Building Resilient Futures in the Virtual Everyday

Virtual Worlds and the Social Resilience of Teens During COVID-19

JULIAN GOPFFARTH, *Stripe Partners*
REBECCA JABLONSKY, *Google*[1]
CATHERINE RICHARDSON, *Stripe Partners*

Virtual worlds have been central to an imagined future in which advances in technology propel new social practices. The recent focus within the technology industry on the "metaverse" is the latest iteration of imagined, utopian virtual worlds which have continually surfaced in literature, film, product development, and more since the 1960s. One might say that the concept of virtual worlds is resilient—but do these proposed virtual worlds actually make society more resilient? We argue that despite their endurance, these concepts present a deterministic vision of a singular future towards which humanity is inevitably progressing, revoking the agency, desires and resilience expressed by people today in their everyday realities. Building on original ethnographic research conducted with 31 teenagers in China, Germany and the US as well as past anthropological work on using ethnography to anticipate the future and teenage online practices, this paper conceptualizes resilience as present-day creative adaptations which propel people into more desirable futures. Virtual worlds emerge as multilayered and equiprimordial spaces for the building of social worlds, giving teenagers novel tools to build and augment their social resilience.

INTRODUCTION

Helen is a 14-year-old student in North Carolina with an enthusiasm for social media, games, and fashion. When we met her in a remote interview, she had no trouble expressing herself in virtual format. As a teenager whose life and education moved online at the onset of the pandemic in 2020, she was accustomed to using technology to show other people who she was. Helen seamlessly switched between panning her smartphone around her room to provide a tour of her most precious objects and sitting front and center on her laptop video chatting with adults about her life. Not being able to see friends in person during COVID-19, moving online was an important way for Helen to maintain and build meaningful relationships that helped her to cope with social isolation. Living a social life virtually had become so important, that it remained a central part of Helen's post-pandemic life.

For Helen, however, connecting virtually with others had become more than just a coping strategy. Soon we learned that Helen had ambitions to be a social media influencer. She experimented with new short-form videos that might increase her engagement and followers in her PreppyTok community.[2] Helen's approach to documenting her life was meant to come across as natural, but it was also highly curated. Her most recent project was a "start my day" video posted to TikTok. She edited different clips of herself going about her morning routine–waking up, making the bed, using a special soap near her bathtub, and sitting in front of her laptop to show herself as being productive. She emulated these curated physical forms of living in virtual spaces by building "preppy" beach houses on Roblox that, as she said, she would like to live in one day. Inspired by houses that she had seen in person and online she enjoyed showing them to Roblox friends and school friends and sharing videos about them on TikTok. Performing creatively by using the tools available to her in her virtual worlds and in front of virtual audiences was part of Helen's everyday life.

By the time we talked to Helen in February 2022 the pandemic lockdown had been lifted for several months and she was back to school. She was able to meet friends in person. Nevertheless, she continued many of the online practices she developed during lockdown when socializing in person was impossible. What is more, meeting with friends in person had become integrated into her online performance. On her TikTok channel, she would not only post videos of herself, but also content created with her friends in school. When talking about the different platforms and online spaces she used, she described them as spaces that are as important as seeing friends in person in school or during her free time. Often, the physical and virtual spaces and the social relations she had built in them were intertwined and complementary.

Despite this emerging everyday reality, popular visions of "the metaverse" continue to dominate the way virtual worlds are imagined. This paper aims to draw attention away from these futuristic visions by presenting insights gathered in ethnographic research with 31 teenagers aged 13-17 in the United States, China, and Germany, conducted by the research and innovation agency Stripe Partners in conjunction with Intel Corporation. The purpose of the research was to understand teenagers' social connection practices today, in order to anticipate the needs of future laptop users. In doing this work, we came to develop not only a set of design ideas for the future laptop, but a more nuanced, robust understanding of the future of the "metaverse" and how it might run contrary to popular imaginations of virtual worlds.

The research was conducted in February and March 2022. It was a unique time to understand which of the online practices that teens had developed during the pandemic would endure—in all countries studied, pandemic lockdowns had been lifted for several months. We argue that for teenagers in the post-pandemic age, virtual spaces are not a vision of a proximate future but an essential part of their everyday social lives. Not only are they as important as physical spaces in generating social resilience—they also give teenagers a new set of tools to extend, transform and personalize their social worlds in ways not possible in the physical world. To substantiate this argument, we first show how the enduring resilience of futuristic visions of virtual worlds blind us to emerging, often more banal everyday practices of social resilience in, through and across virtual platforms in the here and now. We present our ethnographic research with teenagers as an alternative approach to anticipate the shape and form of future virtual worlds. We then outline our definition of virtual worlds as social worlds before diving into our data and exploring 5 teenage online practices that we think will endure into the future. In our conclusion we propose a reconceptualization of virtual worlds as real spaces that are equiprimordial—that means as essential as physical spaces—for the building, maintaining, and enhancing of social resilience through a novel set of social tools.

THE RESILIENCE OF "VIRTUAL WORLDS"

Virtual worlds and experiences have long been central to an imagined future in which advances in technology propel new social practices. In literature writers such as Robert A. Heinlein imagined the experience of telepresence in his novel *Waldo* as early as 1940 (Heinlein 1969). Later, William Gibson and Neal Stephenson coined the terms cyberspace, avatar and metaverse in their books *Neuromancer* (2015) and *Snow Crash* (2011). In the world of film, cinematographer Mortan Helig's 1960s futuristic *Sensorama Machine* was designed to immerse cinephiles into a virtual film world by simulating a multi-sensory experience (Stanford University 2011). Since its release in 2018, Steven Spielberg's *Ready Player One* has become the movie of reference when it comes to describing how a virtual reality might look.

While Spielberg's world is one of escapism and adventure, series like *Black Mirror* have created influential dystopian accounts of the potential impacts of virtual reality on interhuman relations (Keslowitz 2020). Corporations have been equally influential in shaping popular imaginaries of virtual worlds. In the 1980s, Apple's "Big brother is watching you" TV spot warned of a more dystopian future of surveillance to portray Apple as an alternative to market concentration. More recently, Mark Zuckerberg envisioned "the metaverse" as an "embodied internet," a homogenous singular world that is navigated by a digital twin at the endpoint of a linear development from "desktop to web to phones, from text to photos to video" (Meta 2021).

