Walk as Directed! Adolescents’ Adherence to Pedometer Intervention Protocol

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Background: Despite frequent use of pedometers in interventions targeting youth PA, there is no literature that addresses the prevalence and reasons for protocol nonadherence. Methods: Adherence behaviors of early adolescents (n = 43; Mean age = 12.3 ± 1.0) in an 8-week, faith-based intervention were monitored/recorded. Students provided reasons for various aspects of protocol breach, which were used to develop a post intervention questionnaire. Analyses included calculations of frequency/percentage as well as cross tabulations/chi square to detect gender/age differences. Results: Over the intervention, recording PA in logs decreased by 85% and was attributed to forgetfulness and lack of time. For pedometers, highest-frequency events included error codes (n = 501), incorrect wear (37%, ≥ 1 day), and shaking (58%–69%, ≥ 1 time). Top reasons for shaking were to make up for lost step opportunities and get further along the route. Of permissible stepping strategies, males used ambulatory activity on the playground and stair usage more, while 6th graders used speed stepping in place more than their respective counterparts. Conclusions: Students admit to basal levels of nonadherence, which should be taken into consideration when designing/implementing interventions. Integrating intervention tasks into the regular curriculum and providing sufficient opportunities to perform them may alleviate some barriers to adherence. Future research should attempt to confirm results in other school types/levels as well as quantify these behaviors in free-living or unstructured settings.

Keywords: student conduct, procedural fidelity, measurement invalidity, self-report

Increasing physical activity (PA) is a longstanding public health objective. Toward achieving it, health behavior researchers and practitioners develop, implement, evaluate, and refine PA interventions. In children, the literature suggests that PA interventions have been primarily school-based, demonstrate short-term effectiveness, and yield more favorable results when policy and environmental approaches are included.

Evaluation of PA intervention effectiveness requires measurement of PA using any 1 or combination of methods (eg, direct observation, questionnaire, self-report, mechanized activity monitoring). Motion sensors represent a subcategory of the latter method and include accelerometers and pedometers. Pedometer measurement of PA can be traced back over half a century, although published studies using pedometers to measure an intervention’s effect on PA in children are less than a decade old. Despite this truncated timeframe, evidence to date suggests that pedometer interventions most strongly impact PA in children. The credibility of these results is based on the assumption that pedometers validly and reliably measure PA, which recent reviews seem to confirm. Missing from these reviews and their primary sources is attention to children’s compliance to study protocol. Specifically, interventionists are left to wonder what children may (not) do with pedometers and associated protocol when not in their presence.

Physical education (PE) practitioners have commented on some of these issues in various electronic media and many recommend a policy termed “you shake, I take.” More specifically, in a qualitative study investigating physical educators’ perceptions toward incorporating pedometers into instruction, teachers described the unanticipated ubiquity of students shaking their pedometer to achieve the highest score or see improvement. A health initiative designed to get children worldwide to be active went so far as to ascribe criteria of what constitutes cheating with a pedometer:

Cheating is defined as 1) shaking the pedometer manually to accumulate steps; 2) putting the pedometer on someone else to benefit your step count; 3) strapping the pedometer to a moving object other than you (cars, dogs, space shuttles, etc.); 4) submitting inflated or untrue step data; 5) resetting someone else’s pedometer; and 6) jeopardizing someone’s pedometer, which includes hiding it or destroying it.
In light of scarce formalized detail on these phenomena and the growing dependence of pedometers for measuring PA in applied and basic settings, we sought to chronicle and systematically measure prevalence of acts of (non-)adherence as well as understand reasons underlying them in a pedometer intervention with adolescents. Our intentions were to use the results to improve our own youth interventions, as well as stimulate disclosure, discussion, and remediation of similar acts encountered by other child health epidemiologists.

Methods

Context and Study Origins

This study was born out of a larger study that investigated the effects of a faith-based intervention on early adolescents' (Mean age = 12.3 ± 1.0; BMI percentile = 66.3 ± 27.3) school-based ambulatory activity. Opportunity sampling (n = 45, 27 females, 98% participation rate) was conducted at the only Islamic middle school in a county whose population exceeds 3 million. The school is housed in several wings of a mosque and is extremely compact in space (eg, middle school classrooms can be traversed in under 100 steps; outdoor playground perimeter < 100 steps; physical education is taught at a park that is 250 steps away). Of the original 45 participants, 2 males withdrew from the intervention before its completion and were not included in the current study, leaving 43 participants. The study was approved by the university IRB and written parent consent and student assent were obtained from all participants.

