A focus group study among insufficiently physically active African American adults regarding technology-delivered team-based gamification for physical activity promotion

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Background: Gamification represents a promising approach for facilitating positive social interactions among groups of individuals and is increasingly being leveraged in physical activity (PA) interventions to promote enhanced intervention engagement and PA outcomes. Although African American (AA) adults experience disparities associated with health conditions that can be ameliorated with increased PA, little is known about how best to culturally target PA gamification strategies for this population. The purpose of this study was to gather perspectives from AA adults residing in the Southeast United States and subsequently identify themes to help inform the cultural adaptation of an existing electronic and mobile health (e/mHealth) gamification- and theory-based PA intervention for teams of insufficiently active AA adults.

Methods: An AA moderator facilitated six online focus groups among AA adults (n=42; 93% female; 45.09±9.77 years; 34.40±57.38 minutes/week of reported moderate-intensity equivalent PA), using a semi-structured focus group guide. Drawing from a content analysis approach, transcripts were coded and salient themes were identified.

Results: The focus groups revealed the following seven themes: (I) motivation (team-based gamification motivating); (II) accountability (team-based gamification promotes accountability); (III) competition (competitive elements attractive); (IV) weekly challenges (prefer to choose weekly PA challenges); (V) leaderboard feedback (preference for viewing steps and active minutes via a leaderboard); (VI) cultural relevancy (prefer elements reflective of their race and culture that promote team unity); (VII) teammate characteristics (mixed preferences regarding ideal sociodemographic characteristics and starting PA level of teammates).

Conclusions: Integrating team-based gamification in an e/mHealth-based PA intervention may be acceptable among AA adults. The identification of specific design preferences and perceptions of the value of the social environment points to the need to consider surface-level and deep structure cultural targeting when developing and further exploring best practices regarding gamified PA interventions for insufficiently active AAs.

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Introduction

African American (AA) adults persistently experience health disparities across a range of chronic illnesses relative to non-Latino Whites, including higher rates of type 2 diabetes mellitus (1), cardiovascular disease (2), and certain types of cancers (3). Strong evidence demonstrates a favorable dose-response relationship between higher physical activity (PA) and reduced chronic disease risk, with the shift from inactive to active being especially impactful (4). Yet, over half of U.S. adults are insufficiently active (5), with 55% of AAs reporting low PA levels versus 43% of Whites (6). These racial disparities in chronic disease and low PA rates are present across the U.S., and especially high rates are observed in the Southeast (7,8). Finding effective, scalable, and sustainable solutions for increasing PA among AAs is a national public health priority (9). Specifically, recent calls within the PA field have been made to accelerate exploration of culturally relevant strategies that (I) are informed by perspectives among AAs who are insufficiently active, (II) address levels of influence on PA behavior beyond individual factors alone, and (III) consider technological innovations to reduce health disparities (9,10).

Considerable evidence points to the value of targeting social relationships to promote PA among AA adults. Cross-sectional studies focused on AAs have shown that those who report more social support for PA are more physically active (11-25). The importance of identifying existing social ties that can provide social support for PA is a recurring theme in formative research with AA adults (11,12,26-33). Family-oriented PA is of particular value to AA women versus White women (34). Relatedly, ecological models (35,36) and the Community Preventive Services Task Force (37) endorse interventions that aim to strengthen existing social ties that offer support for PA behavior change.

Yet, evidence for culturally adapted PA interventions to drive improvements in social support that promote enhanced and sustained PA increases in AA adults remains equivocal and underexplored (38-54). Previous interventions have primarily focused on the individual by conveying the value of seeking social support or attempting to foster it among persons previously unacquainted with one another (39,44,47-51,55-57). Further, few studies with AAs have used "deep structure" cultural targeting (i.e., addressing a group's values and norms around PA and its correlates such as gauging perceptions of how the interpersonal environment might influence PA) to inform PA intervention design (32,54,58-61). A small number of faith- and other community-based PA interventions conducted among AA adults have explicitly leveraged strategies to directly engage participants' existing social ties (e.g., group exercise classes, walking groups) (38,41-43,45,46,62). While some of these programs have shown feasibility and promise for driving favorable short-term outcomes (38,42,45,46), many have lacked both methodological rigor (i.e., non-randomized designs, subjective measures of PA) and the potential for population-level scalability (38,41-43,46). Hence, questions remain about best practices for directly targeting

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Highlight box

Key findings

- Most participants shared enthusiasm for an electronic and mobile health (e/mHealth)-delivered, team-based gamified program, noting it would be motivating and foster accountability while also expressing the importance of cultural relevancy.

What is known and what is new?

- Substantial evidence points to the value of targeting social relationships to promote physical activity among African American (AA) adults. Gamification reflects an attractive method for doing so. Few gamification physical activity interventions have included AA adults and only one used formative work to ensure its cultural relevancy.
- Our findings help address these gaps by gauging AA adults' perspectives about a team-based gamification approach, spanning surface-level and some deep structure cultural topics.

