MOVEMENT AS A COPING STRATEGY FOR STRESS

by

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ABSTRACT

MORGAN JEAN RIDENHOUR. Movement as a coping strategy for stress. (Under the direction of DR. AMY PETERMAN)

This study explores the use of non-strenuous movement, such as stretching and fidgeting, as a coping mechanism for stress. Prominent sources such as American Psychological Association (APA) recommend the use of movement to manage stress (APA, 2017a). While there are many assessment tools for coping techniques, non-strenuous movement has not been included in the assessments and is not widely studied. In an online survey, participants (n=69) reported their stress level and their use of coping strategies, as measured by the Stress in General Scale (Yankelevich et al., 2012), the Brief Cope Survey (Carver, 1997) and items created by the author to assess the use of movement to cope with stress. The majority of participants (99%) reported using some type of non-strenuous movement to cope with stress at least "a little bit" and 43% reported using some type of non-strenuous movement "a lot". Participants reported using movement at similar rates to other coping strategies. From the movement items, there emerged an internally consistent movement-based coping strategy scale (Cronbach's α=.79) and two potential subscales. The movement-based scale did not show any significant relationship to stress, similar to most other coping strategy scales. Findings indicate that individuals are using non-strenuous movements to manage stress, justifying further research into the application and effectiveness of non-strenuous movement as a coping strategy for stress. Findings also provide preliminary support of the psychometric properties of the newly created movement-based coping scale, supporting the inclusion of such a scale in measures assessing coping strategies for stress.

DEDICATION

For Moose, who saw that I was stressed and advised me to move.

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CHAPTER 1: INTRODUCTION

Stress is a common human experience with a plethora of negative consequences for both mental and physical health (Gudykunst & Nishida, 2001; Kim et al., 2011; National Institute of Mental Health, 2016; Marciniak et al., 2004; Segerstrom & Miller, 2004). Faced with this reality, people have developed a variety of coping strategies to manage stress. Accordingly, researchers have developed a number of tools to measure these coping strategies. Assessments such as the COPE Scale (Carver, Scheier, & Weintraub, 1989) and Ways of Coping Questionnaire (Lazarus & Folkman, 1984) include a number of techniques for managing stress, such as positive reframing, active coping, and seeking social support. In addition, there is a voluminous literature on the relationship between coping and stress and health (Aldwin & Revenson, 1987; Cooper, 1994), but investigators continue to explore other avenues in this broad field.

One potentially fertile area is the identification and measurement of additional, and perhaps less obvious, coping strategies that people might use in their daily lives beyond those already addressed in the literature. In this vein, non-strenuous movement, such as stretching or fidgeting, could be a promising coping strategy to consider. Though there is little research investigating the use of low-level movement as a stress management, or coping, technique, there are three significant reasons to suspect that this sort of movement is being used to manage stress: (1) prominent sources, such as the American Psychological Association (APA), recommend the use of movement to manage stress (APA, 2017a); (2) research suggests that individuals are using exercise (a more strenuous subtype of movement) to manage stress (APA, 2013); and (3) there is some research suggesting a link between less-strenuous movements and decreased stress

(Seidman & Zagar, 1991). However, in the most commonly used stress management assessment tools, movement is not included as a category of stress management. Because of these reasons, further research into the use of movement as a coping strategy for stress management seems warranted.

A number of prominent, respected sources, including the APA, the American Institute of Stress, and the American Heart Association, have repeatedly recommended that individuals use movement to manage stress. Movement can be broadly understood as the physical activity of the voluntary muscle system and can include strenuous movements that increase heart-rate, often labeled as exercise, but also less strenuous activities that do not tend to increase heart-rate, such as stretching or bouncing a leg. Sometimes recommendations include specifics, such as going for a short walk or engaging in yoga (American Heart Association, 2014; American Institute of Stress, 2017; APA, 2007; Segal et al 2017). While it might be argued that these recommendations intend to reference more vigorous types of exercise rather than basic movements (such as stretching or fidgeting), this is not always the case. Sometimes, recommendations simply cite "physical activity" as beneficial (APA, 2017a). In an article discussing stress-management during the workday, the APA states: "any form of physical activity" can help reduce or manage stress (APA, 2017a).

Additionally, there are a number of devices that are commercially marketed as stress management tools that seem to be capitalizing on the idea of small movements as effective coping strategies for stress. Perhaps most known among these devices is the ubiquitous "stress ball", a term first coined and marketed in 1988 by Alex Carswell (Chetwynd, 2011). The stress ball has since enjoyed widespread popularity, and is even

sometimes marketed as a therapeutic device (Therapy Shoppe, 2017). The theory behind the device suggests that squeezing the stress ball reduces stress. Ultimately, this squeezing action is a type of movement, and one which can be easily employed in a variety of situations where bigger movements may not be feasible. More recently, the "fidget cube" and "fidget spinner" have gained widespread popularity; like the stress ball, these devices claim that through small, unobtrusive movements, an individual can better manage stress (Pocket Fidget, 2017; The Fidget Cube, 2017;). These particular devices are said to help "relieve stress at school or the office" (Pocket Fidget, 2017) and marketed as "the ultimate stress relief [device]" ("The ultimate stress relief cube", 2017). Though these devices are arguably very much in-line with the APA's recommendation of any physical activity as a potential stress management technique, none of these sources cited any research that establishes movement as a coping strategy for stress. In the research that does investigate the ways in which people are coping with stress or the effectiveness of those strategies, smaller movements are not discussed; even when physical movement (exercise) is included, smaller movements are not (Conn et al., 2009; Richardson & Rothstein, 2008; Van der Klink et al., 2001).

