"It Was Something I Naturally Found Worked and Heard About Later": An Investigation of Body Doubling with Neurodivergent Participants

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Body doubling has emerged as a community-driven phenomenon primarily employed by neurodivergent individuals. In this work, we survey 220 people to investigate how, when, and why they engage in body doubling and their own definitions for it. The community roughly defines it as using the presence of others to start, stay focused on, or accomplish a task. Tasks can be productivity or leisure-related. A body double can be collocated or remote, recorded or live, known or a stranger. This phenomenon remains nameless to many neurodivergent individuals; however, once presented with the term and concept, many recognize it as a strategy they have engaged in for years. We present the variety of ways people engage in body doubling (e.g., at a café, with YouTube videos), the diverse range of tasks people utilize it for (e.g., studying and working, doing dishes, cleaning, and exercising), and their motivations for doing so (e.g., generating momentum, staying on task). Lastly, we present implications for future work based upon a two-part model of body doubling as a continuum of space/time and mutuality.

CCS Concepts: • **Human-centered computing** → **Empirical studies in HCI**; **Accessibility theory, concepts and paradigms**; • **Social and professional topics** → **People with disabilities**;

Additional Key Words and Phrases: neurodiversity, body doubling, assistive technology, adaptive strategies

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1 Introduction

Body doubling can be roughly described as using the presence of others to accomplish tasks. This assistive technique has been recently popularized by neurodivergent[1] creators and outlets online [1, 79, 94, 96], but no academic study of the term has been recorded. In this article, we report the motivations and context of ND individuals who employ body doubling. Additionally, we facilitate a formal definition of body doubling generated by community members.

[1]Throughout the article, we use "ND" interchangeably with "neurodivergent." Neurodivergence is defined in paragraph three of this section.

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Body doubling is often technologically mediated. Mediums include video or voice calls, as well as social media live streams and pre-recorded content. The other presence does not necessarily need to be a real person to work—many people use YouTube videos with real or animated characters as companionship and motivation while working [92]. Platforms for body doubling have been developed (e.g., FocusMate, StudyTogether, StudyStream). Body doubling differs from co-working and parallel play [4, 67] in that participants do not need to be involved in the same task activity, nor do participants need to be engaged with each other at all. In this work, we establish an understanding of body doubling as an ND adaptive strategy; a contribution that will help future designers of assistive technology for ND individuals.

Neurodiversity is a broad term for individuals whose brains function outside of what is considered "typical" [100]. An estimated 15–20% of the global population is neurodivergent [26]. This number is likely underestimated due to challenges (cost, labor, access to healthcare, etc.) for formal diagnosis [6, 17, 54, 68, 74]. Due to these challenges there has been a (somewhat) recent push for self-diagnosis to be viewed as valid within mental health communities [29, 34]. There is an important distinction between neurodiversity and disability. Not every neurodivergent person identifies as disabled. Along with navigating diagnosis and disability, forming a cultural Disability identity is a complex process [84]. Neurodiversity may include[2] or co-occur with other mental health or psychosocial disabilities (e.g., anxiety, depression, schizophrenia, and bipolar disorder) [76]. Psychosocial disabilities, among other primarily neurologically derived disabilities, can be described as "invisible":[3] not immediately apparent or physically visible to the unfamiliar [53].

In their book *Cultural Locations of Disability*, Snyder and Mitchell state that "*historically disabled people have been the objects of study but not purveyors of the knowledge base of disability*" [85, p. 198] [25]. It is imperative to the field of **human–computer interaction (HCI)** (especially those focused on accessibility) that we look to disabled, chronically ill, and ND communities as knowers and makers [40, 52, 109] and recognize them as a foundational site of knowledge. Therefore, our approach to bringing this assistive technique to the HCI community is necessarily situated within online community spaces. ND communities come together in online social spaces to commiserate, make friends, and share experiences [29, 35, 56, 62, 77]. Online spaces have been important for disabled and chronically ill folks for shared sense-making (especially during the COVID-19 pandemic) and self-discovery [14, 86]. As active members of these online communities and others, we see how communities establish and share techniques and relevant daily life skills. Based on lived experience and need, these communities build strategies and adapt technologies. Body doubling has emerged as one such strategy.

As far as we know, this is the first formal research inquiry into body doubling as an assistive technology strategy. We are motivated to legitimize body doubling in an academic context because it is a strategy all authors engage in, yet have not seen it talked about as a form of assistive technology. It is a concept we see discussed often on our social media feeds, yet many ND people who stand to benefit do not know about the term. We personally have encountered body-doubling content primarily in ADHD spaces, as those are some of the communities we often engage with. However, our goal is not to focus solely on ADHD and body doubling nor to minimize the experiences of other ND groups that utilize this concept. As we will discuss, many identities are present in our survey and provide important insight into the phenomenon of body doubling. Understanding how technologies are actively being adapted as assistive strategies can help researchers and designers engage with communities in ways most relevant to them.

[2]We will not attempt to define or gatekeep who is or is not ND. For a full list of specific conditions of those who self-described as ND within our survey, see Appendix A.

[3]Invisible disabilities account for a large portion of disability and can include Fibromyalgia, chronic pain, chronic fatigue, Post-Traumatic Stress Disorder (PTSD), and more: https://www.disabled-world.com/disability/types/invisible/

We explore the following research question: *How do neurodivergent individuals define and use body doubling?* The goals of this work are threefold:

—Establish body doubling as an assistive strategy for task completion/initiation for ND individuals
—Publish a standard definition defined by the community
—Investigate various ways of engaging with body doubling

We first present background work on ND assistive technology, capitalist views of productivity, parallel play and sociality, and emerging community-built strategies. We then discuss results from a survey of 220 (primarily ND) individuals exploring their knowledge and use of body doubling. To conclude, we present a model of body doubling as a continuum of space/time and mutuality.

2 Related Work

Assistive technology is designed to improve the lives of disabled populations. Assistive technology is "*any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities*" [41, 82]. In this work, we look at a strategy that uses off-the-shelf technology and social interaction to improve functional capability as assistive technology. We first discuss assistive technology designed for ND populations and then provide background on perceptions of productivity, sociality, and community-defined strategies.

2.1 Neurodivergence and Assistive Technology

Despite focusing on disabled individuals, accessibility research in HCI has a low incidence of ND-related research. A 2021 review of accessibility-related articles at CHI and ASSETS found that the field is dominated by work on visible and physical disabilities. Autism made up 6% of articles' research focus [51]. In another review of only ND-focused HCI articles, Spiel and Gerling found that autism accounted for 40% of articles, followed by Dyslexia with 14% of articles and ADHD with 11% (one article each focused on the following: Trisomy 21, Cerebral Palsy, FASD, Dyspraxia and Dysgraphia) [88]. All of this work with ND populations is primarily conducted with children: 80% of articles featured children 14 years or below [88]. HCI and neurodivergence remain an understudied avenue of inquiry within accessibility research. Beyond being understudied, the research that has been conducted has often reproduced societal harms. Among other harms, research in this space has historically included many interventionist approaches, excluded communities of interest from work, and fails to promote autonomy [7, 88, 89, 109].

Certain ND individuals (primarily discussed in ADHD and autism although not exclusive to these) experience difficulties with executive function—higher level cognitive processes responsible for attention, planning, initiation, and completion [48, 57, 104]. Williams et al. suggest that executive function-focused assistive technology is an emerging topic within HCI but note that assistive tech for autism is typically designed to address social skills despite participants expressing difficulty with attention and executive function [104]. The view that peoples' unique challenges are puzzles in need of and able to be solved through tidy, tech-based solutions is common in assistive technology research and HCI more broadly [18, 63]. Technologists often try to fix disabled people and the problems they believe them to face, using them as engineering or design problems without properly understanding their needs and desires [65]. This deficit framing positions people with disabilities as inherently lacking [102]. This is not to say that technology does not help many disabled individuals navigate their daily lives and improve their quality of life. Assistive technology and medical devices are life-changing for many [5, 61, 80]. However, technology may not be the solution to every problem, nor, sometimes, do those problems actually exist for disabled community members. For

example, West denounces the development of robotic wheelchairs and exosuits rather than spending resources creating curb cuts [102].

HCI research continues to perpetuate the idea that neurodivergent children and individuals are the ones that need to change to fit in society rather than examining and attempting to ease social stigma in order to accept a diverse range of behaviors [78, 87, 109]. Research and design of assistive technology should empower disabled individuals, something that is near impossible to achieve without direct inclusion of disabled voices.