All these cultural and commercial productions have fed popular imaginaries of what virtual reality might look like in a proximate future. They have also proven to be resilient as visions that inspire technologists and companies to work on their realization (Conte 2017, 288), enabling their social enactment (Woolgar 2002, 15) and generating new meanings and uses for technologies (Baym 2015, 23). In short, they have been "powerful stimulators of (...) social changes" (Schwartz Cowan 1976, 21) in the way people build and interact with technologies.

The resilience of such visions is proof of their power and imaginative force. Yet, we think that looking at them to anticipate the future has limited value for two reasons. First, they tend to place emerging technologies and their impact on social life in an extraordinary "proximate future," continually out of reach.[3] Such a framing leads us to overlook how much of that future is already happening now in more banal and messy everyday ways (Bell and Dourish 2007, 2). To argue with historian Ruth Schwartz Cowan, a sole focus on grandiose visions of technological innovation bears the danger of blinding us to what the impact of contemporary technology on people's everyday life can tell us about how the future might look.

Second, as they are part of popular conversations about anticipated technological change, grand visions of technological innovation tend to tell us more about how a particular technology has been perceived in a specific time in history than the myriad ways it has been adopted and used. Grand visions bear in them the desires, fears and preoccupations of the social context in which they emerge (Baym 2015, 23) taking the shape of what has been termed the "utopia – dystopia syndrome," a "public discussion stuck in two worn-out grooves, one of salvation and fascination, the other of doom and abhorrence "(Smits 2006, 490). Imagined as "miracles or monsters" these visions of technological innovation are perceived as opposite to real life (Woolgar 2002, 3), or at least, a mere simulation, illusion, or fictional version of it (Baym 2015, 5) that is "imposed on human lives by irresistible forces of technology determinism" (Fox 2018, 1; see also Marx and Smith 1994)—a perception that has also impacted academic literature on connecting in virtual worlds. Especially prior to the pandemic, a large part of the scholarship on the impact of digital connections on individuals' social life has focused on how individuals "resist" digital media by disconnecting or limiting their media use to build more meaningful connections "in real life" (Woodstock 2014; Syvertsen, 2017; Hardey & Atkinson, 2018). Psychologists warned of virtual worlds leading to us forgetting about real social interactions (Aboujaoude 2012) and nurturing an escapism that could undermine meaningful social relations (Evans 2003) and communication (Turkle 2015), ultimately diminishing individuals' social resilience.

The resilience of these visions may be explained by the social function they serve. As Martijnjtje Smits has argued drawing on Mary Douglas' work on ideas of impurity and danger in societies (Douglas 1999), these polarized perceptions emerge "when a phenomenon does not fit in current cultural categories that order the world" (Smits 2006,

493). For Douglas, when trying to make sense of new phenomena, any society tends to perceive them either as a threat or a miracle. Smits applies this insight to emerging technologies. She shows how these polarized perceptions appear as these technologies become part of our lives and their use affects "how we see the world, our communities, our relationships, and our selves" making the familiar become unfamiliar (Baym 2015, 2) and different from established cultural categories.

Instead of focusing on grand visions we suggest that studying technology's impact on banal everyday behaviors may help to show how lives are actually transformed and technologies adopted in ways often not expected by visionary thinkers, writers, or companies (Schwartz Cowan 1976). In doing so we follow studies of technologies' cultural domestication that have shown how technological innovations are appropriated through trial periods through which they become part of people's lives or are rejected (Lehtonen 2003; Silversone and Haddon 1996). We believe that following such an approach helps us to understand how new technologies are adapted to existing practices of sociality and how they shape the cultural categories of socializing of today and tomorrow (Smits 2006, 501). By adopting an ethnographic method in a time of transition from a pandemic to a post-pandemic reality we also follow an ethnofuturist approach that we think is necessary to identify enduring behaviors that point to potential futures (English-Lueck, Ladner and Sherman 2021; Maiers 2018).

There are of course limitations to this approach. We cannot know if all the behaviors we have seen will in fact endure into the future. First, the pandemic presented an extraordinary social condition of unprecedented collective isolation. Second, our research focused on teens. This means some of the behaviors we have seen are likely to be behaviors these teens outgrow and leave behind once they transition into adulthood. We hope to mitigate the first limitation having done the research when teenagers had transitioned from pandemic lockdown to a post-pandemic new normal where in-person social connections had become possible again. Thus, the behaviors that remained in place during our observations are likely to remain part of their lives. To tackle the second limitation, we designed our research in a way that helped us to distinguish between ephemeral, teen specific and enduring, long-term shifts of behavior. We did so by embedding our respondents' current online practices into a more long-term perspective on their behaviors, asking them to reflect on processes of change—specifically what had changed in their lives in the past couple of years, what they were dealing with at the moment of the interview, and how they anticipated their life to change in the following 2–3 years. That helped us to identify those practices that emerged prior to the pandemic, were amplified by it, continued in the post-pandemic era and, as a consequence, are most likely to endure into the future. We also recruited teens across a spectrum from 13–17 years old, which enabled us to compare past and present behaviors between younger and older teens to help distinguish practices that might dissipate. By delivering a rich picture of teenagers' present-day technology practices we hope our insights provide a lot more than context to future predictions based on big data (Maiers 2018) and help to make meaningful predictions about how everyday life with, in and through virtual worlds will look, sound, and feel.

VIRTUAL WORLDS AS SOCIAL WORLDS

We think that teenagers' skillful and creative everyday use of digital media to build meaningful connections during the pandemic demands we adopt a more nuanced understanding of the relationship between digital media and social resilience. Rather than conceiving of resilience through the lens of "resistance to" virtual worlds, we show how

teenage technology practices reveal "resilience with" by actively shaping what future virtual worlds could and should be through their behaviors today. We thus propose to reconceptualize virtual worlds in three ways.

