Published in final edited form as:

J Racial Ethn Health Disparities. 2019 June ; 6(3): 603–617. doi:10.1007/s40615-018-00559-4.

Positive outliers among African American women and the factors associated with long-term physical activity maintenance

Amber W. Kinsey, PhD^{1,*}, Michelle L. Segar, PhD², Daheia J. Barr-Anderson, PhD³, Melicia C. Whitt-Glover, PhD^{4,5}, and Olivia Affuso, PhD^{1,6}

¹Nutrition Obesity Research Center, University of Alabama at Birmingham, Birmingham AL;

²Sport, Health, and Activity Research and Policy Center, University of Michigan, Ann Arbor, MI;

³School of Kinesiology, University of Minnesota, Minneapolis, MN;

⁴Gramercy Research Group, Winston-Salem, NC;

⁵Winston-Salem State University, Winston-Salem, NC;

⁶Department of Epidemiology, University of Alabama at Birmingham, Birmingham, AL.

Abstract

Studying positive outliers, individuals who have achieved success with long-term (>6 months) physical activity (PA) engagement, may be an important approach for understanding strategies for improving leisure-time PA maintenance among African American (AA) women. This cross-sectional, mixed-methods study 1) examined the personal characteristics, PA patterns and behavioral practices of positive outliers among AA women and 2) compared characteristics of those who maintain PA at recommended levels (HIGH, ≥150 minutes/week >6 months) with those who maintained low PA volumes (LOW, <150 minutes/week >6 months). A large sample of positive outliers completed this study (n=290) and most became physically active on their own (76.2%). These AA women were committed to maintaining an active lifestyle, accumulated 249.7±105.8 minutes of PA/week, and engaged in a variety of activities. Their behavioral practices included scheduling PA during the week (85.9%), goal-setting (82.4%), engaging in PA with others (55.9%), self-monitoring (78.3%), and having a backup plan for missed sessions (54.8%). HIGH maintainers (84.9%) made up most of the sample and these women were characteristically similar to LOW maintainers with few differences. HIGH maintainers have been active longer, achieved higher commitment scores, and engaged in PA at a higher frequency, duration, and intensity, resulting in higher weekly PA volume compared to LOW maintainers (273.8±96.1 vs. 114.4±24.3 minutes per week, p<0.001). Our findings identify factors that may be important for

*Corresponding author: Amber W. Kinsey, Nutrition Obesity Research Center, University of Alabama at Birmingham, 1675 University Blvd, Webb 560, Birmingham, AL 35294-3360, Phone: (205) 934-7953; akinsey@uab.edu.

Conflict of Interest

The authors declare that they have no conflict of interest. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Diabetes And Digestive And Kidney Diseases or the National Institutes of Health.

Ethical Approval and Consent

This study was approved by the participating University's Institutional Review Board and all eligible participants provided informed consent. All procedures were in accordance with the ethical standards of the institution and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

successful PA maintenance among AA women and may help to inform the development of effective behavioral interventions to promote sustained, long-term PA engagement in this population.

Keywords

Positive deviance; exercise; health disparities; coping planning; black women

INTRODUCTION

African American (AA) women are unlikely to engage in sufficient leisure-time physical activity (PA) to achieve national guidelines, (i.e., 150 minutes of moderate-to-vigorous PA (MVPA) per week) [1,2], and are affected by obesity and cardiometabolic diseases to a greater extent than non-Hispanic White women [3]. Behavioral interventions for PA in AA women have successfully promoted short-term improvements in activity patterns, however, facilitating sustained behavior changes in the long-term (i.e., beyond 6 months) [4,5] remains challenging [6,7]. Since attaining better health and eliminating PA-related health disparities requires *sustained* PA engagement [1], more work focused on understanding and identifying the factors that facilitate long-term PA participation in AA women is needed.

One under-utilized approach that has the potential to improve our understanding of how to better foster long-term PA engagement among priority populations is to study individuals within these groups who have successfully maintained PA. The conceptual framework guiding this “*learning from success*” model is positive deviance (hereafter referred to as positive outlier) [8,9], a systematic approach that studies the individuals who have created solutions to a problem faced by members of a particular community through practicing uncommon, positive health behaviors [8,9]. Prior studies of other lifestyle behaviors guided by this approach support its efficacy to improve behavioral outcomes in priority populations [10–12]. For example, in the field of behavioral obesity treatment, much of the current knowledge on “what works” for weight management has been derived from individuals who have achieved success with long-term weight loss maintenance [13,14]. More importantly, disseminating the practices of positive outliers for weight management (previously identified through qualitative study) [11] has been shown to promote weight loss in obese adults [12].

Investigating positive outliers for PA maintenance among AA women has the potential to inform the development of sustainable lifestyle interventions for this population by revealing salient factors and practices to overcome behavioral challenges and promote adherence to long-term behavior change. The first step in this approach is to identify the positive outliers [9]. Fortunately, studies have found positive outliers among AA women and suggest that demonstrating a commitment to an active lifestyle, having a regular routine (e.g., PA in the morning), planning PA with flexibility (e.g., scheduling PA and having a backup plan for missed sessions), and adapting PA routines to fit in the context of their daily lives allow these women to be successful [15–17]. Although prior work provides some insight toward understanding PA maintenance in AA women, these studies were qualitative in nature and the sample sizes of the positive outliers were typically small (n=14 to 15) [15–17], thus

replicating these findings in larger samples is needed. Other studies have also explored the sociodemographic characteristics and barriers to PA that differentiate the AA positive outliers from comparison groups, including insufficiently active (i.e., inactive or engaging in PA below the recommended weekly volume) or novice (i.e., beginners who have been engaging in PA for less than 6 months) AA women [18–21]. Findings from these studies suggest that the positive outliers are characteristically similar and endorse the same barriers as their insufficiently active and novice counterparts. In fact, AA positive outliers have been found in AA populations who are facing known barriers to PA engagement such as time constraints and environmental factors (e.g., economic inequities, rural areas) [15–23]. While these data are exciting and support the existence of positive outliers among AA women, more information about the PA patterns and behavioral practices that may allow this unique group of women to overcome barriers and sustain long-term PA engagement is essential for understanding how these individuals achieve success.

Furthermore, there are additional limitations of prior work that warrant more research in this population. For example, though positive outliers have been found among AA living in rural areas, the researchers did not differentiate between leisure and non-leisure PA [18] which is an important factor to consider given that rural adults achieving recommended levels of PA are more likely to engage in occupational PA [23]. Because occupational PA is beyond one's volitional control, it is possible that high levels of PA among rural AA women may be due to non-leisure activity and, therefore, may not reflect the practices of positive outliers for PA maintenance. Also, previous studies recruited AA women locally where the research took place (e.g., local communities in the Northeast [16,17], Midwest [15,20,21] and Southern [18,19] regions) and, therefore, only represent a subset of AA women in the U.S. population. Lastly, the criteria used to identify positive outliers have varied across studies and may influence the ability to elucidate factors associated specifically with long-term PA maintenance. For example, some operational definitions focus on *PA behavior based on national recommendations for weekly PA volume* (i.e., current achievement of 150 minutes of MVPA per week) [18,21], whereas others focus on *PA behavior maintenance based on how long they have been regularly active* (i.e., 6 months to 1 year). The latter has been used as a sole criterion for PA maintenance [19] and also in combination with the attainment recommended weekly PA volume per week [15–17,20]. Among PA studies, maintenance is often defined as behavior changes that have been sustained for at least six months [4,5]. Individuals can achieve PA maintenance by 1) increasing their PA levels during a PA program or intervention and remaining active for at least 6 months following program cessation, or 2) increasing their PA levels on their own, without a formal program or intervention, and remaining regularly active for at least six months [4,5]. Thus, identifying AA positive outliers for PA maintenance based on these definitions seems more appropriate for elucidating the factors that can promote sustained PA engagement rather than attainment of weekly PA volume.