2.2 Productivity and Burnout

Neurodivergence (and disability as a whole) has been and continues to be pathologized and stigmatized. For example, those receiving disability pensions have been stigmatized and viewed as "undeserving," especially for those with invisible disabilities [75]. Traits that are deemed undesirable by non-disabled and neurotypical society are critiqued and attempted to be suppressed, and prior HCI work has discussed ADHD in terms of "suffering" and "undesirable" framings [89]. For example, as discussed above, many games for autistic children focus on intervention-based approaches to so-called "deficits" in social skills [87].

Capitalist society places a person's value on the labor they can perform (with what counts as valuable labor being subjective and limited) [45, 107]. The narrative of productivity as a person's value can be especially damaging to ND, chronically ill and disabled individuals. Even before the pandemic, young adults were facing high levels of burnout for various reasons (e.g., low wages, high cost of healthcare, student debt, and political turmoil) [69]. We experience guilt over what we aren't doing or doing well enough and when we aren't working, we are expected to self-optimize through various forms of self-care and self-betterment [38]. No amount of self-care will be enough to overcome the exhaustion and burnout that systemic issues within the United States have led to [38, 70].[4] Experiences of failure, whether perceived or actual, as well as facing seemingly unattainable goals can lead to negative effects on our well-being [13, 108].

Additionally, burnout looks different in ND populations, often manifesting with more intensity and increased draining of energy [106]. Particularly in autistic communities, burnout is especially pernicious in that others can start to doubt the capabilities and self-sufficiency of the autistic person [106]. Burnout can result from numerous factors but is exacerbated by ongoing masking. Masking is the hiding of one's ND traits that are deemed unacceptable by wider society [106]. This performative survival strategy is often utilized by neurodivergent people in social settings and workplaces, leaving little energy for oneself when returning home. The masking and burnout experience cannot be condensed to one phenomenon as its manifestation differs across neurodivergent populations despite some aspects being shared [58]. Most environments, including workplaces, are neuronormative, designed in opposition to what neurodivergent body-minds need to thrive. These environments can contribute to long-term burnout, exhaustion, and well-being [37]. This is compounded by many not feeling comfortable disclosing their diagnoses in the workplace, which can make receiving the needed accommodations and flexibility challenging [19, 47, 68]. In fact, neurodivergent individuals are more often unemployed than any other disabled population [68].

2.3 Related Theory

Parallel play is a distinct stage within child development where children transition from solitary play to more social play, initially playing alongside each other, in parallel, but on separate, independent activities [4, 67]. It is primarily discussed in developmental literature, more specifically, regarding autistic children [66]. Parallel play has recently gained attention as a tactic used by adults with

[4]We specifically call out the United States here as this is where we are situated and most of our participants are located.

securely attached relationships [97]. Engaging in independent activities alongside friends and loved ones can foster closeness while allowing space to work toward independent goals [97]. This 2021 New York Times article presents a handful of accounts where people describe working while their friend/partner does something unrelated [97]. They describe this as a happy medium between alone time and direct social interaction.

Diffuse sociality is the strategy of being in public, around other people for indirection interaction. Prior work by Burgess et. al has found diffuse sociality to be a beneficial strategy employed by people with depression [12]. Participants described the desire to be around people but not wanting to be directly social, often going to coffee shops or libraries to combat feelings of isolation and "negative spirals." This strategy was also helpful when participants were unable to focus on their own. Others described feelings of comfort gained from the presence of their loved ones, even when doing separate tasks and not talking. The combination of diffuse sociality and more direct social engagement has helped participants' manage their depression.

Mirror neurons, the Hawthorne Effect, social facilitation, and echopraxia are similar theories on the effects of another's actions on one's own. Mirror neurons are neuronal cells that react to the actions we take and similar actions we observe others taking. They have been a subject of intrigue within psychology and neuroscience for decades [10]. Some claim they may be responsible for humans' ability to empathize and imitate [2, 95]. Similarly, some have posited that body doubling foundationally works due to mirror neurons, but acknowledge there are flaws to this theory [94]. Interestingly, mirror neuron systems are thought to be disrupted in autistic brains [2, 98].

Like mirror neurons, the Hawthorne Effect is another theory hypothesized to underpin body doubling. The Hawthorne Effect describes how natural behavior changes when subjects are observed [55, 103]. The Hawthorne Effect has primarily been studied with regard to research participants who are under observation due to study procedures [55], though informal implications are plausible.

Floyd Allport defined the theory of social facilitation in 1924. Social facilitation shows that performance increases when working on the same task as another person in close proximity to them [3]. This concept is related to rivalry and competition, but automatic. Rather than performance, body doubling appears to be about motivation, task initiation, and completion. Body doubling does not need to be done with the same task. Within the autism community, "echopraxia" is a concept relating to the imitation of others' actions and the use of social relations for motivation and action [90, 105].[5]

Prior theory and design on remote and virtual work has been advanced within the field of **Computer-Supported Cooperative Work and Social Computing (CSCW)**. Unlike body doubling, most CSCW research on working habits (whether synchronous or asynchronous) is predicated on collaborative tasks [9]. Remote collaboration tools are one such subject of interest. While previously used for more social communication [59], remote collaboration typically involves the use of video chat where we are constantly aware of our own presence due to the picture-in-picture interface [60]. This constant feedback of ourselves has been shown to lead to distraction, lower motivation, and decreased self-esteem [60]. Due to increased self-awareness during a video call, we may be more sensitive to feedback [30, 60]. Other technologies for remote collaboration have been developed, such as telepresence robots [33, 64] and virtual reality and avatars [81, 83]; however, these have yet to be adopted at scale.

2.4 Community Strategies and Body Doubling

Body doubling has been written about extensively on ADHD-specific platforms (e.g., ADDA [94], ADDitude Mag [72]) as well as popular media (e.g., CNN [79], ABC [96], and Washington

[5]Historical literature frames echopraxia negatively, however, autistic spaces do not pathologize echolalia or echopraxia.

Post [1]). Body doubling as a concept has gained popularity in neurodivergent communities in recent years thanks to social media but was first coined, as far as we can tell, in 1996 by Linda Anderson [96]. Anderson is an ADHD coach who posits that body doubling works by modeling "a calm, focused presence, which the other person unconsciously mirrors" [96]. On Tiktok, the hashtag #bodydoubling has over 35 million views; on Instagram, there are over one thousand posts with the tag.[6] Additionally, "Study with me" videos have surged in popularity on YouTube in recent years, with some garnering over ten million views on hour+ long videos. Some of these videos feature specific strategies such as the Pomodoro method (blocks of 25 minutes of work followed by a short break, and repeat)[7] and monotasking (focusing on one task versus trying to multitask). A popular media format that has emerged as a component of studying and completing work is that of lofi music streams, primarily on YouTube. The most popular of these channels. Lofi Girl, has garnered over 13.5 million YouTube subscribers, with their most popular video—"1 A.M Study Session - [lofi hip hop/chill beats]"—boasting almost 100 million views at time of writing. Research has found that the animated character who studies on a loop acts as a "study buddy" for many of the viewers working alongside her [92]. For some, Lofi Girl serves as a reminder that "*other people in this college are also studying by themselves, and that I'm not the only one doing this*" [93].

Some creators have begun livestreaming body doubling sessions on platforms like Twitch, TikTok Live, and YouTube Live. For example, the ADHDDesigner (44k Twitter followers, 4.5k Twitch followers) hosts scheduled Twitch streams of body doubling sessions (Figure 2). These videos can be viewed live or after the stream has ended. These livestreams also sometimes feature the Pomodoro technique (Figure 3), and are popular on TikTok as well (Figures 4 and 5). Other creators have posted content and held talks to spread the concept of body doubling to people with ADHD (e.g., Figure 1). Some online community groups host body doubling events online, where neurodivergent people can congregate and work on tasks together. These gatherings differ from a livestream in that the format is usually more mutual, akin to a video call. The group ADHD Babes,[8] for example, hosts body doubling events for Black women and Black non-binary people with ADHD.

It is clear that neurodivergent groups online engage in knowledge sharing and support. Content creators have popularized and disseminated strategies such as body doubling. It is worth noting for others looking into the space of community-driven strategies that, alongside the sharing of tools, are those tools that are marketed. Many use social media to draw customers who are looking for strategies, cures, and help whether or not they can provide any of those things. With the commodification of most things in life, ND communities are not immune to supposedly life-improving products being marketed to them—for better and worse. In a sea of information, parsing sound advice and recommendations from the noise can be challenging given the landscape of paid social media sponsorships and promotions requiring ongoing scrutiny and media literacy [23, 99]. It is easy to understand how people may believe in what are likely false promises for cures and life-changing results [24, 91]. Body doubling itself has not cost, but paid technologies are being developed.

