On the Existential Basis of Self-Sovereign Identity and Soulbound Tokens: An Examination of the "Self" in the Age of Web3

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The blockchain social movement led to the emergence of Web3, a new, token-orchestrated iteration of the World Wide Web comprised of decentralized applications. With Web3, users can adopt a unique digital identity, known as a self-sovereign identity, that allows them to have access to their data and be central administrators of their transportable and interoperable identity. An inherent feature of digital identity in Web3 is that, in some cases, it can live forever. Web3 users, therefore, may accumulate digital assets, such as non-fungible tokens, in an attempt to leave a digital legacy behind. Terror-management theory, a social and evolutionary psychology theory, was theoretically applied to the act of digital asset accumulation as a potential mechanism of escaping death-related fears. In contrast, the current uses of non-fungible tokens (i.e., proof-of-ownership) and soulbound tokens (i.e., proof-of-character) were evaluated from a Logotherapy perspective to inform how Web3 could evolve toward a Decentralized Society.

Keywords: blockchain, Web3, self-sovereign identity, soulbound tokens, Terror-Management theory

INTRODUCTION

Digital identity in Web3, referred to as self-sovereign identity (SSI), has been of interest to many individuals in the last few years (Baars, 2016; Ferdous et al., 2019; Mühle et al., 2018; Zwitter et al., 2020); however, the introduction of soulbound tokens (SBTs) by Weyl et al. (2022) highlighted the need for further reflection on the concept of SSI. Weyl and colleagues propose that SBTs will act as non-transferrable tokens representing "commitments, credentials, and affiliations" (Weyl et al., 2022), signifying that they may function as a novel proof-of-character in Web3. As such, a more holistic approach to decentralization - powered by SBTs - through a "Decentralized Society" model, necessitates a holistic approach to SSI. Such an approach involves an examination of the potential existential motivations of individuals to take up a digital identity in Web3. Terror management theory (TMT), a social and evolutionary psychology model explaining how people protect themselves against concerns about death, can help unpack such potential existential motivations. Moreover, TMT can also help explain a novel form of immortality - digital immortality - which may be achieved through forming a unique and memorable digital identity in Web3. Indeed, Web3 offers a slight variation of symbolic immortality through culture by offering a more permanent form of immortality - one that relies upon nothing physical (i.e., it exists without other people and without "hard" copies anywhere). However, what are the implications for such accessible digital

immortality to the current, existing individual? Beyond addressing the potential implications for the individual, this paper will also maintain that SBTs help to better define the collective spirit or character (i.e., ethos) of a Decentralized Society. As such, a Frankl (1946) logotherapy-based examination of Weyl et al.'s (2022) commentary may help contextualize a Decentralized Society as an example of a modern society's search for meaning through blockchain technology.

Blockchain is a system in which a record of transactions is maintained across several computers that are linked in a peer-to-peer network. Acting as a distributed ledger comprised of multiple validators and a cryptographic record of data in blocks connected to form an information chain, blockchain technology was first created to be decentralized from any controlling central interest - an idea likely inspired by a long line of commentary on privacy and freedom through cryptography (Friedman, 2005; May, 1994; Szabo, 2005). Blockchain technology is integrated into various industries as it can simplify complex transactions by offering transparency, verifiability, and improved efficiency (Andoni et al., 2019; Dutta et al., 2020; Goldston et al., 2022). Beyond blockchain's integration into existing fields, such as supply chain management, record management, and capital markets, it is important to recognize that the decentralized nature of blockchain also lays the groundwork for a computer technology-driven social movement fueled by a growing distrust in traditional authorities (Lundy, 2020; Zīle & Strazdiņa, 2018). One emergent property stemming from the blockchain social movement is Web3 (Wood, 2018). Regarded as a new, blockchain-powered iteration of the World Wide Web, Web3 replaces the attention harvesting model of Web2 with a token-orchestrated network of decentralized applications (dApps), where users can enjoy ownership of their data (Stackpole, 2022; Wu, 2016).