What is the implication, and what should change now?

- These findings will inform the cultural adaptation of a team-based physical activity program for AA adults and should be considered in the design and evaluation of commercial and scientific e/mHealth physical activity programs.

and leveraging the interpersonal environment, including existing social ties, among AA adults for PA promotion.

The principles of gamification, or the use of game-like mechanics and elements in nongame contexts (63), are increasingly being applied in PA interventions (64-66). Gamification reflects an attractive method for promoting positive social exchanges and openness to positive behavioral influences among both unacquainted persons and those with existing social ties (64-66). Popular commercial technologies permit the delivery of a range of gamification strategies to the natural settings where behavior change occurs (67,68) with the added potential for widespread scalability and dissemination (64-66). Although in its infancy, evidence regarding gamification for improving PA has demonstrated promise (64-66). However, few gamification PA interventions have included a high proportion of AA adults (55,69), and, to our knowledge, only one (55) was informed by formative work with AAs to ensure its cultural relevancy; however, it was designed as an in-person intervention in community centers (32). Thus, the optimal gamification structure, elements, and social context best suited for delivery entirely via technologies to promote lasting PA improvements among insufficiently active AA adults remain unclear.

The purpose of the present study was to conduct focus groups with insufficiently active AA adults residing in the Southeast U.S. to explore their perspectives regarding technology-delivered gamification for PA promotion, especially in relation to an existing electronic and mobile health (e/mHealth), team-based PA intervention called Columbia Moves (70). Themes emerging from these data will inform the cultural adaptation of the Columbia Moves intervention and its subsequent implementation and evaluation among insufficiently active AA adults. We present this article in accordance with the COREQ reporting checklist (available at https://mhealth.amegroups.com/article/view/10.21037/mhealth-23-44/rc) (71).

Methods

Participants

Individuals were included in the study if they self-identified as AA, reported being insufficiently physically active (<150 minutes/week of moderate-intensity equivalent aerobic PA), resided in the Southeastern U.S., were 18–65 years of age, reported a body mass index (BMI) of 18.5–55.0 kg/m^2, had access to a smartphone, computer,

or tablet with internet and a camera, and reported being able to walk at least 1/4 mile continuously. Additionally, AA adults who had previously participated in a team-based gamified PA promotion study (Columbia Moves) conducted from 2018–2019 in the Greater Columbia, South Carolina area were also eligible to participate (70), but any individual currently participating in another PA study or structured PA program was excluded.

Procedures and measurements

Non-Columbia Moves participants were recruited in June and July of 2021 via targeted e-mails sent to community network contacts, churches, university listservs, and former participants of lifestyle behavior change studies, as well as via word of mouth. All individuals were offered $50 to participate. Recruitment materials directed interested individuals to a study website to learn more about the study and apply via an online screening questionnaire, which assessed the eligibility criteria listed above, height and weight (used to calculate BMI), and time spent in moderate-intensity equivalent aerobic PA over the past week using the short-version of the International Physical Activity Questionnaire (72). Likely eligible participants were e-mailed to schedule an individual orientation session conducted via the Zoom video conference platform. At this orientation session, the study was described in detail, and eligibility with respect to time spent in moderate-intensity equivalent aerobic PA was confirmed. Participants then provided informed consent electronically, were scheduled for a focus group session, and responded to an online questionnaire prior to attending their focus group session, which contained questions about additional sociodemographic characteristics and current use of electronic PA tracking devices. All online questionnaires were administered using REDCap software v11.0.3.

Focus group structure and procedures

We conducted six separate focus group sessions online via Zoom [to eliminate the risk of in-person contacts posed by coronavirus disease 2019 (COVID-19)] in June and July 2021. Focus groups offer a format in which individuals can discuss ideas at a group level as opposed to solely interacting with a moderator. They provide an opportunity for critical feedback, interpretations, and group ideas and norms to emerge in conjunction with individual ideas and preferences. Using focus groups to gather group-level data best aligned with the goal of our study by allowing us to

better understand the perspectives and norms of a specific target population. All sessions were facilitated by an AA male professor of political science from the Southeast U.S. with a doctoral degree and extensive experience moderating focus groups with AAs (including via Zoom) on issues that disproportionately affect the AA community. The moderator used the same semi-structured focus group guide during each session. He began each group by conveying the focus group purpose and intent to develop a culturally targeted e/mHealth PA promotion program for insufficiently active AA adults. He then facilitated introductions, emphasized group confidentiality and respect, and presented an overview of the Columbia Moves PA team-based gamification intervention (70) to provide a foundation for the discussions.