Despite this coverage on social media and within neurodivergent-focused media, we have yet to find an exploration of the concept of body doubling within peer-reviewed literature. To examine this phenomenon as a community-driven form of assistive technology, we decided to survey neurodivergent individuals about body doubling. Despite the validity of different forms of information dissemination, academia still values peer-reviewed research above all. Thus, we aim

[6]both as of November 16, 2023.
[7]Created by https://francescocirillo.com/products/the-pomodoro-technique
[8]Mentioned with creator consent. More info: https://www.adhdbabes.com/

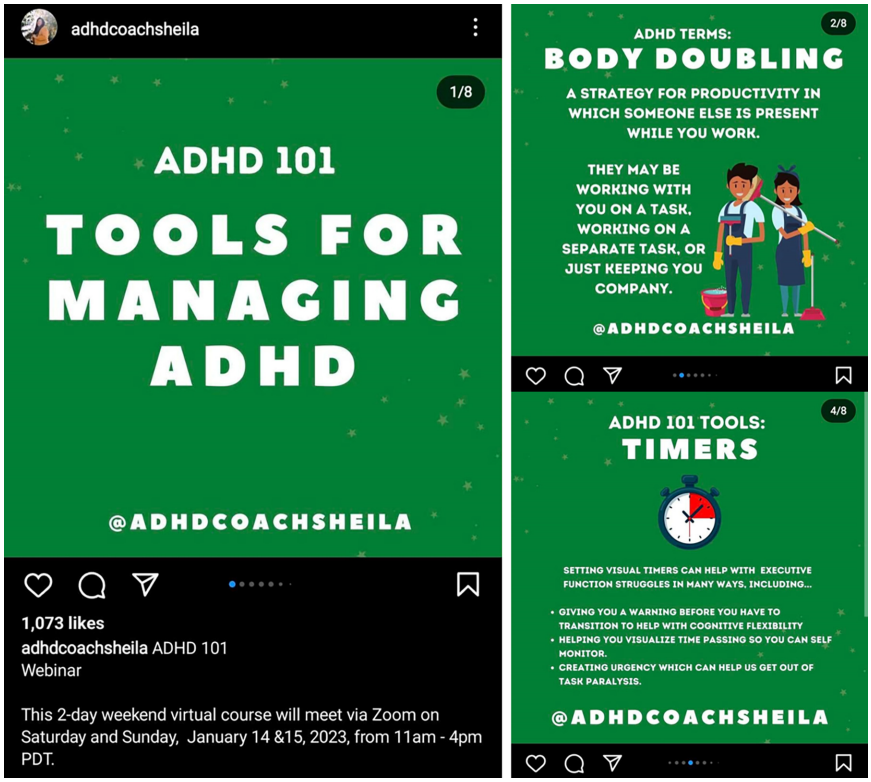

Fig. 1. Screenshot of an Instagram post from @ADHDSheila for a webinar covering tools for ADHD such as body doubling (included with permission from the creator).

to derive and publish a cite-able community-driven definition of body doubling and to engage in sensemaking due to our field's currently limited understanding of this ongoing phenomenon.

3 Methods

3.1 Positionality

Throughout our research, we adopt a critical disability perspective that privileges the lived experiences of disabled and neurodivergent individuals. Authors have backgrounds in psychology, HCI, accessibility, and disability studies. All authors have experience working with disabled individuals and people with psychosocial disabilities. Some of the authors identify as neurodivergent and/or disabled. In our work, our goal is not to speak for our participants but to broadcast their experiences and consolidate themes in order to better support neurodivergent communities in the future. We recognize the limits of our own experiences while always considering the safety of the communities we work with, taking steps to protect their privacy and serve their best interests.

We've struggled throughout this research and writing process with how to present this term. Neurodivergent communities do not need *us* to legitimize or define their practices. Before doing this work, we've often wanted to cite "body doubling." We have continuous discussions in our lab around dissemination and publication outside of traditional academic venues and make efforts to cite a diverse range of sources. We recognize the power dynamic this article represents of extracting techniques from ND communities and presenting them to the privileged academic community.

Fig. 2. Screenshot of a Tweet from the @ADHDDesigner promoting their Twitch live stream co-working and body doubling sessions for people with ADHD (included with permission from the creator).

Fig. 3. Screenshot of a Pomodoro timer that is placed on the side of the screen in one of the @ADHDDesigner's Twitch streams (included with permission from the creator).

However, given the value that is placed on academic writing, we are describing it out of necessity while making an effort to center the community as the site of knowledge by creating a collective definition of an evolving term. We plan to publish blogs and visualizations to disseminate our findings back to the community.[9]

3.2 Data Collection and Approach

Beginning in October 2022, we distributed a survey online asking about experiences with body doubling. The survey asked if and how people body double, why they body double, and when/where they found out about the concept. We included open-ended questions on defining body doubling and the benefits of using it. These open-response questions included:

—In your own words, what is body doubling?
—Why do you make use of body doubling? When do you engage in it?
—Where do you use body doubling?
—What methods or platforms do you use to engage in body doubling?
—What tasks or activities do you do with the help of body doubling?
—How did you find out about body doubling?
—If you would like to share, in what ways do you identify with neurodivergence?

[9]We have created this zine to start: https://issuu.com/misfitlab/docs/body_doubling_zine_

Fig. 4. Screenshot of a TikTok live session for ADHD co-working (included with permission from the creator).

Fig. 5. Screenshot of a TikTok live session from a user that hosts daily body doubling sessions (included with permission from the creator).

We distributed the survey in October 2022 via our personal and lab Twitter accounts, neurodivergent and productivity-focused subreddits, and TikTok. Our posts were also shared and re-shared by several popular accounts. This study was approved by our Institutional Review Board. The median time to complete this survey was 7 minutes. Participants did not receive compensation.

Our survey and recruitment materials were designed primarily with a focus on neurodivergent populations.[10] However, we disseminated the survey to *anyone* who engages in body doubling; 198/220 survey responders identified as ND, 9/220 survey responders did not, and 9/220 were unsure.

We recruited through neurodivergent-specific forums/groups and our own social media networks. Our survey likely reflects only a subset of the current community values and norms due to self-selection bias (as with the majority of surveys). Neurodivergent individuals are not a monolith, and we can neither represent everyone's individual experience nor encapsulate the experience of every ND person into the pithiest of research conclusions. Still, we aim to represent the participants who did complete the survey accurately and hope that others see themselves in some of the findings.

[10]We did not require any form of diagnosis in order to take part.

Table 1. Breakdown of Gender Identity and Neurodivergent Identity

	Identify as neurodivergent?			
Gender ID	Yes (%)	No (%)	Not sure (%)	Prefer not to say/N/A
N/A	1 (0.5)	2 (0.9)	-	8 (3.6)
Female	123 (55.9)	4 (1.8)	4 (1.8)	-
Male	26 (11.8)	2 (0.9)	2 (0.9)	1 (0.5)
Non-binary / third gender	32 (14.5)	1 (0.5)	2 (0.9)	-
Prefer not to say	6 (2.7)	-	1 (0.5)	-
Provide own ID	5 (2.3)	-	-	-

3.3 Data Analysis

We analyzed 220 complete survey responses. Out of 410 total submissions, we removed 187 partially completed responses and a further 3 submissions from participants under 18 years. Demographics and quantitative survey questions were analyzed using descriptive statistics. Two researchers coded these free-text responses.[11] The researchers generated themes iteratively and resolved any disagreements through discussion [39].

We took a deductive approach based on the questions asked. As such, a codebook was not developed for most open response questions, rather the responses were directly coded within relevant categories [15, 36] (e.g., for the question "How did you find out about body doubling?", the following response was coded as "Discord"—"*I heard it in a discord group.*" which later got collapsed under the "Social Media" code). Multiple thematic categories were often coded within one response [39].

For example, in an open response where participants expanded upon their identification as neurodivergent ("If you would like to share, in what ways do you identify with neurodivergence?"), we did not work off any pre-existing list but coded based on direct responses, adding tags for each new participant's identity as we went. Responses that seemed out of place (e.g., "*fear of climbing*") were not tagged. For example, "*autistic, ADHD,..., photophobia*" was tagged as autistic and ADHD, but not photophobic. Participants often elaborated on whether they were diagnosed or not, but we did not differentiate in our coding.