Though there is no be research establishing or investigating the usefulness of these small, basic types of movement as stress management techniques, there are significant data indicating people are using exercise to manage stress and finding it effective. According to the Stress in America survey, 43% of US adults report that they use exercise to manage stress, and 62% of those who do so report that exercise is very or extremely effective in managing stress (APA, 2013). Similarly, in a meta-analysis assessing the impact of exercise on workplace outcomes, participants who reported

higher levels of exercise also tended to report lower levels of job stress (Conn et al., 2009). Though widely used and believed to be effective in reducing stress, exercise is a more vigorous form of movement that is poorly suited to many situations in which stress may arise, such as the workplace. For example, in a typical office, a 30-minute jog or yoga session would likely be impractical during work hours. However, if people are using these more strenuous types of movement and finding them effective, it is possible that they are also using less-strenuous movements when the option to exercise is unavailable. There may, in fact, be a relationship between exercise (such as jogging) and the use of less-strenuous movements (such as stretching) as stress management techniques, though no known research has investigated this possibility. Research around movement and stress typically focuses on the more vigorous forms of movement (exercise), leaving room for additional investigation into those smaller movements better suited to certain environments such as a typical office or classroom setting.

While there is a great deal of research about the impact of exercise on mental health (Stathopoulou et al., 2006; Strèohle, 2009; Rebar et al., 2015), there is far less research investigating the impact of smaller, more practical movements better suited to most work or school settings. However, there is some research that suggests less-vigorous movement may still have a significant impact on stress. Seidman and Zagar (1991) found that lower stress levels were positively correlated with low level physical exercise, such as slow walking. In addition, Merom et al., (2007) found that the combination of cognitive behavioral therapy and a mild walking program produced more significant decreases in stress (as well as depression and anxiety) compared to cognitive behavioral therapy alone, again suggesting that milder forms of movement may be effective in

decreasing stress. When the more vigorous forms of movement (i.e., exercise) are not readily applied during certain environments where stress may arise (e.g., an office or classroom), these types of low-level physical activity may be more practical. If, as the data from these studies suggest, low-level physical activity reduces stress, it would make sense for people to engage in these kinds of movements to manage stress, particularly in settings where other coping strategies may not be so readily applied (such as during a typical workday).

If movement is indeed being used as a stress management technique, it should be included as a subscale in assessment tools measuring the use of coping strategies. Because movement is not included in any of the current measures of coping strategies, it is unclear how movement might fit into the existing body of research about how people use various coping strategies and to what effect. By measuring movement along with other coping strategies, we can start to understand to what extent to which movement functions similarly or differently to these other strategies. Such a comparison would first provide a clearer picture of movement as a coping mechanism for stress and second potentially inform future research into the possibility of combining strategies or selecting certain strategies for certain stressors.

Though little is known about movement as a coping strategy for stress, we can theorize the broad category of coping under which movement may fall. Pervasive throughout the many subcategories of coping included in popular assessment tools, a dominant theory distinguishes two broad categories of coping strategies: problem-focused coping and emotion-focused coping (Lazarus, 1999). Problem-focused coping aims to shift the external environment in some way so as to alleviate or resolve the source

of stress; such efforts might include task-oriented actions, gathering information or skills, or engaging in conflict resolution (Folkman & Moskowitz, 2000). Alternatively, emotion-focused coping aims to shift the internal environment (the mind and body) so as to mitigate or resolve the experience of stress. This category includes a wide variety of subcategories, such as: substance use, avoidance, and positive reappraisal (Lazarus, 1999). Though some emotion-focused strategies are typically deemed unhealthy or maladaptive (such as substance use), others are widely included in therapeutic treatments (such as positive reframing). From these definitions, movement would likely fall under the label of emotion-focused coping, a method to manage or reduce symptoms of stress, but not actively addressing the source of stress.

A consistent item of interest in the research is the relationship between coping strategies and mental health outcomes, particularly stress level (Austin, Shah, & Muncer, 2005; Chan & Hui, 1995; Lazarus & Folkman, 1984; Folkman et al., 1986; Montero-Marin et al., 2014). Though there is no known research investigating the relationship between stress and movement-based coping strategies, we can begin to consider the possibilities from what we know of other coping strategies. Because the current study is non-experimental, only correlational data will be obtained, preventing any inferences regarding the effect of coping strategies on stress, but merely examining the relationship between these factors. Fortunately, there is literature addressing the expected correlation between stress and non-movement-based coping strategies. In some literature, use of problem-focused coping strategies was found to be positively correlated with psychological well-being, while emotion-focused coping strategies tended to be associated with poorer mental health outcomes (Austin et al., 2005; Lazarus & Folkman,

1984; Folkman et al., 1986). Similarly, some researchers have identified escape-avoidance behaviors within emotion-focused categories of coping and have found such escape-avoidance coping strategies to correlate with higher levels of stress and emotional exhaustion (Austin et al., 2005; Chan & Hui, 1995; Montero-Marin et al., 2014). From these findings, we may expect that movement, which fits under the definition of emotion-focused coping and which could be construed as an "escape-avoidance" behavior, should be positively correlated with stress level.

However, some researchers have argued for a more intricate relationship between problem-focused and emotion-focused coping strategies. Dewe (1985) argued that emotion-focused coping strategies may be important first-step strategies as they can reduce emotional discomfort and enhance an individual's ability to utilize other strategies, such as problem-focused strategies. In addition, Seidman and Zagar (1991) suggest that a combination of problem-focused and emotion-focused strategies may be necessary to improve mental health outcomes. If this is true, we may expect to see movement correlated with multiple other coping strategies (both emotion-focused and problem-focused), with no clear correlation to stress level.

As movement-based coping strategies have not been included in studies investigating coping strategies for stress management, it is not yet clear how movement will relate to the current body of research around prominent coping strategies. It is possible that, like other emotion-focused coping strategies, movement will have a positive correlation with stress level. Alternatively, if smaller movements (such as stretching or fidgeting) function similarly to exercise or low-level physical activity such as walking, we might expect to see movement-based coping strategies negatively

correlated with stress level. If movement is shown to have a positive correlation with problem-focused coping strategies, it may provide additional and nuanced support of research arguing for the facilitative role of emotion-based coping strategies (Dewe, 1985; Seidman & Zagar, 1991). Ultimately, further research is needed to explore the relationship between movement and other coping strategies. The current study will be the first, to the author's knowledge, to investigate movement alongside other coping strategies commonly included in measurement tools of stress coping strategies.