The Walk4Life MVP model pedometer, whose accuracy and validity compares favorably to Yamax and Accusplit Eagle 120XL, pedometers was used to quantify PA toward making a virtual pilgrimage of 250,000 steps to Mecca, Saudi Arabia in 8 weeks. Students could optionally record daily step counts in a personal log for bonus step awards of up to 2250 steps/week. In addition, they could earn 1000 bonus steps per correct answer to trivia questions about destinations en route. Incentives (eg, toe token, dollar store prize) were based on step count thresholds/week and overall, as well as destinations reached. A gift card to a sporting goods store was awarded upon reaching Mecca. (The amount on the card was not revealed to students.)

We demonstrated the mechanism and proper wear of the pedometer at an initial orientation. Students were allowed to handle their pedometer and leash to orient themselves with function and placement. All students practiced aligning the pedometer with their right knee and clipping it to the outer or inner waistband of their trousers or undergarment, respectively. (Females practiced the added task of affixing the pedometer beneath the mandatory tunic.) We informed students of (un-)acceptable means of accruing steps and gave them an opportunity to ask questions. We also checked for understanding with specific yes/no questions (eg, Are you allowed to wear it anywhere other than your waist?). Logs were distributed at the initial orientation, and we led students in guided practice followed by independent practice filling out log entries (ie, predicted days to reach destination, daily and cumulative totals, and graphing progress). We broke down how many steps/day needed to be averaged to reach Mecca and how through a combination of steps and extra credit this could be achieved albeit with effort.

The intervention was preceded by a 2-week multiple delayed baseline across grades during which students wore sealed pedometers for 1 week followed by unsealed pedometers for a second week. These steps were taken to establish habitual school physical activity level before intervention as well as get students into a wear routine and ease them into a recording routine (ie, during the second week students recorded daily steps only on a personal ledger). Goals for improvement based on baseline data were not formally addressed. We distributed pedometers each day at morning assembly and collected them each afternoon at dismissal.

During baseline (pedometers: 1st week, sealed; 2nd week, unsealed) and the first few weeks of the intervention (unsealed pedometers), we observed infractions of pedometer rules (eg, overt shaking upon collection) and also received peer reports of student cheating (eg, breaking seal, shaking, and wearing a pedometer on one’s shoe). We were also surprised by the number of blank and incomplete weekly logs, which although optional were a means to earn incentives more quickly and were endorsed by 8th grade students in a pilot study conducted the previous academic year.

These events prompted our investigation into the frequency and nature of (non-)compliance. We proceeded by gathering information from students as to 1) strategies used besides regular movement types and conditions to accumulate steps, 2) reasons why pedometers might be shaken, and 3) reasons why logs would not be filled out. The information was gathered through informal conversations on multiple occasions during recess, lunch, and pedometer distribution/collection periods from small groups and individuals, some of whom in addition to providing information about themselves would also voluntarily tattle on their peers. Student comments were hand-recorded in a small notebook immediately after a conversation and became the basis of the following measures.

Measures and Data Collection

On a questionnaire administered on average 1.2 weeks after the post intervention, separate sections were devoted to 1) strategies used to accumulate steps (11 questions, response options based on frequency used plus 1 open-ended Other strategy) and 2) reasons why logs were not completed each week (12 questions, 5-point Likert scale anchored by 1 = strongly disagree to 5 = strongly agree). On a separate sheet containing no traceable identifiers, 1) 1 question asked for gender; 2) 3 questions asked about the frequency of incorrect wear and shaking (5 frequency response options); 3) 6 questions asked for level of...
agreement with reasons why a pedometer was shaken (to be completed by those who shook the pedometer; 4-point Likert scale anchored by 1 = strongly disagree to 4 = strongly agree); and 4) 1 question was open-ended (Other reason not listed). The questionnaire was administered to each grade separately. All questionnaire section instructions and first items were read aloud and student questions answered. For the separate anonymized sheet, students were reassured that responses were anonymous and would help refine the program. We then left the room while the classroom teacher remained at her desk until students completed the sheet. She then collected them, called us from outside, and handed us the questionnaires.