3.4 Demographics

Table 1 shows the gender and neurodivergent identification breakdown of our participants, with the majority identifying as female (55.9%). Ages ranged from 18 to 72, averaging 34.2 ± 11.6 (median = 31.5); 193 participants (87.7%) identified as neurodivergent. Table 2 shows the top five self-disclosed identities (see Appendix A for a full breakdown). ADHD and autism were the two most represented identities, followed by **Obsessive Compulsive Disorder (OCD)**, Dyscalculia, and Sensory Processing Disorder.

For the open-response question on how people identify as neurodivergent, some (but not all) participants indicated the type of diagnosis (i.e., self-diagnosed, suspected, or confirmed by a clinician). We coded every response regardless of type, no matter any additional qualifications provided in an answer (i.e., "ADHD (diagnosed)" and "I am in the process of getting evaluated for ADHD, but I've suspected it for a few years now" were both coded as "ADHD"). As the diagnostic process is inaccessible to many, we considered these types of responses the same. We did not require an "official" diagnosis for someone's self-identification to be coded.

[11] The researchers themselves engaged in body doubling to complete the coding process.

Table 2. The Top 10 Most Represented Self-Identified Neurodivergence (See Appendix for Full Breakdown)

Neurodivergence	Count
ADHD	139
Autism	82
OCD	11
Dyscalculia	11
Generalized anxiety disorder	10
Sensory Processing Disorder	10
C-PTSD, PTSD	7, 2
Hyperlexia	9
Dyspraxia	7
Dyslexia	7

A wide array of nationalities (30 countries) were represented in this sample. North America (USA, Mexico, and Canada) accounted for 123 responses, South America for 4 (Argentina and Chile), the Middle East and Africa for 4 (Israel, South Africa, Nigeria, and Egypt), Europe for 58 (Spain, Sweden, Switzerland, UK, Slovakia, Poland, Netherlands, Lithuania, Italy, Ireland, Georgia, Germany, Finland, France, Belgium, and Austria), and Asia Pacific for 17 (Singapore, Philippines, Australia, New Zealand, and India). However, these responses were limited to participants who could access our English language survey.

4 Results

To frame reasons why people may engage in body doubling, we first present the following. A task as seemingly straightforward task such as doing laundry may prove difficult for ND individuals as it is actually comprised of many small tasks and transitions. Motivation and task initiation issues may lead to putting it off, waiting until the last minute to start, let laundry sit half-completed for a long period of time, or leaving it hung or in the dryer until the space is needed again. Even after building up motivation to put laundry in the machine, remembering to transfer it and then take it out again is a barrier to completion. They might start the laundry only to forget about it and have it sitting wet for 3 days. An individual may not like doing laundry because they need to go outside of their building to do it (potentially needing to remember coins or a prepaid card). The public laundry has time-dependent steps that need to be followed, such as transferring it from the washer to the dryer after waiting the appropriate amount of time for the machine to wash the clothes. This may be a seemingly simple task, if time-consuming, to some. However, for someone struggling with task completion and motivation, it takes significant brainspace and energy.

These stages of doing a task—getting ready to start a task, starting a task, staying on task, and completing a task—present many potential hurdles to a neurodivergent mind. However, some have figured out that the presence of others helps them see a task through. For example, one might video call with their friend while folding their laundry to alleviate some of the tedium of the task. This use of others as stimulation to encourage productivity of some sort may not be required by all neurotypical people.

In this section, we will discuss a community-generated definition of body doubling, how body doubling is carried out, why it is used, why it seems to work, and the logistics of body doubling.

Table 3. Breakdown of Respondents Who Use Body Doubling and Neurodivergent Identity

	Do you utilize body doubling?		
Identify as neurodivergent?	Yes (%)	No (%)	Not sure (%)
Yes	145 (66)	28 (12.7)	20 (9.1)
No	4 (1.8)	3 (1.4)	-
Not sure	7 (3.2)	-	2 (0.9)
Prefer not to say	1 (0.5)	-	-
N/A	8 (3.6)	-	-

4.1 What Is Body Doubling?

While colloquial definitions of body doubling exist in ND communities and media, we were interested to discover how community members define it for themselves. We found that many people were unfamiliar with the term but had intuitively been using the strategy (see Section 4.2). We collected personal definitions from every participant, both those who already knew the name/concept and those who did not.

We have collected the following themes from participant's definitions. Together, they represent *the community's shared definition of body doubling*:

—having someone in the room (n = 127) or on a call/chat (n = 27)
—in order to accomplish a task (n = 65) or be productive (n = 38).
  –The second person may be doing a different task (n = 65) or a similar one (n = 13)
—it is a form of accountability (n = 23)
—helps you stay on task (n = 21).

Some participants equated body doubling to parallel play when asked to provide a definition. For example, P174 (HSP, HSS) said, "*Like parallel play, when another person is present with you while you each are doing your own thing (usually task- or work-related).*" Another participant explained this in more detail saying,

> "*Body doubling is intentionally being in a space together with someone else working independently on similar tasks. It's not co-working per se, but co-habitating a space and working in parallel.*"—P42 (autism + possible ADHD).

These results are from the first open survey question. After asking for their own definitions, we displayed the following text to ensure the survey takers were on the same page,

> People have many definitions of body doubling that we want to capture. When building the next few questions, this is the definition we had in mind: "Body doubling can mean using the company of others (can be co-located, remote, strangers or people we know) to stay focused on specific tasks (of any domain)."

After comparing participant definitions with ours, we found that survey respondents' definitions of body doubling were more specific to their use cases (i.e., mirroring behaviors, using Zoom), but primarily aligned in general themes. Overall, body doubling broadly constitutes using the presence of someone (in the same room, online, via media) to help start, work on, or accomplish a task (does not have to be work-related) as a form of accountability and/or reminder to stay on task.

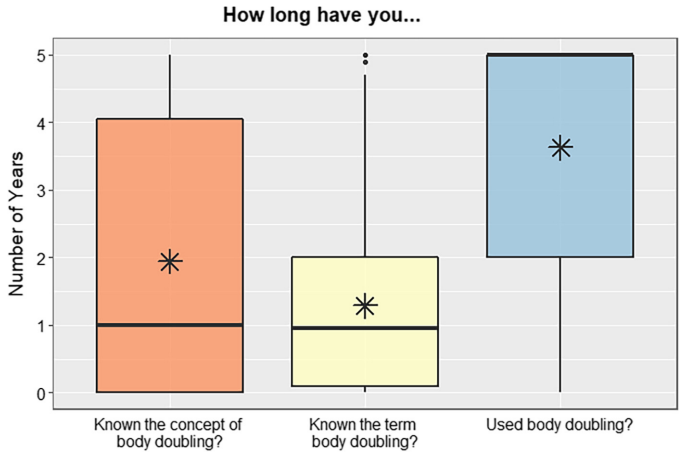

Fig. 6. Number of years participants have (1) Known the concept of body doubling, (2) known the term body doubling, and (3) used body doubling. *Indicates average response, the horizontal black line represents the median response. Response options ranged from 0 to 5+ years.

4.2 Finding and Utilizing Body Doubling

When asked "*Have you heard the term body doubling before?*", 57% (n = 124) of participants responded yes. Interestingly, after being provided with a definition and asked "*Do you use body doubling?*", 75% (n = 165, see Table 3) of participants responded yes that they do engage in body doubling (10% of participants remained unsure if they do it or not). As seen in Figure 6, many participants indicated they had been body doubling unintentionally without knowing the concept for longer than they had known the term "body doubling" (average use of body doubling was around 4 years compared to knowing the term which averaged at 1.5 years).

Twenty-four percentage (n = 53) of responses indicated that participants found out about the term "body doubling" only while taking our survey. However, many mentioned that provided with a definition, they realized they have been body doubling for many years without knowing the concept's name. Fifty-two participants stated that they "have always done it" when queried. For example, P58 (ADHD, autism) says: "*I knew it helped [my] productivity in this capitalist hellscape. A TikTok put a name on the term for me.*" This is echoed by P41 (ADHD, Dyspraxia, Dyscalculia), who says "*I have done it for about 5 years with my friends, but I learned about it about 2 years ago.*"

Participants provided a wide range of responses to the question of how they found out about body doubling. Participants primarily learned about body doubling through social media (n = 64), with the most common origin platforms being Twitter (n = 22) and Reddit (n = 14). Thirty-one participants found body doubling "online" (e.g., Internet, Podcast, Article, ADHD Web sites). People known offline (e.g., friend/family, therapist, co-worker) accounted for only a small portion of the responses (n = 16). For example, P214 had an **occupational therapist (OT)** suggest using it, "*I've been using it as a coping skill since elementary school, but didn't learn that it had a name until my ND child was diagnosed and an OT suggested it for behavior modification.*" Others, such as P88, found out about body doubling online,

> "*Recently I saw a post of how did you know you had ADHD. People were describing every moment. And I found the word body doubling. I looked it up and I believe it made me cry cuz [sic] I knew I did that too.*"—P88.