Research Questions:

1. Do people use movement-based coping strategies to deal with their stress?
    a. If so, what movements do they use most often?
2. What is the relationship between use of movement and use of other coping strategies?
3. What is the relationship between level of stress and the use of movement-based coping strategies?
4. What is the relationship between exercise habits and use of movement-based coping strategies?

CHAPTER 2: METHODS

2.1: Procedures

The present study received approval from the UNC Charlotte Institutional Review Board (IRB) on March 29, 2017 for the period of one year.

An email with a link to a brief online survey was forwarded to 150 professional leaders. The email was forwarded to the participants by the president and founder of TeachingHorse, a leadership training program, with whom the participants had previous contact. The email introduced the project and included a link to the survey. After two weeks, a reminder email was sent. No further emails were sent after two weeks as additional responses were deemed unlikely.

2.2: Participants

The potential participants in this study were 150 professional leaders (including business owners, managers, directors, and chief executive officers). This sample was chosen for the following reasons: the author had access to the population through association with TeachingHorse; research indicates that work, particularly for individuals in leadership positions, tends to be a primary source of stress (APA, 2016; APA, 2017b; Campbell, Baltes, Martin & Meddings, 2015; Health and Safety Executive, 2016); and the typical work environment is better suited to the non-vigorous types of movement that are the focus of this study (rather than the more vigorous types movements involved in exercise). Of the 150 requested surveys, 75 surveys were returned and 69 were reasonably complete: six of the 75 returned surveys did not include any responses to the coping strategy questions and were therefore not included in analysis.

Participants' ages ranged from 26 to 74 (*M*=50, *SD*=11.31) and 54 (78.3%) of the participants were female. The majority of participants (59, 85.5%) identified themselves as "White", four (5.8%) participants identified as "African American", four (5.8%) participants identified as "Hispanic", and two (2.9%) identified as 'Other.' The majority of participants also reported being in a "long-term relationship" (51, 73.9%), while three participants (4.3%) reported being "separated", fifteen participants (20.3%) reported being "single", and one participant (1.4%) reported being a "widow".

2.3: Measures

The survey began with an informed consent requiring review and agreement before participants were able to proceed.

The following demographic information was requested in the survey: age, gender, ethnicity, marital/partner status. In addition, the survey contained three assessment tools.

Godin-Shephard Leisure-time Exercise Questionnaire (Godin & Shephard, 1985; Appendix A). This is a widely used 4-item questionnaire that assesses amount and level of physical activity in adults. Only 7 participants (10.1%) completed this section of the survey correctly (i.e., indicated the amount of time spent exercising at each level of strenuousness); this measurement was therefore not included in analysis.

Stress in General Scale (Yankelevich et al., 2012; Appendix B). This is an 8-item questionnaire intended to assess the emotional experience of stress in the workplace, derived from a previous version by Stanton et al., (2001). Convergent validity of this measure was established with other stress and job satisfaction scales (Yankelevich et al., 2012). Answers were scored with the following values, as developed by the original

creators (Stanton et al., 2001): “No” = 0; “Yes” = 3; “?” = 1.5. Higher scores indicated higher levels of work stress.

Brief COPE Survey (Carver, 1997; Appendix C). This survey was derived from the original 60-item version, the COPE Inventory (Carver, Scheier, & Weintraub, 1989). It includes 28 self-report items representing 12 scales. Each item is rated on a 4-point Likert scale with the following values: 1 = I usually don’t do this at all; 2 = I usually do this a little bit; 3 = I usually do this a medium amount; 4 = I usually do this a lot. This measure has been designed and tested to assess both dispositional and situational coping and has shown strong internal consistency of the subscales (Carver, 1997). For the current study, the introduction to the survey was modeled after the complete COPE survey introduction (Appendix D) and modified slightly to clearly indicate to participants that answers should be related to workplace stress, and not stress in general (Appendix E). This emphasis was included to direct participants to consider the coping mechanisms they use specific to situations in which more vigorous movement (i.e. exercise) is typically not feasible. In addition, items were converted to present tense, as they were written in the original COPE survey. Responses to this measure were categorized according to the following 14 subscales (developed by the author of the measure): self-distraction, active coping, denial, substance use, use of emotional support, use of instrumental support, behavioral disengagement, venting, positive reframing, planning, humor, acceptance, religion, and self-blame.

For each of the subscales, the mean score for each category was used to represent a participant’s overall use of that coping category, with higher scores indicating higher usage.

2.4: Movement-based coping strategies

As no known measure of coping strategies include movement-based strategies, it was necessary to create items to examine the potential use of movement-based stress-management. The author conducted an informal survey of 15 of the author's peers and colleagues requesting a description of any movements they use to manage stress during the workday. From this survey, the following items were generated:

- I stand up and stretch. ("Stretch")
- I physically step away for a bit. ("Step Away")
- I go for a brief walk. ("Walk")
- I fidget. ("Fidget")
- I pace. ("Pace")
- I tap my foot or bounce my leg. ("Tap")
- I play with a pen or other object. ("Play with Pen")
- I do some other kind of movement. (Please describe_____).

From the addition of these items, a 15th scale was assessed: Movement. Cronbach's alpha was calculated to determine the internal consistency of this proposed subscale.

As with the other coping strategy scales, for each of the subscales, the mean score for the proposed Movement scale (items 29-35) was used to represent a participant's overall use of movement to manage stress, with higher scores indicating higher usage.

2.5: Data Analysis

Missing data

Only 10% of participants (7 of 69) completed the Godin-Shephard Leisure-time Exercise Questionnaire correctly; this scale was therefore not included in analysis.

