Original Research

"It makes me want to take more steps": Racially and economically marginalized youth experiences with and perceptions of Fitbit Zips® in a sport-based youth development program

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ABSTRACT

Healthy and high levels of physical activity can positively impact youth development, physiological and psychosocial well-being, academic performance, and reduce the risks of obesity, cardiovascular disease, and other chronic illnesses. Various health and physical activity interventions have started to engage with wearable technologies (e.g., Fitbit®) to objectively measure and manage levels of physical activity, for both academics and practitioners alike. The purpose of this study is to explore the potential utility of digital activity trackers, and the subsequent experiences of wearing such devices, toward increased engagement with physical activity among racially and economically marginalized youth. To this end, we had 20 youth of color wear a Fitbit Zip® over a 23-week period during their participation in a sport-based youth development program. At the conclusion of 23 weeks, 17 of the students reflected on their experiences by taking part in one of three focus groups. The participants shared predominantly positive experiences with and attitudes toward the devices. While there were some sentiments of indifference, most participants acknowledged increased levels of physical activity and awareness of the resultant health benefits. These results further highlight the potential value of integrating digital activity trackers in sport-based youth development programming and stress the importance of culturally appropriate expectations and training.

Keywords: physical activity; marginalized youth; sport-based youth development; digital trackers; wearable technology

"IT MAKES ME WANT TO TAKE MORE STEPS": RACIALLY AND ECONOMICALLY MARGINALIZED YOUTH EXPERIENCES WITH AND PERCEPTIONS OF FITBIT ZIPS® IN A SPORT-BASED YOUTH DEVELOPMENT PROGRAM

A growing body of literature suggests a strong, positive association between higher levels of physical activity and cognitive, physical, psychological, and social health indicators (Appelqvist-Schmidlechner et al., 2018). For instance, healthy physical activity can lead to the development and maintenance of strong bones and muscles, life longevity, improved physiological and psychosocial well-being, as well as reduced risks of some cancers, obesity, cardiovascular disease, and other chronic illnesses (Centers for Disease Control and Prevention, 2011, 2018a, 2018b). As it concerns to youth, higher levels of physical activity have been linked to better academic performance, improved cognitive abilities (Centers for Disease Control and Prevention, 2010, 2014), and positive psycho-social health outcomes such as increased self-efficacy, self-concept, and self-worth (Haugen et al., 2011). Moreover, increased physical activity at a young age can lead to enhanced physical literacy, defined as "the ability, confidence, and desire to be physically active" (Aspen Institute, 2015a, p. 3), an outcome which can situate youth on a life course trajectory of healthy physical activity and its ensuing benefits (Bopp et al., 2019). Taken together, this

literature demonstrates the crucial role physical activity plays in the physiological and psychological development of youth, the promotion and subsequent maintenance of which has led researchers to appropriately quantify it (i.e, measure it; Gusmer et al., 2014).

It is in this vein that monitoring one's movement has influenced various health interventions to engage with physical activity tracking devices such as accelerometers and pedometers to objectively measure physical activity (Hurvitz et al., 2014; Schaefer et al., 2016). Recent trends in physical activity have seen an increase in both the commercial availability and utilization of wearable technologies and digital activity trackers, for both academics and practitioners alike (Graham & Hipp, 2014). Though limited in number and scope, studies have been conducted to assess not only the validity and/or reliability of Fitbits® in physical activity measurement (see Ferguson et al., 2015; Gusmer et al., 2014; Mooses et al., 2018; Schneider & Chau, 2016; Haegele et al., 2017), but also, their efficacy in examining the behavioral intentionality toward physical activity among youth populations (see Altamimi et al., 2015; Klinker et al., 2014; Pope et al., 2018; Walther et al., 2018). Despite the recent popularity of tracking devices such as Fitbits® to document daily physical activity and health behaviors (Bice et al., 2016), much is to be learned regarding the utility of wearable technologies toward increased levels of youth physical activity (Ridgers et al., 2016).

Recent studies have cautioned that the effects of behavioral, environmental, and social factors on the relationship between wearable digital activity trackers and positive youth outcomes must be accounted for when analyzing youth engagement with wearable technology and physical activity opportunities (Bagot et al., 2018). Schaefer et al. (2016) contended that while "wearable devices can yield great insights for youth about their physical activity, these devices may not be successful agents of change in and of themselves" (p. 15). Further, Kerner and Goodyear (2017) posited that digital movement and activity trackers can have a negative impact on physical activity motivation among youth. The youth in their study experienced decreased levels of competence and autonomous motivation toward physical activity. Kerner and Goodyear suggested these declines might be the result of the competitive elements of the Fitbit® app utilized in the study, leading to both external and internal pressure (e.g., predetermined goals and guilt). Regardless, Goodyear et al. (2019) maintained the potential benefit of such wearable technology to provide opportunities and aid youth in increasing their health knowledge and physical activity levels; however, they noted that such health-related opportunities must be supplanted by an understanding of said opportunities from young people themselves. Similarly, Ridgers et al. (2018) found wearable trackers to provide benefits toward the promotion of physical activity among youth but cautioned that more information is needed "about how youth engage with and use such technology" (p. 8).