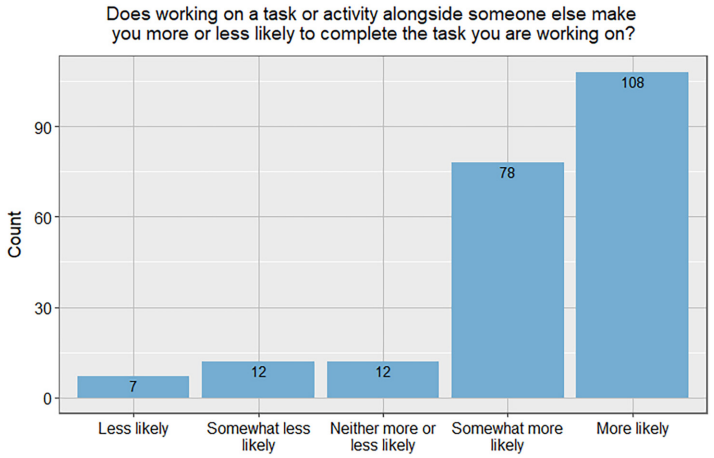

Fig. 7. Participant likelihood of completing a task when working alongside another person.

Giving individuals a chance to *put a name to a strategy* can be a source of self-understanding and connection with others. Having the label also allowed individuals to see the activity as a "coping skill" or a legitimate strategy to be used when needing assistance in task completion.

4.3 Use Cases

Participants had differing reasons for body doubling and described various situations when they would employ the technique. Generally, it helps with task completion. Almost half (n = 108) of participants responded that they were more likely to complete a task when working on it alongside someone else, with the majority of people (n = 186) indicating that they are somewhat more likely or more likely to finish tasks when in the presence of another person (see Figure 7).

For many (n = 78), body doubling helps them *stay* focused on a task and see it through. However, seeing it through and staying focused are not always synonymous. Having companionship is more stimulating than doing a task alone, so several participants (n = 7) report it serves as a welcome distraction from a monotonous task. "*To make otherwise dull tasks bearable. If i can talk to someone, i don't have to think about the task*"—P61 (Unspecified ND).

Social interaction can also be focusing. The following quote is from a participant who is better able to stay on task when another person is around to act as a sounding board for the relevant activity and associated feelings of anxiety/overwhelm around difficult tasks:

> "*It helps me stay on track with my task, because I freeze up if anything unplanned happens and it helps to have someone to talk me through the thinking process. For tasks that don't require a lot of brainpower, it also gives me something to focus on while I do the task that is not anxiety-related thoughts or potential flashbacks to times said task went wrong and/or became associated with a traumatic event...*"—P85 (autism).

Indeed, many (n = 30) report using it to help them feel less anxious or overwhelmed about the tasks, especially around difficult or intimidating tasks. P15 responded that they use body doubling "*to do tasks that are particularly daunting to me.*" What comprises a difficult or unpleasant task differs quite a bit from person to person. Participants report body doubling to help with tasks that aren't motivating on their own. Doing certain activities is associated with a lack of motivation or interest (n = 31) for many participants. Another common theme is around deadlines (n = 18)

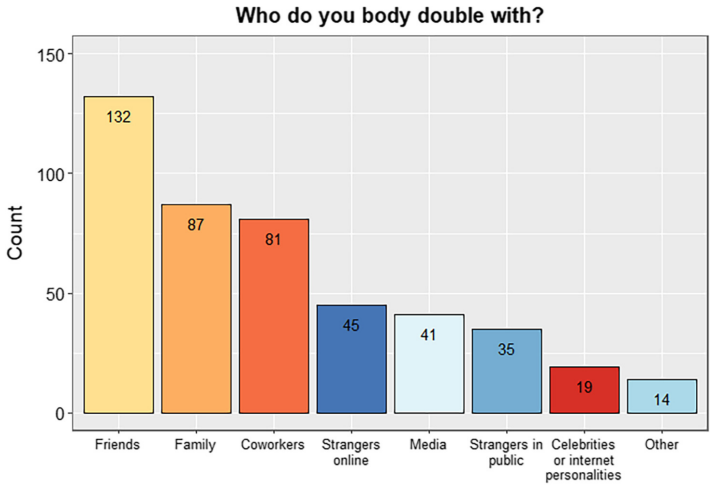

Fig. 8. Bar chart displaying the response counts to the question "Who or what do you body double with?"

("*It helps me motivate myself to focus on my work, and is particularly helpful when I'm working on a deadline*"— P43 (autism, Dyspraxia, chronic pain)). P160 emphasizes the interplay between emotion and unpleasant tasks:

> "*It keeps me accountable and provides emotional regulation when I am frustrated with a task. I use it when tasks are particularly unpleasant, difficult, or emotionally stressful.*"—P160 (ADHD, autism).

It follows that anxiety and overwhelm were commonly used terms for why people engage in body doubling. P188 uses it when they are "*... paralyzed by the overwhelm of everything that needs to be done*—P188 (ADD)." A common place to get stuck in this avoidance loop is at the very beginning. The second highest use-case for body doubling was around task initiation (n = 44)—helping people get started on something and combat procrastination when feeling "stuck": "*For chores or when im 'stuck' (on one thing physically and/mentally liking on phone in bed) and need help to change task/focus/get up and doing*"—P148 (ADHD, SPD). P20 also describes needing assistance with gaining the momentum to get over the hurdle that is actually starting on a task:

> "*i have a really hard time starting tasks and staying focused on them, it helps a lot to have the company of another person. often i will not be able to start on these tasks without a person in the room, so i engage in it literally every day.*"—P20 (ADHD, Bipolar Type II).

Overall, body doubling seems to help participants complete tasks and get unstuck. It can serve as motivation and comfort for large, looming tasks or encouragement for tedious ones. When engaging in body doubling every day, like P20, the issue of when one can feasibly find someone to body double with arises. We discuss this and other body doubling logistics in the following section.

4.4 Logistics of Body Doubling

In this section, we detail the logistics of body doubling as described by our participants: who they body double with, where they body double, and how to find people to body double with.

4.4.1 Who to Body Double with. Figure 8 displays the counts of answers to whom people engage in body doubling with. Participants primarily indicated that they body double with friends (n = 132,

Table 4. Count of Responses Indicating Where People Are Body Doubling Categorized by the Modality Used—Live/In-Person, Online and virtually, and Finally, via Media

Modality	Where	Count
Live	Home	125
	Public (e.g., cafe, library)	57
	Work/School	66
Online	Online	81
	Body Doubling Platform	10
	Chat Platforms and/or Video Calls	50
	Phone/Audio Calls	15
Media	Podcasts	4
	Videos (e.g., YouTube)	17
	Livestreaming (e.g., TikTok Live, Twitch)	14

60%). Family (n = 87, 40%) and co-workers (n = 81, 37%) received a similar amount of responses. While most responses indicate that participants body double with people they know offline, 20% (n = 45) and 16% (n = 35) of participants noted that they body double with strangers online and strangers in public, respectively. "*I tend to invite someone into my usual workspace…Sometimes I go to a public space (library, cafe, etc) if none of my friends are available and I'm very stuck.*"—P42 (autism, possible ADHD).

4.4.2 Where to Body Double. Table 4 shows the locations where participants body double and the modalities used to do so. The most popular places to work in public were at the library (n = 20) and at cafes (n = 17).

> "*Mostly remote or at home. Sometimes I sit in the cafe where other people are working on laptops. It's sorta like body doubling without them knowing.*"—P114 (ADHD, autism, Monotropic).

In terms of where people body double, 66 participants responded that they work mainly in-person, 23 body double virtually, and 93 do a mix of the two. Clearly, some people prefer co-located body doubling sessions, as with P113 (ADHD) who mostly works at home with their partner: "*In-person - online does not appeal to me.*"

The majority of participants also body double at their homes (n = 125, 57%). However, not all that do so at home are co-located with their body double. 81 participants noted in the open response questions that they body double online through video calls, chat conversations, live streams, and other media. P20 (ADHD, Bipolar Type II) does a mix of online body doubling from home and working with their boyfriend in the room:

> "*I use facetime or discord to call friends and sit in silence, sometimes ill listen to a podcast and that feels like there are people in the room with me. My boyfriend will play video games in the room with me while i focus on what i need to do.*"—P20.

