed by technology, but we should be wary of the possible consequences of limitless usage of social media.

Conclusion

The careful review of the different psychological fields and their perspectives on empathy and social media has allowed a broader and more detailed explanation of the complexities of empathy, its likely relationship with social media, and the possible negative consequences on the human mind. Though research does support the idea of a negative relationship between social media and empathy, it does not bind humans to a destiny of being controlled by technology.

Unfortunately, some limitations have negated the possibility of a strong and successful empirical study. Time constraints and resource limits only allowed for a simple literature review, which brings forth its own set of limitations. Most of the articles gathered were secondary sources as well, and the few primary sources were mostly WEIRD (western, educated, industrialized, rich, and democratic). Therefore, the future goal for this study is to create an experiment to determine how empathy is affected by social media. However, this could lead to ethical problems because the experiment would need to subject participants to stressful and distressing media posts, which would bring into question if the risks outweighed the benefits. Additionally, it would be difficult to control variables in participants' lives, so it would create confusion if empathy was affected due to the usage of social media or because of personal reasons.

Interventions towards social media could be used to ensure a brighter future for the human mind. Herriman and colleagues (2024) reviewed 39 experimental studies with interventions to examine their efficacy. The different types of interventions observed were based on cognitive-behavior therapy (CBT), reality therapy, motivational enhancement therapy, and self-compassion-focused therapy. Additionally, the different intervention designs included education of the human mind.

Future research should undertake the experiment by creating a longitudinal study to track the possible changes empathy has due to social media usage. Additionally, a longitudinal study allows researchers to gain more detail over an extended period, gain knowledge about external events, explore patterns of change in a group and individuals, gain time-related characteristics, and much more ("Strengths of longitudinal data, n.d.). Furthermore, usage of medical technology should be used to further expand on the neuropsychological consequences of social media by

looking at brain areas, brain activity, hormonal levels, and more. Though potential future research seems rather ambitious, it is necessary to conduct it to better understand the potential future of the human mind and to help predict the imminent relationship between humans and technology.

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