Thus, to deepen our understanding of the role that digital movement and activity trackers play in the lived experiences of youth, we must curate knowledge on not only how and why youth might engage in the use of wearable technologies, but also the perceptions of these individuals when utilizing these respective technologies (Goodyear et al., 2019). To this end, the purpose of this study is to explore the potential utility of digital activity trackers, and the subsequent experiences of wearing such devices, toward increased engagement with physical activity among racially and economically marginalized youth. Given the contextual backdrop of the sport-based youth development (SBYD) program within which we collected our data, we sought to focus particularly on how these trackers might impact engagement with physical activity for racially and economically marginalized youth. Knowing race and socioeconomic status to be social determinants of health (Braveman & Gottlieb, 2014; Trent et al., 2019), we considered these factors in our analysis of the data.

Framing the Study

SBYD programs are designed to assist youth in positively engaging with their community and contribute to their overall development and social capital through their interactions with and participation in sport and physical activity (Coakley, 2011; Perkins & Noam, 2007; Petitpas et al., 2017). However, since positive development and social outcomes are not inherently derived simply through sport participation, efforts toward youth development and enhanced physical activity must be intentional, strategic, and innovative (see Jones et al., 2017). It is in this manner that sport serves a crucial role in the physiological and psychological development of youth regarding physical activity. As already noted, Gusmer et al. (2014) argued the promotion and maintenance of this development partly rests on how physical activity is measured.

Such considerations of bodily movement and ecological interaction have since influenced various health and physical activity interventions to engage with movement tracking devices such as accelerometers and pedometers to objectively measure physical activity (Schaefer et al., 2016). Although we appreciate that digital health technologies can offer positive insight and development for

youth as it concerns physical activity (Schaefer et al., 2016), we also understand that there exist "social-material circumstances that enable particular ways of being a Fitbit® subject for some, while constraining others" (Esmonde & Jette, 2020, p. 311). Accordingly, Esmonde and Jette acknowledge that although possible to procure insight on one's own physical activity from any given social location, it may be:

> *… more difficult to do so if you do not have the flexibility to walk throughout the day, a body that can take 10,000 steps per day, the availability of safe and interesting areas to walk in, or even the appearance of a person who can walk in those safe areas without arousing suspicion. (p. 311)*

Thus, the manifestation of such social, structural, and systemic barriers can result in physical activity disparities among youth (Adlakha et al., 2014), thereby decreasing opportunities and thwarting their development toward a lifetime of healthy physical activity (Bopp et al., 2019). It is in this manner that race and socioeconomic factors act as social determinants of health (Braveman & Gottlieb, 2014; Trent et al., 2019).

Within the United States of America, Black youth are physically active at a significantly lower level than their White counterparts, partly due to having fewer options to become active in the first place (Aspen Institute, 2015b; Centers for Disease Control and Prevention, 2018b). In a study of estimated facilities and resources in North Carolina, New York, and Maryland in the early 2000s, Moore et al. (2008) found that 71 percent of predominantly Black neighborhoods lacked access to a recreational facility, as opposed to only 38 percent of predominantly White areas. This may be exacerbated when accounting for the relationship between race and socioeconomic status, as one's respective socioeconomic status can impact physical activity levels (Aspen Institute, 2015a). In turn, a lack of recreational resources stemming from financial barriers can impact one's health (Adlakha et al., 2014), such that youth from households earning the lowest incomes ($25,000 or less) are about half as likely as youth from wealthier households ($100,000 or more) to participate in physical activity (Aspen Institute, 2015a).

Strengthening our understanding of the perceptions of sport participation and physical activity among racially and economically marginalized youth will afford researchers and practitioners an evidence-based foundation on which to design appropriate studies, as well as program offerings and curricula. In doing so, it is critical to remain cognizant of the intersections of race, physical activity, and digital (in)equity when considering digital trackers as an intervention toward increased and/or enhanced levels of physical activity of racially and economically marginalized youth. Despite the recent popularity of tracking devices such as Fitbits® to document daily physical activity and health behaviors (Bice et al., 2016), little is known about how they might be perceived and utilized in low socioeconomic communities (Ridgers et al., 2018; Schaefer et al., 2016). Tichavakunda and Tierney (2018) suggested researchers and practitioners might better understand and serve the physical activity needs of marginalized youth by providing a thorough examination of their use of activity trackers, without which may leave scholars with an "incomplete understanding of digital inequality and how best to support diverse groups" (p. 113). Thus, the purpose of this study is to explore the potential utility of digital activity trackers, and the subsequent experiences of wearing such devices, toward increased engagement with physical activity among racially and economically marginalized youth.

METHODOLOGY

The SBYD Program

The SBYD program in this study is a free after school program that serves disadvantaged middle and high school students, primarily 11-15 years of age, in a suburban community. The program meets for approximately two hours, Monday-Thursday, on the campus of a predominantly White institution and offers a unique blend of sport, academic enrichment, health promotion, and character and life skills development. The primary sport on which this program focuses is tennis, however the program offers participants other sporting experiences throughout the year (e.g., basketball, swimming, roller hockey, quidditch). Tennis and other sporting experiences are therefore utilized as a context in which participants' life skills are reinforced and practiced. Prior to participating in different sports, coaches explain to the participants the reason(s) for doing so, and during such activities, coaches seize on learning opportunities by stopping play to discuss the application of individual and interpersonal skills. For instance, as an individual sport, while playing tennis participants are taught emotional self-regulation, focus, and conflict resolution (e.g., when disputing a call). Conversely, roller hockey is a team sport that further allows youth to develop their communication skills, practice accountability, and strengthen their teamwork abilities.