Columbia Moves (70) was delivered entirely through e/mHealth technologies and underpinned by the social cognitive theory (73), self-determination theory (74), social network theory (73), and insights from behavioral economics (73). This pilot feasibility study offered a team-based gamification approach to promoting PA with a racially diverse population in central South Carolina. Participants engaged in a 12-week program on a team of 3–8 self-selected teammates of friends, co-workers, and/or family members. The intent of leveraging teams of individuals with existing social ties was to harness a social structure favorable to sustaining social support and fostering social influence, social norms, and collective efficacy for PA—key theoretical behavior change constructs and contributors to maintaining regular PA participation (73)—potentially ignited via gamification. Participants also received graded personal step goals based on their accelerometer-measured average baseline daily step count, a Fitbit Alta HR (Fitbit Inc., San Francisco, CA, USA) for self-monitoring their PA progress, access to the study web app with behavior change information, and regular electronic feedback from interventionists about their progress towards their goals (70). Each team had a generic virtual shoe mascot and competed against one another in both a step competition and weekly PA challenge game with a storyline. Team rankings and step counts were displayed on a leaderboard. The weekly PA challenge game was characterized by the presentation of varying types of challenges, levels, and points centered around the principle of loss aversion (73). These specific gamification elements were designed to foster motivation for PA primarily by allowing for social comparison, reinforcement, and the facilitation of autonomy and aversion to potential loss (73,74). The results were updated every 15 minutes on the leaderboard within the app (70).

During the focus groups, the moderator provided verbal and visual descriptions (i.e., screenshots of the gamification elements within the study app) of the Columbia Moves intervention approach and sought to understand perspectives from all participants (both those who had participated in Columbia Moves and those who had not). Participants were specifically asked to share what they thought about team-based competition and challenge games in general. The moderator posed additional open-ended questions about team-based gamification for PA promotion more broadly, including preferences for types of weekly PA challenges, leaderboard feedback, game aesthetics, and teammate characteristics. Throughout the discussions, the moderator encouraged participants to genuinely share their thoughts about aspects of a digital PA promotion program that would convey it was culturally designed for AAs and probed deeper when comments were shared that appeared to be related to culture or race or required further elaboration or contextualization. Examples of focus group guide questions included the following, with the full focus group guide content (Focus Group Guide is available at https://cdn.amegroups.cn/static/public/Focus-Group-Guide.docx):

❖ What do you think about a team competition like this one [Columbia Moves]? How much, if at all, would this kind of competition motivate you to be more physically active? Why or why not?

❖ What do you think about the shoe mascot and selecting a team name—is it something you feel is important to create team unity, and in turn, would it help motivate you and your team to be physically active? What types of images would you prefer to select from to represent you or your team in an online physical activity competition other than the shoe mascot (for example, something such as an avatar—an icon or figure that you can choose to represent you online in a game—or some other representation of your team and yourself, and if so, what?). Or do you like the shoe mascot idea alone?

❖ What do you think about this idea [weekly challenge game]? How much, if at all, would you enjoy participating in this type of game with a team? How much would it motivate you to be more physically active? Why or why not? What types of challenges would appeal to you the most?

❖ When thinking about participating in an online program such as this one [Columbia Moves]: How important would it be to you to be in a team with people you already know? How important is it to you to have teammates who have a similar starting activity level as you? How important would it be for your teammates to be the same sex? How important would it be for your teammates to be Black? How important is to you to have teammates who live in the same geographic area as you?

Focus group sessions ranged from 80 to 112 min in duration, were held in the evening, video recorded, and transcribed verbatim by an independent transcription company (Rev, Austin, TX, USA).

Statistical analysis

Data were analyzed using the NVivo 12 qualitative analysis software. Drawing from a content analysis approach (75), a subset (n=2) of transcripts was emergently coded independently by two members of the research team. Consensus was reached on a codebook that was then applied to the remaining transcripts using a constant comparative method (75), with coder debriefing and comparisons conducted throughout the coding process to identify and incorporate any further emergent codes in subsequent transcripts. Salient themes were identified using this inductive approach and data were also examined for gender and age patterns. Research team members then reviewed the themes to contextualize them, placing the ideas within theoretical models and associating them with extant literature, with the intent to provide a foundation for guiding the development of a culturally targeted e/mHealth intervention for insufficiently active AA adults. Two-sample t-tests and two-sample tests for proportions were used to analyze potential differences in sociodemographic and PA characteristics between Columbia Moves and non-Columbia Moves participants using SPSS v26. Statistical significance was set at 0.05.

Ethical statement

The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by the University of South Carolina's Institutional Review Board (No. Pro00104562) and informed consent was obtained from all individual participants.