There were a total of 15 missing response items (out of total 3243 response items) from the other questionnaires, which appeared to be missing randomly. No more than 3 response items were missing from any given question. Missing items were excluded from calculations.

Analyses conducted

Relationships between variables were assessed using Spearman's Rank-Order correlations. Factor analysis was used to explore the proposed Movement scale. Internal consistency of scales was assessed using Cronbach's Alpha.

CHAPTER 3: RESULTS

3.1: Descriptive Statistics

The average stress level (M=11.69, SD=6.26), as assessed by the Stress in General scale, was similar to the average stress level for the population used in the construction of the scale (M=13.9, SD=7.10; Stanton et al., 2001). Descriptive statistics were calculated for all coping strategy scales (see Table 1).

3.2: Use of Movement-based Coping Strategies (Research Question 1)

To examine whether participants utilize movement-based coping strategies, the frequency with which participants reported using each category of coping strategy was calculated (see Table 2). Ninety-nine percent of participants reported using at least one of the movement-based coping strategy items at least a "little bit". Seventy-five percent of participants reported using at least one of the movement-based coping strategy items at least a "medium amount". Forty-one percent of participants reported using at least one of the movement-based coping strategy items "a lot".

Another source of insight into the use of movement-based coping strategies to manage stress came from the responses to the question “I do some other kind of movement. (Please describe)”. Twelve participants responded to this questions, and all responses involved movement of some sort (see Table 3). While 8 of the 12 responses cited some sort of exercise (such as “run long distances” or “work out”), the remaining 4 responses described items similar to other Movement scale items (such as “bite nails” and “walk”).

3.3: Frequency of Movement-based Coping Techniques (Research Question 1.a)

Differences in frequency of use appeared for individual Movement items (see Table 4). Three items were consistently reported to be used at higher rates than the other items. At every level (at least "a little bit", at least "a medium amount", and "a lot"), Step Away was used at the highest rate, followed by Walk and then Stretch. These items were reportedly used at much higher rates than other items. All items were reportedly used "a lot" by at least 4 participants (6%) and "a little bit" or more by 25 participants (36%). About half of participants reported using the items Tap (51%), Play with Pen (51%), and Fidget (49%) at least "a little bit". Though less frequent, over one third of participants reported using Fidget (39%) at least "a little bit". All items were reportedly used "a lot" by at least 4 participants (6%) and "a little bit" or more by 25 participants (36%).

3.4: Movement Scale

The initial proposed Movement scale was composed of 7 items which demonstrated reasonable internal consistency (Cronbach's α=.79). All seven items were significantly and moderately correlated to the proposed Movement scale total (see Table 5). All seven items were also significantly correlated with one another (see Table 6). However, two main groupings of correlations were observed: (1) items Step Away, Walk, and Stretch (ρ's $\geq$ .5, p's < .001); and (2) items Fidget, Pace, Play with Pen, and Tap (ρ's $\geq$ .46, p's < .001). There were only two significant, albeit smaller, correlations between items across the two groupings: Step Away was positively correlated with Play ((67)=.24, p=.047) and Walk was positively correlated with Fidget (ρ(66)=0.36, p=.034). Principal components analysis (PCA) was conducted to determine whether subscales should be considered.

The factorability of all seven movement items was considered. All items were correlated at least .5 with at least one other item (see Table 7). The assumptions necessary for factor analysis were considered. The Kaiser-Meyer-Olkin measure of sampling adequacy was .7, surpassing the recommended value of .6. Bartlett's test of sphericity was significant (χ^2 (21) = 206.39, $p < .001$). All of the diagonals of the anti-image correlation matrix were over .5, so all items were included in the factor analysis. The communalities were all above .6 (see Table 7), indicating that items shared some common variance. Based on these findings, all seven items were included in factor analysis.

Principal components analysis was conducted. The initial eigen values showed that the first factor explained 45% of the variance and the second factor 26% of the variance, accounting for a combined 71% of variance. The remaining factors had eigen values below 1 and each explained less than 10% of the data; these factors were therefore not further considered. The two factors were not significantly correlated and therefore a Varimax rotation method was used (though there was little difference between the Varimax and Oblimin solutions).

All items had primary loadings over .8 and no item had any cross-loading (see Table 7). The first factor, labeled Movement:Walk (α=.79), includes three items: Step Away, Walk, and Stretch. The second factor, labeled Movement:Fidget (α=.87), includes four items: Tap, Fidget, Pace, and Play with Pen. The two subscales were included in the assessment of relationship between movement-based coping strategies and other scales.

3.5: Relationship Between Movement and Other Coping Scales (Research Question 2)

Relationships between all coping strategy scales were assessed using Spearman's Rank-Order Correlations (see Table 8 and Table 9). Significant to this study, the proposed coping strategy scale of Movement was positively correlated with five other coping strategy scales: Positive Reframing, Emotional Support, Acceptance, Self-Blame, and Humor. These coping strategies would be considered emotion-focused, which might suggest that Movement has more in common with other emotion-focused coping strategies than with problem-focused coping strategies.

The two movement subscales related somewhat differently to the other coping strategy scales than the larger Movement scale (included in Table 9). Though both subscales were positively correlated with Positive Reframing, only Movement:Walk was positively correlated with Acceptance and Emotional Support while only Movement:Fidget was positively correlated with Self-Blame. Movement:Fidget was also positively correlated with two scales the Movement scale did not correlate with: Disengagement and Distraction.

Additional information can be inferred from the frequency at which participants reported using different coping strategies. Movement was used at least "a little bit" at similar rates to most other coping strategies (the exceptions being Disengage, Denial, and Substance Use, which were used at much lower rates). Movement was used at least "a lot" at a rate similar to 7 other coping strategy scales (Distraction, Religion, Humor, Instrumental Support, Emotional Support, Acceptance, and Positive Reframing). Two coping strategy scales (the only two problem-focused scales) were reportedly used "a lot" in much greater frequency than all other scales (Active Coping and Planning).