We maintained a Microsoft Excel 7.0 spreadsheet of (adverse) events by participant and grade that included daily and summated weekly tallies of the number of students who 1) recorded step totals; 2) answered bonus questions; 3) returned a pedometer with the letter E, L, or both appearing on the screen [i]; 4) did not have their log in the central storage case on Fridays (ie, day logs were picked up to calculate progress and award prizes); 5) temporarily or permanently lost their pedometer; 6) were late to school and forgot to take/wear their pedometer; and 7) took their pedometer home.

**Data Analysis**

Data from 43 questionnaires were entered into SPSS 17.0. Frequencies and percentages were calculated for all items. Gender and grade level effects were examined using crosstabs/chi-square, and were based on an initial log reasons, P (ie, significance: step strategies, value of .10 and subsequent Bonferroni corrections P- using crosstabs/chi-square, and were based on an initial all items. Gender and grade level effects were examined

*Table 1 Frequency and Percentage of Protocol Adherence Events*

<table>
<thead>
<tr>
<th>Cohort events</th>
<th>1 n=45</th>
<th>2 n=45</th>
<th>3 n=45</th>
<th>4 n=44</th>
<th>5 n=43</th>
<th>6 n=43</th>
<th>7 n=43</th>
<th>8 n=43</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recording steps</td>
<td>26 (57.8)</td>
<td>22 (48.9)</td>
<td>14 (31.1)</td>
<td>10 (22.7)</td>
<td>7 (16.3)</td>
<td>8 (18.6)</td>
<td>5 (11.6)</td>
<td>4 (9.3)</td>
</tr>
<tr>
<td>Bonus questions</td>
<td>15 (33.3)</td>
<td>16 (35.6)</td>
<td>11 (24.4)</td>
<td>6 (13.6)</td>
<td>5 (11.6)</td>
<td>7 (16.3)</td>
<td>5 (11.6)</td>
<td>4 (9.3)</td>
</tr>
<tr>
<td>Missing folder</td>
<td>1 (2.2)</td>
<td>9 (20.0)</td>
<td>10 (22.2)</td>
<td>11 (25.0)</td>
<td>10 (23.2)</td>
<td>10 (23.2)</td>
<td>9 (20.9)</td>
<td></td>
</tr>
<tr>
<td>Lost pedometer</td>
<td>2 (4.4)</td>
<td>3 (6.7)</td>
<td>1 (2.2)</td>
<td>3 (6.8)</td>
<td>1 (2.3)</td>
<td>0 (0.0)</td>
<td>1 (2.3)</td>
<td>0 (0.0)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wear days/week events</th>
<th>1 n=173</th>
<th>2 n=178</th>
<th>3 n=178</th>
<th>4 n=167</th>
<th>5 n=140</th>
<th>6 n=138</th>
<th>7 n=149</th>
<th>8 n=168</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screen error (E)</td>
<td>Inc</td>
<td>71 (39.9)</td>
<td>76 (42.7)</td>
<td>53 (33.8)</td>
<td>69 (49.3)</td>
<td>67 (48.6)</td>
<td>78 (52.3)</td>
<td>88 (52.4)</td>
</tr>
<tr>
<td>Screen lock (L)</td>
<td>Inc</td>
<td>9 (5.1)</td>
<td>15 (8.4)</td>
<td>7 (4.4)</td>
<td>3 (2.1)</td>
<td>4 (2.9)</td>
<td>4 (2.7)</td>
<td>2 (1.2)</td>
</tr>
<tr>
<td>Forgot to take</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>3 (1.9)</td>
<td>1 (0.7)</td>
<td>1 (0.7)</td>
<td>2 (1.3)</td>
<td>2 (1.2)</td>
</tr>
<tr>
<td>Did not return</td>
<td>1 (0.6)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>2 (1.3)</td>
<td>2 (1.4)</td>
<td>2 (1.4)</td>
<td>3 (2.0)</td>
<td>1 (0.7)</td>
</tr>
</tbody>
</table>

Abbreviations: Inc, Incomplete.

*a Percentage = frequency ÷ # overall participants/week.

*b Percentage = frequency ÷ [Σ(# participants/grade/week × # days pedometer worn/grade/week) – (# absences/week)].