First, instead of relying on popular notions of virtual worlds as fictional spaces that are opposite to real life, we follow tech philosopher David J. Chalmers and define virtual worlds as virtual spaces that are genuine realities. They are neither illusions nor fictions, but fully immersive and interactive computer-generated environments for real life (Chalmers 2022, 202). As a consequence, we believe that it makes sense to conceptualize virtual worlds as essential spaces for building new and complementing existing "social worlds" (Quercia et al. 2012) . The sociological concept of social worlds defines "amorphous and diffuse constellations of actors, organizations, events, and practices which have coalesced into spheres of interest and involvement for participants" (Unruh 1980, 277). Boundaries of social worlds are blurry and dynamic and can change over time. They are held together by people who share interests, views and ways of doing that are continuously co-produced through communication, interaction and the creation of shared cultural artifacts (Unruh 1980, 271). This interactive dimension is central but does not mean that every participant in the social world interacts with each other. Rather, there is a shared culture that allows for a shared understanding and interaction fostering a sense of community that is essential for the building of social resilience (Hall and Lamont 2013, 2). As a consequence, virtual worlds can be conceptualized as equiprimordial to physical worlds in the construction of social resilience.

 "Equiprimordiality" or also "co-originality" is a philosophical concept that emerged out of Martin Heidegger's philosophy and was later picked up by Jürgen Habermas in his discourse theory. It describes a co-dependent relationship between two phenomena. Saying two phenomena are equiprimordial means that both are "conceptually presupposing the other in the sense that each can be fully realized only if the other is fully realized" (Bohman and Rehg 2017). Below we will show how in today's teenage social worlds virtual and physical spaces presuppose each other.

Secondly, defining virtual worlds as social worlds means adopting a broader approach to virtual worlds that includes apps, social media platforms and messaging platforms that teenagers use to build, assemble, and maintain their social worlds virtually. Here we diverge from David Chalmers' definition. Chalmers defines virtual worlds as integrated, fully immersive worlds where users apprehend the environment "with all their senses, as if they're physically inhabiting the environment, and where no trace of the ordinary physical environment remains" (Chalmers 2022: 189). We believe that limiting the concept of virtual worlds to fully immersive experiences risks overlooking novel integrations of virtual with physical social worlds. Social media platforms and messengers might have been around for a while. In and of themselves, they do not represent virtual worlds. However, today's teenagers are the first generation that grows up in a world where social media have always existed as constantly accessible via mobile devices and apps. We observed that by using different apps, functions, and platforms at the same time and to varying degrees of immersion, teens combine and juxtapose different layers of virtual and physical social worlds.

Finally, we've observed that these virtual worlds are not only equal to and integrated with physical spaces for teenagers' construction of social worlds and social resilience. They also offer teens a novel set of interactive tools to build, extend, modify, and manage social worlds in unprecedented ways, providing them with alternative resources to build their "ontological security" (Nettleton et al. 2002). This is because virtual worlds are characterized

by three central interactive qualities—the social interactivity with different individuals and social groups, the technical interactivity with the devices they use enabling them to personalize their interfaces and adapt them to their personal preferences and, finally, their textual interactivity that allows them to enter a "creative and interpretive interaction between users (readers, viewers, listeners) and texts" (Baym 2015, 9; see also Fornäs et al. 2002, 23). As danah boyd has shown, even prior to the pandemic teens started using online platforms to build their own virtual spaces online to explore their identities and stay connected to worlds and people they care about and cannot interact with in person (boyd 2007, 20). As we will demonstrate below, the pandemic has amplified this behavior and turned virtual worlds into essential spaces for the building of teenagers' social resilience. Coming out of the pandemic, teens' present-day creative use and adaptations of virtual worlds' interactive qualities enable them to build and maintain meaningful social worlds which propel them into more desirable futures in the face of a challenging present (Hall and Lamont 2013, 2). They enhance teenagers' social resilience as they increase their individual agency in building social worlds that cater to their individual needs in ways that are not possible in social worlds that are purely anchored in physical spaces.

BUILDING SOCIAL RESILIENCE IN THE TEENAGE VIRTUAL EVERYDAY

As we briefly explored with Helen's example in the introduction, virtual spaces gained significance as spaces for creating social connections during the pandemic, when the use of physical social spaces was limited. In what follows we explore five post-pandemic practices we found teenagers continued to use to build their social resilience beyond the pandemic:

1. Teens build and inhabit a plurality of integrated and assembled virtual worlds
2. They manage the degree of immersion within them
3. They modify their social selves and personalize their audiences
4. They maintain and develop social relations through the creation of social artifacts
5. They remember virtual pasts and project virtual futures

Engaging in these activities helps teens not only to be more socially resilient in present everyday situations. It also gives them the tools to adapt virtual worlds to build the social worlds they desire to inhabit in the future.

Teens build and inhabit a plurality of integrated and assembled virtual worlds

Virtual platforms enhance teenagers' social resilience by enabling them to build their own virtual worlds according to their personal preferences, interests, and needs. We found that these worlds can take the shape of integrated and assembled worlds. Integrated worlds tend to be constructed around a place where teenagers express themselves in relation to defined social groups, e.g., existing groups of friends they have in the physical world such as classmates, or friends they've made online with whom they share an interest or passion. Multiple activities happen in one centralized application or platform that integrates multiple functions. It can exist across multiple devices but is likely to be centered on the laptop or the PC. Through their integrated character and their boundedness to a stationary laptop or PC setup, integrated virtual worlds are more insular and less interoperable with other platforms.

In our fieldwork we met Alana and Savannah, two 16-year-old girls from New York City whose friendship predated COVID-19 (see figure 1). When they were unable to see each

other during the lockdown, they started meeting and hanging out in Roblox, building complex houses that imitate real life architecture they have seen in physical worlds in New York, or virtually when browsing the web. During lockdown they would hang out in their respective virtual houses, engaging in banal everyday activities such as making food, eating or watching TV together or doing food deliveries to earn money to pay the bills for their houses' electricity. They were living everyday virtual lives that were not possible to live together in the physical world. Coming out of the pandemic they continue to hang out in these worlds when they're not together in person. Roblox allows them to do multiple things by immersing themselves into one platform: hang out, be creative, entertain each other, earn a living that helps them to pay for in-platform items, communicate with each other in the game chat or explore different identities by creating multiple avatars. Both agree to meet up in this world on specific days and times, using their laptops to enter it from their desks in their rooms.