At the time of data collection, 91% of the program participants identified as Black or African American, 6% as Hispanic/Latinx, and 3% as White. Just over half (54%) of the students self-identified as female and 46% as male.

Most (80%) of the students hailed from single parent/guardian households, and although 70% of parents/guardians were employed, over 80% of the participants' households reported an annual income of less than $25,000.

Research Design and Procedures

This study was designed using qualitative methods to explore the potential utility of digital activity trackers, and the subsequent experiences of wearing such devices, toward enhanced physical activity among racially and economically marginalized youth in a SBYD program. Funding for this study was received from the Janet B. Parks NASSM Research Grant Program and provided us the opportunity to purchase 20 Fitbit Zips®. Fitbit Zips® were selected as the appropriate digital tracker due to their relatively low cost, ease of use, and durability (i.e., sweat, rain, and splash proof). University IRB approval was received prior to the grant proposal and collecting data. Accordingly, parental consent and participant assent was also obtained.

We invited 20 students to participate in the study, all of whom agreed. It is important to note that no incentives were offered by the researchers. The 20 invitees were selected by the program's executive director based largely on attendance and their potential willingness to participate, with no input from the researchers. Participants were requested to wear the Fitbit Zips® for 23 weeks from November to May, however only while attending the program and when scheduling allowed. Prior to the commencement of the 23-week period, researchers and program administers met with the participants to explain the purpose of the study as well as the study protocol. Additionally, the youth were instructed on how to put on, turn on, operate, and interpret symbols and numbers that appeared on the screen of the wearable trackers. This was an informal discussion that took approximately 20 minutes. At the conclusion of the 23 weeks, we requested that participants reflect on their experiences by taking part in a focus group. Seventeen of the 20 participants consented, and based on availability during the scheduled days, were assigned to one of three focus groups, comprised of six, six, and five participants. Two facilitators were present at each focus group: one of the two lead investigators, both of whom identify as White males, served as facilitator while a graduate assistant, an African American male, helped to keep the youth participants focused on the discussion.

The focus group discussion guide drew on questions adapted from Schaefer et al.'s (2016) study on the feasibility of fitness tracking with youth in an urban setting. Questions centered on the youth's experiences (*Were you more active while wearing the Fitbit Zip*®?), potential knowledge gain (*Did you learn anything about yourself?*), behavioral shifts (*Did anything about you change when you had the Fitbit Zips® on or off?*), as well as attitudes and perceptions (*Did you talk to anyone about the Fitbit Zips®, and if so, what did you say?*). Focus groups were deemed a relevant research approach for this study as they have been an effective means to learn more about the experiences and attitudes of youth, particularly those from racially and ethnically marginalized groups (Hesse-Biber & Leavy, 2011). Given the identity sources of our participants, we felt focus groups best afforded these students space to share their experiences and perspectives, as well as to provide an opportunity for "education, exploration, and collaborative generation" (Hesse-Biber & Leavy, 2011, p. 165). Other researchers have argued that focus groups can provide youth peer support, facilitating self-disclosure (Kennedy et al., 2001) through the notion of safety in numbers (Kitzinger, 1994). Thus, to ensure a positive experience for each of our participants, we designed and conducted our study with consideration given to guiding principles as outlined for conducting research with youth by Gibson (2007) and Neill (2005). For instance, we received IRB approval, parental consent, and participant assent, ensured all verbal and written communications were at an appropriate reading and speaking level, were clear about the purpose of the study, encouraged them to ask questions, stressed that their participation was voluntary, and reiterated that they could withdraw at any time without penalty.

Participants

A total of 20 program participants agreed to wear Fitbit Zips®. Due to factors outside of the researchers' control (e.g., sports, extracurricular school commitments), three students did not participate in the focus groups. Of the seventeen remaining students, 10 (59%) were male and seven (41%) were female. Fourteen participants identified as Black or African American and three identified as Hispanic/Latinx. The ages of the participants ranged from 11-15 years (see Table 1 for participant details).

