

Social Media and Changes in Values: Correlated or Causated?

The purpose of this study is to probe the relationship between values and social media through the lens of neuroscience and psychology. Various academics, politicians and businessmen are raising concerns that social media usage is changing people's attitudes and values, polarising the public discourse and potentially harming society as a whole. Through analysing relevant academic papers, this study hopes to improve our understanding of the neurological and psychological basis of values and attempts to sketch out two potential answers as to how social media usage could be impacting our values.

Social Media

Social Media statistics – mapping out the field

Social media are defined by Kietzmann et al. (2011, p. 1) as "Employ[ing] mobile and web-based technologies to create highly interactive platforms via which individuals and communities share, co-create, discuss, and modify user-generated content." This definition seems to capture the most important elements of social media platforms, namely that they are becoming more and more immersive and apart from mere communication, individuals use them to share various aspects of their lives with other users.

If we want to estimate the influence these platforms might have on global societal phenomena, it is important to first appreciate the worldwide spread social media have achieved over the last ten years. There are 4.6 billion active users around the world, tripling in size from the 1.482 billion users in 2012 (DataReportal, 2022). Yearly change equates to 10.1 % growth (424 million new users joined in 2021), meaning that roughly 1 million new users have joined every day. The global penetration rate is 58.4% (DataReportal, 2022). Even though young people tend to use social media more frequently, social media usage cuts through all age groups (Our World In Data, 2019). Average daily time spent on the internet is 6 hours 58 minutes, with social media occupying the biggest share of time spent online at 2 hours 27 minutes per day, nearly doubling from the 1 hour 30 minutes spent daily in 2012 (Statista, 2022a). The platform with the most active users is Facebook with 2.91 billion, followed closely by YouTube (2.562 billion) and WhatsApp (2 billion), with Instagram closing in at 1.478 billion users and TikTok, being the fastest growing site, having 1 billion users (Statista, 2022b). As is evident from the numbers, social media are becoming more prevalent in our society by the day in all age groups and slowly also in most regions of the world.

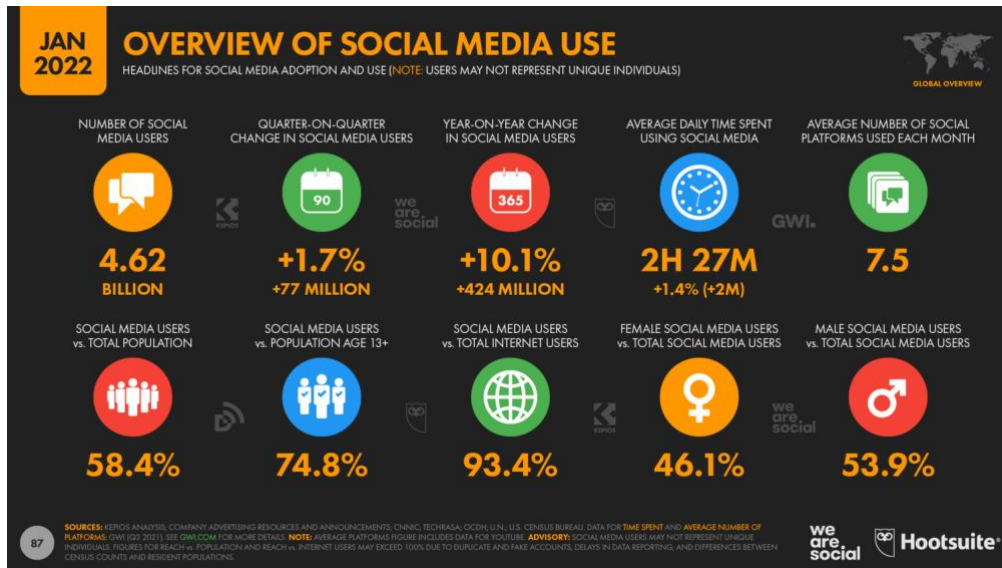


Figure 1: Global Social Media Overview January 2022 (DataReportal, 2022)

This gives the idea that they could play an influential role in global societal processes great plausibility. To assess this plausibility and which specific effects social media might have, this study will focus on the influence it has over individuals’ brains and how this affects interpersonal communication and various other aspects of the human psychology. The study is divided into three main sections: The Brain and Social Media, The Brain and Values and Values and Social Media – The Link. The first provides a detailed look on what happens in the human brain when it interacts with social media, analysing the processes at the most fundamental neurological level and building our way up to complex cognitive structures. The second section provides a brief philosophical discussion of what values are and then reviews forecasting literature which assesses the importance values play on a global scale. The remainder of the second section then focuses on the most well-established evidence-based psychological theory of values and connects this to the forecasting literature. Finally, in the concluding section, two stories or models emerge of the possible connections between the worldwide spread of social media and the global shift in values.

The Brain and Social Media - What the brain does when it sees Facebook

In this section, I aim to outline in detail the most important brain functions associated with social media use. Based on the reasoning that social networking sites are social in nature, since they provide users with opportunities to engage with other users, exchanging content, information and ideas through shared content or messages, the model for the brain’s activity on social media is based on Meshi et al.’s model of offline social cognition, i.e. the model describing how individuals interact with each other in everyday, face-to-face settings. I outline the three brain networks responsible for social cognition: Mentalising Network, Self-Referential Cognition Network and Reward Network, and review research on how each of these performs in the specific context of social media usage. The emerging picture, summarised at the end of each section in the Key Takeaways box, will then guide the discussion on whether there could be a potential link between the worldwide spread of social media usage and the destabilisation of values.

Social Cognition

The need for affection and belongingness are some of the most fundamental human needs (Kenrick et al., 2010). The roots of these needs can be found in the evolutionary history of our species, as

forming groups and long-standing relationships can bring significant advantages, with the primary driver being protection from predators (Dunbar, 2012). Moreover, other individuals also represent an important source of acquiring information, such as learning about potentially poisonous food (Wicker et al., 2003) and are therefore a vital driver of learning (Frith, 2008). In addition, it is often helpful that an individual pursues their goals with the help of others, rendering shared goals another important aspect of social cognition (Frith, 2008). Apart from an evolutionary perspective, being social and interacting with others is simply a part of everyday life and as such brings many further benefits. Engaging with other people is associated with greater subjective well-being and general life satisfaction (Rafnsson et al., 2015) helps alleviate the negative impacts of stressful and traumatic events (Clark, 1993) and even plays a role in staying healthy (Monninger, 2022). All in all, it is safe to say that humans benefit from social interactions and they form a vital part of their lives.

Meshi et al. (2015) argue that social networks address these fundamental social needs, as connecting with others and managing one's own reputation taps into the advantages of social life. Hence, users on social media constantly interact with content and other users in a way that allows them to broadcast and receive feedback in the form of likes or engagement with posts, which is subsequently utilised for social comparison, i.e. contrasting one's own feedback with that of others in order to determine one's own social standing (Meshi et al., 2015). Therefore, it seems reasonable to assume that the neural networks engaged in "offline" social behaviour will also play a crucial role in the on-line interactions (Meshi et al., 2013). Based on this reasoning, I will utilise Meshi et al.'s model which identifies three main domains responsible for these activities: Mentalising, Self-Referential Cognition Network and Reward Network. In the remainder of this section, I will explain in detail the functioning of each of these domains and relate it specifically to how it influences users engaging in social media usage.