P84 describes similar feelings but adds that they use media like YouTube videos and live streams to simulate being with someone:

> "*Platforms have been Skype (before it went down), Discord, art streaming sites like Picarto, other streaming sites like Twitch, or occasionally using YouTube videos to mimic the feeling of doing something with another person. Otherwise i try to line*

> *up physical meet ups with friends to do other tasks.*"—P84 (dissociative identity disorder).

A total of 41 participants responded that they body double with some form of media (see Figure 8) or online content. This includes *pre-recorded content* such as "*YouTube videos of people studying.*"—P39 (ADHD) and "*podcasts and YouTube videos*"—P47 (ADHD, autism, Dyscalculia) and "*live*" *or real-time content* such as "*tiktok videos, twitch streams dedicated to body doubling*"—P93 (ADHD).

4.4.3 Finding People to Body Double with. As noted above, the majority of our participants engage in body doubling with people they know in their personal lives. However, these people may not always be available as an option due to scheduling, compatibility (e.g., "*I want to make use of body doubling, but I can't find anyone who wants to be there for me who isn't too chatty.*"—P190 (autism)), or comfort level ("*I only really engage in it if I can find the courage to ask someone to study with.*"—P27 (ADHD, autism)). This can cause issues for people who depend on it, like P106: "*I frequently don't manage to get out of bed and get breakfast until a body-double is available.*"—P106 (ADHD, autism).

To this end, online services have been cropping up in recent years to meet the need for virtual co-working. Some participants have found Discord servers and other people on social media for this purpose "(*Voice calls over discord, sometimes twitch (as a streamer ir [sic] audience member)*"—P211 (ADHD, autism)). Participants also mentioned using some of the following Web sites that specifically allow for virtual co-working, often with strangers: Caveday, Focusmate, StudyStream, Fiveable, ADHDActually.

4.5 Why Does Body Doubling Work?

When asked "Why do you make use of body doubling?" some participants posited that body doubling is about copying someone else's behavior (n = 13), although this category was split between uncertain guesses (e.g., "*mirroring someone else's posture & movements?*") and a more approximate reasoning of why body doubling may work. For example, while some participants did mention mirroring another person's behavior (e.g., "*Assuming it's enlisting someone else so you can mirror their behavior and stay on task*"—P172 (ADHD, autism)), they imagined this mimicry was in a task-related context: "*Im not sure, maybe having someone along side you working on the same task like their body is a double of yours?*"—P40 (OCD).

4.5.1 Companionship and Social Pressure. Companionship was a recurring theme in the responses to this question. The presence of another person is motivating for various reasons; companionship, accountability, guilt, and serving as a visual reminder. As an adaptive strategy, it may help with self-regulation and negative sentiment around tasks and goals [108]. Here, P69 describes feeling less alone and like they are able to accomplish their tasks in tandem with one another:

> "*I use body doubling because it, in part, helps me feel less alone in my tasks. It makes everything less daunting to face. Alone, my todo lists can feel intimidating because there is constantly so much to complete, but with the perceived presence of others who may be working on their own tasks it creates a sense of togetherness - we can do it mentality. I primarily engage in it while studying for my degree, as there is a significant amount of content and work required to complete to the grade level I wish to achieve.*"—P69 (ADHD, autism)

Companionship, for some, came more so in the form of "monitoring," as with P177: "*I do better (at anything) if I'm doing it with or for someone else. My motivation for just me is almost zero. Another*

person in the room, even if they don't say anything, gives me external policing that helps keep me on task."—P177 (autism). Having another presence while working also served, for many, as a visual reminder of what they should be working on. For example, "*It helps me stay on task. I have ADHD, so it's useful to have a physical reminder of what I'm supposed to be doing.*"—P219 (ADHD). P41 expands upon this idea of a person as a physical reminder, while also acting as an intentional accountability aid, "*...Having another person around reminds me that there is something I need to do, and I usually let them know what I am trying to work on so they can remind and motivate me...*"—P41 (ADHD, Dyspraxia, and Dyscalculia). However, for some, having anyone around while they are trying to focus can cause even more distraction: "*It's usually more distracting than helpful. I have to be in the right mindset for it and fear the judgment of the other person for it to work*"—P17 (ADHD, Unsure if they ID as ND).

Accountability was specifically mentioned in 26 responses. Some of this accountability comes from direct refocusing on the part of the body double ("*..someone could remind me what I was busy with in case I lose concentration*"—P152 (ADHD, PTSD)) while for others, the presence of another is enough pressure to keep them on task ("*I feel like I am accountable to not engage in impulses if someone is there with me, as I am very bad at curbing impulses otherwise.*"—P154 (ADHD)). Four participants expanded upon feelings of accountability that veered toward guilt and not wanting to be perceived as "lazy"—"*Forces me to stay on task so I won't look lazy*"—P127 (ADHD, Anxiety). P217 expands upon this feeling of guilt as a somewhat "maladaptive strategy" due to being potentially negatively perceived:

> "*On one hand it's a bit of a maladaptive strategy; I do it because I'm afraid of someone else observing my lack of focus and the fear drives my to work.* ***I find it easier to be accountable to others rather than myself****...Similarly if I am overwhelmed with the amount of tasks I have to complete as the prevents me from starting, but body doubling makes me just make a start anywhere*"—P217 (ADHD).

We know that a presence helps some people feel accountable which may be due to providing an alternative focal point. Says P74, body doubling "*makes the task easier to start when your brain is focused on the person instead of the task*"—P74 (AuDHD, Dyscalculia, Hyperlexia, Synesthesia, C-PTSD, Depression, Anxiety). Others propose that another person provides the stimulation—"*the presence of the other person is the stimulation to focus on completing the task*"—P126 (ADHD) or the energy ("*their presence allows you to borrow some of their energy to initiate and complete your task*"—P101 (ADD, autism, OCD, C-PTSD)) needed to focus.

4.5.2 Task-Related Feelings. Certain tasks can come with many associated feelings, such as overwhelm, daunting, anxiety, and also embarrassment around tasks that should seemingly be easy to accomplish but are hard for many (e.g., "*Embarrassing: showering. I watch tiktok in the shower to distract/ increase motivation*"—P150 (ADHD, autism)).

Especially for difficult or unpleasant tasks, body doubling enables people to stay focused and feel less overwhelmed—"*I use it when tasks are particularly unpleasant, difficult, or emotionally stressful.*"—P160 (ADHD, autism). With tasks such as this, participants noted that they tend to avoid working (—"*It helps me with tasks that are particularly hard or that I've been avoiding.*"—P101 (ADD, autism, OCD, C-PTSD)) due to overwhelm and anxiety—"*any anxiety inducing task*"—P71 (ADHD, autism, mood disorder). Body doubling can help to get past some of the anxiety to at least start a task and get going, even for things people *want* to be doing—"*tasks I don't want to do as much as others but sometimes things I want to do but can't seem to get myself to do*"—P80 (ADHD, autism)).

We now look more specifically at what types of tasks people are using body doubling to accomplish.

4.6 Activities

What activities are people using body doubling for? The most common tasks that people noted they work on with the aid of body doubling pertain to the household (n = 86) which primarily consisted of chores, laundry, cleaning, organizing, and other general housework. This was followed by schoolwork and studying (n = 64) and work (n = 52). Additionally, reading (n = 12), writing (n = 25), and coding (n = 12) were other activities people mentioned doing while body doubling, which were sometimes mentioned as work-related and other times as hobbies. Other tasks mentioned included: running errands (e.g., getting groceries, n = 20), hobbies such as art or personal projects (n = 35), and care of oneself (e.g., cooking, hygiene, exercising, n = 35).

> "*I've done this for things like chores, writing important emails, making phone calls that I think will be stressful, and even taking a shower (the other person and I both went to our own shower at the same time, and it was much easier).*"—P184 (ADHD, autism, Dyspraxia, OCD, Auditory Processing Disorder).

A subset of participants included sentiment around the activities they use body doubling to work on. Eleven participants use body doubling for tasks that feel complicated or have many steps. Six participants noted they find mundane and tedious tasks easier to complete when in the presence of another person. P181 (ADHD, autism) responded that they use body doubling for "*Mundane boring things or big intimidating tasks.*"

5 Discussion

In this study, we surveyed 193 neurodivergent individuals, finding that participants, whether they knew of the term "body doubling" or not, overwhelming used the practice to help initiate, stay motivated during, and complete tasks. In this discussion, we explore the meaning of neurodivergent (ND) online communities as spaces for shared sense-making and defining their shared experiences. Following, we expound upon the definition of body doubling generated by community members, how and why body doubling is utilized, why it works, and the logistics of engaging in body doubling.