Results

Sample characteristics

A total of 96 individuals completed the online screening questionnaire. Of those, 17 were ineligible (16 self-reported >150 minutes of moderate-intensity equivalent aerobic PA; one did not meet the age criterion), 28 did not respond to orientation scheduling emails, and nine were eligible but did not attend their scheduled focus group. The remaining 42 participants (39 female and 3 male) participated in the focus groups. On average, participants were 45.09±9.77 years of age and had a BMI of 34.43±7.80 kg/m^2, with 64% classified as having obesity (BMI ≥30 kg/m^2). Focus groups averaged 95 minutes and consisted of 4–8 individuals per group (mean =7 per group). Ten participants aggregated across four of the focus groups had participated in the Columbia Moves study. Former Columbia Moves participants self-reported a higher volume of moderate-intensity equivalent aerobic PA compared to non-Columbia Moves participants (91.50±84.13 versus 16.56±30.33 min/week, P<0.001), although both groups met criteria to be classified as insufficiently physically active (4). No other differences were observed between those who had participated in the Columbia Moves study and those who did not. All participant characteristics are provided in *Table 1*.

Themes

As shown in *Table 2*, seven salient themes were identified. Participants frequently discussed ideas in ways that tapped into multiple themes at once (e.g., competition, motivation, accountability). While each theme distinctively emerged from the focus groups, the themes often appeared to have strong connections to one another. No gender or age patterns emerged.

Topic 1: gamification
The idea of promoting PA via gamification prompted enthusiasm among most participants across all focus groups, with frequent thoughts raised specifically about motivation and accountability.
Theme 1: motivation
When presented with the description of both the team-based step competition and weekly PA challenge game, participants consistently volunteered that this overall gamification notion would be motivational for

Table 1 Characteristics of sample (n=42)

Measure	Values
Age (years)	45.09 (9.77)
Female, n (%)	39 (92.86)
Education, n (%)	
Bachelor's degree or higher	36 (85.71)
Relationship status, n (%)	
Married	24 (57.14)
Divorced	4 (9.52)
Separated	2 (4.76)
Single	12 (28.57)
Reside in South Carolina, n (%)	41 (97.62)
Body mass index (kg/m^2) based on self-reported height and weight	34.43 (7.80)
Moderate-intensity equivalent physical activity (min/week) based on IPAQ	34.40 (57.38)
Currently use electronic physical activity tracker, n (%)	25 (59.52)
Previously participated in Columbia Moves study, n (%)	10 (23.81)

Data are presented as mean (standard deviation) unless indicated by n (%). IPAQ, International Physical Activity Questionnaire-short version.

Table 2 Themes based on focus group perspectives (n=42)

Theme	
(I)	Motivation
(II)	Accountability
(III)	Competition
(IV)	Structure of weekly challenges
(V)	Type of leaderboard feedback
(VI)	Cultural relevancy of gamification elements
(VII)	Teammate characteristics

PA promotion. For example, a non-Columbia Moves participant said, "*I love to play games, so it seems like it'd be a fun game where you can be competitive against people…it would definitely motivate me to walk more*." Similarly, a Columbia Moves participant said, "*I thought it was great…it just motivated you in a different kind of way*." Stated reasons for why it would be motivational often converged around the

team-based aspect of it. The ability to compete as a team against other teams and having built-in social support for PA as a result of being on a team were frequently mentioned as motivational forces to be physically active. For instance, a non-Columbia Moves participant conveyed, "*I thrive on challenges because it gets you to do more, it wants you to be better than the next group,*" and another said, "*I think it [Columbia Moves] is a good idea. Not even just the competition part. But I think working in a group is more motivating…because you're having other people who you're competing against, but you're also having that motivation from other people.*" Additionally, another non-Columbia Moves participant shared, "*…when I think about like physical activity as a whole, working as a team and being competitive… sharing ideas, sharing resources, I think that those things are very powerful and they're motivating and encouraging all at the same time. So teams will empower me…*"

Theme 2: accountability

Participants consistently volunteered that the combination of gamification and teams would foster a stronger sense of accountability, and, in turn, PA, than one without the other (i.e., engaging in a gamified PA program alone or engaging in a non-gamified PA program as a group). For example, a non-Columbia Moves participant stated, "*I think weekly challenges are a great idea because when you have accountability, you do better. And I'm one of the people that actually do better in groups, and competition is always great…*" One non-Columbia Moves participant shared the sentiment that being engrossed in a game with teammates would even spur them to strive for greater PA achievements, explaining, "*…I would like to see how I'm contributing to the group. So let's say, this week, I got in 500 steps, which, of course, if it's a challenge, it would be more. But if I got in 500 steps, okay, maybe tomorrow, I'll make sure I get 700. So to make sure I'm holding myself accountable to help the team as a whole achieve the goal as well.*" Others noted that team-based gamification would not only facilitate a sense of personal accountability to be physically active, but it would also compel them to hold their teammates accountable. For instance, one non-Columbia Moves participant who had participated in other team-based PA programs in the past said, "*…even when they [teammates] didn't want to do it [exercise], I made them do it. Come on! You got to move! It really helped to have someone there push you and you push them.*" A Columbia Moves participant shared, "*Being a part of a team, there's accountability…you don't want to let your team down. But at the same time, I also found myself with one of the team members, Oh, hey. You go to the same gym. We could meet up and do it together.*"

Topic 2: game structure/mechanics and aesthetics

When it became evident that most participants had favorable reactions and reflections about gamification for PA promotion, the moderator sought to elicit deeper participant insights about the structure, elements, and aesthetics of gamification. Given Columbia Moves was introduced as the primary example of gamification for PA promotion, many participants shared ideas about its features, with themes emerging around competitions, the weekly PA challenge game, leaderboard feedback, game symbols and aesthetics, and preferences regarding interventionists/coaches.

