

Elderly Educated African Americans and the influence of Exercise Identity, Self-Determination, and Social Determinants of Health on Physical Activity

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ABSTRACT

Background: This study examined the influence of socio-economic status (SES), exercise self-definition and self-determination variables on physical activity participation among African-American retirees.

Methods: Both African-American men and women, of at least 60 years of age, were surveyed. All participants lived independently. The data collected included demographic, Godin Leisure-Time Physical Activity Questionnaire (LTPA), Exercise Self-Definition Scale (ESDS), Behavioral Regulations Exercise Questionnaire-2 (BREQ-2), and Basic Psychological Needs Satisfaction in Exercise Scale (BPNES). The findings and analyses were based on data collected from 149 participants.

Results: Only gender was a statistically significant predictor of physical activity participation in the study. Based on self-reports, African Americans with moderate to high SES (MH-SES) were well above the physically “active” threshold as defined by the LTPA.

Conclusions: It was observed that physical activity participation decreased as individuals aged while exercise identity plateaued. MH-SES may have a “buffering” effect among older African Americans by suppressing sedentary lifestyle adoption. Hence, race may not be as salient a factor in predicting physical activity participation among African Americans as once thought.

Keywords: Elderly African Americans, exercise psychology, self-determination theory, exercise self-definition

INTRODUCTION

The prevalence of lifestyle related chronic diseases among African Americans (i.e., Blacks) has been linked to a lack of regular physical activity participation (Geyen, 2012). Based on several studies, African-American women are far more physically inactive compared to African-American men and other ethnic/racial groups (Bland & Sharma, 2017; Gothe & Kendall, 2016). Because all Americans are living longer, older adults are an at-risk group for physical inactivity, particularly African Americans. In 2012, 60% of older adults had 2 or more chronic diseases that could be managed with regular physical activity (Ward et al., 2014). However, less than 60% of older adults participated in regular physical activity (National Center for Health Statistics, 2014). Wilson and colleagues (2004) reported educated and high SES African Americans engaged in more physical activity compared to low SES African Americans.

Social determinants of health (SDOH) are conditions in which people are born, grow, work, live, age, and the wider set of forces and systems shaping the conditions of daily life (Solar & Irvin, 2010). These conditions are responsible for most health disparities. Examples of SDOH include socioeconomic status (SES) (i.e., education level & income), racial segregation, and low social support (Daniels

et al., 2018). However, scholars are still debating whether race (i.e., one’s phenotype) or racism (i.e., systematic practice of discrimination) is a social determinant of health (Ellis, 2019). Yet, race has been implicated as a cause for lower physical activity levels and increased cardiovascular disease prevalence among African Americans compared to other races (Mathieu et al., 2012). While race has been consistently correlated with the high prevalence of chronic diseases among African Americans (Price et al., 2013), there are additional reasons. Factors such as age, gender, exercise self-definition, motivation, and low SES can all contribute to decreasing physical activity participation among African Americans (Bopp et al., 2006; Gothe, 2016; Hays et al., 2010; Joseph et al., 2017; & Landry & Solomon, 2004).

Low SES (L-SES) has been correlated with low physical activity participation (Pampel et al., 2010; Parks et al., 2003). Within the context of SES, Tucker-Seeley and colleagues (2009) reported that leisure-time physical activity (LTPA) levels were higher for higher SES older adults compared to lower SES adults. That study also reported that the higher SES older adults reported living in much safer neighborhoods than lower SES adults (Tucker-Seeley et al., 2009). Often, L-SES neighborhoods lack safe venues for residents to exercise and live

(Boone-Heinonen et al., 2011; Landrine & Corral, 2009). In a 2015 study, Samson et al. concluded that one's adult SES was an important predictor of the future development of cardiovascular diseases particularly among both African American women and among younger African Americans. Hence, L-SES may predispose individuals to a life prone to becoming physically inactive (Allen et al., 2017). In Georgia, the average annual retirement income of individuals 65 years of age or older was \$24,091 (U.S. Census Bureau, 2019). This translates into an average monthly income of \$2008.00. In this study, over 60% of the sample reported a monthly income greater than \$3,000 and the average individual had at least 16.28 years of education, while 26 individuals held a doctoral degree. As a result of having an above average mean monthly income and high a percentage of individuals with a post-secondary education, the researchers operationalized this sample having moderate to high SES (MH-SES).