As we have found, body doubling is not a one-size-fits-all phenomenon. It has a range of sentiments and methods of utilization. Not every ND person will benefit from or enjoy body doubling. Those who do may utilize it differently depending on the task, their mood, and the availability of others. For example, one of the authors finds body doubling via Focusmate to be effective for some types of work, whereas another author felt they would hate this type of one-on-one virtual body doubling with an unknown person. Mediums like Focusmate with its high social pressure and accountability can be stressful or overwhelming. Alternatively, some ways of body doubling involve little to no social pressures. For example, someone may benefit from watching LoFi Girl while working but will not be as scrutinized as if they were working in the same room as someone aware of what the person "should" be doing. All authors utilize body doubling in varying capacities as needed, and our uses are constantly fluctuating and changing forms. We see this as an untidy assistive technology, as discussed in Section 2.1.

Virtual coworking platforms (e.g., Focusmate, Flow Club, Study Stream) have surged in popularity during the pandemic and the transition of many to work from home. They can involve 1:1 or multi-person working sessions. While some of these platforms are free to use, there may be limitations on use without payment which can be a slippery slope of profiteering on ND populations [28]. In this regard, we have experienced misgivings about publishing this work. On the one hand, we have wanted to discuss and write about body doubling but lack a "rigorous" citation up to this point. Conversely, we question the costs and consequences of attempting to "legitimize" community practices in academic work. Disabled and neurodivergent communities have been and continue to

be used as fodder for ableist interventions and work that excludes them. After much discussion, we feel that this concept has been discussed enough on ND social media and written about in enough popular press that it is unlikely that this work will lead to profiteering off of ND people that has not already happened or is in the process of happening.

5.1 Contributions

This work offers the following contributions and suggestions:

- —Establishing body doubling as a neurodivergent community-driven phenomenon for task initiation and completion within academic research
- —Present methodology around generating community-driven definitions of collective phenomena by (1). Valuing community-driven practices for self-management and not asserting our own ideas of what they need and (2). Viewing communities as sources of valid knowledge beyond existing academic literature
- —Gaining consent to use screenshots of social media posts [31, 32]
- —Sensitivity to the complexity and multi-faceted nature of the populations we work with and avoiding making sweeping claims
- —Designing around Space/Time and Mutuality, with flexibility for individual preferences
- —Accepting self-diagnoses and expanding our view of participants to include given challenges around diagnosis [11].

We expand upon these in the following sections.

5.2 Community-Driven Knowledge

Disabled populations are not helpless, and it is crucial to not only give them a voice in ongoing research but also, to involve them in every stage of the process to determine if certain research is even wanted or needed [109]. Methods such as action research [44, 73], co-design and participatory design [20, 27, 42, 43, 101], and community-collaborative approaches [50] have gained popularity in recent years as the HCI assistive tech community focuses on the amplification of community-driven knowledge. There are, as with any method, limitations to these studies that can fail to account for privilege, equity, and working with underserved and historically marginalized populations [43, 49, 73]. Additionally, despite inclusion of the communities of interest as participants now being expected in accessibility research, some areas of assistive technology work still fail to meet this [101]. Insider perspectives and involvement in knowledge production are crucial [8], and increasingly more accessibility research is conducted by member researchers [21, 22, 29].

Despite the fact that there are many people doing good work in these domains, we still feel it is necessary to continue to push for more community-driven knowledge to be disseminated within academic research. Communities have unique makeups and needs, and neurodivergent communities continue to face ableist critiques and medicalized research studies [71, 88, 89]. Additionally, neurodivergence accounts for only a small portion of HCI and accessibility literature [51]. Recent work by Bowman et al. on dexterity and smartphone accessibility features included participants who did not have diagnosed dexterity challenges, but rather focused on identification with statements about finger/hand movement [11]. As we propose in this study, including people without clinical diagnoses is an important consideration in accessibility research given the challenge of receiving diagnoses and recent pushes for acceptance of self-diagnosis within neurodivergent communities [29]. Diagnostic gatekeeping, as well as non-inclusive and ableist language, do the communities we work with a disservice, but also other disabled researchers within our academic communities [16]. Neuroinclusivity and listening to and collaborating with neurodivergent individuals in these communities are essential to conducting caring and equitable research [16].

While technology can augment treatment or aid in symptom management, it is problematic to uphold technology as having the potential to be a universal remedy. Here, we attempt to discover what ND people are actually using as strategies for task initiation and completion. This is not necessarily solely for work and productivity but also for daily tasks such as showering, cooking, and cleaning the house—things that are typically excluded from the capitalist view of "productivity." Individual needs are always different, just as the things we struggle to do are unique. Coping mechanisms and assistive technology thus require flexibility and personalization, as we can see in the wide array of modalities in which people body double. There is not one correct way to body double, and we should not attempt to constrain or gatekeep what works for people, nor should we attempt to exploit ND people into societally acceptable productivity machines.

Participants describe receiving comfort and soothing from the company of another presence, which is important in a pandemic where many work from home and experience ongoing isolation. The presence of others can aid as a visual reminder to focus but also as motivation to start or keep working. Interestingly, a number of participants compared body doubling to parallel play. However, parallel play is typically written about with regard to child development and less as a strategy employed by adults. There is a disconnect between concepts that are commonly discussed in ND spaces and peer-reviewed research on these practices. Communities, as we know, are a vast source of knowledge, but this knowledge can be viewed as colloquial and less valid. We continue to encounter these issues while working in the space of neurodivergence and HCI—part of our rationale for conducting this work.

Strategies discussed on social media for gaining momentum and staying focused, as with any social media advice, should be taken with a grain of salt and wariness around paid products. However, it is important not to dismiss popular topics just because they are trending on social media. Body doubling has been circulating within ND communities for years, but little research has focused on it. As seen in Section 4.1, survey participants often engage in these communities for self-understanding and connection. Putting a name to practices they had been doing for years was normalizing. Shared knowledge within these communities benefits many through collective sense-making.

5.3 Mapping Body Doubling

We propose that body doubling is a spectrum of (primarily) two things—Space/Time and Mutuality (see Figure 9). This model reflects the flexibility we saw participants utilizing. First, a spectrum of *space and temporality* exists. This addresses the "liveness" of the body double. The space–time spectrum ranges from *happening in real time, in a shared space* to *pre-recorded in a different space.*

For example, when body doubling, two people could be on a real-time video call (however, video calls may activate people's social anxiety [46]) or someone watching a Twitch live stream. On the other hand, the level of real time may look different for different people as well—for one person, periodic texts to check in may be sufficiently "live," while for another, it may be too asynchronous for them to work that way. There are also times when the event may be "live" only for the initiator, that is, someone who may watch a previously occurring live stream or a "study with me" YouTube video to act as a body double. This component has various levels of being perceived and pressures of perception—one-on-one body doubling can involve check-ins about task status. In contrast, it is unlikely that a stranger in a coffee shop is checking in on someone else's progress. Previous research for individuals with depression similarly found that being physically co-located with other people in public, such as a coffee shop, was enough to feel "social" without the pressure of accountability to others being too much [12]. Likewise in our study, the need for accountability and "social pressure" varied from participant to participant.