3.6: Relationship Between Movement and Stress (Research Question 3)

None of the Movement (sub)scales were correlated with stress level (see Table 10). This lack of relationship was not unique to movement, but mirrored 12 of the 14 other coping strategies included in the survey. Only two coping strategy scales were significantly correlated with Stress (Emotional Support and Self-Blame).

3.7: Relationship Between Exercise and Movement (Research Question 4)

Unfortunately, the portion of the survey intended to address this question was not usable. The reason for lack of response to this measure is unknown. As the last section of the survey, it could be that participants were fatigued and ended the survey prematurely. It could also be that participants were confused by this measure and so filled it out incorrectly (as 5 participants did, listing the type of activity they did rather than the amount of time they spent doing activities), or simply skipped it all together rather than attempting to answer.

However, it is noteworthy that 75% of write-in answers (8 of 12 responses to "I do some other kind of movement. (Please describe)") fit a theme of exercise (such as "run long distances" and "workout", see Table 3).

3.8: Relationship Between Movement and Demographic Information

Movement:Fidget was negatively correlated with age ((66)=-.25, p=.04; see Table 10)). Only two significant differences occurred in the way each gender reported using the coping strategies. Women (M = 2.32, SD = .97) reported using the Stretch item significantly less than men (M = 3.07, SD = .83), t(23.11) = 2.94, p < .007. Similarly, women (M = 2.56, SD = .83) were found to use the Movement:Walk subscale, which includes the item Stretch, significantly less than men (M = 3.10, SD = .62), t(26.65) =

2.66, $p < .013$. No other gender differences were found. No differences were found based on other demographic information, though this may be related to the demographic homogeneity of the participant group.

CHAPTER 4: DISCUSSION

Results from this sample suggest that individuals are using movement to manage stress, and that they are using movement about as often as they use other measured coping strategies. The rate at which participants reported using movement-based coping strategies "a lot" (41%) was very similar to the rate at which people report using exercise to manage stress in the national Stress in America survey (43%; APA, 2013). Though all items were reported to be used "a lot" by at least 4 participants, three types of movement were reportedly used most often: Walk, Step Away, and Stretch.

The ways in which movement-based coping strategies relate to other coping strategies is still somewhat unclear. This was complicated by differences in how individual movement items correlated with the other coping strategies. While multiple correlations existed between Movement and other coping strategy scales, no clear pattern emerged. However, the Movement scale was not correlated with problem-focused coping strategies (Planning and Active Coping) and was reportedly used at frequencies similar to other emotion-focused coping strategies. This might suggest that Movement has more in common with other emotion-focused coping strategies than with problem-focused coping strategies and is functioning similarly to these other emotion-focused coping strategies.

In the current study, there was no clear relationship between stress level and the use of movement-based coping strategies. This lack of relationship was mirrored in most other coping strategies. This may be due to the measure used to assess stress, which may not have provided an adequate representation of true stress level. The rating of this measure involves a "?" which is numerically scored between a "yes" and "no", potentially obscuring actual stress level. Though no correlation was detected with the

current measures, a relationship may still exist and may become apparent in future research utilizing a more quantitatively valid measurements of stress. This seems to be the most likely explanation for the lack of relationship between the coping subscales and stress, since substantial previous literature documents consistent associations between stress and the Brief COPE.

Though no correlation was apparent between stress and movement, it could be that other factors are obscuring a relationship, such as correlations with other coping strategies, or unmeasured variables. Work setting and work culture, for example, may have an impact on both stress level and use of movement that could potentially disguise a relationship between the two. For example, perhaps movement is negatively correlated to stress in typical office settings, but positively correlated to stress in hospital settings. Alternatively, there may truly be no correlation between movement and stress level. Future research is clearly needed to explore these possibilities.

The two coping strategies that did correlate with stress would be considered emotion-focused coping strategies while no problem-focused coping strategies were significantly correlated with stress, confusing expectations for how emotion-focused and problem-focused coping strategies tend to relate to stress level (Austin, Shah, & Muncer, 2005; Chan and Hui, 1995; Montero-Marin et al., 2014). Because problem-focused coping strategies are typically predicted to correlate negatively with stress, the lack of such correlation in this study may support the inaccuracy of the stress measurement. However, these results may support other theories that emotion-focused strategies facilitate or work in tandem with other strategies to effect stress (Dewe, 1985; Seidman and Zagar, 1991).

4.1: Movement Scale

Based on the frequency with which people report using movement to manage stress and the ways in which movement uniquely relates to other coping scales and variables, future research might include a scale development study for a Movement scale to be added to common coping strategy assessment tools. The strong correlation between certain items might suggest that these items could be safely consolidated, but ultimately further research is needed to clarify which items might best reflect the use of movement as a coping strategy. While the current study cannot offer such a scale without additional testing on a broader population, the data do suggest that one Movement scale may not be sufficient to capture the full scope of how movement may function as a coping strategy. The development of at least two subscales may be necessary, distinguishing between agitated movements (as reflected by Movement:Fidget items: Fidget, Pace, Play with a Pen, and Tap) and more meditative movements (as reflected by Movement:Walk item: Walk, Step Away, and Stretch).

4.2: Strengths and Limitations

Though the current study seems to indicate that individuals are using smaller movements to manage stress, there are a number of other limiting factors in the interpretation and application of the results. The participant group was relatively homogeneous on certain variables (primarily European-American, female, in long-term relationships), which limits the generalizability of results. The sample was somewhat skewed towards middle-aged participants who may, based on life-experience, use coping strategies differently than other groups. Unfortunately, the sample selection was not random; participants were all volunteers and are all connected to a leadership

development program (TeachingHorse). It is possible that the participants, by nature of being volunteers or by shared connection, have certain unknown and unmeasured qualities or predispositions that affect the variables. For example, it could be that this population uses more movement because it has had more exposure to movement than other populations, based on their participation in TeachingHorse programming, which involves experiential learning and movement. Additionally, it could be that more highly stressed individuals did not respond to the survey because they were otherwise occupied by a higher-stress, higher-demand job, limiting results to those with lower levels of stress.