Mentalising

Mentalising "is the process by which we make sense of each other and ourselves, implicitly and explicitly, in terms of subjective states and mental processes." (Bateman & Fonagy, 2010) It is vital to viewing the self and others as thinking, believing and desiring beings (Bateman & Fonagy, 2010) and is therefore crucial to understanding others. Specialised neurons called mirror neurons are likely to play a vital role in this process (Frith & Frith, 2006), as they are activated both when one performs an action and observes an action of a similar type in others (Rizzolati & Craighero, 2004), meaning, effectively, that in order to understand actions and emotions of others we activate our brain as if we were performing that action ourselves (Wicker et al., 2003). These neurons aid in interpreting basic social cues such as processing other people's facial expressions in the amygdala (Livneh et al., 2012) or inferring one's object of attention from following their gaze in the superior temporal sulcus (Frith & Frith, 2006) since both involve mirroring physical actions. However, there are also higher level processes involved in mentalising (Kanai, 2012) such as future planning in the prefrontal cortex, understanding and monitoring the emotions and actions of ourselves and others in parts of the medial frontal cortex or retrieving information about the world from long-term memory in the hippocampus (Bird & Burgess, 2008), which together constitute the complex phenomenon of understanding others as agents with minds of their own.

Mentalising seems to play an important role in social media usage, since some studies discovered that the bigger the size of one's social network, the denser their grey matter in regions relevant to social cognition (Kanai, 2012; Von Der Heide et al., 2014). However, one significant difference when comparing "offline" and "online" social behaviour is that the online sphere lacks many of the non-verbal cues, such as gaze following or facial recognition, which accompany face-to-face communication. One consequence of this seems to be a lowered ability of assessing the other communicator's true thoughts and feelings, especially due to the lack of vocal cues such as vocal inflections and pauses (Lieberman & Schroeder, 2020). The lack of hearing a voice might also have

the effect of dehumanising the other communicator, namely, making them appear less thoughtful and emotional (Lieberman & Schroeder, 2020). Another consequence of the lack of nonverbal cues might be the online disinhibition effect, i.e. people self-disclosing or acting out in a more frequent and intense manner online (Suler, 2004), which can lead to hostile behaviour online and even to cyberbullying (Antoniadou et al., 2016, Terry & Cain, 2016). This effect seems to be primarily a consequence of two features of social media communication (Wu et al., 2016): 1) The asynchronicity of online communication, i.e. the delayed reception of consequences of one's actions. For instance, when posting a hateful comment online, one can log off the app and simply forget about the comment they left, as opposed to a real life setting which would produce an immediate emotional reaction in both parties (recall the functioning of the mirror systems). 2) Dissociative imagination, i.e. the feeling of disconnectedness from one's acts of communication. To continue with the previous example, leaving a hateful comment on a social networking site can be perceived as much less a personal act than shouting an insult towards someone in a face-to-face setting, meaning the barrier for engaging in toxic behaviour is much lower in a social media setting. Both of these features seem to have an effect on the levels of toxic behaviours online (Wu et al., 2016). However, it should be noted that for some, the disinhibition effect can yield a positive influence, with users exhibiting more acts of compassion and kindness online than offline (Terry & Cain, 2016). Hence, it might seem that whether the disinhibition will have positive or negative outcomes depends in part on personality traits, especially low honesty, humility and high emotionality predicted a toxic form of disinhibition (D'Agata & Kwantes, 2020). However, it is important to note that the very form of social media communication, namely the dissociative and asynchronous aspect lead to toxicity regardless of personality factors (Wu et al., 2016).

Even though there are differences in offline and online communication, it still seems that communication through social media can be beneficial to the user and can achieve relatively comparable levels of social presence, a feeling of "being there" with the other person (Oh et al., 2018). However, this only seems to hold if social media is used for active communication with close partners. Conversely, when used mainly to passively consume content, then it is associated with lowering well-being (Liu et al., 2019). Moreover, users with lower mentalising skills seem to be more prone to problematic social media use which leads to severe mental health issues (Bersani et al., 2022). However, some research also supports the idea that active social media use might improve mentalising (Gentina et al., 2021). Either way, mentalising is a crucial process to social media interactions and the lack of some of its ordinary offline features can lead to dehumanising and hostile behaviour.

With these communicative limits in mind, it is now crucial to consider how one might process the feedback received from others on social media and use it for social comparison. It seems that the primary manner in which this is done is upward comparison (Vogel et al., 2014), meaning that people choose as target for comparison a person who seems superior to them, as opposed to downward comparison where an inferior individual is used for comparison. The reason upward comparison seems to be more prevalent is because social media offers great opportunities to carefully tinker with and idealise one's self-presentations, therefore, one is more likely to encounter other people's carefully crafted successes rather than failures (Verduyn et al., 2020). Moreover, users receive feedback more frequently due to the social nature of the sites and from a much larger number of people than usual (Blomfield & Barber, 2014). Subsequently, a large body of research paints the mechanism of upward comparison as the primary reason as to why social media usage leads to issues with self-esteem and subsequent low subjective well-being (Jiang & Ngien, 2020; Verduyn, 2020; Vogel et al., 2014). As mentioned before, the feeling of low subjective well-being is intensified when content from social media is merely passively consumed (Qingqi et al., 2017; Verduyn et al., 2015). All in all, it is clear that the primary means of receiving and processing feedback from others is upward social comparison and, given the fact that social feedback is crucial for self-evaluations

(Festinger, 1954, p. 118), in the next section I aim to probe what effects this might have on individual users' conception of their Self.

Key takeaways: Mentalising is the ability of attributing to oneself and others subjective mental states, meaning one sees agents as thinking, believing and desiring beings. A fundamental mechanism behind this ability are mirror neurones which fire both when an action is being performed and being perceived by an agent, meaning that we understand the behaviour and emotions of others through "simulating" their state of mind in our own mind. Through additional processes such as future planning, assessment of one's own and others' emotions or utilising long-term memories, one constructs the ability of thinking about others in terms of their mental states. As such, this skill is vital to understanding and engaging with others on social media, with the important lack of nonverbal cues in online communication. This has the effect of making estimates of other users' emotions and thoughts less accurate and to a certain sense dehumanises one's communication partners. This can be observed in the online disinhibition effect, wherein precisely the lack of nonverbal cues and immediacy felt in "offline" communication causes users to share and act out in a more frequent and intense manner. While this can mean that some users will be kinder and more compassionate than they would be in real life, it can also lead to more hostility and in extreme cases to cyberbullying behaviour. While predetermined personality factors such as dishonesty, lower humility or higher emotionality play a role, the asynchronous (i.e. lacking nonverbal immediacy) and dissociated (i.e. perceived disconnectedness from one's behaviour on social media) nature of online communications itself causes the disinhibition to take on a more toxic form. The primary means of understanding others in the limited social media landscape seems to be upward social comparison, i.e. choosing an individual perceived as superior as target for comparison. Upward, as opposed to downward comparison, seems to be the prevalent form of processing feedback on social media because the self-presentations of other users are usually very carefully crafted to reflect positive aspects of the users' lives. The information from these comparisons is then utilised to update the understanding of one's self.

Self-Referential Cognition Network

Self-Referential Cognition is the processing of stimuli that are experienced as strongly related to one's own person (Northoff, 2008). These stimuli can range broadly from the subjective experience of seeing red colour or perceiving that one's own leg itches to recognising oneself in a photo or recognising one's own house. What ties all these various phenomena together is a subjective feeling of "mineness" (Metzinger, T., 2003, p. 302), the introspective feeling that a stimulus relates to one's self. This intimate and fundamental feeling seems to be a result of complex neurological processes in distinct areas of the brain, meaning that the processing of the self-related stimuli might be separate from processing "neutral" stimuli such as cars or geographical facts (Kelley, 2002). For instance, in one study participants were asked to judge adjectives in three conditions: relating to the self ("Does the adjective describe you?"), other ("Does the adjective describe the current U.S. President George Bush?") and case ("Is the adjective presented in uppercase letters?")(Kelley, 2002). The results showed that a region in the medial prefrontal cortex engaged specifically in judgements related to the self questions (Kelley, 2002). Relating this back to the example of when one's leg itches, the feeling that it is *my* leg that itches seems to be processed separately and in a different place in the brain than the itchiness itself. All in all, self-cognition seems to be a distinct neurological process occurring in the Cortical Midline Structure (Northoff & Bermphol, 2004). Apart from the very fundamental feeling or sensation of "mineness", self-cognition involves the complex process of creating an identity or a self, i.e. creating in us the sense of who we are. Perhaps this almost seems a truism, but the sense and knowledge of who we are represent perhaps the most important aspects of our lives. Hence, apart from a sort of experiencing phenomenological self, there seems to be an empirical self which somehow absorbs all the various facts about a person which the

“phenomenological I” then “experiences” (Wozniak, 2018). This means that the mind, one way or another, constantly creates and updates models of one’s self and the way one understands their own identity (Metzinger 2003; Epstein, 1973). These models have many features which I will now discuss in connection to social media usage.