Even if some elements of this world were predefined, it gave both of them the opportunity to build their own personal and shared social spaces that provided the backdrop for interactions amongst each other and with other Roblox players. Instead of having to adapt to a social world that they were thrown into (as would happen in physical environments) they could build their own, according to their personal preferences and interests.
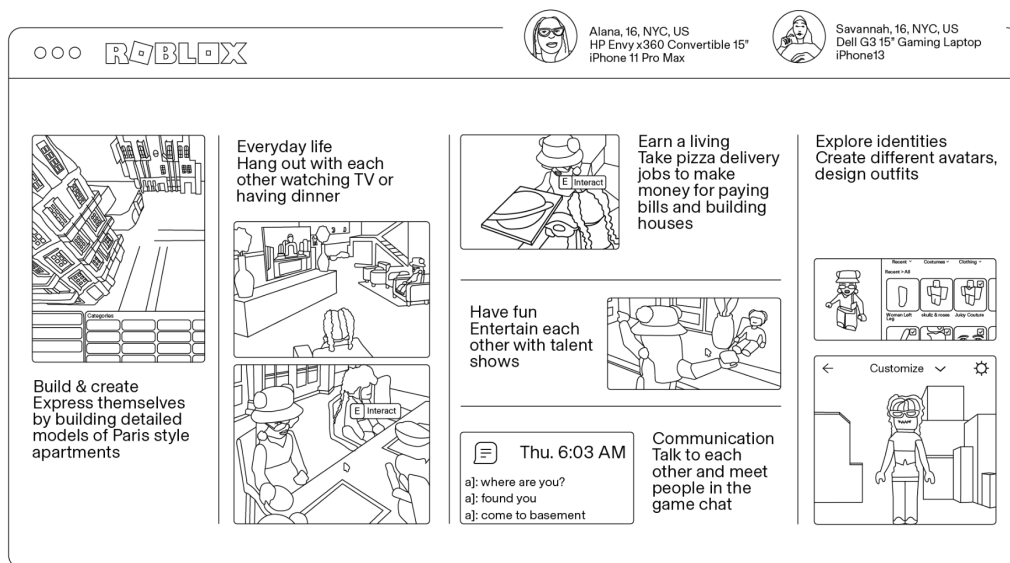

Figure 1: Visualization by authors including photos and screenshots from the fieldwork.

Teenagers' virtual worlds can equally take the shape of assembled worlds that exist across a multitude of platforms and devices. These worlds tend to be constructed around an identity or social circle to create a sense of place. Different applications and platforms have different functions that fulfill the individual and collective needs that the "inhabitant" of this world has. Assembled worlds can exist solely on the phone and/or the laptop but they are more likely to be carried across multiple devices and integrate with other virtual and physical worlds as they are modular, portable and permeable.

Take the example of Shanshan, a 16-year-old girl from Beijing. Her assembled world was held together by her passion for a Chinese singer (see figure 2). She'd engage with other fans in a virtual world that she assembled herself across different platforms. She'd co-watch her idol's videos on TikTok while hanging out virtually with friends on her phone. She'd listen to her idol's music on NetEase or QQ Music on her laptop while doing homework. She'd connect with other virtual and school friends by chatting with them about their idol on WeChat on her phone and laptop. And she'd create elaborate fan art on Photoshop on her laptop that she'd post on Weibo and WeChat and sell to other fans. Shanshan's assembled virtual world corresponds to what Couldry and Hepp have described as "media ensembles" (Couldry & Hepp 2017, 132) assembled according to the specific needs, here sustaining a fan culture across different platforms, applications, and devices (Couldry 2012, 163–178).
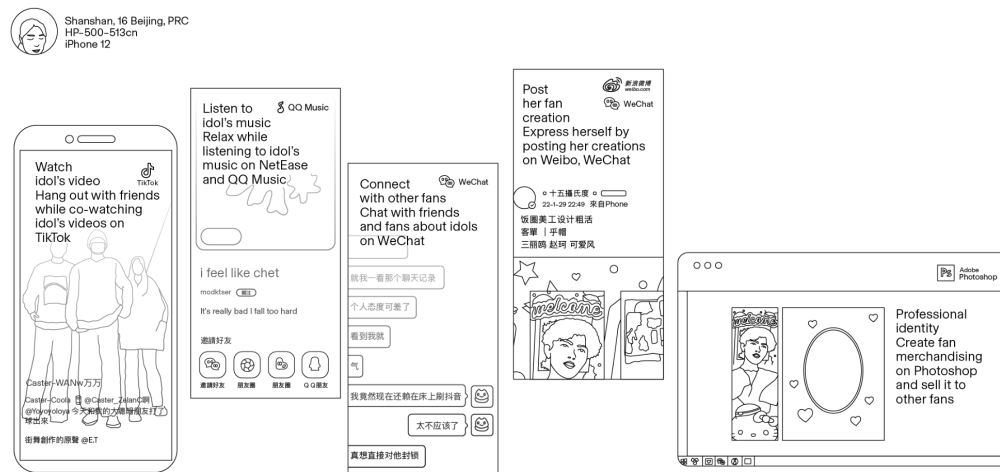

Figure 2: Visualization by authors based on photos and screenshots from the fieldwork.

Teens cannot only personalize the aesthetics and modules that carry these virtual worlds. Building multiple social worlds virtually allows them to express, maintain and enact multiple identities within and across them. This enables teens to relate to virtual worlds on their own terms, expressing only those parts of their identity they want to share with others in ways not possible in social worlds anchored in the physical world. Self-expression can either take the shape of bolstering one identity across several virtual spaces or enacting different identities within or across different virtual worlds. For example, Simon, a teenager from the US, uses multiple virtual platforms to build and assemble a single identity using Roblox avatars (and photos of it) that he designed to look like him. He plays WW2-themed games in Roblox while chatting to other players on Discord and making friends with other teenagers who share an interest in WW2 on Facebook. Lanlan from China, on the other hand, enacts different identities across different virtual platforms. She modified her real appearance with filters and posted them on TikTok. She created so-called Original Characters[4] on Picrew as fictional "better versions of myself" and used them to do video calls on TikTok. She turns off the video to voice chat with her best friends on WeChat as her "authentic self" so she "does not have to dress up." Just like physical worlds, virtual worlds can thus be used for real life encounters. Yet they also enable teenagers to create, inhabit and manage their virtual worlds in ways they never could in physical worlds, allowing them to create their own

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identities distinct from the ones they have in the physical world. In that way they can create fictional identities in real social spaces, and, inversely, use their real selves to navigate fictional virtual worlds.