The rationale for identifying AA positive outliers for PA maintenance based on the length of regular PA engagement is further supported by evidence suggesting that AA women who maintain PA may still engage at a level below the recommended 150 minutes of PA per week (e.g., two times per week for 30 minutes per session) [22]. The practical importance of these *low-volume maintainers* cannot be ignored given that most PA interventions do not succeed

in promoting long-term maintenance [6,7]. Although low-volume maintainers engage in PA below the recommended levels, these under-studied groups have found ways to sustain their behaviors in the long-term. Therefore, studying these individuals may reveal factors and strategies to support insufficiently active and/or novice AA women achieve maintenance status. Likewise, examining potential differences between low- and high-volume maintainers may reveal additional opportunities to intervene with the low-volume group to facilitate their transition to recommended PA levels. Overall, these insights have the potential to improve our understanding of relevant factors associated with the long-term PA maintenance in AA women.

In the current study, we fill gaps in the PA literature by recruiting a large sample of positive outliers among AA women from across the United States and utilizing a mixed methods design. Overall, the objectives of this descriptive study were to 1) identify a large sample of AA women who are positive outliers for PA maintenance living throughout the United States and describe their personal characteristics, and PA patterns and behavioral practices, and 2) compare these characteristics between HIGH and LOW maintainers. To our knowledge, this is the first study of its kind and is an important step towards a better understanding of the factors that contribute to the long-term PA maintenance among AA women.

METHODS

Procedures

This study used a cross-sectional, mixed-methods design, distributed as an online survey (Qualtrics, Provo, UT) consisting of three individually-linked questionnaires: Screener (SCREEN, 6 items), Main (MAIN, 72 items), and Future Interest (FUTURE, 2 items). Using linked questionnaires allowed for the automatic generation of different respondent IDs for SCREEN, MAIN, and FUTURE, thereby maintaining the anonymity of the responses between the respective surveys (e.g., data collected in SCREEN could not be linked to data collected in MAIN) [24]. Additionally, responses within each survey were anonymized [25] but included measures to prevent individuals from taking the survey more than once. Additional survey details are provided below and in the summary of the survey's compliance with the Checklist for Reporting Results of Internet E-Surveys (CHEERIES) [26] (Online Resource 1). No incentives for participation were provided. This study was approved by the participating University's Institutional Review Board (protocol number: E170201008).

Recruitment and Screening.—Prospective participants were recruited from June to November in 2017 via: 1) ResearchMatch, a national health volunteer registry, 2) through targeted emails, 3) flyers posted in gym/fitness and recreation centers and exercise groups in the local metropolitan area, 4) flyers posted on the participating University's campus, 5) word of mouth, and 6) through the research team's professional and personal networks and social media (i.e., Facebook, Instagram, and LinkedIn, Twitter). Noteworthy, our research team consisted of physically active women, most were African American, and our personal and professional networks included other physically active adults and black women. Additionally, the content of our recruitment scripts encouraged our audience to share the information with other women who may be eligible for our study (Online Resource 2). Thus,

in part, snowball sampling may have also supported our recruitment efforts. Prospective participants accessed the survey through an anonymous uniform resource locator (URL) or a quick response (QR) code displayed on recruitment flyers (Online Resource 2) which directed them to a Captcha verification page. After passing this verification, prospective participants were directed to SCREEN which was used to determine eligibility, collect geographic information, and, if eligible, obtain informed consent. Eligible participants were women living in the United States who identified as AA or black, were at least 18 years of age, and self-reported currently being physically active for more than 6 months, as determined by the stages of change categories used previously to identify AA women who were PA maintainers [19]. PA criteria for this study focused on the leisure domain, specifically the *activities completed in the spare time for recreation, sport, or exercise*. Prior findings in AA women have reported that the stages of change are reflective of actual leisure time PA behavior [27]. Eligible participants were directed to the informed consent page and those providing consent were redirected to MAIN.

Description of MAIN.—All measures were asked in MAIN. The purpose of MAIN was to collect data to address the research objectives and identify how the participants found out about the study. The contents of MAIN were developed by the co-authors based on the literature and were pilot tested in five individuals who did not participate in the study. Items in MAIN were organized into several blocks that were preceded by brief descriptions and consisted of multiple choice, select all that apply, and open-ended questions. Spaces for participants to write in their responses were included in some of the items to give them the opportunity to provide alternative or additional responses that were not listed. For convenience, participants were permitted to use a ‘back button’ in MAIN and had the option to ‘save and continue’ at a later time (up to 72 hours, thereafter responses were recorded). Following the completion of MAIN, participants were directed to FUTURE which examined their interest and willingness to participate in future research. Interested individuals provided information to be contacted at a later date.

Measures

Anthropometric and Sociodemographic Characteristics.—Participants provided sociodemographic (i.e., age, height, weight, marital status, education, income, number of children <19 years that live at least one week per month in the home, whether they engage in PA with their children) and employment information (i.e., employment status, whether their workplace provided incentives to be physically active (e.g., rewards for their involvement in programs or challenges)). Body mass index (BMI) was calculated from self-reported height and weight.

Physical Activity Patterns and Characteristics.—A summary of the physical activity survey items can be found in Table 1. We were specifically interested in whether the AA women identified as positive outliers became physically active by participating in a formal PA program or by their own accord [4,5]. Information about the women’s PA patterns (i.e., length of time they have been regularly active, current frequency per week, duration and intensity and per session, type of activities), commitment to PA, and PA experiences during youth were also collected (Table 1). Weekly PA volume, calculated from frequency per week

and duration per session, was used to categorize participants as high-volume (HIGH, 150 minutes per week) or low-volume (LOW, <150 minutes per week) maintainers. To assess intensity, the 6–20 Borg Scale [28] was provided. Others [29] have used this scale to retrospectively assess activity intensity in long-term exercisers. Given the importance of PA frequency, intensity, and duration for health, and the literature suggesting that some AA women may not realize the importance of intensity [21], this study examined which of these factors (i.e., frequency, intensity, or duration) the participants deemed most important to their participation in PA. An additional response option (i.e., None of these, I just do it) was included in this question to allow them to indicate that none of the factors were seen as important to their participation in PA. In addition, participants were asked about the type of activities they engaged in most often (within the past 6 months) and were provided a predetermined list of activities and permitted to write-in additional activities not listed. The overall goal of these questions was to encourage the women to think generally about the PA behaviors they have been able to maintain rather than capture snapshot of their behaviors in a specific time-frame (e.g., 7 days or 1 month) which is common among other self-report measures of PA. An adapted 11-item commitment scale [30] (range of possible scores=11–55, midpoint=33) was used to assess commitment to PA as previous studies have suggested that higher scores (i.e., scores > 33) demonstrate a commitment to an active lifestyle and is associated with PA maintenance in AA women [15–17]. To explore participants' PA experiences during youth, questions about their involvement in organized extracurricular sports/sports-related activities as a child during elementary, middle, and high school, or with a travel team were included. Additionally, whether the women perceived their job to be physically demanding (as an indicator of occupational activity) and how they typically commuted around town (as an indicator of transportation activity) was obtained.

Behavioral Practices.—Participants' behavioral practices were explored to investigate additional factors related to PA maintenance in AA women (Table 1). We asked about the typical time of day of PA engagement, whether they scheduled PA throughout the week, whether they had a personal goal for how often they preferred to be physically active each week, and whether they tracked PA with activity monitors and/or mobile applications, or through non-electronic (i.e., paper) journals. Additional questions explored whether these women typically engaged in PA alone or with others, and if they had a “back-up” plan in place for missed PA session. If a backup plan was used, participants were prompted for further open-ended details about their plan.