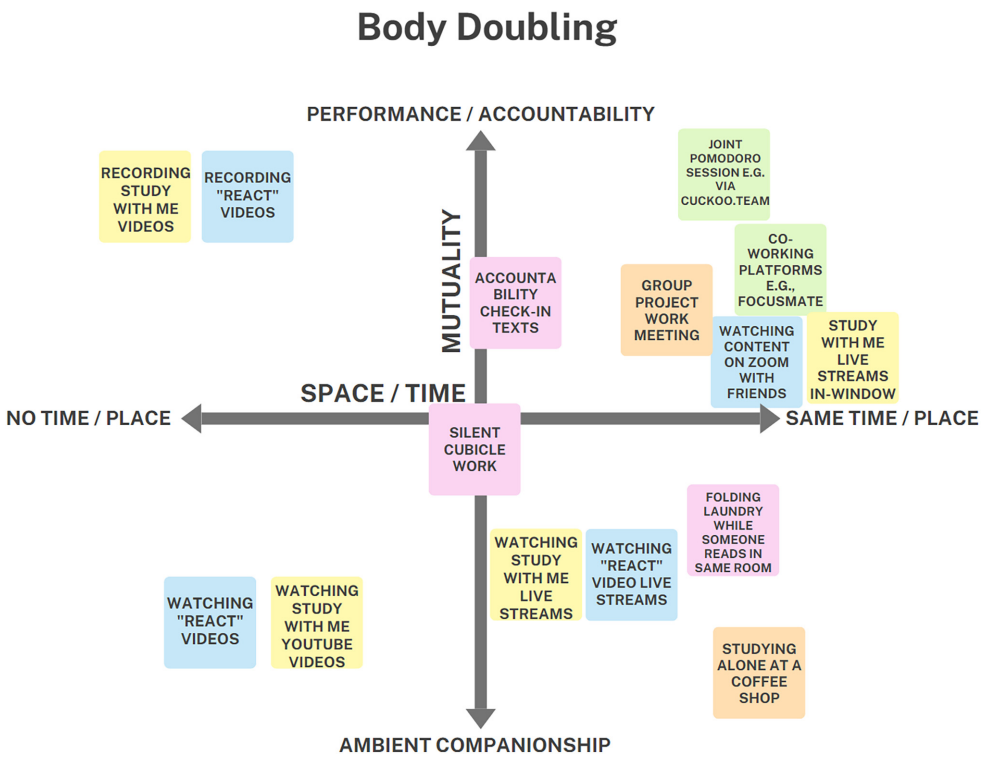

Fig. 9. Concept map representing the components of body double. The *y*-axis depicts mutuality—level of awareness from being a performance/accountability act on one end to ambient companionship on the other. The *x*-axis depicts space and time, ranging from no real time or place to the same time and/or place.

Second, there are differing levels of *mutuality and awareness* on the part of the entity acting as the body double. This spectrum ranges from *someone who knows what you are doing and you can be accountable to*, to *someone sharing a space but unaware of their role as a body double*. On one end of the spectrum lies body doubling as a performative form of accountability. In one instance, two people may agree to act as body doubles for each other to complete tasks via video call and Pomodoro sessions. A live streamer on TikTok or Twitch is aware how many people are watching them and, potentially, using them as a body double. In a sense, we can view this as cosplaying as a person that is productive or potentially masking ND traits. On the other hand, there is body doubling in the form of ambient companionship. When body doubling in a public location such as a cafe or library, the strangers acting as body doubles are likely unaware that someone is using them to focus (although it is a reasonable assumption that people in these spaces are doing work of some sort). There are varying levels of disclosure of a body doubling session within this range. As we found, many participants body double with their friends or family, likely people that they feel comfortable being frustrated or vulnerable with.

High mutuality and same space/time represent mediums such as co-working on virtual platforms or joint Pomodoro sessions. High mutuality and nebulous space/time represent instances such as recording study-with-me videos to be posted at a later time for people to watch. Low mutuality and less similar time/place would be something such as watching study with me YouTube videos. Low mutuality within the same time/place would be studying alone at a coffee shop, for example.

5.3.1 Designing along the Model. There is room for exploration within this model. While the community has adapted strategies and is creating content utilizing the technique across the map, almost all commercial technologies exist only within the map's upper right (high mutuality, high/space–time). This seems to be the most obvious/low-hanging fruit. However, our results and discussion show that not everyone always benefits from that approach. New technologies could exist along the less populated sections of the concept map to support more varied engagement and connection (i.e., supporting *ad hoc* sessions between friends and suggesting body double-worthy videos). We're excited about new possibilities for body doubling. How can we highlight communication and consent in public spaces? How can we share responsibilities for being and using doubles? How can we support long-term companionship?

People don't necessarily think of body doubling as assistive technology, so what does that mean for design? Given the complex and personal journey of identity and disability, not all participants viewed body doubling as assistive technology. There is much co-opting of existing technology within this practice (e.g., timers, YouTube, video calling platforms). We see body doubling as an opportunity to leverage existing technology rather than designing it as something separate that people need to seek out. As body doubling is an experience that people are already engaging in, we don't necessarily need to formalize it into one product, nor would that be possible given the variability in preferences of engagement. In this publication, we have shied away from providing best practices but rather observations of occurring practices, given that body doubling appears to be a highly individualized tactic. Throughout this work, we have discussed how some people prefer video versus collocation, for example. We believe designers could take on this multitude of approaches and develop a variety of new technologies to fit different needs (as exemplified in Figure 9).

Designers should also consider the modality preferences of potential users and how to support autonomy and flexibility. Bowman et al. [11] found that users did not think to look in accessibility menus on mobile phones despite having features that could be helpful to them due to lack of identification with labels of "disability" or "accessibility." If people do not identify as disabled (or neurodivergent), they may not think to look for "assistive technology," furthering our finding that many participants have been body doubling for years without knowing or recognizing it as an adaptive strategy. Language is powerful and clearly drives support. Participants here talk of coping strategies and life hacks rather than calling out "assistive technology" or understanding self-accommodations.

Reasons for body doubling and its use cases are discussed in Section 4.3, areas of potential interest for designers to ideate around, such as focus or overwhelm around a task. Body doubling does not require technology, and in its simplest form may be two people sharing the same space. Below are examples of when specific implementations could be applied.

- —When home or alone/no access to another human: watching study with me videos, Lofi videos, recording oneself studying, TikTok lives/Twitch streams
- —When in public: sitting at a cafe, working with a friend at the library, check-in texts, watching Lofi or study with me videos
- —Potential interference: finding someone to work with, motivation to leave the house, needing to use text-to-speech or speech-to-text while in a quiet or too loud place
- —Non-technical: Silent cubicle work, studying at a cafe or library, sitting with another person while you fold laundry
- —Technical: YouTube videos, video calls, phone calls, check-in text, timers, online Pomodoro sessions, apps (e.g., Forest, Flipd), online coworking platforms (e.g., FocusMate)

Potential interference: Distractions online/on phone, modality preferences, internet access, forgetting to use apps, social anxiety around being online with a stranger (e.g., FocusMate).

Body doubling is not necessarily productivity-centric; it could be successful in that someone even starts a task or body doubling session. Body doubling, for many, is a tool to get unstuck and generate momentum. Given the stigma around productivity and neurodivergence, we don't want to play into the shame of not "getting enough done." If someone's goal is task completion (e.g., taking a shower), they may consider having taken a shower to be "success." However, if body doubling moved someone infinitesimally closer to their goal that is enough (incremental success). We do not believe that success is the most useful measure here, as neurodivergent folks are often shamed (externally and internally via ableism) for not being "productive enough." We did not explicitly ask participants about what makes body doubling successful, but how it was carried out (Section 4.4) and why they do it (Section 4.5). Success could be relative to the "why" section: did they meet their goals of initiation, socialization, etc.? In terms of metrics, we may think of: Not did they do the thing well, but did they start it? Did they feel better about it? Was it easier?

5.4 Limitations

There are several limitations to our current study. First, our sample of 220 is relatively small compared to the number of ND individuals worldwide and also consists mainly of people from the US and EU. Thus, the generalizability of these findings is not unquestionable, given the variability in peoples' preferences. Second, our sample is not evenly distributed across ND identities and is heavily informed by respondents with ADHD. Therefore, we can also not generalize across different ND communities and assume that body doubling will work the same way. There is a larger question of who can participate in collective sense-making or even be active in ND communities. Additionally, the participants in our study were primarily female-identifying.[12] Despite this small swath of ND individuals, our findings represent at least a part of the discussion on body doubling. We are hopeful for more research and development in this area.

6 Conclusion

Our survey finds that the majority of neurodivergent participants use body doubling to accomplish tasks ranging from work and school to household chores and cooking. Participants report primarily using the presence of friends and family to accomplish tasks, but also body double with strangers online (via Discord, Focusmate, etc.) and in public (such as at a café). This initial survey shows that for many, body doubling is an oft-utilized and effective means of task initiation and completion for neurodivergent individuals and describes community-driven definitions of a home-grown phenomenon that has arisen to address challenges these groups may face in their daily lives.

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Appendix A

Table A1. Full List of Self-Identified Neurodivergence

Neurodivergence	Count
ADHD	139
Autism	82
OCD	11
Dyscalculia	11
GAD	10
Sensory Processing	10
Hyperlexia	9
C-PTSD	7
Dyspraxia	7
Dyslexia	7
Depression	6
Mood disorder	5
Auditory Processing Disorder	4
Synesthesia	4
Bipolar Disorder (Type I or Type II)	3
Asperberger's	2
Dysgraphia	2
Highly Sensitive Person	2
PTSD	2
Cyclothymia	1
Executive Function Disorder	1
Hyperacusis	1
Tourette Syndrome	1
Misophonia	1
Monotropic	1
Dysautonomia	1
Other specified dissociative disorder	1
Dysthymia	1
Hyperphantasia	1
High Sensation Seeking	1

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