As mentioned in the previous section, the core mechanism behind receiving and processing feedback from others is upward social comparison. What effects can this have on one’s self? A potential explanatory guide could be the looking-glass hypothesis, stating that our self is largely formed by considering the information about ourselves gathered from others (Cooley, 1983, pp. 127). Hence, if information from others is received in a continually unfavourable manner, this could have a seriously negative impact on one’s perception of the self. Indeed, research shows that upward social comparison is heavily linked to lower self-esteem and subsequent lower well-being (Vogel et al., 2014; Jiang & Ngien, 2020, Verduyn, 2020). Self-esteem is the “individual’s positive or negative attitude toward the self as a totality” (Rosenberg et al., 1995) and is closely linked to one’s self-concept, which is a knowledge structure uniting traits, values and various sorts of memories about the self and processing self-relevant information (Jones, 2015; Campbell et al., 1996), or, put more simply, an answer one gives themselves to the question “Who am I?” (Myers, 2010, pp. 39). As mentioned above, the possession and understanding of one’s self is perhaps the most intimate and fundamental of our sensations and as such this makes the self-concept a vital structure for one’s life. However, it seems that people with a lower self-esteem tend to have less clarity about their self-concept (Campbell, 1990), which leads to the question whether social media usage could have detrimental effects on its users’ self-concepts, as self-concept clarity plays an important role in one’s identity and well-being (Lin et al., 2021). Previous research suggests that engaging in unfavourable upward social comparisons has negative effects on one’s self-concept (Burlinson, 2005), meaning in effect that one thinks much lower about the defining aspects of their self after a substantial amount of unfavourable comparison, as reactions of others are used as important information for creating a firm self-concept (Appel et al., 2018). Thus, given the fact that this mode of comparison seems to be prevalent on social media, it seems likely that social media use negatively impacts one’s self-concept. Especially for adolescents, social media usage was associated with identity distress, i.e. an inability to reconcile aspects of the self into a coherent unit (Yang et al., 2018). Moreover, heavier social media usage in adolescents was associated with a more negative self-concept (Peters et al., 2021) and is associated with less self-concept clarity (Appel et al., 2018, Valkenburg & Peter, 2011), since the ease with which one can create different identities on-line can lower one’s ability to create a stable idea of the self (Valkenburg & Peter, 2011). This effect is especially evident when social sites are used passively (Lin et al., 2021; Qingqi et al., 2017). Hence, to summarise, it seems that there is a complex interplay between different aspects of the self and social media usage. It seems that social media usage lower our clarity about who we are and also has a negative effect on our self-concept, meaning we think lower of the defining aspects of our identity. Additionally, social media usage negatively affects our self-esteem, leading to more negative evaluations of oneself, which, in turn, seems to further lower our self-concept clarity, creating a vicious cycle of sorts. All in all, due to the constant influx of upward social comparisons, it seems that social media usage poses as an obstacle to creating a stable personal identity.

It is an important observation that many of the well-being measures are based on self-observation or self-evaluative questionnaires. Hence, it seems reasonable to ask the question why users of social media keep coming back despite sometimes even being aware of the detrimental effects this has on their well-being. An answer to this question lies in the final brain network I will consider.

Key takeaways: Self-Referential Cognition is the processing of stimuli that are experienced as strongly related to one’s own person. Ranging from experiencing red colour and recognising this as my self’s perception to recognising oneself in a photo or mirror, these experiences are accompanied

by the intimate feeling of “mineness” or belonging to one’s own self and as such are some of the most fundamental sensations one has. These stimuli connected to one’s own person seem to be processed in a distinct neural structure, the Cortical Midline Structure, from neutral stimuli such as geographical facts. Apart from the “experiencing” or “phenomenological” self, there also seems to be a cognitive structure which unites information about our person and helps us understand ourselves, ranging from information about my possessions to information about how I am perceived by others. This structure, among other things, involves: 1) one’s self concept, i.e. the answer one gives to the question “Who am I?”, 2) self-esteem which is the positive evaluation of one’s self and also 3) self-concept clarity, which is the degree to which one understands their own identity. As the possession and understanding of one’s self is perhaps the most important aspect of one’s life, it can be seen as a worry that social media usage is detrimental to all of the three aspects of the self outlined above. Social media usage is associated with: 1) negative self-concept, meaning one thinks more negatively about the defining features of their self, 2) lower self-esteem, with people evaluating themselves less positively, which also leads to lower overall subjective well-being, and also 3) lower self-concept clarity, meaning users are more confused about what their identity is. This seems to be strongly connected to the fact that individuals utilise information from others to inform the creation of their identity and the manner in which such information is received on social media seems to be mostly unfavourable to the individual. Hence, the fact that we are often forced to perceive ourselves as inferior on social media might lead to an inability to create a stable concept of one’s self and to have clarity about one’s own identity. This, in turn, leads to further lowering of self-esteem, which negatively influences one’s self-concept, creating a sort of vicious cycle regarding personal identity.

Reward Network

The reward network is a set of complex cortical and subcortical regions which mediates different aspects of incentive-based learning (Haber & Knutson, 2010). In addition to regulating information about motivation, desire and reward, the reward network works in cooperation with many regions which are responsible for planning and carrying out behaviour appropriate to the desire (Haber & Knutson, 2010). This signifies that the reward network is not an isolated circuit but rather involves a complex network of brain areas. At the heart of this mechanism are midbrain dopamine neurons. These are neurons which fire e.g. after registering food or liquid rewards or reward-predicting visual cues (e.g. seeing food nearby)(Schultz, 1998). Hence, these neurons play the role of determining which events will bring utility and subsequently informing the relevant brain areas about which these are. This means that dopaminergic neurons make constant predictions about the expected value of events, creating an anchor for future predictions. On this framework, errors are crucial for learning, as an error can both mean that the brain predicted value where there is none or, alternatively, that it missed out on an event which turned out to bring more value than predicted. Thus, after an early “adjusting” period of robust responses to rewards as such, the brain switches to robustly responding to predictive cues in the following manner (Keiflin & Janak, 2015): when a reward is better than predicted, this elicits a stronger response, accurate predictions yield a neutral response and a smaller reward than predicted leads to a negative response from the dopamine neurons (Schultz, 2010). This mechanism is often labelled the reward prediction error. Subsequently, additional neurons in the striatum are used to determine behaviours which will be most conducive to bringing about a rewarded outcome and neurons in the orbitofrontal cortex seem to help comparing different rewarded outcomes with respect to how important they are to fulfilling our motivations (Hollerman, 2000). This means that different types of rewards are processed in different parts of the Orbitofrontal cortex, with sensory rewards (e.g. tastes) being processed in the posterior regions as opposed to the frontal processing of more abstract rewards (e.g. money)(Kringelbach & Rolls, 2004).