Data Analyses

Descriptive statistics are presented as means, standard deviations, and ranges for continuous variables and frequencies for categorical variables. For questions permitting participants to select “all that apply” options or write-in multiple responses, the frequencies for these variables represent selection frequencies (how often the response was selected) as opposed to overall sample proportions. For write-in quantitative responses written as ranges (e.g., 20–30 minutes) or minimum values (e.g., 25+ years), the lower value was used in the analyses (e.g., 20 minutes and 25 years, respectively). Non-specific or vague write-in quantitative responses were not included in these analyses. Open-ended responses detailing participants' backup plans for missed session were independently coded by two members of the research

team and discrepancies were discussed to reach consensus. An inductive approach involving multiple steps was used [31]. First, each coder read the raw text and derived their own set of initial coding categories and subcategories. In the second step, coders discussed discrepancies and refined upper and lower level categories and subsequent descriptions. In the third step, using the refined coding categories, data were independently coded and compared with a kappa statistic for non-square tables as previously described [32]. During the third step, it was identified that each coder selected up to three codes per open-ended response. Since second and third codes may not have been applied to all responses, the kappa statistic was only calculated for the first code and was acceptable (kappa=0.74). Following agreement comparisons, consensus was reached for any discrepancies present at this stage and codes and descriptions were finalized. Cumulative selection frequencies (how often the strategy was used combining all three codes) for backup plan strategies are provided. Illustrative quotations are included to support coded categories and descriptions. Comparisons between HIGH and LOW maintainers were analyzed with t-test and chi-square test (or fishers exact tests). Quantitative data analyses were conducted in SAS 9.4 software (SAS Institute Inc., Cary, NC, USA).

RESULTS

Recruitment Summary

Of the 456 AA women who initiated SCREEN, 76.5% (n=349) completed SCREEN and were eligible for this study (Figure 1). Of this sample, 95.4% (n=333) agreed to participate and initiated MAIN. Most of the individuals agreeing to participate provided sufficient geographic information (97.6%, n=325); most lived in the southern region of the United States, determined by census classifications (South: 60.9%, Midwest: 18.5%, Northeast: 12.0%, West: 8.6%). The completion rate for MAIN, and subsequently FUTURE, was high with 290/333 (87.1%) participants. More than half of these individuals (61.0%, n=177) expressed interest in being contacted for future research (Figure 1). Remaining results are reported for the 290 participants who completed MAIN and most of these individuals heard about the study electronically (51.7% via social media, 37.9% via email, 8.6% via word of mouth, and 1.7% via flyers or did not provide an answer).

Anthropometric and Sociodemographic Data

On average, participants were middle-aged (40.7 ± 11.8 years, range= 19–71 years), had a BMI of 27.8 ± 5.9 kg/m², highly educated (92.4% with at least some college), and single (45.9%) (Table 2). Most women were employed (76.1% full-time), had a total family income of at least \$50,000 (69.8%), and did not have a job that provided incentives to be physically active (64.3%). One-third of the women had children less than 19 years of age living in their home; most women had 1–2 children (74.4%) and engaged in PA with their children (77.9%).

Physical Activity Characteristics

The majority of participants became physically active on their own (76.2%) rather than participating in a formal PA program (23.8%), and had been regularly active for more than 2 years (71.4%), averaging 13.0 ± 10.0 years. Some participants wrote in vague details about

the duration of their participation (n=14), such as “*since 16 years old*”, “*all my life*”, “*lifelong*”) and were not included the calculation of the mean time. These women self-reported being active 4.5 ± 1.2 days per week for 55.4 ± 16.8 minutes per session, resulting in 249.7 ± 105.8 minutes of PA per week (Table 3). The average Borg scale rating for intensity per session was 14.3 ± 2.2 indicating moderate intensity activities. PA frequency (i.e., *how often they do it*) was cited by 54.1% of the women as the most important factor for their participation in PA; 22.8% cited intensity (i.e., *how hard they do it*) as the most important factor and 14.5% indicated that they *just do it* and suggesting that frequency, intensity, or duration were not as important as just being active. These AA women engaged in multiple activities (Figure 2). Although walking, running, and weight lifting were the most common, the women mentioned a broad range of activities including calisthenics, yoga, dancing, hiking, swimming, and playing sports. Household activities such as gardening and carrying groceries were infrequently reported (Figure 2). The mean commitment score (44.7 ± 6.5) exceeded the midpoint threshold (i.e., scores >33) suggestive of being committed to maintaining an active lifestyle. Most of the women (68.6%) participated in organized extracurricular sports/sports-related activities during youth, particularly during middle school and high school (Table 3). Additionally, most participants did not consider their job to be physically demanding (77.3%) and primarily commuted around town by driving (85.5%).

Behavioral Strategies

Common behavioral practices among participants included engaging in PA in the morning (50.3%), scheduling PA throughout the week (85.9%), setting weekly PA goals (82.4%), engaging in PA with others (55.9%) as opposed to alone (44.1%), and self-monitoring PA (78.3%). Of the women who self-monitored PA, most used activity monitors and/or mobile applications (94.3%) while few used paper journals (5.7%). Approximately half (54.8%) of our sample had a back-up plan for missed sessions. Participants tended to use five back-up plan strategies when they missed a PA session. These strategies were categorized as *timing* (i.e., when they made up the missed session), *location* (i.e., where they made up the missed session), *activity* (i.e., how they made it up as it pertains to using an alternate activity), *duration* (i.e., extending the duration of their next session), and *changing dietary intake* (i.e., manipulating their diets to account for less PA that day) (Table 4). Of these five categories, the most frequently used back-up plan strategy focused on the *timing* (52.4%) followed by the *activity* (22.9%) and the *location* (15.6%) of the make-up session (Table 4). Six participants' responses detailing their backup plan did not indicate that a session was missed (e.g., “*make sure the activity still goes on*”) or provided a non-specific response (e.g., “*depends on reason*”). These women were categorized under the proportion of women indicating that they did not have a backup plan.

HIGH vs. LOW Comparisons

Most participants (98.3%, n=285) provided sufficient information to estimate weekly PA volume; most were categorized as HIGH maintainers (84.9%, n=242/285 vs. LOW maintainers, 15.1%, n=43/285). Comparisons between these individuals are summarized here and data tables can be found elsewhere (Online Resource 3). Interestingly, in general HIGH and LOW maintainers were similar with only minor differences noted. HIGH

maintainers have been regularly engaging in PA for a longer period of time ($\chi^2=10.95$, $p=0.004$) and at a higher intensity (Borg scale rating: 14.4 ± 2.3 vs. 13.8 ± 1.6 , $p=0.02$), higher frequency (4.8 ± 1.1 vs. 2.9 ± 0.6 days per week, $p<0.001$), and longer duration (58.0 ± 16.5 vs. 40.8 ± 9.4 minutes per session, $p<0.001$) all of which contributed to a higher weekly volume (273.8 ± 96.1 vs. 114.4 ± 24.3 minutes per week, $p<0.001$) compared to LOW maintainers. Likewise, HIGH maintainers scored higher on the commitment scale than LOW maintainers (45.5 ± 6.1 vs. 40.7 ± 7.0 , $p<0.001$). Although there were no differences between these two groups in the proportion who used self-monitoring tools ($\chi^2=1.27$, $p=0.26$), there were differences in self-monitoring preferences. HIGH maintainers were more likely to use an activity monitor and/or mobile app (76.5% vs. 60.5%, $\chi^2=4.9$, $p=0.03$) and less likely to use paper journals (3.3% vs. 11.6%, $\chi^2=5.8$, $p=0.02$) compared to LOW maintainers.