Similarly, there may be other factors affecting the variables, such as work environment and health-promotion programs. As professional leaders, it may be that this population has had more training in how to manage stress, making them more effective or possibly leading them to over-use or over-report use of coping strategies. It may also be that this population exists in a work environment where movement is more possible (such as a floor nurse) or less possible (such as a cubicle), impacting the results. Though ideally an assessment of these factors would be included in the current study, to maximize rate of participation it was necessary to keep the survey as brief and anonymous as possible.

In addition, as the current study is cross-sectional and does not use an experimental design, no inferences about causation or temporal relationship is possible. No conclusions can be drawn about the efficacy of movement as a stress management technique. However, the results of this study inform and justify a more in-depth examination of movement as coping strategy and the development of a Movement scale to be included in coping strategy assessment tools. By assessing popularly studied coping strategies, stress levels, and movement together in the same sample, we have gained

insight not only into how movement is being used as a coping strategy, but also into the many relationships between movement and the other variables. In future studies, researchers will be able to create an appropriate experimental design informed by and reflective of the findings of the current study.

4.3: Future Research

Stress is universal and common to the human experience, often involving a significant cost to individual and community alike. The better we understand how to effectively manage stress in all situations, especially in those situations where stress plagues us most (our work), the better our lives can become. While conclusions may be limited, it is clear from this study that movement plays a role in how people manage stress. This being the case, there are many more questions to consider. Under what circumstances are people using movement? Do people combine movement with other coping strategies? How do people perceive the use of movement to manage stress? And, critically, what is the effect of movement on stress? Does it actually help? While some of these questions might be answered with additional survey data, an experimental design would help clarify the effectiveness of movement-based coping strategies. With such a design, one could assess the actual impact of movement on stress and whether or not this impact changes with other variables (such as shifts in environment, the combination of movement and other coping mechanisms, or presenting a pro-movement versus anti-movement culture). Though questions about the use of commercial fidget tools (such as the stress ball or fidget cube) were not included in this study, future research might ask about such devices and investigate their impact on the frequency and effectiveness of movement as a coping strategy to manage stress.

Unfortunately, the current study was not able to assess a relationship between use of movement-based coping strategies and exercise habits. We can speculate that perhaps a relationship does exist given that all write-in answers to the question "I do some other kind of movement. (Please describe)" related to either movement or exercise. In future studies, perhaps a shorter survey or a different type of exercise assessment would provide the required data to address the remaining question of how exercise and movement-based coping strategies may be related.

Finally, based on the current results, the continued development of a Movement scale is warranted. Future studies might test additional movement-related items generated by the write-in answers, explore the possibility of multiple Movement subscales, and consolidate items to find the best representation of use of movement as a coping mechanism with the fewest items possible. A broader population sample will be necessary to fully explore the ways in which movement may function as a coping strategy for individuals of varying demographics.

4.4: Conclusion

This study found that people do use movement-based coping strategies to manage stress during the workday and there is preliminary support of some psychometric properties of the newly created Movement scale. Future research can continue the development of a Movement scale, explore the circumstances under which individuals use movement to manage stress, and investigate the effectiveness of movement-based coping strategies in managing stress. This information will allow us to give better recommendations and create better stress-management programs at individual and organizational levels.

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TABLES

Table 1

Descriptive Statistics of Scales

Scale	N	Mean (SD)
Acceptance	69	2.99 (.62)
Active Cope	66	3.48 (.63)
Denial	69	1.35 (.59)
Disengage	68	1.33 (.55)
Distract	69	2.57 (.70)
E. Support	67	2.92 (.83)
Humor	68	2.65 (.94)
I. Support	69	3.05 (.73)
Movement	68	2.16 (.83)
Movement:Walk	68	2.67 (.82)
Movement:Fidget	69	1.77 (.83)
Plan	67	3.46 (.55)
P. Reframe	69	3.17 (.63)
Religion	69	2.24 (1.05)
Self-Blame	68	2.23 (74)
Substance Use	69	1.43 (.68)
Vent	65	2.4 (.79)

Table 2
Frequency of Reported Use of Coping Strategy Scales

Scale	"A little bit"	"A medium amount"	"A lot"
Acceptance	7% (5)	43% (30)	49% (34)
Active Cope	4% (3)	23% (16)	71% (49)
Denial	28% (19)	7% (5)	4% (3)
Disengage	22% (15)	9% (6)	4% (3)
Distraction	30% (21)	38% (26)	32% (22)
E. Support	23% (16)	26% (18)	48% (33)
Humor	26% (18)	32% (22)	35% (24)
I. Support	19% (13)	38% (26)	43% (30)
Movement	23% (16)	35% (24)	41% (28)
Planning	0% (0)	25% (17)	74% (51)
P. Reframe	7% (5)	41% (28)	52% (36)
Religion	30% (21)	20% (14)	33% (23)
Self-Blame	45% (31)	33% (23)	13% (9)
Substance Use	32% (22)	4% (3)	6% (4)
Vent	32% (22)	45% (31)	16% (11)

Frequencies were calculated by adding the number of participants who reported using a given strategy at the indicated amount. The exact number of participants who reported using a given strategy at the indicated amount is listed in parentheses to the right of the percentage. The total number of participants was 69.