Social rewards are amongst the many types of desired outcomes processed in the reward networks, with examples ranging from seeing somebody smile (O’Doherty, 2003) to receiving praise (Deci,

1971) or improving one's own reputation (Izuma, 2008). Thanks to the social nature of sites such as Facebook or Instagram, social rewards are a crucial part of the user's experience. Especially in adolescence, reward centers are more activated by the presence of others including in on-line environments (Smith, 2014) and there seems to be some evidence that this effect continues into early adulthood (Steinberg & Monahan, 2007). The primary forms of social rewards are the various sorts of feedback on social media such as the "Like" on Facebook or Instagram. Receiving likes on one's own posts strongly activates the reward centers, as does seeing posts with more likes rather than few likes (Sherman et al., 2016). Furthermore, providing likes to others is also associated with activation in the reward network (Sherman et al., 2018). It is precisely this positive social feedback that makes people come back to the sites (Lindström et al., 2021), meaning regular social media usage can be understood as a learned habit where likes and other types of feedback are a form of reward for social behaviour (Lindström et al., 2021) This suggests that users will be motivated to use social media more frequently because the more frequent the usage, the more rewards one gets (Herrnstein, 1970). However, this approach only seems to explain the more immediate aspects of social media usage, such as users spending more time on a forum where one received more positive feedback (Das & Lavoie, 2014). As explained earlier, the response of the reward centers increases insofar as the value of the stimulus is bigger than expected, meaning that the effects wear off after a while. Therefore, to maintain the pleasurable effect of using social media over a prolonged period of time it seems that the social networking sites must alter their architecture to counterbalance this effect, or, alternatively, the user's behaviour must somehow adapt. So what keeps the users coming back?

To the first end, it seems that the reward prediction error mechanism coupled with some of the social sites' design features could provide an answer. The social networks' architecture follows a Variable Reward Schedule, which means that positive stimuli are distributed at random intervals, for instance through notifications or ads being interspersed between posts (Burhan & Moradzadeh, 2020). Thanks to this randomised distribution, the user's "surprise levels" stay relatively constant, i.e. its prediction error is higher than expected every time a post is seen since there are brief periods of unexpectedly low rewards in between posts. This is because, the expected "anchor" with which rewards are compared constantly shifts from lower to higher and back (Keiflin & Jasnak, 2015). Another design feature which could counter the wearing off is the swiping for new content seen on various social media platforms, which allows the user to refresh their feed once bored. In effect, this means that the user summons a new set of social rewards 'at the click of a button' renewing the interest in the site once it has plateaued. Hence, it seems that social media are engineered to keep us in the feedback loop for prolonged periods of time.

However, it is also possible that it is the adaptive behaviour of the user which keeps one engaged with the sites. An illuminating perspective on this might be offered by considering a model which employs the predictive processing theory (White & Miller, 2021). This model takes expectations rather than reward as the primary cause of behaviour, arguing that agents act in a surprise minimising way, rewarding expected rather than surprising outcomes. This model arises from a rather simple question about human decision making; imagine, for instance, that there is an apple in front of you and you are trying to decide what to do next. There are a few options, the most obvious one being to eat the apple, perhaps a less obvious one would be that the apple is poisoned and should not be eaten. Now, the simple question is, how do I decide between these different models of what is about to happen next? The predictive processing model says that the brain considers its previous knowledge about similar situations, current evidence and the complexity of the different models (eating vs poisoning), averages this out and executes the averaged prediction (FitzGerald et al., 2014). This means that the brain goes with a model which averages out the most plausible (accurate) and simple (minimal complexity) prediction, meaning the brain's primary goal is to minimise surprise in the long run. Hence, unsurprising actions are rewarding on this framework, meaning that dopamine signals the onset of actions which are likely to bring predictable sequences

of action (Miller et al., 2020). In the long run, this can mean that the brain will aim to converge its attainable actions with its predicted ones (Friston et al., 2014), so that rather than updating our expectations when something goes wrong, we update our behaviour to fit our expectations as much as possible, as that is what the brain finds rewarding. Hence, the appeal of social media on this framework comes from being immersed in an environment that is rewarding thanks to its increasing familiarity (White & Miller, 2021).

Both of these explanations have different merits and it is upon future research to determine which model better reflects the users' interactions with social media. However, it is crucial that both of these models involve a shift in the brain's expectations and subsequent understanding of its environment. Whether it is the reward prediction error mechanism or prediction processing theory, both involve constant and often massive shifts in the brain's expectations, effectively warping one's reality based on the new environment that is social media. Moreover, both models have dopamine as the key actor in this engagement and effectively resemble the workings of an addiction. While many researchers recognise social media addiction (see Andreassen, 2015 for a review), defined as "the irrational and excessive use of social media to the extent that it interferes with other aspects of daily life" (Hou et al., 2019), as an actual addiction and compare it to behavioural addictions such as gambling (Ibid.), it cannot be argued that all users suffer from such severe forms of dependence. However, as Levy (2013) points out, the label of addiction as a disease is often socially normative rather than functionally normative, meaning that the brain functions themselves need not be functioning pathologically in what we would ordinarily call addiction, but it is rather social connotations which paint the picture of the behaviour as addictive. Hence, while it is important not to give in to 'moral panic' and place overt focus to negative aspects of social media (Schønning et al., 2020), it is crucial to note that due to the engagement of the reward network, engagement on social media networks can be viewed as highly addictive.

Key takeaways: The reward network is a key brain mechanism in social media usage. Neurons producing dopamine in the midbrain engage in active predictions of which stimuli will bring reward and constantly tweak their predictions based on a prediction error mechanism – meaning that the brain constantly updates its expectations both upwards ("Something went better than expected, I should heighten my expectations for next time") or downwards ("Something went worse than expected, I should lower my expectations for next time"). What is crucial to remember is that these predictions and behaviours are *learned*; only after one is exposed to a rewarding stimulus a few times does one develop a habit of seeking out that stimulus. Social media functions within this framework, with knowledge of others and subsequent social interactions such as likes or comments serving as social rewards. It seems that especially adolescents are sensitive to these rewards. The rewarding nature of social media is what creates the initial appeal for users to come back, with positive feedback motivating users to spend more time on a given platform. However, long-term usage can be accounted for by two theories of reward: 1) the Reward Prediction Error (RPE) model which posits that design features of the social sites, such as randomised distribution of rewarding posts, keep our "surprise" levels at a consistently high level, meaning we find it rewarding to engage over prolonged periods of time, or 2) by a Prediction Processing (PP) model which states that over time, we alter our behaviour on social media to align with our expectations, meaning we find the unsurprising nature of the virtual environments rewarding and we keep coming back. Importantly, on both of these models, the longer the users use the sites, the more their behaviour starts to resemble addictive behaviour and involves a significant shift in how one perceives their immediate surroundings and reality in general.

The Model in Action

Now, having outlined the three relevant networks, it is worthwhile to review how the three interact in action. It seems that social media engages our ability to mentalise, i.e. gather information about others through thinking about them as the same kinds of agents as we are. Individuals then utilise this information to update their own self-perceptions to better fit the feedback received from others. This information is rewarding in nature, since it serves as a valuable source of improving one's own standing in a group, self-esteem and overall subjective well-being. However, it seems that on social media it is received primarily in two ways: 1) one receives only a limited portion of the relevant information as the communication on social media is less immediate and personal, meaning people tend to communicate more toxic information on-line and, in part as a consequence, 2) one receives primarily comparisons that paint them as inferior to others. Moreover, it is received in larger amounts than would be usual in face-to-face communication. This can lead to a vicious cycle of sorts, where one comes back for the social rewards which are enhanced by design features of the social sites, however, this is at the expense of receiving lots of unfavourable social information, meaning, in effect, that users keep coming back to hear bad news about themselves. This undermines their certainty about their identity, paints their own self-concept in a more negative way and overall lowers their self-esteem and subjective well-being. Hence, in effect, the user's behaviour can be described as an addiction to social rewards with the side-effect of losing important features of one's identity in the process.

The Brain and Values

Introduction to be consulted depending on how we frame the observation that values are changing.

What are values?