An important feature of Web3 tokenomics relates to the use of fungible and non-fungible tokens (Freni et al., 2022). Fungible tokens are non-unique and equivalent goods that are interchangeable, like Bitcoin (BTC). Conversely, non-fungible tokens (NFTs) represent uniquely identifiable data that encode digital assets that are not interchangeable, such as a rare piece of digital art or virtual land in the metaverse. Together, these two forms of digital assets largely contribute to an individual's ability to participate in the Web3 movement. Indeed, dApps use smart contracts (i.e., programs stored on a blockchain that run when predetermined conditions are met) to facilitate peer-to-peer transactions, which necessitate Web3 users to utilize encrypted wallets to send and receive tokens (Anoop & Goldston, 2022). As such, through tokenized participation in the Web3 ecosystem, users naturally acquire a digital identity - a reflection of their digital assets - which, as research on digital identity suggests, they may begin to personally identify with (Papainnou et al., 2021). To examine such a possibility, this paper sets out to define the existential basis of self-sovereign identity through a terror management theory perspective of digital identity in Web3. This exploration aims to shed light on the social and evolutionary significance of the Web3 revolution emerging from blockchain technology.

Digital Identity in Web3: Existential Implications for Self-Sovereign Identity

Hume (1739), an 18th-century philosopher, described personal identity as "nothing but a bundle or collection of different perceptions, which succeed each other with inconceivable rapidity, and are in a perpetual flux and movement". In line with Hume's bundle theory as being used to describe personal identity, one can extend the bundle theory to digital identity, where an individual's digital identity is nothing but a bundle or collection of digital assets (Kidd, 2021). Herein lies the fundamental difference between digital identity in Web3 and Web2; that is, digital assets represent user-centric ownership of data through tokenization such that an individual is an owner (i.e., the Web3 model) rather than the product (i.e., the Web2 model). It is equally important to mention that digital assets are held in encrypted wallets which, in theory, should be compatible with different dApps, thereby enabling digital identity to be interoperable as digital assets can be transferable from one blockchain network to another. Data ownership and interoperability are therefore necessary conditions; although, on their own, neither one produces sufficient conditions for digital identity in Web3. As such, towards a universal nomenclature of digital identity in Web3, we will adhere to the notion of self-sovereign identity (Tobin & Reed, 2016).

Self-sovereign identity (SSI) was foreshadowed by Pretty Good Privacy (PGP) in 1991 through the introduction of the "Web of Trust" - a concept aiming to establish trust in a digital identity through

validating the authenticity of the binding between a public key and its owner (Allen, 2016). Further efforts to describe SSI can be found in Ellison's (1996) paper on digital identity as an emergent property defined by lower-level properties such as certificate authorities and peer-to-peer systems. With the introduction of blockchain technology, SSI was later revisited, as blockchain provided an additional layer of autonomy in the multi-layered nature of SSI. Indeed, as Allen (2016) points out in "10 Principles of Self-Sovereign Identity", an independently existing, consenting, and protected user must have access to their data and be central to the deployment of free, open-source algorithms which administer their transportable and interoperable identity.

Most relevant to this paper, though, Allen (2016) notes that identities could be long-lived and, preferably, should last forever - unless otherwise indicated by the user. This notion of identities living forever is significant in that individuals, through the internet, can now leave behind an easily identifiable legacy that will likely persist for many generations. However, what are the implications for such accessible digital immortality to the current, existing individual? Indeed, how does the current behavior in the NFT space inform us of the kind of digitized legacy individuals wish to leave behind? Further, if digital identity is the culmination of one's digital assets, how can we explain the wealth signaling behavior currently facing the NFT and cryptocurrency space? Before we answer these questions, we should first understand why Web3 users accumulate digital assets. At face value, the reasons widely vary; however, when one closely examines human behavior, the reason why Web3 users take up their digital persona becomes clearer. Here, digital identity can be examined from the perspective of terror management theory (TMT).