Data Analysis

Wanting to explore and understand participant behaviors and experiences when wearing digital movement and activity trackers during programming, we selected an analytical technique that allowed researchers to uncover themes from the data (Denzin & Lincoln, 2005). Taking an inductive approach to analyzing the data afforded us the opportunity to explore and interpret potential shifts in participant attitudes toward physical activity, and subsequently, how said shifts might influence or impact

Table 1. Participants Demographics

Pseudonym	Racial/Ethnic Identity	Gender	Age
Mark	Hispanic/Latinx	Male	11
Rick	Black/African American	Male	14
Skylar	Black/African American	Female	13
Mike	Black/African American	Male	13
Danni	Black/African American	Female	15
Dave	Black/African American	Male	13
Tim	Black/African American	Male	13
Terri	Black/African American	Female	13
Minnie	Black/African American	Female	13
Tommy	Hispanic/Latinx	Male	11
Joey	Black/African American	Male	11
Rob	Black/African American	Male	15
Johnny	Hispanic/Latinx	Male	13
Robin	Black/African American	Female	11
Jennifer	Black/African American	Female	13
Brian	Black/African American	Male	12
Tina	Black/African American	Female	14

outcomes associated with behaviors and social-material circumstances (Esmonde & Jette, 2020; Saldaña, 2013; Thomas, 2006). To this end, we conducted an inductive analysis, involving the coding of data and development of themes (Patton, 2015). We audio recorded the responses and discussions in the focus groups and had them transcribed using Rev.com, an online transcription service. It is important to keep in mind that the responses were short, as is common with this age group, and primarily in direct response to the questions (Heary & Hennessy, 2006; Kellett & Ding, 2004). However, the inductive coding of our raw data helped to mitigate any loss or stunting of potential themes (Thomas, 2006).

The principal investigator independently read through the transcripts, making note of key words and phrases, and created a preliminary set of 23 categories (or codes). Following this process, the second researcher read the transcripts and developed a second set of 24 codes. The researchers then convened in person to discuss differences and came to an agreement on similar and/or overlapping codes, merging their results into one combined set of 36 codes (Table 2). These codes were subsequently grouped into categories based on relatedness and similarities, resulting in seven general categories. The seven categories were representative of the participants' *General Affect*, *Management of Physical Activity*, *Levels of Physical Activity*, *Health Outcomes and Metrics*, *Motivation* (*Intrinsic and Extrinsic*), and the *Fitbit Zips*®. From this, three overarching themes were derived: *Attention to Physical Activity*, *Physical Activity Behaviors*, *and Usability and Acceptability of the Fitbit Zip*®. The codes were then applied to the text in another review of focus group transcripts to thoroughly understand and better interpret the intentions of participant responses.

Table 2. Categories, Themes, and Codes identified from Youth Wearing Fitbit Zips®

Themes	Categories	Codes
Attention to Physical Activity	Management of Physical Activity	Assistance
		Confidence
		Goals
		Health Awareness
	Extrinsic Motivation	Food
		Incentives
		Money
		Prizes
	Intrinsic Motivation	Amotivation
		Competition
		Distance
		Inspiration
		Pride
		Steps
Physical Activity Behaviors	Levels of Physical Activity	Activity
		Distance
		Lack of Behavior Change
		Running
		Steps
		Walking
	Health Outcomes and Metrics	Calories
		Exercise
		Fat
		Fit
		Weight
Usability and Acceptability of the Fitbit Zip®	General Affect	Hesitancy
		Indifference
		Negative
		Perception
		Positive
		Program Integration
	The Fitbit Zip®	Aesthetics
		Functionality
		Limited Capabilities
		Lost
		Utility

We achieved trustworthiness of our data, a foundational element of sound qualitative research, through procedures designed to meet criteria of credibility, validity, and objectivity (Lincoln & Guba, 1985; Schwandt et al., 2007). For instance, coding consistency checks were utilized to establish dependability and integrity of the data (Thomas, 2006). This was achieved through the process of independent parallel coding. Accordingly, the two researchers individually coded the raw data, met to review and discuss their findings, and came to an agreement on the content of their codebooks, allowing for competing themes and explanations to be categorized (Patton, 1999; Thomas, 2006).

Positionality Statement

The principal investigator of this study has a professional working relationship with the administration of this SBYD program, and as such, was mindful of his interactions with and observations of participants during the 23 weeks.

Moreover, both authors were working from an interpretivist epistemology in which knowledge results from the subjectively constructed interplay of one's perception and reality. As two self-identifying White male researchers collecting, analyzing, and interpreting data from marginalized youth of color, we recognize our engagement may have influenced participants' responses and our subsequent analysis. For instance, one participant altered his voice and body language when first participating in a focus group, attempting to use vernacular he does not commonly use during programming. Likewise, perceptions may have limited the examples that were given or narrowed the talking points to only those with which we (as White researchers) might seemingly have a level of familiarity. Taken together, we sought to remain aware of each of our contexts, location, and relational power throughout this process, which was accounted for, in part, through several consistency checks, as described above. Moreover, the graduate assistant who helped facilitate each focus group is a self-identifying African American male whose presence may have eased the comfort level of the participants and the disposition of each conversation, particularly given the proportion of participants who held a shared racial identity. As such, we engaged in self-reflexive practices and discussed how the representation of White male researchers may have influenced our understanding and interpretation of the data. Wanting to provide a detailed examination of the participants' experiences with Fitbit Zips® in their own words, as well as the subsequent interpretation and application of said experiences, we endeavored to present their "voices as knowledge and truth that comes from experience and that deserves a protected space and serious attention" (Cervantes-Soon, 2012, p. 376).

RESULTS

Below is a detailed examination of the data that comprised the 36 codes, grouped into seven categories under three themes.

Theme 1: Attention to Physical Activity

The participants spoke of the effects the Fitbit Zips® had on monitoring their levels of physical activity. Being able to keep track of their movement in real-time and observe their changes over time served as not only a means to manage their physical activity levels, but also a form of motivation, both intrinsic and extrinsic, for the youth.