It is very difficult to define the concept of values, as it cuts across many disciplines and seems rather abstract in its nature. To start at the most fundamental level, it seems that discussions about values are concerned with what is "good" or with "goodness" in general (Schroeder, 2021). Hence, when something is called a value or valuable, this can be understood to mean that it is good. The next obvious question is how do we determine what is good? It seems that there can be two different kind of goodness: 1) There is an instrumental kind of goodness, which can be defined as "the value that something has in virtue of being a means to an end" (Zimmerman & Bradley, 2019). So, for instance, to be a successful Formula 1 racer, it is *good* to have a well-developed hands-eye coordination, because that will help one's career as a racer. However, this does not seem to encompass the stronger sense of goodness we associate with values when we talk about e.g. morals, politics or culture. Hence, there seems to be a second kind of goodness, 2) intrinsic goodness, which is "the value something has in itself" (Zimmerman & Bradley, 2019). To continue with our example, perhaps one wants to be a successful Formula 1 driver because this will garner respect from others and respect can be understood to have value in itself. Why? Because it is just *good* to be respected.

Following this distinction, in this paper, I aim to focus on goodness or values which are stronger in the second sense, i.e. have at least to some extent an element of intrinsic goodness. Now, another obvious question is how to determine what has intrinsic goodness? This query seems to have two different levels: 1) One level is the question whether there has to be one "ultimate intrinsic supervalue" which all things we ordinarily deem good somehow derive from (perhaps it could be pleasure, wisdom or God), or whether there can be a plethora of things which are intrinsically good. This distinction is labelled the "Monism vs. Pluralism" debate (Mason, 2018) and it is out of the scope of this paper to go over it in detail. However, it seems that since this paper aims to consider values in a societal context, it seems reasonable to be open to a version of pluralism, as it is not obvious that the values that people are holding (or losing?) all come from one "super-source" and two people can differ in the specific contents of their value systems while still both being considered as having values. The second level of determining intrinsic goodness is this: 2) Regardless of whether there is

one or many intrinsic values, how does one determine which exactly these are? Broadly speaking, there seem to be three approaches in the history of philosophy: the deontological approach, the consequentialist approach and the virtue ethics approach (Mason, 2018). In short, deontology seems to be concerned with goodness as relating to moral principles, consequentialists are concerned with goodness as maximising the amount of good in the world and finally, the virtue ethicist considers goodness as becoming a good agent or person (Mason, 2018). Once again, this debate spans over centuries and it cannot be settled here. However, it seems that the “crisis of values” does not necessarily seem to turn on the question of which moral theory best encompasses what is good. Both a consequentialist or a virtue ethicist can be easily conceived of as having values. Rather, what seems to be happening is one of two things; either, people simply no longer have a stable value system, or, alternatively, their values can no longer be considered as being concerned with the questions of goodness but seem rather confrontational in nature.

How can this be reconciled with the definition of values as “being concerned with goodness”? It seems that we need a more complex definition. Hence, I choose the following definition of values used by OECD: “Values are the guiding principles that underpin what people believe to be important when making decisions in all areas of private and public life. They determine what people will prioritise in making a judgement, and what they will strive for in seeking improvement.” (OECD Future of Education and Skills 2030, 2019). This definition seems to capture the two important elements discussed above. Firstly, it highlights the importance of the role an individual plays in creating their own value system, meaning different individuals might have differing values, while also maintaining that a value system’s primary purpose is seeking good. Additionally, it also captures the fact that values are not merely about what is important to an individual but that they are an important factor in our public life, i.e. they are crucial to how we positively relate ourselves to other people. With this definition in mind, I will now consider whether and how our values may be changing.

Key takeaways: Generally speaking, values are constructs or concepts which are concerned with the “good”. Things can have instrumental value, meaning they can serve as useful means to a desired end, however, the societal values in question here seem to be of a different kind, namely, they have intrinsic goodness, i.e. they are good or desirable in themselves. While the history of philosophy recognises many approaches to determining what is or is not good, societal values in this paper are defined as “the guiding principles that underpin what people believe to be important when making decisions in all areas of private and public life. They determine what people will prioritise in making a judgement, and what they will strive for in seeking improvement.” This definition captures that while values are highly individual and important to the specific agent, they also have an element of being crucial to how we positively relate to others in our public life. It seems that the crisis of values will be concerned precisely with changes in one of the aspects of the definition: either people are losing the stable guiding element of values or people’s values no longer relate one positively to others but seem to be more and more confrontational in nature.

Changing values

As mentioned in the starting discussion, values are a topic which encompasses many different disciplines and seems to involve a fair amount of abstraction. As such, values may vary between individuals and it is challenging to give a unifying definition for all the different phenomena connected to this topic. However, many sources do report various sorts of shifts in values as a megatrend, i.e. one of the “long-term driving forces that are observable now and will most likely have significant influence on the future” (European Commission, 2022). The National Intelligence Council (2017, pp. 17) predicts that there will be a continuing fragmentation of identities and increasing disagreement over ideas between populations, with likely consequences being various

identity conflicts around the world and the loss of values such as tolerance and diversity. They also add that group identities will start to play an influential role and as a result, a rise in nationalism and populism should be expected (NIC, 2017, pp. 18.). The rise in populism, defined as “parties and politicians that claim to represent the true will of a unified people against domestic elites” (ESPAS, 2019, pp. 31), seems to be particularly connected to crises in identity, as it offers people a sense of stability due to its exclusionary nature which divides people into friends and enemies (ESPAS, 2019, pp. 31). However, despite the growing significance of group identities, many sources also report a growing shift towards individualistic rather than collectivistic values (JRC, 2022; České priority, 2021), with people becoming more entrenched in their individual rather than shared value systems (Shaldor, 2020, pp. 13; Deloitte, 2017, pp. 93). I will return to this puzzling tension later, however, for now it is important to point out that either of these factors could be a cause of the observed growing social unrest (Deloitte, 2017, pp. 73) and decreasing social cohesion (IPSOS, 2016, pp. 63). A connected phenomenon is increased polarisation, with different interest groups failing to find common ground and means of communication on different societal or political topics (Shaldor, 2020, pp. 24; Deloitte, 2017, pp. 61). Moreover, it seems that global freedom is at a slight decrease, with 79 countries decreasing their level of freedom, especially regarding personal freedom indicators (such as fairness of laws, personal safety or freedom of movement and assembly, for a full list see World Population Review, 2022)(Roland Berger Trend Compendium 2050, 2020, pp. 13). However, there does seem to be a positive shift towards more environmental consciousness and ethical consumerism (Euromonitor International, 2019, pp. 9). Overall, it seems safe to say that there is an ongoing shift in values which will have a significant global influence in the following decades and some even label the current state of affairs a “crisis of values” (Meer, 1999). While there seems to be a plethora of differing opinions in the literature on which specific values are changing, it seems that many of the changes are growing out of people’s increasing uncertainty both about the various aspects of their different identities and about the direction in which the world is moving (Shaldor, 2020, pp. 12). In general, it can be said that people are feeling increasingly insecure, despite general growth in domains such as health, life expectancy and wealth (UNDP, 2022). The discussion above reveals two interesting paradoxes: 1) there seem to be contradictory opinions on whether people are becoming more entrenched in their individual value systems or those of their groups and 2) intuitively, values should provide the necessary sense of security that people lack, so it is rather puzzling that uncertainty seems to be the factor driving the changes and sometimes even losses of values. To illuminate these two paradoxes, in the next section I will consider the psychological basis of values on the individual and group level and attempt to shed light on the ongoing “crisis of values”. Understanding these two contradictions in the literature, which I aim to explain in terms of mechanisms in human psychology, will help us understand the phenomenon of the “crisis of values” in more depth and will serve as a segue of considering a link between the growing social media usage and the current value shift.