Digital Identity as a Terror Management Strategy

"Nothing in life is promised except death" (West, 2005). Why, then, are humans actively living in denial of this one single promise? This is because avoidance of death has allowed humans to maximize their chances of survival, as explained in the Pulitzer Prize-winning book by Becker (1973) entitled The Denial of Death. To build on Becker's ideas, terror-management theory (TMT), originally proposed by Greenberg, Solomon, Maxfield, and Pyszczynski, posits that human beings are plagued by existential terror due to the coupling of self-preservation instincts with an awareness of the inevitability of death (Pyszczynski et al, 2006). That is, people "solve" the problem of death by escaping a physical existence into a world of symbolic existence - namely, culture. Indeed, culture offers symbolic roles and identities of value, which can transcend death by being memorialized in the minds of others. To manage existential terror, therefore, humans have an anxiety-buffering system that builds on three contributing factors: (1) cultural worldviews; (2) self-esteem; and (3) close interpersonal relationships (Pyszczynski et al., 2020).

The function of cultural worldviews is to attenuate the anxiety associated with the human awareness of vulnerability and death by creating order and meaning in a universe subjected to chaos through entropy (Greenberg et al., 1997). Cultural worldviews function through social conditioning by providing the basis for how one should behave in society. Precisely, cultural worldviews shape how an individual interacts with reality and interprets questions surrounding the nature of life and death. By establishing a symbolic context around how life should be lived, cultural worldviews thus offer avenues for immortality or death-transcendence as a result of managing the potential for death-related fear. Of note, symbolic immortality, which stems from the cultural beliefs and values our ancestors created, relates to how one creates a lasting significance beyond death in an attempt to gain protection from death-related fear (Greenberg et al., 2014).

For example, a widespread cultural worldview that offers terror management benefits is that which is generated when one is intrinsically devoted to their religion (Jonas & Fischer, 2006). That is, religious beliefs protect devoted individuals from death-related fear by offering an interpretation of life and death that is fundamentally based on the notion that death is only of the body and that existence continues for eternity. Therefore, individuals will devote their lives to leading a life that qualifies them for literal immortality, as there is an intrinsic sense in which one solves the problem of death/finitude. Indeed, Dechesne et al. (2003) concluded that there is a degree of interchangeability between the death-transcendence pursuits of literal and symbolic immortality and that the avenue in which one pursues is determined by contextual factors (Dechesne et al., 2003). Given that contextual factors largely determine

terror management strategies, it would follow that some individuals living in the age of digitization and Web3 would look toward forming a digital identity as a means of escaping death-related fear.

Digital Identity and Symbolic Immortality

Let us then consider the explanation that symbolic immortality may offer regarding the nature of digital identity. First, it can be conceived that Web3 users may identify with their digital assets as a vehicle for death-transcendence. This is because, in TMT terms, the awareness of the inevitability of death leads Web3 users to question their existence. In turn, the anxiety-buffering system, functioning through cultural worldviews, will lead Web3 users to symbolize the world around them in an attempt to generate meaning in their life (Arndt et al., 2004). Precisely, as a function of cultural worldviews surrounding social status in the digital age, individuals learn to recognize and idolize the trends spreading throughout social media that confer eternal social status given that, in some sense, the internet is forever. In buying into this cultural worldview of death-transcendence through digital identity, individuals begin to realize that it is only by accumulating digital assets that people come to acknowledge their existence and immortalize them in the history of the Web3. Although, not everyone can be immortalized via any one particular means. A religious afterlife is only available to those who live up to religious ideals. Similarly, secular immortality is only bestowed upon the select few who make momentous contributions to society (e.g., leaders) such that people are constantly seeking out places where they can fit in and feel special or immortal within a sphere of transcendence (e.g., scientific specialization, athletic specialization, etc.). This is the whole idea of a worldview or system of personal value - only some people are selected as special (Hubley et al., 2020). Web3, therefore, may be attractive to people who don't have other means of transcendence, or it may be attractive due to the allure of permanence.

Unlike religion, however, we can hypothesize that the general perception in 100 years will be that those deceased Web3 users with valuable digital assets that are worshipped by Web3 culture are not still "alive" in heaven, signifying that their immortality through digital identity would be of the symbolic kind. That is, despite this general perception of the afterlife, there is a sense in which those prominent Web3 users would exist symbolically in the minds of people who pay attention to or worship Web3 and the social status that comes from owning certain digital assets. This line of reasoning, however, is based on a view that Web3 will gain mainstream adoption, and that by being immortalized as an early adherent to this system of transcendence, Web3 users will be forever remembered by the multitude of people who come afterward. In light of this view, TMT posits that Web3 users willingly devote their life to their digital identity as a way to excel, and, consequently, achieve symbolic immortality. Through this lens, it becomes clearer why Web3 users would want to identify with their digital assets - to achieve symbolic immortality. In essence, the purpose of contributing to something so personally profound is so that one's legacy lives on in the memories of friends, family members, and even Web3 users worldwide.