DISCUSSION

The goal of this study was to investigate the personal characteristics of a large sample of AA women identified as positive outliers for PA maintenance and to describe their PA patterns and behavioral practices. Additionally, since sustaining long-term PA engagement is challenging and a previous study suggested that AA women may maintain low levels of PA [22], potential differences between AA positive outliers who have maintained HIGH and LOW PA levels were explored. Our sample consisted of 290 AA women and most of these participants lived in the southern region of the United States. This might be due to the origin of the study being conducted in this region. Our study participants accumulated, on average, 250 minutes of moderate PA per week which is 66.7% greater than nationally recommended levels [1]. These women also reported a commitment to maintaining an active lifestyle and engaging in a variety of activities. Several behavioral practices were common among these women and may have contributed to their success with long-term maintenance. Most participants maintained recommended levels of PA and, interestingly, there were only minor differences observed between HIGH and LOW maintainers related to PA patterns and self-monitoring preferences.

Successful maintenance of PA can be achieved by individuals becoming physically active through their participation in a formal PA program or through self-guided changes, and then sustaining these behaviors for >6 months after program cessation or on their own [4,5]. Program-induced changes have been the primary focus of PA research to date, whereas the self-guided changes, in general, have been associated with the maintenance of some other lifestyle-related behaviors [33], including those for which PA is critical for long-term outcomes (i.e., successful weight loss maintenance) [13]. Though some positive outliers achieved maintenance after participating in a program, most women (76.2%) achieved maintenance status on their own. Therefore, our findings may reflect salient factors and strategies necessary for AA women to initiate and sustain long-term PA engagement and can contribute to improving the effectiveness of behavioral interventions moving forward.

It has been suggested that some AA women may engage in PA because of circumstances beyond their control (e.g., household, transportation, and occupational) but *may not necessarily be committed to maintaining leisure-time PA* [16]. In contrast, having a

commitment to being active has been positively associated with time spent in leisure-time PA and PA maintenance [34], suggesting that those who can make a firm commitment may be more likely to stay physically active despite changes in their life circumstances. Studies in women, including AA's, who have maintained PA support this relationship [15–17,35]. Consistent with prior studies, our participants reported a commitment to maintaining PA behaviors. One factor that might motivate greater commitment among AA positive outliers is the length of time these women have been regularly active. Most of our participants have been active for >2 years to “*all my life*” and tended to participate in organized PA during youth (68.6%). Thus, the long history of being physically active may have contributed to high levels of commitment. Findings showing a positive relationship between PA stage of change and commitment support this rationale [34]. Yet, it is also possible that this relationship could be the reverse; higher commitment levels may lead to more PA [36]. Worth mentioning, a snapshot of the positive outliers PA from other domains of activity was captured (77.3% did not consider their job to be physically demanding (*occupational*), 85.5 % primarily commuted driving (*transportation*), *household activities* were infrequently reported (Figure 2)). This suggests that activity from these domains may not make substantial contributions to the overall PA levels of our sample and, hence, add support for an association between commitment and leisure-time PA.

Our sample of positive outliers reported high levels of PA and one factor that may allow them to do so is engaging in a variety of activities. In fact, greater variety has been associated with higher daily MVPA [37]. Other studies have shown that using various modes of PA support long-term engagement [16,38], and this may be due to enhanced enjoyment with more activity variety [39]. Noteworthy, most of the AA women in our study considered the frequency of engagement to be the most important factor for their participation in PA. This finding may also explain their participation in a variety of activities and might be important for PA maintenance.

Greater PA variety has also been associated with the achievement of 250 minutes of PA per week [37], an amount necessary for the prevention of weight gain [40]. Interestingly, our sample reported maintaining approximately 250 minutes of PA per week and most of the women were classified as normal-weight or overweight according to the BMI. It is important to note that some AA positive outliers were also classified as obese. The idea that AA women can maintain high levels of PA and still be overweight or obese has been observed in other studies [19,20] and reinforces the notion that factors beyond weight management are important for PA maintenance in this population. This finding has implications for PA interventions, in particular for the focus and content of messaging strategies that target more immediate benefits of PA (e.g., stress reduction, improved mood).

Several behavioral strategies appear to be associated with PA maintenance among the AA positive outliers in this study. Most of these women had a regular routine (i.e., active in the mornings before starting their day and scheduling PA during the week) and used goal-setting and self-monitoring practices; self-regulation practices known to support behavior changes [41] and maintenance [15–17,42]. Likewise, most reported engaging in PA with other people supporting previous research on the key role of social support for PA engagement [43] and maintenance in AA women [44]. However, it is unknown if our sample of positive outliers

are the providers or the recipients of social support. That is, does serving as role models and supporting others motivate them to maintain PA or is their ability to maintain PA a result of the support they receive from others? Both roles have been associated with PA maintenance in women [20,35,45]. Some evidence suggests that multiple dimensions of social support are used by AA women to sustain an active lifestyle [44]. Exploring the factors influencing the directionality of how social support (i.e., providers vs. recipients) and pertinent dimensions (e.g., emotional support) promote PA maintenance among AA women warrant investigation.

More than half of the AA positive outliers reported strategies they used to make up missed PA sessions demonstrating their use of flexible planning strategies. This is important because flexible self-regulation (vs. rigid) is thought to be an important strategy for sustaining physical activity participation [42,46] especially for women who juggle multiple roles and responsibilities. Although diverse back-up plans were identified, the most commonly used approach focused on changing the timing of when a missed session would be made up (e.g., doing it on the same day but at a different time or on another day). These behavioral practices identified in our large sample support findings from other qualitative studies with small sample sizes [15–17], as well as interventions targeting increased PA [47].

In prior studies examining the factors associated with PA maintenance in AA women there have been inconsistencies in operational definitions used to identify the “maintainers” [15–22], making the ability to elucidate factors associated with sustained, long-term engagement in this population difficult. Here, we focused specifically on PA maintenance defined by the length of time individuals have been regularly engaged in PA (i.e., >6 months). This might be a better definition for identifying factors associated with long-term maintenance of PA, as opposed to focusing primarily on a weekly PA volume, for several reasons. For example, focusing on individuals who have been regularly engaging in PA for >6 months may allow for the examination of factors related to on-going participation whereas focusing solely on weekly PA volume, without reference to the duration of behavior sustainability, captures PA engagement but does not allow researchers to examine maintenance-related factors. Furthermore, AA women who maintain PA may engage at a level below the recommended volume per week [22] which has practical implications as potential factors that can assist non-maintainers (e.g., <6 months of engagement regardless of PA volume) transition to maintenance may be identified. This is particularly important given that most interventions have not succeeded in promoting long-term maintenance among AA women [6,7], though exceptions exist [48]. Therefore, studying low-volume maintainers (i.e., those maintaining PA below the recommendations) may be informative and reveal factors that can support recent PA adopters and non-maintainers to develop strategies that initially focus on *maintaining low levels of PA*. Once regular PA participation is achieved, strategies to support low-volume maintainers’ transition to recommended levels of PA can be elucidated by exploring the factors that differentiate these two groups of maintainers.