Teens' use of these complex integrated and assembled worlds and their navigation through multiple identities showcase a novel degree of media literacy and sociality enabled by cross-media interfaces that does not limit itself to the understanding, interpretation, and use of digital media. It is a *deep* media literacy that allows teens to construct personalized social worlds, to communicate in and about them and to express their individual identities in multiple novel ways (Couldry & Hepp 2017, 341–2). Enabling teens to build alternative social worlds and identities helps them to create ways to build social resilience in ways that correspond to their personal preferences and needs and that are not possible in a more restrained physical world. These worlds help teenagers to increase their social resilience as they can build personalized social spaces, they know they can turn to in the face of everyday challenges in the present and the future.

Teens manage their degree of immersion into their virtual worlds

Virtual worlds increase teens' social resilience as they can connect to and disconnect from them to different degrees where and whenever they feel the need to. When they access them, they can decide on the degree to which they want to immerse themselves in these worlds, regulating their presence in these virtual worlds via the degree of sociality and immersion into them.

The level of immersion ranges from thin *online* connection, such as glancing at a notification on a smartwatch or listening to music on Airpods while out and about, through to thick *online* connection, such as hanging out in Roblox or Fortnite. Thin connections involve engaging intermittently with a low density of audio-visual information while thick connections represent the fully immersive mode David J. Chalmers describes in his definition of virtual worlds. The second dimension which shapes teens' connection to virtual worlds is their level of sociality, from thin *social* connection, such as asynchronously sending each other videos on TikTok and liking social media posts, to thick *social* connection, such as playing a game together, hanging out in Fortnite or making a TikTok video together. Similar to what Nancy Baym has identified as rich and lean media (Baym 2015, 9), the thicker both online and social connections are, the richer the mediated experience and the more important it is to be able to show and be able to read social cues. The importance of the physical surroundings retreats while the importance of the virtual world and one's behavior and ability to navigate it gains in prominence. The thinner both are, the leaner the experience and the more detached from the one single virtual world one is. Interaction is not synchronous and happens through mediated layers.

We found that together these two dimensions, the level of immersion in technology and their level of social connectedness, encapsulate 4 distinct modes of connection: asynchronous presence, ambient awareness, individual immersion, and immersive co-presence (figure3).
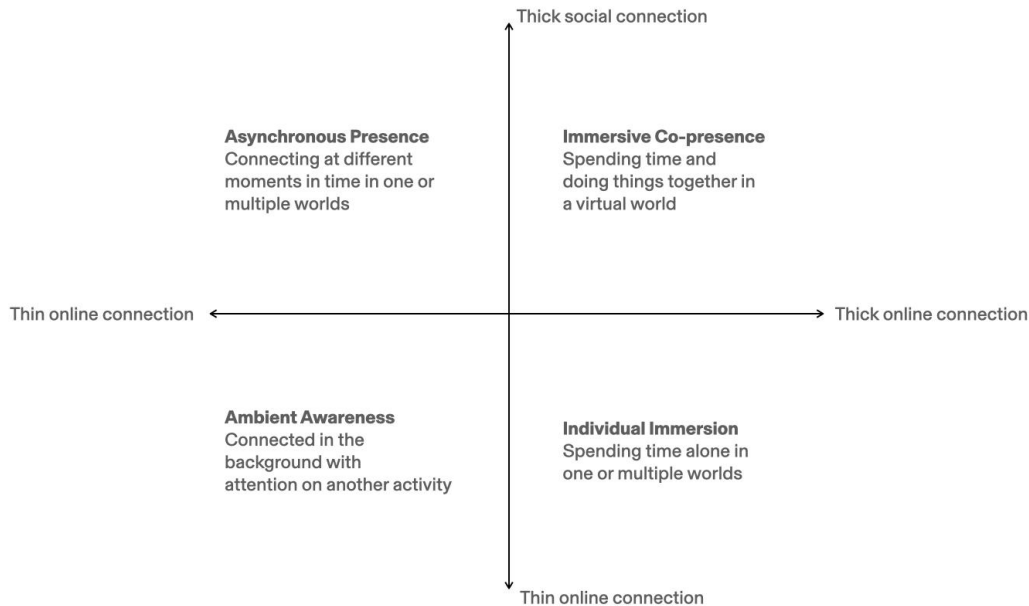
Figure 3: Four modes of connection to virtual worlds.

Teens remain persistently connected to their virtual worlds, but they shift between modes depending on the activities they are engaged in. For example, Max's (DE) Fortnite world had become particularly meaningful to him during the pandemic. He frequently spent evenings with friends hanging out in Fortnite, sometimes battling each other, but other times just chatting (immersive co-presence). He and his friends would also post about their Fortnite activities on social media, teasing each other about aspects of the gameplay (asynchronous presence). On his own he spent time watching better players live stream their games on Twitch and spent money on upgrading his skins (individual immersion). Finally, he would discover new Fortnite seasons while browsing through TikTok, which often acted as a trigger to restarting gameplay (ambient awareness). Further, we found teens frequently join multiple worlds across different modes concurrently, using the range of devices and audiovisual channels available to them to manage and modulate their level of connection to each. For example, Helen, who we introduced in the opening of this paper, had become adept at Facetiming friends on her phone, while building houses in Roblox and keeping one eye on her muted Zoom class in the background on her computer.

The possibility to be constantly connected, simultaneously to different worlds and across different devices to different degrees of intensity and sociality is made possible through what Couldry and Hepp described as the "new infrastructure of social knowledge" (Couldry and Hepp 2017, 128) that "manifests itself in the extension of information and social interactions across time and space into the singular ever-presence of 'big data'" (Rose 2017). This fundamentally alters the way teens can build and maintain social connections. It gives them the control over how much and how deeply they want to engage with different virtual worlds. It also lets them mix different thinner layers of these worlds with other virtual or physical worlds they engage in simultaneously, enabling teenagers to maintain a feeling of simultaneous connection to multiple social worlds and the identities expressed within them. In this way they can adapt the digital tools they use to their own connection needs and

preferences and build personalized connection patterns and habits they can carry into the future.

Teens modify their social selves and personalize their audiences

We've explored how teens build, inhabit, and engage with virtual worlds. But how do they enact their social selves in these worlds? Virtual worlds have become spaces for identity performances that are as important as physical spaces. Yet, virtual worlds give teens new tools to modify their social selves and their social audiences in enabling them to mix virtual and physical social audiences according to their preferences.