Management of Physical Activity

Participants spoke of how wearing the Fitbit Zips® helped them to be more aware of their physical activity levels as well as better monitor it during program sessions. This was summed up quite succinctly by Dave who noted, "it helped me very much," in reference to the positive effects of wearing the device. Most notably, the positive manifestation of monitoring their physical activity was described in terms of steps. Dave continued, "it helped me keep track of how many steps I took." Regarding his steps, Joey said, "I don't know how much I'm doing, but the Fitbit® helps me." Mark added, "I been paying attention" to his number of steps. Another manifestation of wearing the Fitbit Zips® that aided their ability to manage and monitor their physical activity was increased health awareness. In reference to this awareness, Tommy pointed out that the Fitbit Zips® did "tell us how healthy we are." Although one's definition of healthy can vary, the participants in this study equated it to the number of steps they took, miles walked or distance traveled, as well as calories burned, and weight lost—neither of which were measurable metrics on the devices. Being able to quantify health (e.g., number of steps), the participants discussed how the device prompted them to set goals. Tommy liked that he could "set a goal in the Fitbit®" and added that "when we have a Fitbit®, it makes us want to reach a goal." After determining a baseline of 8,000 steps per day, Mark's daily goal was "to get more."

Motivation (Intrinsic and Extrinsic)

Many participants were intrinsically motivated to get in as many steps as they could while wearing the digital activity tracker. Oftentimes this motivation was the result of competition, both with one's personal goals (intrinsic) as well as with friends and other program participants (extrinsic).

Intrinsic motivation was revealed to be towards specific goals regarding the number of steps one could obtain in each session as well as a general sense of accomplishment and pride with their overall level of physical activity. For instance, Mark was very proud of being the self-proclaimed "first person to 8,000 steps in one day." Likewise, Tommy was very proud of surpassing 8,000 steps, recalling how he exclaimed to his mom, "I got 8,732 steps!" Some participants did not have a specific goal in mind regarding a daily number of steps or distance traveled, yet were still active and cognizant of their steps. Rick said it was "exciting to see how many steps I was taking" and "how many miles I walk[ed]," whereas Joey shared that every time he wore it and "clicked it, I looked forward to something," which "helps me stay more in shape." However, several participants expressed not liking or not wanting to know how many steps they took, calories they burned, or time they were physically active in a session. For

instance, Tina was disappointed when she realized one day that she "didn't even have 1,000 [steps]." Such feelings of frustration or dissatisfaction were minimal and appeared to have limited effect on participant behavioral changes, as most participants proudly shared the specific ways in which their levels of physical activity had positively changed.

Extrinsic motivation was also a factor that increased physical activity, particularly amongst friends and program peers. Tina was not shy about the digital trackers making her "more competitive. Me and my friends, we like to see who can get the most steps when we wear it. We try to beat each other". Danni was a little more reserved in expressing a similar sentiment about how at the end of the day she and her friends "would just have a conversation about who had more." Several participants did not see the value of the devices, noting that "you're just walking" (Joey). Subsequently, these same participants suggested the program offer incentives (extrinsic motivation) if they were to continue wearing the devices after the conclusion of the study or wanted to integrate the devices into everyday programming. Some of the participants were vague with their comments regarding a "reward" or "prizes," while several participants had specific enticements in mind, such as "money," an "apple," or "candy." Tommy was more innovative by suggesting incentives match the level of accomplishment: "the more steps you got, the bigger prize it is."

Theme 2: Physical Activity Behaviors

Most participants responded favorably to wearing the Fitbit Zips®. Recognizing they were increasing their movement and being more active, the youth participants spoke to how their increased activity levels were benefitting them from a health and fitness perspective.

Levels of Physical Activity

Mark noted, "when I had a Fitbit® on, I just get more and more active". This positive influence was confirmed by Skylar who simply stated, "I'm more active." Terri was more pointed in her response, noting that she didn't "count my steps, not without my Fitbit® on." While there were more testimonies that supported levels of increased physical activity, there were several participants who did not describe experiencing any behavioral change towards physical activity. Terri revealed that she was "still the same," while Joey added that "I still play the same." Interestingly, Joey seemed to differentiate between different types of physical activity. Although he still played the same, he also admitted to "working out more."

Differentiation between types and quantity of physical activity was consistent among the participants, as some emphasized how they moved (i.e., running, walking, particular sports) opposed to how far they moved (i.e., steps, distance traveled). When focusing on steps, participants referenced "you take a lot of steps" (Minnie) and "it makes you want to take more steps" (Terri). Several statements were made regarding the distance they traveled. Rick said it was "exciting to see how many miles I am walking" and Danni "kept track of how many miles I walked." Mark was surprised with his activity level, adding that when he saw how many steps he took and how far he traveled, "I said, 'Oh I don't know I walked this much.'" Terri was very cognizant of her steps, pointing out that when she is "going to walk, [she] puts it on" to accumulate more steps. Given the SBYD program is primarily focused on tennis, it was not surprising that participants referenced how sport participation increased their steps: "We used to play tennis. I used to look at my steps and be like, 'Hey, I got a lot of steps'" (Terri). Additionally, Joey referenced a particular sport and how it might have contributed to his number of steps, "I got 17,000 steps. I was playing basketball."