**Results**

When considering the cohort as the unit of analysis (Table 1), optional activities of recording steps and answering bonus questions decayed each successive week with one exception (ie, bonus questions, week 2 > week 1). A majority recorded steps the first week, which was followed by a ~85% drop in participation by the final week. In comparison, approximately 40% fewer students answered bonus questions at the start, which was followed by a ~70% drop in participation by the final week. Over the latter half of the intervention, the same students both recorded steps and answered questions from week to week. Missing student folders prevented the authors from tallying individuals’ step totals and awarding prizes. After the first week, between 9 and 11 (20.0%–25.0%) folders were missing each Friday when the storage box was checked. Temporary pedometer loss invalidated step totals for a given day while permanent loss additionally required replacement of the unit (~$35). Loss rate was minimal; however, over the intervention, there were only 2 weeks when pedometers were not temporarily or permanently lost. Loss was primarily temporary (ie, 8 of 11 instances) in nature.

When considering wear days as the unit of analysis (Table 1), the rates of students forgetting to take a pedometer in the morning or not returning it at dismissal were low. Over weeks 2–8, when we had complete data, the prevalence of locked pedometers was highest weeks 3–5, with overall frequency of locking far more pronounced among 6th graders (33 times) compared to 7th–8th graders (≤7 times). Error codes were encountered daily, were
lower at the beginning (weeks 2–4), successively highest the final 2 weeks, and were more pronounced among 6th graders (229 times) compared to 7th graders (146 times) and 8th graders (126 times). Because this pedometer model is sensitive to step counts exceeding a sustained 1-min rate of 5.7 miles∙hr⁻¹, we analyzed error code differences between PE and no-PE days. Using a 1-tailed paired t test, error codes/week were 60% greater on PE days ($t_{8} = 5.26, P < .001, d = 1.65$). Although PA during PE may have actuated the error code, a basal level of potential tampering was suspected based on an average 25.2 error codes/week found on no-PE days.

Frequency of improper wear and shaking of pedometers is shown in Table 2. Both were independent of gender. A majority of students indicated that they never wore the pedometer incorrectly while the remainder admitted to wearing it incorrectly 1–3 days. Majorities also indicated that they neither shook the pedometer on any day during a typical week nor any times during a typical day, respectively. Of those who admitted shaking the pedometer, a majority indicated they shook it only once per typical week and once per typical day, respectively. In general, students strongly disagreed with each reason for shaking the pedometer. Two reasons generated more agreement than others: make up for lost step opportunities ($n = 10$) and get further along the route ($n = 12$).

Conversely, students reported many acceptable and some novel strategies for accumulating steps (Table 3). Of 12 strategies, the top 2 involved changes in stepping/walking habits, in place and on the playground, respectively. The next 2 strategies involved maximizing the amount of wear time thereby increasing opportunity for steps. The lowest 2 ranked strategies among the top half involved increasing the distance required to reach a destination and a change in locomotor type, respectively. Moving around the playground ($n = 10$), taking the stairs more than necessary ($n = 9$), and jumping in place ($n = 8$) were the top 3 strategies of those that were used more than once daily. Males reported disproportionately greater use of the following 2 strategies: walking/pacing/running around the playground, $\chi^2(3) = 11.7, P = .008$, and going up/down the stairs more than what is minimally necessary, $\chi^2(3) = 14.9, P = .007$. Eighth and sixth graders reported disproportionately lesser and greater use, respectively, of speed stepping in place, $\chi^2(6) = 25.7, P < .001$.

Recording step totals, graphing progress, predicting days needed to reach destinations, and answering trivia questions were means by which students could earn bonus steps while reinforcing various academic skills and learn more about their religion. Reasons for not performing these activities are listed in rank order in Table 4 and were independent of gender and grade. Two of the
The current study offers the first quantitative account and qualifications thereof regarding youths’ adherence to pedometer intervention protocol. Findings, however, apply to school day contexts only. A distinction is made between nonadherence to or incomplete engagement in pedometer intervention protocol (Table 1) and outright cheating (Table 2). The former was far more ubiquitous than the latter and in the long term may be more important to redress. Between 32%–42% admitted to not following pedometer wear procedures or shaking it. In traditional middle school academic content areas, Murdock, Hale, and Weber13 found that percentages of self-reported cheating ranged between 23% (math) and 43% (social studies). More generally, 48% of students in grades 6–12 admitted to cheating on a test in school in the last year.14

The previously-alluded mastery goal orientation is associated with use of deep-level cognitive processing strategies (ie, figuring out and testing different ways to solve problems),16 which are in turn associated with a lower likelihood of believing that cheating is acceptable.17 In this regard, the variety and frequency of permissible strategies students devised to augment step totals is heartening. Previous research has focused on misuse of pedometers,9 thus the novel and licit means of accruing