Key takeaways: While the specific changes in values can be difficult to conceptualise, the forecasting literature considers the general shift in values to be a potential long-term driving force with a significant impact on the future. The US National Intelligence Council predicts a continuing fragmentation of identities and increasing disagreement over ideas between populations, with likely consequences being various identity conflicts around the world and the loss of values such as tolerance and diversity. Some sources report people’s inclination to uphold their group’s values while others claim that people tend to become more entrenched in their personal value systems. Generally, populism and radicalism seem to be on the rise, with the connected phenomenon being growing social unrest and decreasing social cohesion. Global freedom seems to be threatened, with 79 countries all over the world decreasing their level of personal freedoms including fairness of law or freedom of movement and assembly. Even though there are reports of increasing environmental consciousness among people, some scholars have called the current state of affairs an all out “crisis of values”. All in all, while it is difficult to paint a unified picture of the shift in values, it seems to be growing out of increasing uncertainty that people have both about their identities in the increasingly

complex world and about the direction that the world is moving. This feeling of insecurity is growing despite many measures of wealth or health quality improving. This discussion reveals two interesting paradoxes: 1) There seem to be contradictory opinions on whether people are becoming more entrenched in their individual value systems or those of their groups and 2) Intuitively, it seems that values should provide the necessary sense of security that people lack, so it is rather puzzling that uncertainty seems to be the factor driving the changes and sometimes even losses of values. These paradoxes will be guiding the discussion of the psychology of values and will help understand what the “crisis of values” actually entails.

Psychology of Values

What are values?

It seems that even the field of psychology has trouble with giving a clear definition of what values are (Rohan, 2000), however, following Rokeach (1973, pp. 5) a value is “an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence” and a value system is a hierarchical enduring organisation of these beliefs (Rokeach, 1973, pp. 5). Hence, even as a cognitive structure, values are a system of important personal priorities, which aid one both in personal and social decision making. While values are a cognitive structure (Oyserman, 2015), it is also important to note that they are closely linked to the affective system, meaning that they have a profound effect on one’s behaviour while simultaneously providing meaning and continuity across the plethora of different situations one goes through every day (Rohan, 2000). According to Schwartz (Schwartz, 2012), whose theory is presently the most well-known evidence-based theory of values (Russo et al., 2022) human values are structured around two primary motivational dimensions: 1) The motivational contrast between “openness to change” and “conservation” values, where the first represents values embracing one’s independence and readiness to change while the second represents values which focus on the preservation of the past and maintaining known order. 2) The motivational contrast between “self-enhancement” and “self-transcendence” where the first represents, broadly, values that promote following through on one’s own interests whereas the second emphasises values that promote interests of others. Generally, these motivations stem from three universal requirements of human existence: biological needs, the requirements of coordinated social interaction and the survival and welfare of groups (Schwartz, 1992). Put simply, humans need to satisfy their biological needs with the aid of others and to persuade others, they need to be able to communicate these goals with them. Hence, Schwartz defines ten basic value types representing ways of fulfilling the three requirements (Schwartz, 1992): power, achievement, hedonism, stimulation, self-direction,

universalism, benevolence, conformity, tradition, and security. Figure 2 provides definitions of each of these value types.

Value Types and Definitions	Representative Values
Power: Social Status and Prestige, Control or Dominance Over People and Resources.	Social power: Control over others, dominance. Authority: The right to lead or command. Wealth: Material possessions, money.
Achievement: Personal Success Through Demonstrating Competence According to Social Standards.	Success: Achieving goals. Capability: Competence, effectiveness, efficiency. Ambition: Hard work, aspirations. Influence: Have an impact on people and events.
Hedonism: Pleasure and Sensuous Gratification for Oneself.	Pleasure: Gratification of desires. Enjoyment in life: Enjoyment of food, sex, leisure, and so on.
Stimulation: Excitement, Novelty, and Challenge in Life.	Daringness: Adventure-seeking, risktaking. A varied life: Filled with challenge, novelty, change. An exciting life: Stimulating experiences.
Self-Direction: Independent Thought and Action-Choosing, Creating, Exploring.	Creativity: Uniqueness, imagination. Freedom: Freedom of action and thought. Independence: Self-reliance, self-sufficiency. Curiosity: Interest in everything, exploration. Choose own goals: Select own purposes.
Universalism: Understanding, Appreciation, Tolerance, and Protection for the Welfare of all People and for Nature.	Broadminded: Tolerant of different ideas and beliefs. Wisdom: A mature understanding of life. Social justice: Correcting injustice, care for the weak. Equality: Equal opportunity for all. A world at peace: Free of war and conflict. A world of beauty: Beauty of nature and the arts. Unity with nature: Fitting into nature. Protecting the environment: Preserving nature.
Benevolence: Preservation and Enhancement of the Welfare of People With Whom One is in Frequent Personal Contact.	Helpful: Working for the welfare of others. Honesty: Genuineness, sincerity. Forgivingness: Willingness to pardon others. Loyalty: Faithful to my friends, group. Responsibility: Dependable, reliable.
Tradition: Respect, Commitment, and Acceptance of the Customs and Ideas That Traditional Culture or Religion Provide the Self.	Humility: Modesty, self-effacement. Acceptance of my portion in life: Submission to life's circumstances. Devotion: Hold to religious faith and belief. Respect for tradition: Preservation of time-honored customs. Moderate: Avoiding extremes of feeling or action.
Conformity: Restraint of Actions, Inclinations, and Impulses Likely to Upset or Harm Others and Violate Social Expectations or Norms.	Politeness: Courtesy, good manners. Obedience: Dutiful, meet obligations. Self-discipline: Self-restraint, resistance to temptation. Honor parents and elders: Showing respect.
Security: Safety, Harmony, and Stability of Society, of Relationships, and of Self.	Family security: Safety for loved ones. National security: Protection of my nation from enemies. Social order: Stability of society. Cleanliness: Neatness, tidiness. Reciprocation of favors: Avoidance of indebtedness.

Figure 2: Definitions and descriptions of the ten basic values according to Schwartz (Schwartz, 1992).

As the motivational contrasts described above suggest, oftentimes pursuing one value, for instance self-direction and seeking one's own goals, has negative consequences on the pursuit of another value, such as conformity and self-restraint. Conversely, sometimes values can act in synergy, e.g. hedonism and stimulation. Hence, what forms individual value systems is the manner in which one handles and prioritises the congruencies and incongruencies between the different values (Schwartz, 1992), with values whose goals are aligned tending to be paired together more often. Figure 3 represents this continuum, with values closer together representing compatible pairs and values further apart representing incompatibility. This also suggests that it is simply impossible to be "value-less", as that would mean that an individual does not fall under any of the three universal requirements of human existence. Rather, shifts in values represent shifts in the equilibrium of the value continuum.

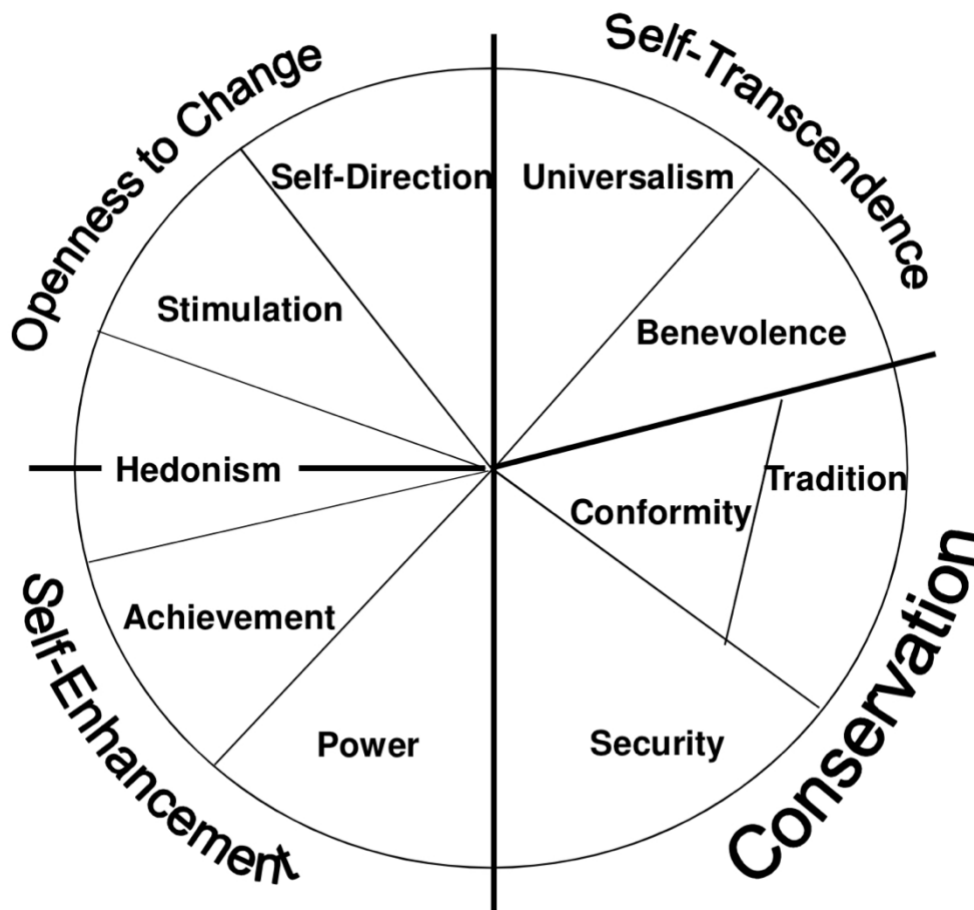


Figure 3: The relational model of the ten basic values types (Schwartz, 2012)