Conversely, several participants revealed some potential drawbacks to the impact of the Fitbits® on physical activity. Dave admitted that he was "inspired to run more," but also suggested that the increased levels of activity were temporary and contingent upon wearing the device: "When I wear it I run a lot, but when I don't wear it, I don't run at all." Tommy made a similar comment, stating "it makes us want to run more because when we're not, when we don't have a Fitbit® we're like, 'Oh, I don't want to run.'" Tommy further revealed that wearing the Fitbit® had a negative psychological outcome, pointing out that he feels "really lazy" when his activity level is dormant or not up to his expectations.

Health Outcomes/Metrics

As a result of the positive impact on their physical activity behaviors, several participants spoke about losing weight. Skylar shared that "it did help me lose some weight." Minnie, Joey, Johnny, and Danni all spoke to the positive influence on them "burning calories," while Tina also mentioned that wearing the Fitbit Zips® helped "burn fat and all that good stuff." Participants also recognized additional health benefits in the form of fitness and exercise. Terri said the Fitbit Zip® "makes me more fit", while Joey added that because of the digital tracker, he's "been trying to get more fit," as it "helps [him] stay in shape." Danni went so far as to equate her wearing of the Fitbit® to "exercise" itself.

Theme 3: Usability and Acceptability of the Fitbit®

Attitudes toward the usability and acceptability of the devices were mixed. At times, the participants seemingly had difficulty parceling their experience with the Fitbit Zips® from the program activities, but overall, we were able to discern the generally upbeat attitudes of the youth wearing the movement and activity trackers.

General Affect

Positive comments were typically vague, with Dave saying it "worked good for me"; Mark adding "I think it's good"; and Danni simply stating "it's just fun." While there were some negative feelings, demonstrated by Terri stating "I just don't care," most of the negative affect was specifically directed towards the device and what it did not do. For instance, Joey was not impressed with the device, opining that "it just counts how many steps you walk." Johnny likewise minimized the Fitbit Zips® many tracking options saying "I don't need a Fitbit® to count my steps." Rick seemed indifferent towards the device, shrugging and simply responding "so, so" when asked about the impact of the digital trackers, whereas Robin bluntly stated "I don't want people to know I'm wearing a Fitbit®." When probed further, she added "it doesn't look good." This and similar comments led to discussions about the actual, tangible device.

The Fitbit Zip®

Discussions regarding the aesthetics of the Fitbit Zips® addressed the looks, fit, and feel of the device, whereas usability focused on their utility, functionality, and capabilities. While some of the participants "liked how it looked," the majority seemed to favor the Fitbits® that are worn as a watch given that they "looked better." There were also several comments regarding the Fitbit Zips® being plain black and lacking in color. The device's screen was also deemed "too small," making it difficult to read and track your activity. The youth also lamented that due to its size, it "popped [or] fell off" too easily and moved around too much. Further proof of this sentiment was the fact we lost two of the wearable devices during the study. However, the primary issue with the Fitbit Zips® worn in this study seemed to be their functionality. Despite having worn it intermittently over 23 weeks and selecting Fitbit Zips® due to their ease of use, several participants still did "not know how to work it." However, this could also be the result of the limited training received by the participants.

DISCUSSION

In this exploratory study, we sought to learn about the experiences of wearing digital activity trackers (i.e., Fitbit Zips®) and potential utility of these trackers in increasing physical activity levels among racially and economically marginalized youth. Overall, participants in our study voiced primarily positive experiences wearing digital activity trackers. More specifically, wearing the Fitbit Zips® while at the SBYD program served as a valuable resource for participants to measure and monitor their physical activity. This capability resulted in increased levels of physical activity, as many of the participants developed and pursued personal goals or competed against peers to have the most steps. Focusing on such activity metrics led to youth being more cognizant of the means (e.g., running, walking, tennis) by which they were being more active, as well as the ensuing health benefits. The participants spoke of calories burned, weight lost, exercising more, getting in shape, and staying fit regarding the positive health gains accumulating from their continued digital tracking efforts. Although the utility of the Fitbit Zips® facilitated the youths' motivation to be more physically active, the aesthetics of the devices were not as inspiring. Below, we discuss the implications of these findings in practice and research.

Accurately accounting for and measuring the amount and type of physical activity and movement behaviors is critical to health and development research (Hurvitz et al., 2014). This data is particularly useful for health- and sport-related interventions aimed at youth, given the proficiency of physical activity to provide a foundation for healthy life outcomes (Appelqvist-Schmidlechner et al., 2018; Bopp et al., 2019). The results of our study suggest Fitbit Zips® to be a useful tool toward this end. More specifically, the youth in our study were most interested in counting their steps. Simply put, the Fitbit Zip® served as a reminder to participants that they might not be attaining desired or recommended physical activity levels and encouraged them to move and walk around to advance toward achieving said levels. Though pursuit of daily steps may have been the catalyst for movement, tracking their activity levels made the youth more cognizant of the types of activities that were more effective at increasing their step count, as well as the subsequent health benefits. These results not only support previous work among adolescents (e.g., Ridgers et al., 2018), but simultaneously extend the literature base by contextualizing youth movement tracking within a SBYD program serving racially and economically marginalized youth.