Theme 3: competition

Of those participants who voluntarily responded across focus groups about the competitive element of the two main aspects of Columbia Moves (team step competition and weekly PA challenge game), over three-fourths found it to be attractive, which was also evident in their discussions about motivation and accountability. For example, one Columbia Moves participant said, "*So for me, I loved it [Columbia Moves program]. Like everyone said, I like the competitive aspect of it, competing against people…just made me work harder than I normally would…*" In response to the idea of a weekly PA challenge game with a competitive aspect, a non-Columbia Moves participant commented, "*So that [would] sometimes motivate me to do better with things because I can sometimes be a little bit competitive.*" One Columbia Moves participant who did not feel like a strongly competitive person prior to engaging in the Columbia Moves program shared the following statement about tracking the team rankings on the leaderboard: "*I found it to be pretty good because it pushed me to be more competitive than I realized I was…and then it motivated me to want to do more.*"

Theme 4: structure of weekly challenges

Over half of the participants across focus groups voluntarily expressed preferences related to the structure of the Columbia Moves weekly PA challenge game. Beyond supporting the overall idea of challenges as evident in their discussions about motivation, accountability and competition, there were some aspects they found more appealing than others. Many participants felt it would keep things fresh, and, in turn, motivate them to continue to be physically active. For instance, a non-Columbia Moves participant shared this thought about the weekly challenges, "*It's switching it to not doing necessarily the same thing over and over again, because doing the same thing over and over again can get boring. I just feel like having that diversity of anything in general actually helps.*"

Further, several participants across all groups endorsed certain types of PA challenges, including ones that they could craft or choose, were team-based, and focused on both PA and non-PA targets. For example, in regard to having the option to select which challenges their team would complete, one Columbia Moves participant expressed, "*Choices matter to me because when I can choose, then I tend to be a little more invested, versus having somebody tell me exactly what I need to do.*" A non-Columbia Moves participant shared, "*I think team-based [challenges] is good because you can motivate each other to whatever that challenge is…you guys can work together to achieve that…*" Another non-Columbia Moves participant endorsed the idea of having some weekly PA challenges that "*didn't have to do with exercise, [and instead] just the social support*" aspect. However, most participants did not want a weekly challenge in which a team member was randomly selected to see if they met their PA goal. A Columbia Moves participant explained why, saying, "*I didn't pick the random person [challenge] because I wouldn't want our challenge to fall into the hands of that one person. That's just too much pressure.*" As far as other characteristics of the weekly PA challenge game, participants frequently liked the idea of having levels, points, and recognition as part of the structure, but some did not feel a storyline or narrative was necessary. For instance, one Columbia Moves participant said, "*I didn't find it interesting,*" and a non-Columbia Moves participant stated, "*I play video games…I've never liked a lot of the backstory. I'm kind of like, let's get to the challenge.*"

Theme 5: type of leaderboard feedback

Over half of the participants across focus groups voluntarily expressed preferences related to the leaderboard. Of those, most participants wanted to see leaderboard feedback in the form of step counts and active minutes from the Fitbit. One Columbia Moves participant explained, "*…it [leaderboard feedback] did make me more mindful that you definitely don't want to be at the bottom, so you're looking at your Fitbit a little bit more often and you're getting up and taking that walk at work…*" Another Columbia Moves participant said, "*…when I'm choosing like any type of workout program, I firstly find it helpful to see how many steps a person took and also how long they were active.*" However, participants had differing opinions about whether they wanted to see individual rankings displayed in addition to team rankings. According to a non-Columbia Moves participant, viewing both would be beneficial so one "*can celebrate individually and also collectively.*" Another non-Columbia Moves participant explained the value of being able to see individual rankings by saying there "*may be a reason why [an] individual cannot*

get their numbers up. So that way…you could probably help someone." Other participants shared varying explanations for not wanting to view individual rankings, including to avoid blame and shame ("*…it would be like pointing at that person for not maybe pulling their weight when we're all busy…we're just trying to do the competition together*"—Columbia Moves participant; "*…it's kind of embarrassing to show how terrible you are.*"—non-Columbia Moves participant; "*I think instead of shaming people and saying, A did so-and-so and B did so-and-so, just make it about the group.*"—non-Columbia Moves participant).