Table 3 Strategies Used to Augment Step Totals During a Typical 4-Day Wear Week (n = 43)

<table>
<thead>
<tr>
<th>Rank strategy</th>
<th>Frequency days (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>1. Walk/march/stomp in place</td>
<td>5 (11.6)</td>
</tr>
<tr>
<td>2. Walk/pace/run around playground</td>
<td>8 (18.6)</td>
</tr>
<tr>
<td>3. Get pedometer first thing at assembly</td>
<td>10 (23.2)</td>
</tr>
<tr>
<td>4. Delay returning pedometer</td>
<td>12 (27.9)</td>
</tr>
<tr>
<td>5. Take longer way to destination</td>
<td>12 (27.9)</td>
</tr>
<tr>
<td>6. Jump in place</td>
<td>12 (27.9)</td>
</tr>
<tr>
<td>7. Take stairs more than necessary</td>
<td>17 (39.5)</td>
</tr>
<tr>
<td>8. Speed step in place</td>
<td>18 (41.9)</td>
</tr>
<tr>
<td>9. Get out of desk seat more frequently</td>
<td>22 (51.2)</td>
</tr>
<tr>
<td>10. Walk in circles</td>
<td>27 (62.8)</td>
</tr>
<tr>
<td>11. Other</td>
<td>33 (76.7)</td>
</tr>
<tr>
<td>12. Alternate back/forward steps</td>
<td>34 (79.1)</td>
</tr>
</tbody>
</table>

`Rank is from most to least frequent strategy used based on frequency of 0 response option. Order of ties is determined by frequency of 1–3 response option.

b Jerk body around (2), run more in PE/recess (2), go to restroom more frequently, go up stairs.

c Take smaller steps.

d Jump up then down stair step, walk downstairs before lunch, go up/down stairs many times, and organize class walks around school.
steps reported herein are notable and might serve as basic parameters for practitioners to encourage their students by. Future research will undoubtedly uncover others. Of note is that boys used 2 strategies to a greater extent than girls. Ranked second, "movement around the playground" was constrained by space (perimeter ~250 feet) and involved boys’ vigorous play and sport. Coed participation in these forms and contexts of PA diminishes during the course of Muslim girls’ childhood and in postpubescence is prohibited on religious and cultural grounds.18 Speed stepping in place, while ranked only eighth, differed by grade and may reflect differences between ages (ie, 11- versus 13-year-olds) regarding its social acceptability.

In addition to steps accrued by means of pedometer, steps were awarded to students who voluntarily logged/predicted steps, answered trivia questions, or both. Highs in these 2 behaviors were essentially achieved the first week of the intervention and consistently diminished over ensuing weeks. The decline suggests that the prospect of earning additional step-based incentives overall or earning any incentive more quickly did not outweigh the perceived cost of engaging in the behaviors. Completing the aforementioned tasks required self-regulatory skills, which develop in stages and are in part predicated on motivational beliefs and achievement goals.19 The vast majority of students may have initially performed the tasks motivated by extrinsic rewards then subsequently lapsed into a state of amotivation, which is antithetical to self-regulatory behavior. Indeed, according to the overjustification effect20 students who are both intrinsically and extrinsically motivated for the same behavior would default into an extrinsic focus because it is the more salient of the 2 inclinations. In this study, the top 4 reasons for not completing tasks were related to processes or barriers that were either under control of the student or could be overcome with effort (ie, intrinsic control).

### Implications and Future Directions

The subject of this study and its treatment are novel and merit further consideration. As the study was conducted in a school setting, additional research needs to explore the prevalence of noncompliance and cheating in free-living or unstructured settings—conditions under which these behaviors may increase. A case is made in endnote II as to why results may be applicable beyond this particular cohort, yet we recommend further systematic approaches to elucidating the prevalence of and reasons for adherence events in PA interventions. Specifically, adherence events should be monitored across different ages as children’s moral development evolves over time. Measuring the effect of explicit instructions and consequences on adherence behavior against a control group would eventually lead to the identification of language and processes that limit nonadherent behavior. Similarly, the extent of goal setting and extrinsic rewards as they relate to adherent behavior could be applied to randomly assigned and matched individuals. To further measure shaking behavior, future waves of research-caliber pedometers might come equipped with sensors that denote if the pedometer was removed from its clipped position coupled with an inclinometer that assessed deviation from waist level when standing upright.