What Schwartz suggests is that because values stem from universal needs of human existence, the underlying value types are endemic to all cultures and that differences stem merely from the differences of priority that each culture assigns to the different values (Schwartz, 2012). Later, Schwartz developed his theory further and argued that apart from the congruencies and incongruencies playing a role in structuring values, another axis along which values are structured is “anxiety-free vs anxiety-based” values (Schwartz et al., 2012). He argues that values which are “anxiety-based” are ones which primarily function to protect and individual’s self against uncertainty and threat, while “anxiety-free” values prioritise self-expansion in the absence of anxiety. The following are the “anxiety-based” values: Power, Security, Conformity and Tradition and the “anxiety-free” values: Hedonism, Stimulation, Self-Direction, Universalism and Benevolence, with Achievement being a borderline value (Lee et al., 2016). This highlights that one’s values, being a dynamic structure, might shift in light of environmental cues which prime one to re-evaluate their values (Bardi & Goodwin, 2011), even though generally speaking they tend to be stable (Russo et al., 2022). A primary example of such cues are changing social circumstances, especially increasing social uncertainty (Schwartz, 2012). Here, we might find an answer to the second puzzling question, namely, how the growing uncertainty functions as the driving factor in the ongoing change in values. It seems that according to Schwartz’s theory, in times of heightened uncertainty, people tend to resort to “anxiety-based” values which give one a sense of protection and include values such as security, conformity and tradition. Therefore, the theory neatly explains why individuals tend to stick to group identities, nationalism and populism more (because this corresponds to promoting the values of conformity and tradition) or why they oppose the values of diversity or tolerance (which are based more towards universalism, an “anxiety-free” value) in times of uncertainty. **Hence, one**

way to conceptualise the ongoing shift in values is to interpret it as a trend towards increasing uncertainty, and, as a result, the cognitive response of individuals pursuing “anxiety-based” self-protective values as opposed to “anxiety-free” self-expansive values.

To find an answer to the first puzzle, namely, why there seem to be contradictions in the literature as to whether people are becoming more entrenched in their individual value systems or those of their groups, it is important to understand how values and one’s personal identity are intertwined. Specifically, the inconsistency in the literature could be explained by Gecas’ suggestion that values are a crucial part of one’s self concept and play an important role in forming one’s identity (Lee et al., 2016; Hitlin, 2003; Gecas, 2000, pp. 94). This highlights that just like any other part of the self-concept, values can undergo significant changes, depending on one’s current self-definitions. This is supported by evidence suggesting that the relative stability of personal values depends on their closeness to one’s ideal self (Russo et al., 2022). Apart from contributing to the creation of one’s personal identity, personal values are also a cohesive force that unifies the various social identities one has into a stable personal identity and, thus, some argue that values are the primary force behind experiencing personal identity (Hitlin, 2003). Hence, importantly, individuals will seek to align their social group identities and group values with their personal values in order to achieve psychological coherence (Bardi et al., 2014). This is also supported by Schwartz’s argument that values tend to align around motivational goals, so it is reasonable to assume that one’s personal and group values would align around a motivational goal rather than go against each other.

This discussion highlights two points: 1) it seems that the difference between one’s personal and group values might not be as sharp as it first seems. Individuals seek psychological coherence, and thus it is unlikely that one’s personal values would be in a significant conflict with one’s group values since the individual will utilise coping mechanism to eliminate the contradiction. Thus, perhaps the question of why there seems to be a contradiction in the literature is just a question of inaccurate conceptualisations of values on part of the researchers, as, ultimately, both types of value systems will be present in one’s self-concept. However, 2) the literature still emphasises a shift in the values that individuals hold. **Hence, another way of conceptualising the changes in values that are occurring must be some changes that are happening to individuals’ self-concepts.** This final remark acts as a segue into the final section, where two models are presented, putting forward a potential link between the ongoing in shift in values and the increasing use of social media worldwide.

Key takeaways: Values are a cognitive structure comprising of hierarchically organised priorities that guide individuals through the different situations in life and inspire socially positive behaviour. According to Schwartz, whose theory is currently the most well-known psychological theory of values, the need for values arises from three universal requirements of human existence: biological needs, the requirements of coordinated social interaction and the survival and welfare of groups. Put simply, humans need to satisfy their biological needs with the aid of others and to persuade others, they need to be able to communicate these goals with them. Values, then, are motivational goals which aid individuals in achieving these requirements. Schwartz defines the following ten basic human values which are universal to all cultures, since they grow out of the same existential needs: power, achievement, hedonism, stimulation, self-direction, universalism, benevolence, conformity, tradition, and security. Differences in personal or cultural value systems then reflect the differences in how much importance is given to each specific value.

Since there could be multiple strategies to fulfil the universal needs, different values will represent different approaches to the task. Hence, the values are further structured around the following two axes: 1) There is a motivational contrast between “openness to change” and “conservation” values, where the first represents values embracing one’s independence and readiness to change, while the second represents values which focus on the preservation of the past and maintaining known order. 2) There is a motivational contrast between “self-enhancement” and “self-transcendence” where the

first represents values that promote following through on one's own interests whereas the second emphasises values that promote interests of others. This further highlights that one's value system is primarily a system of trade-offs, since following for instance an "openness to change" value will be detrimental to a "conservation value" and vice versa. Later, Schwartz added another distinction into the nature of the basic values: "anxiety-based" values which primarily function to protect and individual's self against uncertainty and threat and "anxiety-free" values which prioritise self-expansion in the absence of anxiety. Hence, in times of changes in one's environment which mean increasing uncertainty, individuals will tend to shift their motivational goals to the protection of oneself against threat and uncertainty. This way, the shift in values can be conceptualised as a trend towards increasing uncertainty, meaning individuals will be primarily motivated to protect themselves against said uncertainty and pursue "anxiety-based" values. This also addresses the second contradiction in the forecasting literature, since a shift to a value such as populism or nationalism can be explained both in individual and cultural terms, therefore, the inconsistency might simply be arising from an unclear definition of how values function. Even still, there does seem to be a sort of change in how people's values in today's world function. This change is addressed in the section Model 2 - Social Media and The Shifting Self-Concept.

Values and Social Media – The Link

In this final section, I aim to present the two models of a possible interaction between the shift in values and the worldwide spread of social media. The two models largely depend on which of the two conceptualisations of the "value crisis" above one chooses, however, both seem to grow out of the same neurological and psychological substrate. Namely, both models are centred around the fact that social media significantly influence one's personal identity, making individuals less positive and certain about themselves, which, in turn, ought to have a significant effect on one's personal values which are largely based in one's identity. With these preliminaries in mind, the two models are presented below.