Theme 6: cultural relevancy of gamification elements

Participants consistently volunteered that they supported relevant gamification features that promoted team unity (i.e., team name and team mascot/symbols/avatars) in a way that would reflect their interests, race, and culture. In reference to the generic shoe mascot that was assigned to each team as part of the Columbia Moves program, one non-Columbia Moves participant explained, "*…if you want it [PA intervention] to be geared towards AAs you definitely would need something a little more culturally, because a sneaker could mean…any race…if I saw a sneaker I would just be like, oh, okay…if you throw in that black girl magic or spray it with something more geared towards our culture and I'm like oh! this is something for AAs, let me check this out…*" A Columbia Moves participant expressed a similar sentiment, stating, "*I want to be able to have an avatar that has natural hair like myself, or if we're doing something during Juneteenth, be able to have a Juneteenth flag, something that represents our heritage…*" Relatedly, when invited to share their thoughts about preferences regarding interventionists/coaches, most participants wanted them to be AA or felt it was "*preferable*" (non-Columbia Moves participant). One Columbia Moves participant explained, "*I think they [AAs] understand some of our experiences, and just things about us as people that it's just helpful. I'd say the same thing in patient care with clinicians. There's a certain connection racially.*" Another Columbia Moves participant said, "*A lot of times, we have providers that are usually white that's giving us bad news that we have diabetes, we have high blood pressure, we have this. So it'd be great to get some preventative information from someone who looks like us, who can make sure it's culturally relevant to us, talk to us on our level.*"

Topic 3: team

Participants frequently mentioned their affinity for the team-oriented aspect of Columbia Moves throughout the focus group discussions (e.g., motivating to be on a team; team provides accountability; want team-based PA challenges; want features that promote team unity). When the moderator invited them to share more about the ideal composition of their team, mixed views emerged regarding teammate characteristics. Participants wanted teammates who were motivated and supportive, but diverse views were expressed regarding preferences for a range of other characteristics.

Theme 7: teammate characteristics

(I) Race

While some participants, including most of the Columbia Moves participants, volunteered that the race of their teammates did not matter as long as they were motivated to be physically active, a slightly higher number of other participants volunteered that they preferred to have teams comprised exclusively of AAs. For example, one non-Columbia Moves participant said, "*People are people. And everyone, no matter whether they black, white, purple, whatever, they need to be a fit. If they want to be a part of the team that I'm on, as long as they're willing and they're dedicated…I have no problem [with a teammate's race].*" Conversely, another non-Columbia Moves participant said "*…I would like to see someone that looks like me, it will make me feel more comfortable.*" A fellow non-Columbia Moves focus group participant concurred, "*…I think [she] had a really good point about people who look like you…the fact that you can relate to someone because you have the same struggles. As black women, we have very similar stories. And so I think that is motivating for me.*"

(II) Existing social ties versus new social ties

Participants volunteered a wide range of views regarding whether it would be optimal to have teammates they already knew (i.e., friends, co-workers, family members), ones they did not know, or a combination. Feeling comfortable to encourage one's teammates to do well was one reason a Columbia Moves participant gave for wanting teammates they knew ("*I'm just the type of person that it takes me awhile to get used to people I don't know, so with something like this, and you're motivating somebody and holding them accountable, I just prefer to do it with somebody that I know.*"). Others preferred to be on a team with people they did not know, viewing it as an opportunity to learn and expand their social network. A non-Columbia Moves participant shared, "*I would love to be in a group with someone that I don't know because that will just give me the opportunity to get to know their culture or their values, they learn mine. And the way that they exercise… will help me, and what I do will help them. So I would rather be in a group with someone I don't know.*" Others had no strong

opinion for either option. For example, a Columbia Moves participant said, "*It's great having people that I know, but, at the same time, I think just it's still the motivation through camaraderie and team effort. I don't know if it matters as much. If I was placed with people I didn't know, it would be people I get to know.*"

(III) Sex

Of those participants who voluntarily responded across focus groups, over half shared that they were indifferent about their teammates' sex as long as they were committed to the team, while some expressed different views regarding preference for a team member's sex (male or female). As one Columbia Moves participant put it, "*My biggest thing is people are committed and trying to motivate the others in the group…and so I don't care if it's male or female, if you're just willing to engage so we can encourage each other, that's the important thing.*" Some women leaned towards preferring to have female teammates, whereas other women felt male teammates would be ideal. One non-Columbia Moves participant said, "*I just like the female gender, you know, group, if we can get it, I just prefer that. Really, I do.*" In contrast, another non-Columbia Moves participant felt male teammates would serve as more motivating role models for PA, stating, "*…the workout would be just a little bit more harder, which is what I would want…so it wouldn't matter to me. But if, there's a situation where you have to choose, I probably would choose male.*"