In the current study, HIGH and LOW maintainers were similar in most characteristics. However, there were several key differences worth mentioning including how long they had been regularly engaging in PA and their commitment scores, PA patterns, and self-monitoring preferences. HIGH maintainers have been regularly active longer and scored higher on the commitment scale than LOW maintainers. As previously mentioned, a long

history of being active may contribute to high levels of commitment [34] or it may be that higher commitment levels lead to more PA [36]. The latter may be the case when comparing HIGH and LOW maintainers in the present study for a few reasons. First, the between-group differences concerning the length of time these women have been regularly active and their PA volume may not be as meaningful given that, on average, both HIGH and LOW maintainers have been engaged in PA for 10+ years and the LOW maintainers were engaging in a lot of PA. Second, though commitment scores differed, both groups exceeded the midpoint threshold (i.e., scores >33) indicative of AA women being committed to an active lifestyle [15–17]. However, the higher scores achieved by HIGH maintainers and our findings demonstrating that these women participated in more sessions, engaged in PA at a higher intensity, and for longer durations per session, resulting in a higher total volume of PA per week, seem to suggest that higher commitment may be associated with more PA. Likewise, the differences in PA patterns between HIGH and LOW maintainers may also be explained by the fact that to continue reaping the benefits of PA, physically active individuals may need to progressively increase the PA stimulus to a level greater than the body is normally accustomed which can be achieved by increasing the frequency, intensity, and/or duration of the activity [49]. We also found that HIGH maintainers were more likely to use electronic self-monitoring devices, as opposed to paper diaries, though electronic devices were preferred by both HIGH and LOW maintainers. Compared to paper diaries, adherence to self-monitoring PA appears to be better with electronic devices [50]. Likewise, consistently tracking PA has been associated with long-term maintenance of MVPA [51]. Overall, our findings between HIGH and LOW maintainers suggest that intervention strategies that can enhance LOW maintainers commitment to being physically active may help these individuals transition to sustaining higher levels of PA and that electronic approaches to support self-monitoring should be utilized.

This study has several strengths. Prior studies recruited participants locally from surrounding areas where the research was conducted. Using an online survey platform allowed us to cast a broader net and expand our recruitment efforts beyond the local community of the participating University. Most AA positive outliers in our sample were HIGH maintainers and lived in the Southern region of the United States. The proportion of women not meeting guidelines for leisure-time PA is high and significantly lower than the national average among those living in the South relative to other regions of the United States [52], and among AA adults relative to other populations [3]. However, our ability to identify this important group of AA women in the South highlights potential benefits of studying positive outliers and using it as a tool to improve disparities in PA and health in priority populations. This study provided insight into the factors that may be relevant for promoting sustained PA engagement in AA women. Since our findings are more reflective of the PA patterns and behavioral practices of AA women who became physically active on their own and maintained recommended levels of PA, these factors may be pertinent to long-term success and, therefore, may better inform the development of effective behavioral interventions.

While the study has several strengths, it is not without limitations. This cross-sectional study may be limited by recall bias regarding PA behaviors over the last 6 months, the reliance on self-reports may overestimate actual PA levels [53], and causal inferences cannot be determined by this study design. Most AA women were from high socioeconomic status

(SES) backgrounds and, therefore, our findings may be more generalizable to AA populations of similar economic status. Consistent with much of the literature, including a recent study that compiled physical activity patterns from four national datasets [54], AA women with higher education and/or income levels tend to be more physically active than their respective counterparts. It is clear that more work dedicated to understanding the factors associated with PA maintenance in AA positive outliers from lower economic backgrounds is needed. In fact, studies have been able to identify AA positive outliers for PA maintenance within lower economic communities [16,20]. Interestingly, there were similarities between those studies and our findings (e.g., commitment to PA, using varied modes of PA, goal-setting and flexible planning strategies), suggesting that these might be key factors for PA maintenance among diverse populations of AA women. Future research identifying positive outliers from lower economic backgrounds is warranted to better understand how these individuals overcome their unique challenges to adopt and maintain a physically active lifestyle. This approach may reveal new knowledge that has the potential to improve disparities in PA and health due to racial and economic factors. Though our sample included a broad age-range, we did not conduct additional age-related analyses. Since maintaining PA is difficult and few studies have focused on identifying positive outliers for PA maintenance, our goal was to identify positive outliers among AA women, in general, with limited exclusion criteria to allow for variation within the sample of maintainers. Future studies, however, should examine potential age-related differences in this under-studied population. In an attempt to explore AA positive outliers real-life PA experiences we asked questions with reference to average PA engagement but did not use validated self-report questionnaire to quantify PA patterns. We chose this method to encourage participants to think more generally about their regular PA behaviors in the context of what they currently maintain rather than in reference to their recent behaviors within the past month or previous seven days. Future research to overcome these limitations should include a prospective sample, along with objective methods to validate long-term PA behaviors.

Although the majority of PA promotion studies for AA women have typically focused identifying the factors that contribute to the prevalence of sedentariness or inactivity as a strategy to improve PA adoption and maintenance, we took an alternative approach to understand PA maintenance by exploring the factors that promote successful maintenance of PA in AA women. We also examined the factors that differentiate those who maintain high vs. low levels of PA to elucidate best strategies to help AA women transition to maintenance status after adopting an active lifestyle. However, in-depth inquiries with AA women who maintain low levels of PA are needed to better delineate why this group has not achieved recommended levels of PA (e.g., time, personal importance of PA, physical limitations). Finally, continuing to examine the factors that enable positive outliers among AA women to successfully maintain PA, through mixed-method approaches, are warranted to gain a better understanding of their strategies for success to be used for widespread dissemination and improve disparities in PA and health AA women. Of particular interest are future studies exploring the strategies used by positive outliers among AA women and other priority populations to prevent sedentary relapse given the high prevalence of dropout/relapse from PA after initial adoption in this population. We were able to assemble a large sample of AA women who have maintained a physically active lifestyle but are not often queried about

their behavioral strategies. Therefore, we have moved beyond a deficit model towards an exploration of assets used by this group to maintain an important health behavior.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

Funding

AWK was supported by T32DK062710 from the National Institute of Diabetes and Digestive and Kidney Diseases.

REFERENCES

1. 2018 Physical Activity Guidelines Advisory Committee. 2018 Physical Activity Guidelines Advisory Committee Scientific Report. Washington, DC: U.S. Department of Health and Human Services; 2018 Available from: https://health.gov/paguidelines/second-edition/report/pdf/PAG_Advisory_Committee_Report.pdf. Accessed 1 Aug 2018
2. Whitt-Glover MC, Taylor WC, Heath GW, Macera CA. Self-reported physical activity among blacks: estimates from national surveys. *Am J Prev Med.* 2007; 33: 412–417. [PubMed: 17950407]
3. National Center for Health Statistics (US). Health, United States, 2016: With Chartbook on Long-term Trends in Health. Hyattsville (MD): National Center for Health Statistics (US); 2017 Available from: <https://www.ncbi.nlm.nih.gov/books/NBK453378/>. Accessed 1 Aug 2018
4. Marcus BH, Dubbert PM, Forsyth LH, McKenzie TL, Stone EJ, Dunn AL, Blair SN. Physical activity behavior change: issues in adoption and maintenance. *Heal Psychol.* 2000; 19: 32–41.
5. Amireault S, Godin G, Vézina-Im L-A. Determinants of physical activity maintenance: A systematic review and meta-analyses. *Health Psychology Review.* 2013; 7: 55–91.
6. Pekmezi D, Jennings E. Interventions to Promote Physical Activity Among African Americans. *Am J Lifestyle Med.* 2009; 3: 173–184.
7. Whitt-Glover MC, Keith NR, Ceaser TG, Virgil K, Ledford L, Hasson RE. A systematic review of physical activity interventions among African American adults: evidence from 2009 to 2013. *Obes Rev.* 2014; 15:125–145. [PubMed: 25196410]
8. Marsh DR, Schroeder DG, Dearden KA, Sternin J, Sternin M. The power of positive deviance. *BMJ.* 2004; 329: 1177–1179. [PubMed: 15539680]
9. Bradley EH, Curry LA, Ramanadhan S, Rowe L, Nembhard IM, Krumholz HM. Research in action: using positive deviance to improve quality of health care. *Implement Sci.* 2009; 4:25. [PubMed: 19426507]
10. Awofeso N, Irwin T, Forrest G. Using positive deviance techniques to improve smoking cessation outcomes in New South Wales prison settings. *Health Promot J Austr.* 2008; 19:72–73. [PubMed: 18481937]
11. Stuckey HL, Boan J, Kraschnewski JL, Miller-Day M, Lehman EB, Sciamanna CN. Using positive deviance for determining successful weight-control practices. *Qual Health Res.* 2011; 21:563–79. [PubMed: 20956609]
12. Kraschnewski JL, Stuckey HL, Rovniak LS, et al. Efficacy of a weight-loss website based on positive deviance: A randomized trial. *Am J Prev Med.* 2011;41: 610–614. [PubMed: 22099238]
13. Barnes AS, Kimbro RT. Descriptive study of educated African American women successful at weight-loss maintenance through lifestyle changes. *J Gen Intern Med.* 2012; 27:1272–1279. [PubMed: 22539067]
14. Hill JO, Wyatt HR, Phelan S, Wing RR. Lessons Learned From the National Weight Control Registry In: Kushner RF, Bessesen DH, editors. *Treatment of the Obese Patient.* Contemporary Endocrinology. Totowa: Humana Press; 2007 pp 395–403.