Model 1 – Social Media and Anxiety-Based Values

This model is based on the observation that in times of uncertainty, people tend to shift their values in favour of "anxiety-based" values which primarily function to protect the self against uncertainty and threat. Thus, the values which fit this motivational goal of protection in uncertainty are the following: Power, Security, Conformity and Tradition. Hence, in times of uncertainty, rather than losing values, people are simply gravitating to these values outlined above. Now, it has to be noted that the sources of uncertainty in today's times are plenty, hence this model cannot be taken to be the sole explanation of the shift in values. However, there seems to be good reasons to believe that social media can significantly influence this process. Firstly, social media is relevant from a statistical perspective since over 58 % of people worldwide are now social media users, which equates roughly to 4.6 billion people on-line. Hence, it is very likely that social media is now a key factor in influencing global trends. Secondly, there seems to be a link between the psychology of values and the psychology of social media, namely that social media usage increases uncertainty by undermining one's personal identity. As mentioned previously, the primary mode of receiving information on social media is upward social comparison, meaning users tend to end up in unfavourable comparisons to others, bringing down their self-esteem. Moreover, receiving an abundance of such information seems to undermine one's clarity of their self-concept, i.e. the answer to the question "Who am I?".

In spite of these negative effects, users keep coming back and there are two possible reasons for this, depending on which theory of rewards we use: 1) On the Reward Processing Error (RPE) framework,

users keep coming back because social sites are engineered in a way that distributes rewards randomly, meaning that generally, we are always surprised enough to keep the reward levels of high and desirable. 2) On the Predictive Processing (PP) framework, users keep coming back because they become increasingly familiarised with the space of social networks (which is also supported by algorithms which feed users their preferred content) which yields rewarding certainty. Now, on the RPE framework, there are two clear reasons to protect the self against uncertainty: 1) One never knows when the reward is coming, therefore, one lives under a constant source of uncertainty. 2) The self is being threatened by being undermined by the constant social comparisons. On the PP framework, only the second reason seems to apply, because PP posits on the contrary that over time, uncertainty in individuals will be decreasing. Even so, it is undeniable that the threats against the stability of the self themselves bring about uncertainty, thus, both frameworks can explain why social media users will gravitate towards “anxiety-based” values. Furthermore, it seems to be that this effect will be enhanced by the disinhibited form of social media communication. Because values play a significant role in trust (Oyserman, 2015), the lack of relevant cues from which to recognise whether or not one shares my values will lead to increased uncertainty and hostility towards them. Hence, this limited form of communication can lead the individual to further protect their self, which leads them further towards “anxiety-based” values. Now it is worth noting that from the perspective of value research, these values are as important as all of the others and should not be negatively contorted. On the other hand, it is also vital that on Schwartz’s model, values are a constant trade-off, therefore, promoting the “anxiety-based” values is in direct conflict with promoting values such as Universalism, i.e. caring for the general welfare of all people and nature or Self-Direction, i.e. independent thought and action. **Generally speaking then, increased social media use can be associated with a shift towards Self-Enhancement and Conservation values as opposed to Openness to Change and Self-Transcendence values.**

Crucially, the effect of people becoming entrenched in anxiety-based values will grow stronger the more users social media sites gather and the more time users spend there. The average time is already approaching the 2,5 hour mark and can be expected to be increasing. Therefore, this could also have the effect of reducing diversity and plurality of opinion in the long run, as the increasing uncertainty both from the outside world and the social media landscape will cause a convergence of values towards “anxiety-based” ones. The PP framework offers an illuminating perspective on why time spent by users will be increasing. Under the assumption that the world is getting more uncertain by the day, the PP theory posits that individuals will seek to minimise surprise. Now, in order to do this, users will either change their behaviour to better adapt to the changes in one’s surroundings, or, alternatively, users will adapt their expectations of the world so they fit the way the world behaves. Here is where social media sites come into play, because the algorithms that track one’s preferences can act as a means of either adapting one’s behaviour by allowing one to quickly search for content they like (“The world is behaving in a way I do not like, I will do something differently so the world fits my expectations”) or adapting their expectations by following the preferences observed in the user (“The world is behaving in a way I do not like, I need to change my expectations so I like the world better”). Either way, the plasticity of the social media landscape allows to create a personalised safe haven for everybody, making users increasingly more disconnected from the outside world. While this adaptation seems like a convenient way out, it might not be sustainable from a long-term perspective, since holding “anxiety-based” values is associated with lower well subjective well-being (Sortheix & Schwartz, 2017) which starts the cycle of increasing one’s uncertainty about their identity all over again. Therefore, while it might seem that over time certainty will increase and users will tend to promote “anxiety-free” values again, the persisting effect of social media on one’s identity will likely block this effect. In conclusion, it seems that social media is conducive to promoting “anxiety-based” values since it acts as a source of uncertainty both because of the limited nature of on-line communication and, primarily, because it fuels uncertainty about an individual’s personal identity.

Model 2 – Social Media and The Shifting Self-Concept

The second model is based on the observation by Gecas that values form an important part of one's self-concept and are therefore an integral part of one's identity. Now, the self-concept is not a ready-made concept but rather a dynamic structure that constantly evolves and changes depending on our surroundings and the information we receive (see e.g. Markus & Wurf, 1987). It seems to me that here lies the second potential link between social media usage and a value shift, namely, that social media usage has a very strong negative effect on the creation of a stable self-concept which, in turn, means that individuals have limited means of creating a stable value system. Social media has been shown to negatively influence various different aspects of one's identity, ranging from low self-esteem and low subjective well-being to a negative self-concept and decreased self-concept clarity. Hence, it seems that the overwhelming influx of social information which would likely be impossible in an offline setting is inhibiting people's ability to create a stable identity which is largely dependant on the information received from others. In other words, the brain is not wired to receive social information from this many sources and this can mean that there is no unifying power to piece them all together. Moreover, this can create a vicious cycle since information about the self are derived also from observations of the self (Markus & Wurf, 1987), meaning that if the ability to correctly self-assess is worsened due to saturations of social interactions, this will further undermine one's ability to create a stable self-concept and, therefore, a stable value system. **This can be another way of interpreting the seeming contradictions in the megatrends literature; when asking whether people are shifting more towards individual or group values, the answer is actually that they are doing both. It seems that rather than losing values per se, people just do not have a consistent and unified system to guide them and instead make decisions on a much more immediate basis.** Once again, this is possible because the brain essentially becomes addicted to receiving the social rewards provided by social media. However, perhaps because it is just not wired to receive it in these copious amounts, the tradeoff is the stability of one's personal identity and losing one of the most important of our possessions, namely, the answer to the question "Who am I?".

One important finding of the research on social media is that the negative effects on identity seem to be increased when users engage with social media only passively, meaning they just browse content and do not get in touch with other users. Thus, it can be seen as worrying that there are reports claiming that passive usage of social media is on the rise (Deloitte, 2017, pp. 47). It seems that at least one way that user behaviour should be changed is to encourage social network users to connect with people in a meaningful way rather than just use these sites as a device to kill time. However, one might argue that perhaps these changes in the psychology of identity are not a sign of a crisis but rather a shift in the way that the brain reacts to a world that is becoming much more dynamic. With the world's increasing complexity, perhaps it will be simply impossible to have one unchanging personal identity but instead it will be necessary to have a dynamic system which is able to promptly react to various different situations. After all, this problem has been taken up by philosophers and some claim that personal identity is on a spectrum or continuum rather than a simple "yes or no" affair (Korsgaard, 1989). It should at least be taken up as a serious possibility that in the future, one body could hold various different persons or personal identities as that will simply be what the world demands. On the other hand, it could also be argued that much of society is built on the predicate that a single body holds a single individual, ranging from acts such as voting or signing a lease to deeper issues such as personal responsibility for inflicting harm etc. Either way, it cannot be disputed that social media has a profound negative effect on the creation of personal identity and the new generations of digital natives will likely be the ones most affected by this. Given the brain's immense plasticity and increasing time spent on social media, it is plausible that new generations will grow up with very differently functioning value systems than preceding generations, as losing a stable self ultimately leads to losing stable values.

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