(IV) Geography

Many participants volunteered that they were ambivalent regarding where their teammates were residing geographically as long as they were motivated to be physically active. However, the COVID-19 pandemic seemed to influence some participants' views about this aspect. For instance, one non-Columbia Moves participant said, "*…based on what motivates me, I think it will be more beneficial for me to have…some people who are close by. Maybe my answer would have been different pre-Covid. But because everything has been virtual for so long, I just don't think that would motivate me.*" A Columbia Moves participant viewed this scenario differently, explaining, "*…when we did it [Columbia Moves], it [having teammates close by geographically] did matter. That was before the pandemic. And then now, it's like since we had to do everything online, at this point, no, it doesn't matter. I realize that you didn't have to have people right there with you to be connected.*"

(V) PA level

Participants were somewhat evenly split on whether to include or exclude teammates who met the criteria for being

regularly physically active at the start of a program, with reasons focused on benefits (and disadvantages) of having teammates being more active than they were. For example, a Columbia Moves participant said, "*I honestly have to stick with someone on my [PA] level, because I feel like we start on the same level, we can just progress together.*" A non-Columbia Moves participant commented, "*I think it's important [to have teammates at the same starting level] because you think you're the only person that has those challenges, but really there's other people who have the same challenges.*" Another non-Columbia Moves participant had a different view about having teammates who are already physically active, sharing, "*…another person who's already gotten a bit higher than me…they can be like, come on, you can do this.*" Regarding the same scenario, another non-Columbia Moves participant said, "*…you have somebody on there that has more knowledge than you, and it never hurts for you [to] learn new things.*"

Discussion

The present study used qualitative methods to examine insufficiently active AA adults' perspectives about gamification for PA promotion, specifically in relation to an existing e/mHealth PA program called Columbia Moves. Across all focus group sessions, most participants shared enthusiasm for a digitally delivered, team-based gamified program characterized by a step competition and weekly PA challenges. Specifically, seven main themes about this type of program emerged: (I) motivation (it would be motivating), (II) accountability (it would foster a sense of personal accountability to the team to be active and compel teammates to hold each other accountable), (III) competition (competitive elements are appealing), (IV) weekly challenges (team-based challenges targeting PA and social support are appealing), (V) leaderboard feedback (PA feedback about teams is appealing), (VI) cultural relevancy (want team names and symbols and role models that align with their culture and characteristics), and (VII) teammate characteristics (mixed opinions shared about preferences for ideal teammates).

This is the first qualitative study to query insufficiently active AA adults about e/mHealth-based gamification for PA promotion. The attractiveness of the team aspect of the Columbia Moves program reflected a common factor that participants frequently mentioned in discussions centered around the emerging themes, touching on deep structure factors (i.e., motivating to compete against other teams, work with teammates to achieve PA challenges, and have

built-in social support and accountability when doing so; appealing to select program features that support team unity and have teammates who are motivated to be active). Findings from previous formative studies with AA adults also highlight the value of collectivism and social support for PA, especially from existing social ties (11,12,26-34,58). In line with the Supportive Accountability model, the human support and social presence provided via a team can enhance accountability, and, in turn, adherence to e/mHealth interventions (76). While some participants in the present study particularly preferred to have teammates they knew, others were open to networking with new people. Given the collective body of formative evidence predominantly pointing to the importance of social support from family and friends (11,12,26-34) in conjunction with the lack of evidence from rigorous and scalable PA promotion trials that directly leverage existing social ties among this population (45,60,62), future e/mHealth gamification studies should prioritize exploring this approach further.

Interestingly, in a recent qualitative study examining how differences in levels of autonomous motivation among AA women relate to PA barriers and facilitators (32), participants across all levels of motivation also frequently expressed the significance of social support from family and friends for engaging in more PA, as well as the desire to participate in a team. However, women with low autonomous motivation mentioned the importance of having instrumental support in the form of PA partners with greater frequency, whereas those with high autonomous motivation placed a greater emphasis on emotional support and the importance of participating in PA opportunities that are novel, exciting, and competitive (32). The latter notion is consistent with findings from the present study in which most participants in a sample comprised largely of women frequently mentioned the appeal and motivating nature of team-based competitions, although this perspective could not be linked to their level of autonomous motivation given it was not measured. Prior research with AA men has also revealed the importance of camaraderie and competition as PA intervention components (77). Relatedly, a systematic review of social features in mobile health interventions conducted among varying populations revealed that some users preferred competition, while others did not, owing to participants' varying inherent affinity for competition (78). Taken together, social support and teams appear to be highly valuable factors for insufficiently active AA women when it comes to PA engagement but perhaps in different ways depending on individual characteristics.

Future research should continue to explore how levels of autonomous motivation and other individual characteristics relate to a broad array of perceived gamification-based PA facilitators and barriers among insufficiently active AA adults. Such insights should then be accounted for in the design and evaluation of future e/mHealth gamification PA interventions.