Lifshin and Greenberg's chapter in Tandy's (2018) *Death and Anti-Death, Volume 16: Two Hundred Years After Frankenstein* points toward digital immortality as another "futuristic death anxiety-buffering strategy that may be starting to play a part in the human technological battle with death." One such use case in Web3 is that of Somnium Space, which offers digital immortality within its metaverse built on the Ethereum blockchain. The Founder of Somnium Space, Artur Sychov, aims to collect user data in an attempt to personalize artificial intelligence-powered, immortal avatars that live forever. The first step in Somnium Space's road to digital immortality is to start recording and storing the data of those who partake in "Live Forever" mode (Strachan, 2022). While digital immortality is not a concept exclusive to Web3, the act of explicitly providing symbolic immortality through user-generated data is rather novel (Bell & Gray, 2000; Cline, 2005; Huberman, 2017; Mcllwain, 2005; Popescu & Scarlat, 2017). In Tandy (2018), Lifshin and Greenberg questioned the possible shifts in people's judgment if indefinite life extension through medical technologies were to be accessible to the public. Interestingly, the authors found that, with the emergence of life extension technologies, study participants were more likely to become increasingly concerned with rule-following, law enforcement, and the punishment of social transgressors, as the only threats to existence would relate to death by violence or accidents. While life extension through medical technologies to achieve immortality differs from digital immortality, which is symbolic, one still has to

question the fact that our data and digital assets, will likely live forever. Presumably, though, there would be so many digital identities that we could not possibly be aware of them all, thereby causing users to be stuck trying to create a digital identity that is worthy of notice. If one intends for their digital identity to live forever, what kind of digital legacy would they want to leave, and how could that legacy be potentially compromised if their digital identity could come under threat of a cybersecurity attack?

Self-Sovereign Identity and Self-Esteem: Implications for Cybersecurity

From a TMT perspective, could one question what may happen to a Web3 user when their wallet is compromised? Symbolically, would this represent the death of their identity in Web3? The failure to achieve symbolic immortality through success - i.e., valuable digital asset accumulation - in Web3 surely could mean the death of a digital identity, right? The consequences of not being able to buffer death anxiety by living up to cherished goals and cultural values are context-dependent; however, there is a general understanding that a withdrawal from these unattainable goals can have severe, and sometimes dysfunctional or even fatalistic, implications for the individual (Hayes et al., 2016). In this instance, what is the mediating factor of a healthy and non-self-destructive withdrawal from the goal of achieving self-transcendence through digital immortality in Web3? Here, it becomes a question of how much of a Web3 user's self-esteem was based on success within Web3, the degree to which they were invested in achieving success in Web3, and how much they identified with their Web3 digital identity.

In TMT, self-esteem is a sense of personal worth and value that directly relates to perceived ideals and estimates of how well one is living up to the standards of their cultural worldview (Solomon et al., 1991). Self-esteem, therefore, may sustain or hinder a Web3 user's strive for symbolic immortality through digital identity by helping one estimate the payoffs of their defensive pursuit of managing perceived threats (Greenberg et al., 1986; Greenberg et al., 1993). We can hypothesize, therefore, that within an existential Web3 psychology framework, self-esteem functions, in some capacity, to defend digital identity under threat (i.e., cybersecurity attacks, identity theft, etc.). Although, it is important to consider how this hypothesis would contend with the introduction of soulbound tokens (SBTs) to Web3.

Modern Society in Search of a Soulbound Token: Implications for Digital Identity and Beyond

Non-fungible tokens (NFTs) are blockchain-enabled cryptographic assets that represent proof of ownership (Chalmers et al., 2022). NFTs are distinguishable and divisible by an individual NFT project, akin to how shares in a company represent ownership in the business. NFTs, in their current mainstream usage, are crypto-collectibles that are unique and, importantly, verifiable. This indicates that wealth signaling through NFTs could be regarded, in evolutionary biology terms, as truly honest signals given that the costly signals (i.e., NFTs) are verifiable and therefore resistant to deceivers (Zahavi, 1975). NFTs, therefore, represent a novel proof of wealth that may weed out deceivers. Such unprecedented, theoretical selection forces may lead those owners of highly valuable NFTs to take this novel opportunity to signal their truly unique and, in evolutionary terms, honest form of wealth.