Few studies have explored how digital tracking devices

such as Fitbits® might be perceived and utilized in marginalized communities (Schaefer et al., 2016), yet this knowledge is critical for enhancing movement among marginalized youth, as their opportunities for and levels of physical activity are lower than their racial and economic counterparts. The influence of the SBYD program resources (i.e., Fitbit Zips®) seemed to be impactful as the self-reported physical activity levels of youth increased when wearing the device, however, participants noted the increases to be largely contingent upon wearing the devices. That is, when not at the SBYD program and wearing a digital tracker, they were not being as physically active nor considering their levels of movement. From this finding, we question whether the Fitbit Zips® are hindering participant activity levels and opportunities for more meaningful engagement with physical activity. That is, are youth in this program benefiting from the educational and health awareness opportunities provided when given access to the Fitbit Zips®? Are they truly comprehending the importance of a physically active lifestyle or are the devices simply a means to accumulating more steps (Kerner & Goodyear, 2017)?

We do not believe the youth in this study fully grasped and embraced the underlying value of being physically active, and as such, positive behavioral changes might only be temporary and not indicative of a more positive, healthy life course trajectory. Such is a critical finding that may hint at the underlying social and systemic barriers resulting in physical activity disparities among racially and economically marginalized youth (Adlakha et al., 2014; Esmonde & Jette, 2020). For instance, economically marginalized youth might not have the proper resources, support, or encouragement to be active other than their time in the program. Health awareness may not be enough to foster increased engagement with physical activity among racially and economically marginalized youth.

The association of the Fitbit Zip® as exercise is one of many emotional and perceptual responses participants had and serves as a strong advocate for such wearable technologies to be integrated into SBYD programming, given the benefits and impacts of physical activity on health and development outcomes. However, programs that want to incorporate the use of such innovative technology toward positive youth development and enhanced physical activity must be more intentional and strategic (Jones et al., 2017). The simple presence and/or use of wearable technology in a SBYD program is not sufficient for foundational knowledge on the health and development benefits of physical activity.

This SBYD program utilized the Fitbit Zips® as not only a motivational tool to enhance awareness and encourage more physical activity, but as an opportunity to teach the youth the types of activities that result in greater physical exertion or steps. For instance, the SBYD program took many field trips on campus to learn more about higher education opportunities and stress the value of education. What they had not considered on these walking tours was the number of steps they were taking. We found that participants were more active (i.e., taking more steps) on such trips than they may have been when playing a sport or participating in a game that does not involve consistent movement or engagement. This discovery encouraged the SBYD program to incorporate more elements of movement and walking into their curriculum, and to not just assume youth were garnering such benefits from participating in sports. From our results, we offer the following implications and recommendations to be considered by SBYD programs looking to strategically integrate digital activity trackers into their programming.

Implications and Recommendations

When provided the opportunity to wear Fitbits® or other digital activity trackers, youth should be instructed on their potential effectiveness and trained on how to properly use them to monitor activity and maximize positive outcomes. SBYD programs should educate and guide youth on how to transfer and utilize the skills and knowledge gleaned from wearing the devices during programming to their everyday lives. It is critical that youth learn to become accountable for their wellbeing and understand how being physically active can improve health outcomes, particularly youth of marginalized communities (Bopp et al., 2019; Centers for Disease Control and Prevention, 2018a). The need for such instruction was clear in participants' responses, which seemed to indicate that the Fitbit Zip® was accountable for the hard work and effort they spent towards the physical activity metrics in this study. This finding suggested a possible disconnect between their own efforts and the potentially resultant physical, health, and psychological benefits that awareness alone cannot amend. Similarly, sentiments of indifference and negative internalization, as well as adverse association with one's own engagement with physical activity (and with the Fitbit Zip®) was witnessed among several of the youth participants. Therefore, it is critical that SBYD programming provide safe and welcoming spaces and opportunities for youth to explore and benefit from physical activity (Watson et al., 2016).

When creating such spaces, socio-contextual factors that can shape the physical activity behaviors of Black/African American and Hispanic/Latinx adolescents from low-income communities must be considered (Hasson, 2018).

One such factor is ethnic identity, whereby engaging with and changing health-related behaviors, such as those relating to physical activity, "may go against culturally constructed local community norms and increase psychological stress and isolation" such that "[physical activity] may be rejected, considered irrelevant, or viewed as outside of one's control" (p. 167). Thus, culturally responsive programming is necessary to understand ways in which youth are exhibiting negative associations with indifference towards physical activity and inform SBYD programs and similar interventions wanting to encourage and increase opportunities toward a physically active lifestyle.