Physical worlds are limited when it comes to the agency individuals have in performing their social identities in them. According to Erving Goffman, social life is a performance on three stages (Goffman 1990). Individuals' agency during their performances is constrained by rigid settings and boundaries between stages, assigned roles and physical appearances, little control over and knowledge of audiences and internalized norms and expectations for behavior (figure 4). As a result, they limit the ways one can manage the building of social resilience.
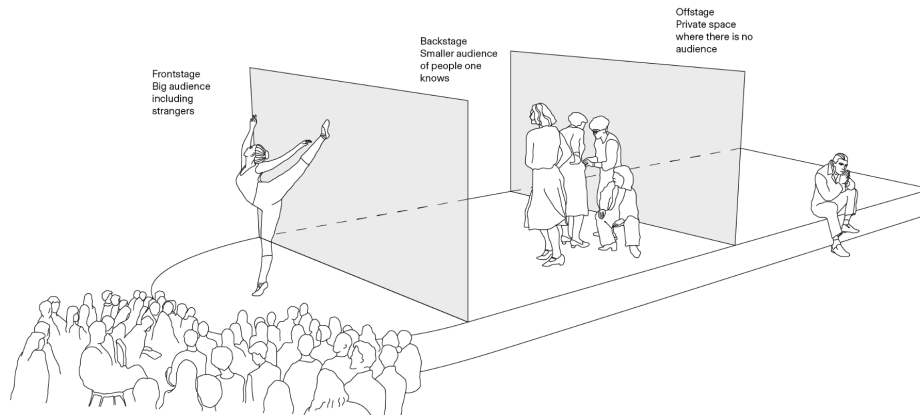

Figure 4: Goffman's model of social life as a performance on three rigid stages.

When building their virtual social selves teens today have control over the "manipulable interfaces with the world" (Ito et al. 2010, 1–28). They are among the first to grow up in a world where Facebook, Instagram and other mobile social media could have been an integrated part of their lives from their earliest living memories. Per Couldry and Hepp "mediated connectivity becomes an operating condition of the child's imagined world, as well as, later on, its secondary institutions of socialization" (Couldry and Hepp 2017, 340). The teens in our study used technology to personalize and manage their roles and stages (figure 5). In virtual worlds teens do not have to deal with the rigid settings and boundaries between stages and the lack of control over roles Goffman describes in relation to physical worlds. Instead they can create their own back, front and off stages, modify their roles and appearances, control and monitor who is watching, and set up their own norms and behaviors. boyd has previously argued that persistence, searchability, exact copyability, and invisible audiences make it more challenging for teens to create their own space in networked publics (boyd 2007, 7–8). However, we found that teens have become adept at

using the affordances of the technologies at their disposal to overcome some of these challenges thereby increasing their capacity to build their social resilience.
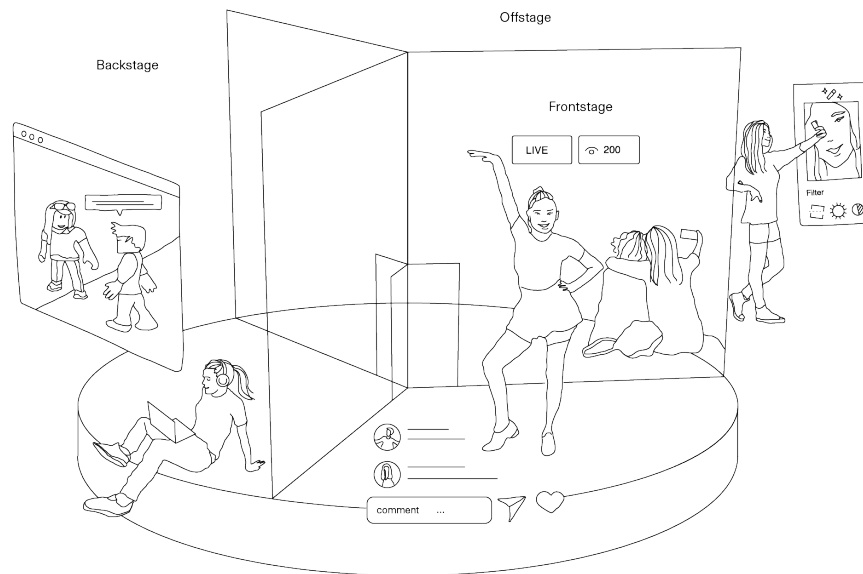

Figure 5: Our model of virtual social lives across variable stages.

One example is Leni from Berlin. She uses all the features of Instagram to set her stages, craft her persona and control and monitor who is watching. She has two private accounts: one that she controls tightly and limits to close friends she knows from her physical world, and one that is more "public" as she allows it to be followed by "virtual" followers she does not know from her physical world. On this more public account she has close to 4000 followers and she posts stylishly posed selfies. On her more private Instagram account she has only 92 followers who are all people she knows personally, mostly friends from school. Here she records and shares funny moments in a more candid style. While the more public private account on Instagram represents a curated view, Leni still uses it in ways that blur the boundaries between the different layers of her selves. She finds it funny to go live on this Instagram account while going to the supermarket to buy groceries with her friends. The sense of where her social world is primarily occurring is elided. The boundaries between the physical retail environment, the private embodied "here" of her using her phone and the public "out there" of the virtual audience becomes blurred (Couldry and Hepp 2017, 208). Virtual worlds thus give Leni the tools to control and define the boundaries between stages and audiences in her social worlds according to what she feels helps her most to grow her social resilience. In that way she can not only determine how she wants to be seen in her present social worlds. She can also build different social selves that she wants to be known and remembered for in the future.