Vitalik Buterin, the Co-Founder of Ethereum, addressed the same issue regarding NFTs and, as a result, introduced the concept of soulbound items within a Web3 context in his seminal commentary on soulbound tokens. The concept of soulbound items is a feature of the popular game World of Warcraft, where a soulbound item, once picked up, cannot be transferred or sold to another player. Further, many of the powerful items in the game are soulbound, tend to be difficult to acquire, and require a team effort to obtain (Buterin, 2022).

Weyl et al. (2022) fully introduced the concept of soulbound tokens within a Web3 context in their seminal paper entitled "Decentralized Society: Finding Web3's Soul." The authors pinpoint the central issue plaguing Web3 - an overreliance on expressing transferable, financialized assets. To address this issue, the authors propose a model for encoding social relationships of trust through a soulbound token (SBT)-powered mechanism. SBTs are publicly visible and non-transferrable tokens representing commitments, credentials, and affiliations. Held in accounts, or wallets, referred to as "Souls," SBTs will have an increased degree of interconnectedness, as compared to NFTs. Indeed, SBTs held by one "Soul can be issued - or attested - by other Souls, who are counterparties to these relationships. These counterparty Souls could be

individuals, companies, or institutions" (Weyl et al., 2022). Therefore, NFTs and SBTs will likely serve different functions. NFTs will serve as proof of ownership, and SBTs as proof of character.

Which of these types of tokens should one strive to obtain? That is up to the Web3 user, as "the shoe that fits one person pinches another; there is no recipe for living that suits all cases.", wrote C.G. Jung, in his book *Modern Man in Search of a Soul* (Jung, 1933). Weyl et al. (2022) explained that SBTs have the potential to contextualize social products in a soulful and empowering manner that prioritizes relationships already present within communities as a meaningful backstop to protect reputation. To fully draw out the potential impact of SBTs, at the collective and individual levels, we can use a logotherapeutic lens to evaluate the commentary provided by Weyl et al. (2022). Logotherapy - a concept developed by Viktor Frankl - explains that the primary motivational force of an individual is to find meaning in life (Frankl, 1946). As Weyl et al.'s (2022) SBT description culminated with a vision of a Decentralized Society, it is clear that their commentary is a meaningful attempt at making sense of Web3's future. As Frankl (2010) pointed out, "man's basic meaning-orientation, his original and natural concern with meaning and values, is endangered and threatened by that pervasive reductionism which is prevalent in Western civilization." Digital identities in Web3 as being merely reduced to the NFTs their wallets hold serve no meaningful purpose, other than potentially serving as a mechanism of escaping death-related fears. What, then, is the meaningful path toward a Decentralized Society? SBTs appear to bring us closer to discovering the ethos of such a society. Indeed, as Aristotle articulated in *Rhetoric*, we obtain an understanding of a given society's ethos in the same manner that we obtain an understanding of the individual's ethos - through its deliberative acts of choice (Ryan, 1972). Therefore, as this modern society's search for meaning through blockchain technology continues to evolve, the introduction of novel methods predicated on the collective need for cooperation, such as SBTs, lay the groundwork for the emergence of a Decentralized Society.

CONCLUSION

The current paper sought to define the existential basis of self-sovereign identity through a terror management theory perspective of digital identity in Web3. A critical analysis of wealth signaling through NFT ownership was theorized as a potential mechanism for escaping death-related fears. As a consequence of this behavior, Web3 users may, in theory, contribute to their immortal digital identity which reflects the digital assets they had accumulated over the course of their engagement with Web3. The introduction of SBTs as a proof of character may add a more "striving for meaning" layer to Web3 that could ultimately evolve toward a Decentralized Society. Through this exploration, therefore, we attempted to shed light on the social and evolutionary significance of the Web3 revolution emerging from blockchain technology.

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