As it relates to the outcomes of this study, we argue that one approach to ensure the movement towards culturally responsive programming is for SBYD programs considering the use of wearable technologies to actively include participant voices in the development of programmatic strategies. It was clear from our participants that their use of such devices is (and would be) contingent on personal goals, favorable (physical) activities, and incentives. For instance, though not a central factor in this study, we gleaned from participants that the inclusion of a culturally relevant rewards system, based on both individual and group-level accomplishments and growth, might aid in their utilization of and benefit from such devices. By upholding cultural competency as the "rubric" throughout the process of planning and implementing strategic interventions, programs can provide an inclusive environment in which all participants and staff feel recognized, engaged, and teach/learn through a variety of diverse approaches (Hansen, 2014). As a part of the process, we expect these suggestions to help minimize the external pressure youth might feel from predetermined (and possibly unrelatable) goals, as well as the internal guilt they might feel from not being able to keep up with their peers (Kerner & Goodyear, 2017).

Our suggestion is in alignment with more recent trends in the space of physical education (PE), particularly those programs that have adopted physical education teacher education programs. In recent years, physical education teacher education programs have been adopted by schools to educate instructors of both PE and physical activity-based out-of-school time programs on how to be more inclusive and effectively respond to the educational needs of students from culturally, ethnically, and racially diverse backgrounds (Cervantes & Clark, 2020). For instance, Hoyer and Henriksen (2018) developed a course for PE teachers aimed at improving their cultural competency, noting as their primary intention for instructors to be more inclusive when teaching PE in multicultural settings. With soccer serving as the sport context, instructors enhanced their knowledge of different soccer cultures, become more culturally aware to the similarities and differences between these cultures and that of their students, and incorporated this into their coaching sessions. As noted, the foundation of these programs was cultural competency, which when applied to the realm of PE, can allow educators to move toward the ability to "successfully teach students who come from cultures other than one's own" (Hansen, 2014, p. 13), as well as better "identify cross-cultural [experiences], and to counteract the marginalization of [individuals] by race, ethnicity, social class, religion, sexual orientation, or other markers of difference" (Metzl & Hansen, 2014, p. 126).

Although the goal of this study was not to conduct market research on Fitbit Zips®, it is necessary to be cognizant of the perceived aesthetics, usability, and acceptability of the trackers so that programs interested in implementing wearable technology can get "cooler" devices. Though limited in their presence in the focus group discussions, comments regarding Fitbit Zips® as an added stressor cannot be ignored, particularly at the youth level where having them wear something they "don't want" or find "boring" can be a deterrent to being active. Such seemed to have manifested during this study given the participants' ridicule of the style and color of the digital activity trackers, and the relative "coolness" of these compared to other wearable technologies. Although the digital trackers did serve their purpose, it was clear that the students would have preferred more options regarding style, color, and how the devices were attached to their person.

Limitations

Despite efforts to share the findings as genuinely indicative of the lived experiences of youth participants wearing Fitbit Zips® during a SBYD program, the study is not without limitations. First, there was variation in the number of days the Fitbit Zips® were worn among the participants. Due to extracurricular activities, personal obligations, program scheduling, and other reasons, not all participants were available to wear a Fitbit Zip® on each day. Collecting qualitative data can also be challenging, particularly when conducting focus groups with youth participants. Drawbacks of this data collection approach include situational pressure, such as feeling compelled to offer statements reflective of group norms (Lewis, 1992) and feeling the need to produce "correct" responses (Kellett & Ding, 2004). It was apparent from our discussions that it was also difficult for participants to parcel out physical activity resulting from the wearing of the Fitbit Zips® versus the increased physical activity that resulted from other program interventions.

CONCLUSION

There exists a void in knowledge regarding the use of wearable technologies and activity trackers among marginalized youth that facilitates digital inequities and fails to provide answers for adequately supporting the technological practices of diverse communities (Tichavakunda & Tierney, 2018). Thus, the purpose of this study was to explore the potential utility of digital activity trackers, and the subsequent experiences of wearing such devices, toward increased engagement with physical activity among racially and economically marginalized youth. By providing participants autonomy in discussing their experiences, we were able to glean valuable insight and add to the current literature on the applicability, influence, and usability of wearable activity trackers (i.e., Fitbit Zips®) among this subpopulation of youth. The youth provided details about their predominantly positive experiences with and attitudes toward the wearable technologies regarding the monitoring and management of their physical activity levels and behaviors, as well as the device itself. While there were some sentiments of indifference, most participants acknowledged that their levels of physical activity increased, as did their awareness of the resultant health benefits.

Given the existing physical activity disparities for racially and economically marginalized youth, results from this study support the integration of digital movement and activity trackers in SBYD programs, with consideration given to the choice of wearable technology as well as culturally appropriate expectations and applications of their use. Developing a better understanding of how digital technologies can aid in the increased engagement with sport and physical activity among racially and economically marginalized youth, researchers and practitioners can inform and develop an evidence-based foundation on which to design appropriate studies, as well as program offerings and curricula. Practical implications from our study can contribute to the development and enhancement of SBYD programmatic offerings toward healthy engagement with movement and increased physical activity. Future research should further contextualize the many sociocultural and economic factors that influence the interrelationship between physical activity, technology, and youth.

CONFLICT OF INTERESTS

The principal investigator of this study has a service agreement with the SBYD program in this study and remained mindful of this throughout the study, including in his interactions with and observations of participants, as well as with program staff. In addition to locating his position, he followed the proper channels to gain university IRB approval to help mitigate any potential conflict of interest.

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