15. Harley AE, Buckworth J, Katz ML, Willis SK, Odoms-Young A, Heaney CA. Developing long-term physical activity participation: a grounded theory study with African American women. *Heal Educ Behav*. 2009; 36:97–112.
16. Harley AE, Rice J, Walker R, Strath SJ, Quintiliani LM, Bennett GG. Physically active, low-income African American women: an exploration of activity maintenance in the context of sociodemographic factors associated with inactivity. *Women Health*. 2014; 54:354–372. [PubMed: 24617833]
17. Price AE, Greer B, Tucker A. Older Black Women's Experiences Initiating and Maintaining Physical Activity: Implications for Theory and Practice. *J Aging Phys Act*. 2013; 21:348–366. [PubMed: 23170756]
18. Sanderson BK, Foushee HR, Bittner V, et al. Personal, social, and physical environmental correlates of physical activity in rural African-American women in Alabama. *Am J Prev Med*. 2003; 25:30–37. [PubMed: 14499807]
19. Scott MS, Oman RF, John R. The benefits and barriers related to regular participation in physical activity by african-american women: implications for intervention development. *Open J Prev Med*. 2015; 5:169–176.
20. Kirchhoff AC, Elliott L, Schlichting JA, Chin MH. Strategies for physical activity maintenance in African American women. *Am J Health Behav*. 2008; 32: 517–524. [PubMed: 18241136]
21. Sebastião E, Chodzko-Zajko W, Schwingel A, et al. An in-depth examination of perceptions of physical activity in regularly active and insufficiently active older african american women: a participatory approach. *PLoS One*. 2015; 10: 1–15.
22. Young DR, Gittelsohn J, Charleston J, Felix-Aaron K, Appel LJ. Motivations for exercise and weight loss among african-american women: focus group results and their contribution towards program development. *Ethn Health*. 2001; 6:227–245. [PubMed: 11696933]
23. Kegler MC, Alcantara I, Dubruiel N, Veluswamy JK, Appelbaum H, Handwerk S. "Positive deviants": a qualitative study of physically active adults in rural environments. *J Prim Prev*. 2013; 34: 5–15. [PubMed: 23329017]
24. Obodda S Use Qualtrics for Human Subjects Research: Anonymize Responses. Available from: <https://ithelp.brown.edu/kb/articles/use-qualtrics-for-human-subjects-research-anonymize-responses>. Accessed 1 Aug 2018
25. Obodda S Use Qualtrics for Human Subject Research: Using a Screener Survey. Available from: <https://ithelp.brown.edu/kb/articles/use-qualtrics-for-human-subject-research-using-a-screener-survey>. Accessed 1 Aug 2018
26. Eysenbach G Improving the quality of Web surveys: the Checklist for Reporting Results of Internet E-Surveys (CHERRIES). *J Med Internet Res*. 2004; 6:e34. [PubMed: 15471760]
27. Webb FJ, Khubchandani J, Hannah L, Doldren M, Stanford J. The perceived and actual physical activity behaviors of african american women. *J Community Health*. 2016; 41:368–375. [PubMed: 26487441]
28. American College of Sports Medicine. ACSM's Guidelines for Testing and Prescription. Philadelphia, PA: Wolters Kluwer; 2017.
29. Stetson BA, Beacham AO, Frommelt SJ, Boutelle KN, Cole JD, Ziegler CH, et al. Exercise slips in high-risk situations and activity patterns in long-term exercisers: an application of the relapse prevention model. *Ann Behav Med*. 2005; 30: 25–35. [PubMed: 16097903]
30. Corbin CB, Nielsen AB, Borsdorf LL, Laurie DR. Commitment to Physical Activity. *Int J Sport Psychol*. 1987; 18:215–222.
31. Thomas DR. A General Inductive Approach for Analyzing Qualitative Evaluation Data. *Am J Eval*. 2006; 27: 237–246.
32. Uebersax J Calculating Kappa with SAS. Available from: <http://www.john-uebersax.com/stat/saskappa.htm>. Accessed 1 Aug 2018
33. Bishop FM. Self-guided Change: The most common form of long-term, maintained health behavior change. *Heal Psychol Open*. 2018; 17:1–14.
34. Gabriele JM, Gill DL, Adams CE. The roles of want to commitment and have to commitment in explaining physical activity behavior. *J Phys Act Heal*. 2011; 8:420–428.

35. Dacey M, Baltzell A, Zaichkowsky L. Factors in women's maintenance of vigorous or moderate physical activity. *Women Sport Phys Act J*. 2003; 12:87–111.
36. Wilson PM, Rodgers WM, Carpenter PJ, Hall C, Hardy J, Fraser SN. The relationship between commitment and exercise behavior. *Psychol Sport Exerc*. 2004; 5:405–421.
37. Bond DS, Raynor HA, Phelan S, Steeves J, Daniello R, Wing RR. The relationship between physical activity variety and objectively measured moderate-to-vigorous physical activity levels in weight loss maintainers and normal-weight individuals. *J Obes*. 2012; 2012:1–6.
38. White JL, Randsdell LB, Vener J, Flohr JA. Factors related to physical activity adherence in women: review and suggestions for future research. *Women Health*. 2005; 41:123–148. [PubMed: 16260417]
39. Glaros NM, Janelle CM. Varying the mode of cardiovascular exercise to increase adherence. *J Sport Behav*. 2001; 24: 42–62.
40. Donnelly JE, Blair SN, Jakicic JM, Manore MM, Rankin JW, Smith BK. American College of Sports Medicine Position Stand. Appropriate physical activity intervention strategies for weight loss and prevention of weight regain for adults. *Med Sci Sports Exerc*. 2009; 41:459–471 [PubMed: 19127177]
41. Michie S, Abraham C, Whittington C, McAteer J, Gupta S. Effective techniques in healthy eating and physical activity interventions: A meta-regression. *Heal Psychol*. 2009; 28:690–701.
42. Teixeira PJ, Carraça EV, Marques MM, et al. Successful behavior change in obesity interventions in adults: a systematic review of self-regulation mediators. *BMC Med*. 2015; 13:84. [PubMed: 25907778]
43. Bland V, Sharma M. Physical activity interventions in African American women: A systematic review. *Heal Promot Perspect*. 2017; 7:52–59.
44. Harley AE, Katz ML, Heaney CA, et al. Social support and companionship among active African American women. *Am J Health Behav*. 2009; 33:673–685. [PubMed: 19320616]
45. Harley AE, Odoms-Young A, Beard B, Katz ML, Heaney CA. African American social and cultural contexts and physical activity: strategies for navigating challenges to participation. *Women Health*. 2009; 49:84–100. [PubMed: 19485236]
46. Segar M, Taber JM, Patrick H, Thai CL, Oh A. Rethinking physical activity communication: using focus groups to understand women's goals, values, and beliefs to improve public health. *BMC Public Health*. 2017; 17:462. [PubMed: 28521756]
47. Segar M, Jayaratne T, Hanlon J, Richardson CR. Fitting fitness into women's lives: effects of a gender-tailored physical activity intervention. *Womens Health Issues*. 2002; 12:338–347. [PubMed: 12457574]
48. Whitt-Glover MC, Goldmon MV, Gizlice Z, Sillice M, Hornbuckle L, Heil DP. Increasing physical activity in black women: results from a randomized trial conducted in faith-based settings. *Ethn Dis*. 2017; 27:411–420. [PubMed: 29225442]
49. Garber CE, Blissmer B, Deschenes MR, et al. American College of Sports Medicine position stand. Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: guidance for prescribing exercise. *Med Sci Sport Exerc*. 2011; 43:1334–1359.
50. Padhye NS, Wang Jing. Pattern of active and inactive sequences of diabetes self-monitoring in mobile phone and paper diary users. 2015 37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society. 2015: 7630–7633.
51. Gavin KL, Sherwood NE, Wolfson J, Pereira MA, Linde JA. Characterizing self-monitoring behavior and its association with physical activity and weight loss maintenance. *Am J Lifestyle Med*. 2018.
52. Blackwell DL, Clarke TC. State variation in meeting the 2008 federal guidelines for both aerobic and muscle-strengthening activities through leisure-time physical activity among adults aged 18–64: United States, 2010–2015 National Health Statistics Reports; no 112. Hyattsville, MD: National Center for Health Statistics 2018
53. Prince SA, Adamo KB, Hamel ME, Hardt J, Connor Gorber S, Tremblay M. A comparison of direct versus self-report measures for assessing physical activity in adults: a systematic review. *Int J Behav Nutr Phys Act*. 2008; 5:56. [PubMed: 18990237]