In light of these findings, a question may be raised as to the accuracy of previous pedometer-measured youth physical activity research. Heretofore, such a concern was
not raised. Intuitively, studies that were longer in duration and noncompetitive, used personalized feedback and goal setting, and took care to explicitly address compliant behavior are least likely to have been affected by shaking. Despite taking safeguards, researchers will have to accept “that some would still shake them and that therefore the results weren’t going to be scientifically valid.”21(p.41)

In conclusion, based on present results and our extensive contact with students and teachers, we note/recommend the following:

1. A discrepancy existed between the number of students that admitted to cheating and the number offering reasons for shaking the pedometer. Splitting the difference pegs the prevalence of cheating at 56%. In addition, cheaters most often selected the lowest frequency level of cheating among response options. From these data, we cannot identify an error correction factor, but are confident that overestimation of actual step counts represented a small percentage of total daily counts. Given students’ proclivity for mastery-oriented task performance and perception that cheating was not extrinsically mediated, interventionists should attempt to proactively reach out to individual students to help them set realistic goals and identify realistic timelines and individualized strategies for achieving them. Because goal setting in an internalized process, foregrounding it, while including yet deemphasizing extrinsic rewards may enhance autonomous adherent behavior.21 De-stressing competition, expanding the duration of an intervention, and engaging in small-group and dyadic interactions in which expectations for protocol adherence are made explicit and students are verbally reinforced for following protocol may enhance student fidelity.

2. Brainstorming permissible strategies for accumulating steps may help students focus on viable alternatives to shaking while also practicing self-regulatory skills. Steep declines in desired self-regulatory behaviors associated with maintaining logs due to amotivation need to be addressed. Without formal accountability, academic task systems are suspended.22 Thus, making these tasks mandatory by enfolding them into existing and relevant class curricula and assignments (eg, PE, math, social studies, and religious studies) may be needed. In addition, dedicated daily class time for performing these tasks would minimize or negate the top 3 reasons (ie, forgetfulness, insufficient time, lost daily step count tally slips) for not completing logs.

3. Vigilant oversight of pedometer storage/distribution appears to minimize issues such as losing, forgetting to take, and not returning pedometers. Shifting this responsibility from researchers to teachers is desirable, but in our study teachers felt uncomfortable taking on responsibility. While a PE specialist did not work at this school, he or she would seem the most appropriate staff to assume the responsibility.

Notes

I In one extraordinary instance, obese preadolescents living in London and participating in an exercise intervention clipped pedometers onto their pet dogs to increase daily totals.23

II Generalization of results from Muslim early adolescents attending a parochial school to children at large is moot. Some of the specific adherence events addressed in this paper are considered forms of cheating. On one hand, these students might be different: There is a Hadith (saying by the Prophet Muhammad) that “the one who cheats (or deceives) is not one of us.” Because of their direct link to the Prophet, Hadith “provide a guide to Muslims about how to behave,”24(p.288) and along with the Qur’an comprise the moral knowledge to be transmitted. While curriculum content is largely noncontentious, how it is taught remains elusive with arguments that Islamic education in North America has been ineffective in teaching and inspiring Muslim children to adopt and adhere to Islam as a way of life and a system of personal and social values.25(p.1) We are unaware of specific studies of Muslim American early adolescents in regard to cheating; however, in general, levels of religious attendance and religious feeling did not decrease the odds of cheating on a test in school,14 and students who attended parochial schools were no less likely to lie and/or cheat than those who attended secular schools.26 Tauhidi’s critique,25 our extended contact with the students, and teachers’ admissions that they observed a disconnect at this age between what is taught and what students do, provide some reassurance that the behaviors chronicled in our study may also be observed among non-Muslim students in various school contexts.

III According to the manufacturer of the W4LMVP Walk for Life pedometer, “an error message shows when the pedometer exceeds 190 steps per minute for 1 minute or more. The letter “E” shows on the screen mask if the criterion is met. The purpose of this code is to help eliminate shaking the pedometer by hand. The “E” code alerts the researcher or teacher that there is a chance the pedometer was not used properly.”27(p.3) The “L” code signifies that the pedometer is locked. This is done by the wearer pressing combinations of buttons and functions. Unless unlocked by the wearer, the pedometer cannot be zeroed unless the battery is removed.

References


6. Kahan and Nicaise