Table 3
Theme of Write-in Responses

Theme	Individual Response
Exercise	Cardio exercise
	Workout
	Workout
	Strenuous exercise
	Run long distances
	Exercise/fitness class
	Exercise vigorously
	Ride my horse
Movement:Fidget	Bite nails/ bite lip
	Doodle
Movement:Walk	Walk
	Yoga stretches/ deep breathing

Table 4
Frequency of Reported Use of Movement Scale Items

Scale	"A little bit"	"A medium amount"	"A lot"
Fidget	29% (20)	10% (7)	10% (7)
Pace	22% (15)	9% (6)	6% (4)
Play with Pen	25% (17)	14% (10)	12% (8)
Step Away	26% (18)	38% (26)	29% (20)
Stretch	35% (24)	29% (20)	17% (12)
Tap	29% (20)	12% (8)	10% (7)
Walk	26% (18)	30% (21)	25% (17)

Frequencies were calculated by adding the number of participants who reported using a given strategy at the indicated amount. The exact number of participants who reported using a given strategy at the indicated amount is listed in parentheses to the right of the percentage. The total number of participants was 69.

Table 5

Correlations Between Movement Items and Movement Scales

Item	Movement	Movement:Walk	Movement:Fidget
Fidget	.669**	.192	.831**
Pace	.630**	.132	.726**
Play	.640**	.138	.843**
Step Away	.653**	.841**	.240*
Stretch	.595**	.816**	.128
Tap	.575**	.132	.765**
Walk	.628**	.853**	.171

Correlations were calculated using Spearman's Rank-Order Correlation.
*p < 0.05
**p < 0.001

Table 6

Correlations Among and Descriptive Statistics For Movement Items

Item	N	Mean (SD)	1	2	3	4	5	6	7
1. Fidget	69	1.80 (.99)		.515**	.640**	.206	.103	.591**	.256*
2. Pace	69	1.57 (.88)			.575**	.159	.101	.463**	.151
3. Play	69	1.88 (1.05)				.240*	.179	.484**	.045
4. Step Away	69	2.88 (.92)					.576**	.040	.631**
5. Stretch	68	2.47 (.98)						.107	.496**
6. Tap	69	1.83 (1.00)							.176
7. Walk	69	2.61 (1.06)							

Correlations were calculated using Spearman's Rank-Order Correlation.
*$p < 0.05$
**$p < 0.001$

Table 7

*Factor Loadings and Communalities Based on a Principal Components Analysis with Varimax Rotation for Movement Items (*N = *68)*

	Movement: Walk	Movement: Fidget	Communality
Fidget		.861	.766
Tap		.853	.732
Play		.825	.698
Pace		.819	.671
Step Away	.877		.775
Walk	.823		.689
Stretch	.804		.657

Table 8
Correlations Between Non-Movement Coping Strategy Scales and Movement Scales

Scale	Movement	Movement: Walk	Movement: Fidget
Acceptance	.356**	.254*	.222
Active Cope	.041	.151	-.060
Denial	.137	.084	.138
Disengage	.238	.071	.331**
Distract	.234	.098	.259*
E. Support	.278*	.290*	.181
Humor	.259*	.151	.208
I. Support	.122	.107	.090
Plan	.163	.106	.105
P. Reframe	.475**	.400**	.296*
Religion	.036	.119	-.082
Self-Blame	.415**	.113	.429**
Sub. Use	.164	-.036	.225
Vent	-.035	-.027	.023

Correlations were calculated using Spearman's Rank-Order Correlation.
*$p < 0.05$
**$p < 0.001$

Table 9

Correlations Among Non-Movement Coping Strategy Scales

Scales	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Acceptance		0.172	-.036	-.057	.247*	.024	.308*	-.105	.197	.490**	.089	.262*	.091	-.072
2. Active Cope			-.128	-.140	-.159	.223	-.004	-.052	.401**	.467**	.209	-.107	-.145	.109
3. Denial				.318**	.043	-.022	.095	.009	-.115	.020	.091	.242*	.330**	.300*
4. Disengage					.161	.078	.136	.063	-.243*	.013	.064	.231	.175	-.035
5. Distract						-.215	.178	-.151	-.090	.106	.019	.185	.007	-.059
6. E. Support							.026	.645**	.134	.168	.011	-.076	.005	.310*
7. Humor								-.011	-.086	.220	.101	.229	.312**	.048
8. I. Support									.065	.069	.035	-.120	-.017	.397**
9. Plan										.398**	.105	-.027	-.034	.074
10. P. Reframe											.342**	.071	.067	-.103
11. Religion												-.047	-.102	.162
12. Self-Blame													.195	.008
13. Sub. Use														.061
14. Vent														

Correlations were calculated using Spearman's Rank-Order Correlation.

*p < 0.05

**p < 0.001

Table 10
Correlations Between Coping Strategy Scales and Other Scales

Scale	Age	Stress
Acceptance	.079	.214
Active Cope	.312*	-.235
Denial	.067	-.034
Disengage	.102	.042
Distract	-.081	-.052
E. Support	-.108	-.285*
Humor	-.223	.137
I. Support	-.099	-.223
Movement	-.253*	-.126
Movement:Walk	-.237	-.155
Movement:Fidget	-.083	-.189
Plan	.024	-.030
P. Reframe	.072	-.106
Religion	.125	-.020
Self-Blame	-.213	.244*
Substance	-.243*	.225
Vent	.035	-.119

Correlations were calculated using Spearman's Rank-Order Correlation.
*$p < 0.05$
**$p < 0.001$

APPENDIX A: LEISURE-TIME EXERCISE QUESTIONNAIRE

Godin Leisure-Time Exercise Questionnaire

During a typical 7-Day period (a week), how many times on the average do you do the following kinds of exercise for more than 15 minutes during your free time (write on each line the appropriate number).