54. Williams WM, Yore MM, Whitt-Glover MC. Estimating physical activity trends among blacks in the United States through examination of four national surveys. *AIMS Public Health*. 2018; 5: 144–157. [PubMed: 30094277]

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Fig. 1.
Recruitment Summary and Completion Rate

Fig. 2.

Types of Activities. Selection frequencies represent how often the activity was selected because participants could select all applicable activities and write-in additional activities not listed. The home and garden category included yard work, gardening, and carrying groceries. The other activities/sports category included roller skating, chair volleyball, and hula hooping

Table 1.

Physical activity and behavioral variables and survey items

Variables of interest	Survey items or questions	Response Options
<p style="text-align: center;"><u>PA Patterns and Characteristics</u></p> <p><i>[Descriptor]</i> The next few questions will ask you about the kinds of physical activities you do in your spare time for recreation, sport, or exercise.</p>		
Initial Changes in PA	<p>■ What led to the initial changes in your current physical activity behaviors? Please select the option that best describes your situation.</p>	<p>The initial changes in my current level of physical activity were due to...</p> <p>☐ My participation in a formal physical activity program. The program ended and I continued to maintain my physical activity.</p> <p>☐ Changes I made on my own.</p>
Length of time they have been regularly active	<p>■ How long have you been regularly engaging in physical activity? If more than 2 years, please write how long it has been.</p>	<p>☐ At least 6 months but less than 1 year</p> <p>☐ 1–2 years</p> <p>☐ More than 2 years</p> <p>☐ write-in response if more than 2 years</p>
Frequency per week	<p>■ On average, how many days per week do you currently engage in physical activity?</p>	<p>☐ Choices ranged from 1 –7</p>
Duration per session	<p>■ On average, how long are you actively engaged in physical activity per session?</p>	<p>☐ Less than 30 minutes</p> <p>☐ 30 minutes</p> <p>☐ 45 minutes</p> <p>☐ 1 hour</p> <p>☐ Other</p> <p>☐ write-in response if “other”</p>
Weekly PA Volume	<p><i>This variable was calculated for self-reported frequency per week and duration per session.</i></p>	-
Intensity per session	<p>■ Using the scale provided above (<i>image of 6–20 Borg Scale included in this question</i>), please select the number that best describes the average intensity of the physical activity you engage in?</p>	<p>☐ Choices ranged from 6–20</p>
Most important to their participation in PA	<p>■ Which of these factors is most important to you in terms of your participation in physical activity?</p>	<p>☐ Frequency (How often you do it?)</p> <p>☐ Intensity (How hard you do it?),</p> <p>☐ Duration (How long you do it?)</p> <p>☐ None of these, I just do it</p>
Type of activities	<p>■ In the last 6 months, what type(s) of physical activities did you engage in most often? (select all that apply)</p>	<p>☐ A predetermined list of options was provided</p> <p>☐ Other</p> <p>☐ write-in response if “other”</p>
Commitment to PA	<p><i>Adapted 11-item Commitment Scale [Descriptor] The next set of questions will ask about you attitudes and feelings towards physical activity. Please select the answer that generally describes how you feel about physical activity.</i></p> <p>■ I look forward to physical activity</p>	<p>☐ All items rated from “strongly agree” to “strongly disagree”</p>

Variables of interest	Survey items or questions	Response Options
	<ul style="list-style-type: none"> ■ Physical activity is a chore ■ I do not enjoy physical activity ■ Physical activity is very important to me ■ Life is more fulfilling as a result of physical activity ■ Physical activity is pleasant ■ I dislike the thought of doing regular physical activity ■ I would arrange or change my schedule to participate in physical activity ■ I have to force myself to participate in physical activity ■ To miss a day of physical activity is a relief ■ Physical activity is a high point in my day 	
PA experiences during Youth	<ul style="list-style-type: none"> ■ As a child were you involved in “organized” extracurricular sports/sports-related activities? <p><i>If Yes, then the next two questions were asked.</i></p> <ul style="list-style-type: none"> ■ When were you involved in “organized” extracurricular sports/sports-related activities? ■ Please list the “organized” extracurricular sports/sports-related activities you were involved in. 	<ul style="list-style-type: none"> ☐ Yes ☐ No ☐ Elementary School <ul style="list-style-type: none"> ☐ write-in response ☐ Middle School <ul style="list-style-type: none"> ☐ write-in response ☐ High school <ul style="list-style-type: none"> ☐ write-in response ☐ Travel team <ul style="list-style-type: none"> ☐ write-in response
Physical job demand (proxy for occupational PA)	<ul style="list-style-type: none"> ■ Do you consider your job to be physically demanding? 	<ul style="list-style-type: none"> ☐ Yes ☐ No
Commuting method (proxy for transportation PA)	<ul style="list-style-type: none"> ■ How do you usually get around town? 	<ul style="list-style-type: none"> ☐ I walk ☐ I bike ☐ I drive ☐ I take public transportation (i.e. bus, metro...etc)
	Behavioral Practices	
Time of day	<ul style="list-style-type: none"> ■ What time of day do you typically engage in physical activity? 	<ul style="list-style-type: none"> ☐ Morning ☐ Lunchtime ☐ Afternoon ☐ Evening (after 5pm)
Scheduling PA	<ul style="list-style-type: none"> ■ During the week, do you typically schedule when you will engage in physical activity? 	<ul style="list-style-type: none"> ☐ Yes ☐ No
Weekly Goal	<ul style="list-style-type: none"> ■ Regardless of your current behaviors, do you have a weekly goal for how often you would prefer to be physically active? 	<ul style="list-style-type: none"> ☐ Yes, I have a personal goal. I would prefer to be physically active ____ times per week.