Teens maintain and build social relations through the creation of social artifacts
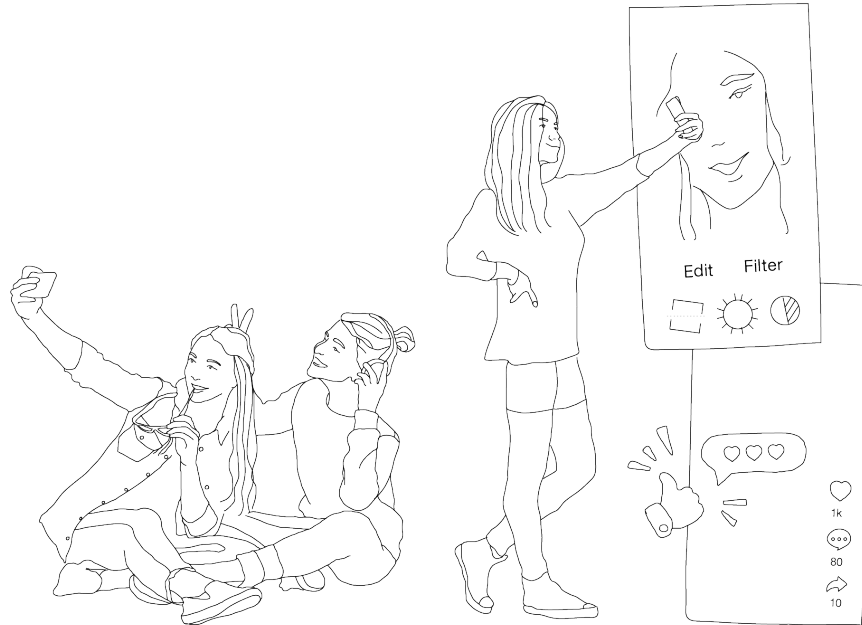

Figure 6: Teens create to connect with others and gain recognition

We found that creating is an essential tool teens use to socialize and build social resilience in their virtual worlds. In contrast to physical worlds, creative content can be produced and shared easily. As a consequence, creative expression through shared content, from quick and casual to skilled and sophisticated, is a central means to build and maintain social connections. Creating shared cultural artifacts enables teenagers to contribute to the (re)production of the social world they engage with (Unruh 1980, 271), first, by connecting with others across physical and virtual spaces during the creation process and, second, by getting social recognition for their creations.

During our fieldwork we found that teens were frequently creating images and videos with their friends as a social activity. We met Layla and Walt, two 14-year-olds based in Berlin. Whenever they get together one of the things they like to do is find dance videos they can copy on Layla's TikTok account. Once they find a dance they like, they search for a version of it on YouTube on a laptop to be able to see the dance more easily on a larger screen so they can copy it. They might spend an hour or two perfecting the routine before recording their own video using the in-built audio sounds on TikTok. When they're happy with the content Layla saves the video to her TikTok drafts. From here she can export it to share on her Instagram Stories, where it will stay up for 24 hours and be visible to her close friends. Layla and Walt's main goal when making these videos is not to have something to share or to participate in TikTok's viral crazes. What they want is to have something to do together, a fun way to spend an afternoon goofing around. Creating content together

provides a more immediate and fun way to engage in their shared interests in popular culture.

The focus is on the people and enjoying the process rather than producing artifacts. The sharing of artifacts matters insofar as it fosters what Leisa Reichelt has called ambient intimacy, "being able to keep in touch with people with a level or regularity and intimacy that you wouldn't usually have access to" (Reichelt 2007). As Layla and Walt are both second generation migrants, they value the ability to connect with family who don't live in Berlin. Ephemerality is central to the experience of sharing content. It's about feeling connected to others who aren't present through a shared virtual moment—the sense of connection only feels special if it's fleeting. Intimacy is also reached by creating and sharing "authentic content" that is situated in real everyday life experiences. Layla and Walt record their videos in their neighborhood, often right after school on their way home. Social resilience is strengthened in two ways here. First, creating content with others in the physical world that is to be shared in the virtual world strengthens social connections in the physical world. Secondly, as David Gauntlett has argued, the regular sharing of ordinary fragments of regular life helps teens to establish a close connection with friends in the virtual world who live through similar daily experiences. It allows them to feel closer to people they care about but in whose lives they're not able to participate as closely as they'd like (Gauntlett 2011, 97).

Another form of creation we observed is one that is focused on producing an artifact to share for recognition, eg. social media likes, compliments, or money. The value of this creative activity is only realized when the creator receives recognition for the artifact they have shared. We found that many teens were actively engaged in creating content for social approval on a daily basis. One notable example is Helen. At 14, she was on her third TikTok account, having experimented with different focuses to garner attention and follows. Her latest incarnation was the account run along with four friends from school mentioned in the introduction. Helen enjoyed the process of creating account content with friends. Yet, her main focus was to get enough likes to be able to participate in TikTok's creator programme.

Although an aspect of Helen's activity had an explicitly financial goal, she didn't see herself becoming a creator professionally. Her aim was to find an "easy way" to save money for college. The night before we met she had spent the evening applying for a job at her local sports stadium which she described as "really boring." By contrast, earning money on TikTok wasn't really work, "you just record yourself and get money." Helen exemplifies how seamlessly teen social creation practices have elided the distinctions between work and play, professional and amateur, active production, and passive consumption, and between producers and audiences, outlined by Natalie Collie and Caroline Wilson-Barnao (Collie and Wilson-Barnao 2020). Social resilience is strengthened here as teens can playfully create bonds and feel recognised by peers in virtual worlds when recognition is inaccessible in their present-day physical worlds. Building these bonds through creation in the present lays the foundations of the social worlds (in Helen's case a more playful professional social world) they want to inhabit in the future.

Teens remember virtual pasts and project virtual futures

Finally, a dimension that has been little explored by scholars so far is that virtual worlds not only have a spatial but also a temporal dimension. This enables teens to inhabit virtual worlds across time, to revisit and (sometimes literally) replay past moments from anywhere and at any time and to lay the foundations for future social selves.

Teens in all three countries have built their virtual worlds and identities over time—so they are associated with specific moments in the past that these teens remember and revisit.

Dongdong and Shishi from China created their own videos and screenshots when they played Identity V to "create memories." They shared these artifacts on WeChat to save these moments on platforms where their friends can see them. In Germany, Max and Johan revisited old seasons of Fortnite and the characters they used to play a few years ago to "remember and relive the times we had together during the pandemic". Creating and sharing memories is essential for the reproduction of a social world through the creation and negotiation of a shared understanding of an event that has been experienced together (Fivush and Graci 2017, 269). Revisiting these past virtual events alone or together strengthens social resilience through the building of a shared sense of belonging to a social world.

Teens also used these worlds to project themselves into the future. They were spending hours learning how to use more advanced tools that they perceived to be essential to getting employment in future. We met teens who wanted to become professional coders, illustrators, animators, and music and video artists. Ahmed from Berlin has been struggling with school and dropped out early, now trying to find a job that gives him a good living. He finds it difficult to find a place for himself in traditional professions but has been a keen follower of cryptocurrencies and NFTs. He spends every free moment on Twitter and YouTube to learn about how to trade cryptocurrencies and NFTs. He recently bought NFTs on OpenSea and started investing in cryptocurrencies on Sandbox to realize his entrepreneurial self. As he put it: "I don't like to be told what to do. I can only devote myself to things I'm really interested in. I love the idea of the metaverse and NFTs. It would be great if I could earn a living with it one day!"