_____ STRENUOUS EXERCISE (HEART BEATS RAPIDLY)
(e.g., running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling)

_____ MODERATE EXERCISE (NOT EXHAUSTING)
(e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing)

_____ MILD EXERCISE (MINIMAL EFFORT)
(e.g., yoga, archery, fishing from river bank, bowling, horseshoes, golf, snowmobiling, easy walking)

APPENDIX B: STRESS IN GENERAL SCALE

Your Stress at Work

Do you find your job stressful? For each of the following words or phrases below write:

Y for "Yes" if it describes your job
N for "No" if it does not describe your job
? for "" if you cannot decide

___ Demanding
___ Pressured
___ Calm
___ Many things stressful
___ Hassled
___ Nerve-racking
___ More stressful than I'd like
___ Overwhelming

APPENDIX C: BRIEF COPE SURVEY

Brief COPE

These items deal with ways you've been coping with the stress in your life since you found out you were going to have to have this operation. There are many ways to try to deal with problems. These items ask what you've been doing to cope with this one. Obviously, different people deal with things in different ways, but I'm interested in how you've tried to deal with it. Each item says something about a particular way of coping. I want to know to what extent you've been doing what the item says. How much or how frequently. Don't answer on the basis of whether it seems to be working or not—just whether or not you're doing it. Use these response choices. Try to rate each item separately in your mind from the others. Make your answers as true FOR YOU as you can.

1 = I haven't been doing this at all
2 = I've been doing this a little bit
3 = I've been doing this a medium amount
4 = I've been doing this a lot

1. I've been turning to work or other activities to take my mind off things.
2. I've been concentrating my efforts on doing something about the situation I'm in.
3. I've been saying to myself "this isn't real.".
4. I've been using alcohol or other drugs to make myself feel better.
5. I've been getting emotional support from others.
6. I've been giving up trying to deal with it.
7. I've been taking action to try to make the situation better.
8. I've been refusing to believe that it has happened.
9. I've been saying things to let my unpleasant feelings escape.
10. I've been getting help and advice from other people.
11. I've been using alcohol or other drugs to help me get through it.
12. I've been trying to see it in a different light, to make it seem more positive.
13. I've been criticizing myself.
14. I've been trying to come up with a strategy about what to do.
15. I've been getting comfort and understanding from someone.
16. I've been giving up the attempt to cope.
17. I've been looking for something good in what is happening.
18. I've been making jokes about it.
19. I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.
20. I've been accepting the reality of the fact that it has happened.
21. I've been expressing my negative feelings.
22. I've been trying to find comfort in my religion or spiritual beliefs.
23. I've been trying to get advice or help from other people about what to do.
24. I've been learning to live with it.
25. I've been thinking hard about what steps to take.

26. I’ve been blaming myself for things that happened.
27. I've been praying or meditating.
28. I've been making fun of the situation.

APPENDIX D: COPE SURVEY INTRODUCTION

We are interested in how people respond when they confront difficult or stressful events in their lives. There are lots of ways to try to deal with stress. This questionnaire asks you to indicate what you generally do and feel, when you experience stressful events. Obviously, different events bring out somewhat different responses, but think about what you usually do when you are under a lot of stress.

Then respond to each of the following items by blackening one number on your answer sheet for each, using the response choices listed just below. Please try to respond to each item separately in your mind from each other item. Choose your answers thoughtfully, and make your answers as true FOR YOU as you can. Please answer every item. There are no "right" or "wrong" answers, so choose the most accurate answer for YOU--not what you think "most people" would say or do. Indicate what YOU usually do when YOU experience a stressful event.

1 = I usually don't do this at all
2 = I usually do this a little bit
3 = I usually do this a medium amount
4 = I usually do this a lot

APPENDIX E: MODIFIED BRIEF COPE SURVEY

Brief COPE

We are interested in how people respond when they confront difficult or stressful events in their work lives. There are lots of ways to try to deal with stress. This questionnaire asks you to indicate what you generally do and feel, when you experience stressful events at work. Obviously, different events bring out somewhat different responses, but think about what you usually do when you are under a lot of stress at work.

Then respond to each of the following items by typing in one number for each item, using the response choices listed just below. Please try to respond to each item separately in your mind from each other item. Choose your answers thoughtfully, and make your answers as true FOR YOU as you can. Please answer every item. There are no "right" or "wrong" answers, so choose the most accurate answer for YOU--not what you think "most people" would say or do. Indicate what YOU usually do when YOU experience a stressful event.

1 = I usually don't do this at all
2 = I usually do this a little bit
3 = I usually do this a medium amount
4 = I usually do this a lot

1. I turn to work or other activities to take my mind off things.
2. I concentrate my efforts on doing something about the situation I'm in.
3. I say to myself "this isn't real".
4. I use alcohol or other drugs to make myself feel better.
5. I get emotional support from others.
6. I give up trying to deal with it.
7. I take action to try to make the situation better.
8. I refuse to believe that it has happened.
9. I say things to let my unpleasant feelings escape.
10. I get help and advice from other people.
11. I use alcohol or other drugs to help me get through it.
12. I try to see it in a different light, to make it seem more positive.
13. I criticize myself.
14. I try to come up with a strategy about what to do.
15. I get comfort and understanding from someone.
16. I give up the attempt to cope.
17. I look for something good in what is happening.
18. I make jokes about it.
19. I do something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.
20. I accept the reality of the fact that it has happened.
21. I express my negative feelings.
22. I try find comfort in my religion or spiritual beliefs.
23. I try to get advice or help from other people about what to do.

24. I learn to live with it.
25. I think hard about what steps to take.
26. I blame myself for things that happened.
27. I pray or meditate.
28. I make fun of the situation.
29. I stand up and stretch
30. I physically walk away for a bit
31. I go for a brief walk around my work space
32. I go for a brief walk outside my work space
33. I do some other kind of movement. (Please describe_____).

Scales

- Self-distraction, items 1 and 19;
- Active coping, items 2 and 7;
- Denial, items 3 and 8;
- Substance use, items 4 and 11;
- Use of emotional support, items 5 and 15;
- Use of instrumental support, items 10 and 23;
- Behavioral disengagement, items 6 and 16;
- Venting, items 9 and 21;
- Positive reframing, items 12 and 17;
- Planning, items 14 and 25;
- Humor, items 18 and 28;
- Acceptance, items 20 and 24;
- Religion, items 22 and 27;
- Self-blame, items 13 and 26;
- Movement-based, items 29-33 (created for current study).