Variables of interest	Survey items or questions	Response Options
		☐ No, I do not have a personal goal
Self-Monitoring PA	■ Do you use any of the following to keep track/ monitor your physical activity?	☐ Activity monitor or mobile application ☐ Journal (non-electronic) ☐ I do not keep track/monitor my physical activity
Engages in PA with Others	■ Do you typically engaged in physical activity with others?	☐ Yes ☐ No
Plan for Missed sessions	■ We know that things may come up causing us to change our schedules. When this happens, do you usually have back-up plan for missed sessions?	☐ Nope, it's just a missed session ☐ Yes
Back-up Plan Strategy	<i>If Plan for Missed sessions was “Yes “, then the next question was asked.</i> ■ What is your back-up plan when something forces you to change your physical activity schedule?	☐ write-in response

Questions asked on the survey are indicated by closed bullets (■); Response options for the respective question are denoted by open bullets (□); Rows with grey highlights indicate questions used to encourage respondents to think generally about the PA behaviors they have been able to maintain rather than capture snapshot of their behaviors in a specific time-frame (e.g., 7 days or 1 month) which is common among other self-report measures of PA.

Table 2.

Anthropometric and Sociodemographic Characteristics

	N	Mean $\pm$ SD [range] or Frequency (%)
Age (years)	290	40.7 $\pm$ 11.8 [19–71]
Age ranges (n, %)		
18–25		24 (8.3)
26–34		72 (24.8)
35–45		97 (33.4)
46–54	290	56 (19.3)
55–64		32 (11.0)
65+		9 (3.1)
Height (m)	288	1.65 $\pm$ 0.1
Weight (kg)	288	75.5 $\pm$ 16.1
BMI (kg/m ²)	286	27.8 $\pm$ 5.9 [18.6–62.0]
Normal		96 (33.6)
Overweight	286	118(41.3)
Obese		72 (25.2)
Marital Status (n, %)		
Single		133 (45.9)
Living with S. O.		21 (7.2)
Married	290	96 (33.1)
Divorced/Separated		37 (12.8)
Widowed		3 (1.0)
Education (n, %)		
HS or GED		22 (7.6)
2-year college degree		37 (12.8)
4 year college degree	290	79 (27.2)
Masters		97 (33.4)
Doctoral/Professional		55 (19.0)
Income (n, %)		
\$24,999		30(10.4)
\$25,000–49,999	288	57 (19.8)
\$50,000–\$100,000+		201 (69.8)
Employment (n, %)		
Full-time		220 (76.1)
Part-time		24 (8.3)
Student	289	17 (5.9)
Retired		14 (4.8)
Unemployed		14 (4.8)
Workplace Incentives		
No	272	175 (64.3)
Yes		97 (35.7)

	N	Mean $\pm$ SD [range] or Frequency (%)
Has children <19 years that live in the home ^a		
<i>No</i>	290	204 (70.3)
<i>Yes</i>		86 (29.7)
<i>1 child</i>	86	35 (40.7)
<i>2 children</i>		29 (33.7)
<i>3 children</i>		17 (19.8)
<i>4 or more children</i>		5 (5.9)
Engages in PA with their children	86	19 (22.1)
<i>No</i>		67 (77.9)
<i>Yes</i>		

Means $\pm$ SD [ranges] or Frequency (%). Sample sizes are included as an indicator of question response rates.

^aLive in the home at least 1 week per month

Table 3.

Physical Activity Characteristics

	N	Mean + SD [range] or Frequency (%)
Initial Changes		
<i>Self-change</i>	290	221 (76.2)
<i>Program-induced</i>		69 (23.8)
Length of Regular Engagement (n, %)		
<i>6 months <1 year</i>	290	23 (7.9)
<i>1 year to < 2 years</i>		60 (20.7)
<i>More than 2 years</i>		20 (71.4)
<i>2–5 years</i>		56 (27.0)
<i>6–10 years</i>		54 (26.1)
<i>11–15 years</i>	207	18 (8.7)
<i>16–20 years</i>		29 (14.0)
<i>>20 years</i>		36 (17.4)
<i>Non-specific/uncategorized</i>		14 (6.8)
Years Active	193	13.03 ± 10.0 [2–52]
Frequency (days/week)	290	4.5 ± 1.2 [2–7]
Intensity ^a	287	14.3 ± 2.2 [6–20]
Duration (min/session)	285	55.4 ± 16.8 [30–180]
Volume (min/week)	285 ^b	249.7 ± 105.8 [60–840]
<i>HIGH</i>		242 (83.4)
<i>LOW</i>	290	43 (14.8)
<i>Uncategorized</i>		5 (1.7)
Most important factor		
<i>Frequency</i>		157(54.1)
<i>Intensity</i>	290	66 (22.8)
<i>Duration</i>		25 (8.6)
<i>None. I just do it.</i>		42 (14.5)
Commitment Score ^c	290	44.7 ± 6.5 [19–55]
History of Organized PA During Youth		
<i>No</i>	290	91 (31.4)
<i>Yes</i>		199 (68.6)
<i>Elementary</i>		127 (63.8) ^d
<i>Middle school</i>		162 (81.4) ^d
<i>High school</i>	100	171 (85.9) ^d
<i>Travel Team</i>		3 (15.1) ^d
Physically demanding job (n, %)		
<i>No</i>	273	211 (77.3)
<i>Yes</i>		62 (22.7)

Primary Commuting Method	N	Mean + SD [range] or Frequency (%)
<i>Drive</i>	290	248 (85.5)
<i>Bike</i>		5 (1.7)
<i>Public transportation</i>		19 (6.6)
<i>Walk</i>		18 (6.2)

Means $\pm$ SD [ranges] or Frequency (frequencies). Sample sizes are included as an indicator of question response rates.

^aValue is for average PA intensity per session based on 6–20 Borg scale.

^bFive participants did not provide enough information to calculate weekly PA volume.

^cCommitment score 33 is an antecedent of PA maintenance in AA women (Range 11–55).

^dValues represent selection frequency from those indicating their participation in organized extracurricular sports/sports-related activities as a child.

Table 4.**Behavioral Practices**

Strategies	N	Frequency (%)
Time of Day		
<i>Morning</i>		146 (50.3)
<i>Lunchtime</i>	290	13 (4.5)
<i>Afternoon</i>		26 (9.0)
<i>Evening</i>		105 (36.2)
Schedules PA		
<i>No</i>	290	41 (14.1)
<i>Yes</i>		249 (85.9)
Weekly goal		
<i>No</i>	290	51 (17.6)
<i>Yes</i>		239 (82.4)
Self-monitor		
<i>No</i>	290	63 (21.7)
<i>Yes</i>		227 (78.3)
<i>Activity monitor and/or app</i>	227	214 (94.3)
<i>Journal (non-electronic)</i>		13 (5.7)
Engages in PA with others		
<i>No (e.g., Alone)</i>	290	128 (44.1)
<i>Yes</i>		162 (55.9)
Plan for missed sessions		
<i>No</i>	290	131 (45.2)
<i>Yes</i>		159 (54.8)
Back-up Plan ^a		
Timing (<i>n=121, 52.4%</i>) ^b		
<i>Same day, different time</i>		54 (44.6)
<i>Different day</i>		55 (45.5)
<i>Other (e.g., fit it in as soon as possible)</i>		12 (9.9)
Location (<i>n=36, 15.6%</i>) ^b		
<i>Home</i>		28 (7.8)
<i>Work</i>		4 (1.1)
<i>Fitness/Rec Center</i>	159	4 (1.1)
Activity (<i>n=53, 22.9%</i>) ^b		
<i>Different type/method of activity</i>		41 (77.4)
<i>Shortened/abbreviated plan</i>		8 (15.1)
<i>Find opportunities to get more activity during the day</i>		3 (5.7)
<i>Other</i>		1 (1.9)
Extending the duration of their next session		15 (6.5%) ^b

Strategies	N	Frequency (%)
Dietary Changes		4 (1.7%) ^b
Uncategorized ^c		2 (0.9%) ^b

Frequency (%). Sample sizes are included as an indicator of question response rates.

^aValues represent cumulative selection frequencies (how often the strategy was used combining all three codes) for each category of backup plan strategies.

^bRepresents the proportion of back-up plan codes among the five general strategies.

^cTwo responses were uncategorized due to limited context.