They were also more focused on leveraging their online presence to establish networks of people who could connect them to potential employers in future. For example, we met Jordan, a 14-year-old teen who was hoping to get a job coding in future. Since the pandemic he had been attending school remotely, but he'd found himself getting much more interested in programming. Achievements in school had become less meaningful to him than completing a hard coding project. He was using Discord to create a record of all his programming activities in place of a resume to demonstrate his abilities to a future employer. Such creative practices laid the foundations for social resilience in the future, by equipping teens both with the skills and networks to help them achieve their professional aspirations.

All five practices we identified in this research were methods of resilience that teenagers picked up before COVID-19, whose usage they increased, adapted, and intensified in response to the pandemic's undesirable social conditions—isolation from their peers, lack of control over their lives, and the global spreading of an unknown disease—and that they continued to use in their post-pandemic lives. This shows that for teens, living in virtual worlds is far from being a vision in the proximate future. Virtual worlds are already inscribed in their lives and deeply entangled with their physical worlds. They are appropriated in the everyday and integrated with pre-existing social worlds and media. Far from being a clean homogeneous singular world, designed by and brought upon humanity by one tech company, these worlds are messy and multiple. They do not transcend physical devices as a final step in a linear evolution from PC to phone to a full virtual environment navigated with a digital twin. Instead, they are used and shaped, integrated and assembled, inhabited and modified individually as spatial and temporal entities across multiple devices and peripherals, endowing teens with new ways to build their social resilience in the here and now.

CONCLUSION

Through ethnographic storytelling and theoretical analysis, this paper has sought to demonstrate that a resilient future doesn't arrive through predetermined, fixed visions from above but is co-determined by teenagers creatively adapting existing technologies to their shifting social needs in response to everyday challenges. In their adaptations, they developed a more resilient present and future self across physical and virtual spaces. The virtual worlds we observed in our studies enable teenagers to do so in three ways:

First, virtual worlds have emerged as equiprimordial spaces for the building and maintaining of social worlds and social resilience. Virtual and physical worlds are not, as much academic literature says, essentially distinct with one representing and generating real social connections while the other is minor, fake, or at least only an enhancing version of it. Nor are they fantastic worlds of a proximate future teenagers can escape into to forget about their real lives as some tech companies want us to believe. Rather, for teenagers physical and virtual worlds are equiprimordial spaces for building and maintaining social resilience in the here and now. In distinction to traditional electronic media, virtual worlds establish spaces that enable the development of new links between virtual locations and social situations that may be independent of or integrate with physical spaces. Instead of weakening the significance of "place as a determinant of social situation" (Meyrowitz 1985, 122), they create new places that augment and provide alternative and complementary "elements and building blocks from which a sense of the social is constructed" (Couldry and Hepp 2017, 7) enabling teens to intertwine those physical and virtual spaces that are fundamental to their everyday social worlds.

Second, in an "age of deep mediatization", virtual worlds are omnipresent in teenagers' everyday social interactions (Couldry 2012, 162–3). Each virtual world we observed during our fieldwork carried different media cultures across different assembled layers that can be simultaneously linked to, juxtaposed with and detached from actual physical contexts each corresponding to specific social needs users want to fulfill. As such virtual realities are spaces where sociality is co-produced in close relation to the physical spaces their individual users inhabit and across different degrees of immersion. Embedded in the everyday virtual worlds don't substitute but supplement social connections in physical spaces (Woolgar 2002, 17). By creating "an effectively infinite reserve for human action" and social interaction "whose existence changes the possibilities of social organization in space everywhere" (Couldry 2012, 2) they enable teens to transcend the boundaries between fictional and real as well as virtual and physical everyday spaces.

Finally, we found that virtual worlds not only expand present day formal practices of social exchange (Crook and Light 2002). By creatively adapting existing devices, apps and platforms to their needs and preferences, teenagers can also actively lay the foundations for an enduring social resilience and the social worlds they want to inhabit in the future. We thus think that the five behaviors we observed—the building, personalizing and assembling of virtual worlds, the management of the immersion in them, the modification of multiple social selves and their audiences, the engagement in creation to build social connections, and the designing of virtual pasts and futures—are likely to be practices today's teens will carry into their adult lives, becoming essential practices of their and, ultimately, our future social worlds.

Julian Gopffarth has a particular focus on exploring cultural differences in perceptions of technology. Before joining Stripe Partners as a Consultant, Julian worked for political think tanks and the European Parliament. He holds a PhD in political anthropology and an MA in

European politics and philosophy from the LSE and Sciences Po.
Julian.gopffarth@stripepartners.com

Rebecca Jablonsky is a Senior User Experience Researcher at Google, where she leads web3 research within the New Experiences group at YouTube. She holds a PhD in Science and Technology Studies from Rensselaer Polytechnic Institute and a Masters of Human-Computer Interaction from Carnegie Mellon University. Her expertise lies in the cultural analysis of new technologies, and the use of ethnography to guide strategy and generate product opportunities.

Catherine Richardson is a partner at Stripe Partners. Her expertise centers on how foundational insight is adopted and travels within large organizations. Prior to Stripe Partners, Cath led research at Etsy and the Government Digital Service, where she honed her expertise in embedding insights into agile, multi-disciplinary teams. She has an MA in Classics from Cambridge University. Cath.richardson@stripepartners.com

NOTES

1. Rebecca Jablonsky is now a researcher at Google, but this research was conducted while she worked at Intel Corporation. This work does not reflect the views or opinions of Google.

2. PreppyTok is a trend movement mainly on TikTok but also other social media where users share highly curated neat and clean aesthetics ranging from fashion to architecture and tidy working set ups to increase productivity.

3. A similar phenomenon can be observed in the field of artificial intelligence where the so-called "AI effect" frames AI as always being in the future, even if it is already part of our everyday reality (Haenlein and Kaplan 2019).

4. "Original characters" or OCs describe a fictional person or creature created by individuals that does not come from an existing copyright work. It can be part of an original story, comic, or an animated series.

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