Regarding what would constitute other ideal teammate characteristics (race, starting PA level, sex, and geographic location), participants shared a wide range of preferences, although many tended to mention wanting teammates and coaches who were also AA due to a sense of comfort, familiarity, and shared experiences. Similarly, in a recent qualitative study that solicited AAs' input on preferred culturally salient resources to inform the design of a web-based PA program (79), many participants across all focus groups expressed preferences for fellow participants and coaches that looked like them and were relatable. In the present study, some participants also mentioned wanting teammates who had a similar starting PA level, which is consistent with previous qualitative findings shared by inactive adults (80). Collectively, these findings are supported by the social cognitive theory (73) which purports that observing peers or role models work towards successfully performing a behavior, particularly persons with similar characteristics, can enhance self-efficacy and motivation to be physically active. Together these findings are also reflective of the social network theory concept of homophily, which is the tendency for people to connect based on a shared characteristic or trait (73,81). In a previous technology-delivered, team-based gamified PA trial similar to Columbia Moves (82), a secondary data analysis revealed that within self-selected teams of Australian adults, individuals had an increased likelihood of having similar characteristics to their teammates versus non-teammates with respect to both self-reported and device-measured PA, as well as sex. Engaging in a PA program with teammates who have similar characteristics may confer advantages for PA participation based on a review of evidence of social network influences on adult PA in which homophily was related to higher PA (81). However, the optimal combination of characteristics among individuals on a team engaging in a culturally targeted e/mHealth gamification intervention for driving sustained PA participation is not clear and should be scientifically explored.

One strongly voiced preference for program features was the desire for symbols and team names that are reflective of AA people and culture. This preference aligns with previous

evidence which points to several characteristics to consider at the surface level (i.e., matching program features with obvious characteristics of the target population) when designing PA promotion interventions for AA women (58). However, few e/mHealth PA interventions among AA women have considered cultural adaptations at either or both levels (60,61). Given the enthusiasm for incorporating features that connote specific tailoring of the program for AA populations, future investigations in this space centered on gamification for PA promotion should be careful to ensure that the tested interventions integrate and retain these aspects regardless of what individual and team characteristics are being explored.

With respect to game mechanics, most participants across all focus groups commented on the appeal of a leaderboard to display team competition rankings in the form of steps and active minutes. A leaderboard promotes social comparison, is one of the most common elements incorporated into gamification-based PA interventions, and was the most frequently used gamification feature in a recent e/mHealth, team-based PA trial among adults (83,84). However, consistent with a review of evidence on users' perspectives of social gamification elements for PA (78), some participants in the current study expressed concerns about the display of individual PA rankings on a leaderboard thinking it could cause embarrassment and shame, while others felt it could allow them to help others who might need it. These findings suggest that careful consideration is needed when integrating leaderboard rankings into a PA program to help motivate individuals and teams in order to minimize triggering negative emotions. When it comes to team-based weekly PA challenges, participants commented on the importance of being able to choose their own challenges, which aligns with self-determination theory's conceptualization of strengthening autonomous motivation for PA (74). Participants also were interested in challenges that focused on elements beyond PA such as social support. Thus, future investigations should consider designing and testing strategies that directly gamify social support for PA.

Findings from this study should be considered in light of a few limitations. The convenience sample was comprised mostly of AA women residing in South Carolina who had access to a technological device with internet and a camera. Thus, findings may not be generalizable to men, those without access to the specified technologies, or other insufficiently active adults of varying races/ethnicities and geographic locations. Future qualitative investigations should solicit perspectives on gamification and social support among AA men and those without mobile technology, as well as from a larger national catchment, to determine how their views might differ. Additionally, using focus groups may have limited the depth of information shared by each participant compared to interviews. Although this study started to touch on some deep structure aspects in relation to the influence of the social environment, the focus group discussions still largely gauged participant reactions to Columbia Moves as opposed to digging deeply into the personal beliefs and experiences underlying their reactions which should be a focus of future research. Despite these limitations, this study is the first to gauge insufficiently active AA adults' perspectives on gamification for e/mHealth-based PA promotion. Insights were gathered that will allow for both surface level and to some degree deep structure cultural targeting. Finally, both Columbia Moves and non-Columbia Moves participants were included in the study, yielding a sample that could provide insights from differing vantage points.

Conclusions

Insights from the focus groups suggest that integrating gamification into an e/mHealth-based PA intervention may be well-received among insufficiently active AA adults and will be used to design a culturally targeted, team-based PA program for this population, representing the next iteration of Columbia Moves. Reflective of the study themes, specific adaptations will involve retaining competitive elements, with a reconsideration of how leaderboard feedback is presented. The structure of the weekly challenges will target both PA and social support, while also ensuring that participants can craft and choose their own challenges. Program aesthetics will be reflective of participants' race and culture. Decisions about eligibility criteria and precise game mechanics will be made after combining these data with the expertise of PA promotion and health disparity experts.

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Footnote

Reporting Checklist: The authors have completed the COREQ reporting checklist. Available at https://mhealth.amegroups.com/article/view/10.21037/mhealth-23-44/rc

Data Sharing Statement: Available at https://mhealth.amegroups.com/article/view/10.21037/mhealth-23-44/dss

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