Exercise identity is defined as the degree to which exercise participation is descriptive of the person's self-concept (Anderson & Cychosz, 1994). Similarly, exercise self-definition is defined as the strength of one's self-perception as an exerciser (Hays et al., 2005). For the purposes of this study, these constructs will be considered synonyms since both are identity constructs. However, exercise self-definition is the focus of this study because it is the construct that has been studied among African Americans (Hays et al., 2005;2010). In contrast, exercise identity has not been explored among African-American populations (Wilson & Moun, 2008). Yet the strength of both identity constructs within individuals has been shown to positively influence exercise behaviors (Anderson & Cychosz, Anderson, Cychosz, & Franke, 1998 ;2001; Cardinal & Cardinal, 1997; Hays et al., 2005; Strachan et al., 2005). As one ages, exercise identity has also been implicated to positively correlate with strong exercise behaviors (Hardcastle & Taylor, 2005; Whaley & Ebbeck, 2002). In general, exercise identity was thought to be relatively stable after a certain age (Serpe, 1987). However, studies have shown that exercise identity may be influenced by psychological needs and behavioral regulations (Ntoumanis et al., 2018; Strachan et al., 2012). One study revealed that exercise identity strengthened among individuals participating in a 14-week structured, aerobic exercise program (Cardinal & Cardinal, 1997). Similarly, exercise self-definition scores increased among a sample of L-SES African-American women who participated in a 24-week exercise intervention, but their exercise behavior did not (Hays et al., 2005). These findings suggested that exercise identity may be a dynamic construct. Yet, the use of this construct to explain physical activity has not been explored extensively in the literature with African-American populations. Only a couple of studies have explored the role of exercise self-definition and its impact of physical activity participation among African Americans (Hays et al., 2005; 2010). Additionally, none of these studies have intentionally researched elderly African Americans. Yet, the relationship between exercise identity and self-determination to exercise motivation is well

documented in the literature (Strachan et al., 2012; Vlachopoulos et al., 2011).

According to self-determination theory, individuals with a strong exercise self-definition are more likely to have fulfilled psychological needs and engage in physical activity at higher, more consistent rates due to innate, intrinsic reasons compared to someone with a weaker exercise self-definition (La Guardia, 2009). A study conducted by Landry and Solomon (2004) assessed African-American women self-determination typologies across the stages of change for exercise. Their findings were congruent with theory in that those African-American women who had been physically active over a period of time were more self-determined in their behavioral regulation typology compared with less or in-active African-American women. According to Ryan and Deci (2000), behavioral regulation typologies are the degree to which an individual is intrinsically motivated or not motivated to engage in physical activity or exercise. However, few studies that have investigated physical activity participation using behavioral regulations of an African-American, older adult population with MH-SES.

In exploring physical activity among African Americans, the role of exercise self-definition has not been widely explored. Hence, race may not be the most salient factor influencing the lack of physical activity participation among this racial group. The objectives of this study are threefold:

- 1) To investigate the mean physical activity participation and exercise self-definition scores of African Americans (men and women) with MH-SES compared to L-SES women.
- 2) To investigate the mean exercise self-definition and physical activity participation scores and determine the relationship between the two constructs as the ages of individuals in the sample increases.
- 3) To investigate whether exercise self-definition is a significant predictor of physical activity participation among MH-SES African American retirees (men & women).

Therefore, the researchers hypothesized that: 1. MH-SES African Americans (men and women) will have higher mean exercise self-definition scale scores compared to L-SES women. 2. As the older African Americans age (men & women), their mean leisure time physical activity questionnaire & exercise self-definition scale scores will both decrease. 3. Exercise self-definition scale scores will be a significant predictor of leisure time physical activity among MH-SES African American retirees.

METHODS

Institutional Review Board Approval

The research reported in this manuscript was reviewed and approved by the Georgia State University Institutional Review Board (IRB).

Participants & Setting

The data analysis and findings were based on hundred and forty-nine ($n = 149$) African-American men and women. To be included in the study, participants had to be at least 60 years, retired Georgia residents, and live independently in their residence (not requiring the care for others to carry out ADLs or community dwelling). Participants were verbally screened and confirmed as residents of the State of Georgia. Additionally, participants had to self-identify as African American and currently participating in regular physical activity. The community dwelling elderly are defined as those individuals who are at least 60 years old and lived independently (Steultjens et al., 2004). In this study, independent living entailed managing their own day to day activities without assistance and living in their own private residence. Individuals could not participate in the study if they resided in a nursing home or assisted living facility. They also were considered “retired” due to receiving retirement payments from their former employer and or social security benefits.

Data collection

The recruitment and data collection were done over a 6-month period. Prior to beginning the study, written informed consent was obtained prior to completing study surveys and demographic information. Participants were recruited using flyers and word-of-mouth-notification at a local fraternity convention, local retirement communities, churches, and fitness centers. All surveys were completed in a large metropolitan city in the state of Georgia. As an incentive, a raffle for commercial gift cards was conducted to encourage participation by participants at some of the venues mentioned. For this study, IRB approval was received through the authors’ institution.

Assessments & Measures

The Behavior Regulation Exercise Questionnaire (BREQRAI-2) is a 19-item, four-point likert questionnaire investigating why people decide to engage or not engage in exercise. The questionnaire is made up of five subscales based on the orgasmic integration sub-theory of self-determination theory. The subscales are amotivation (four statements), external regulation (four statements), introjected regulation (three statements), identified regulation (three statements), and intrinsic motivation (four statements). The responses are rated on a 5-point scale ranging from “0- not true for me” to “4- very true for me”. An example of a question from this questionnaire is “I enjoy exercise because other people say I should”. The relative autonomy index (RAI) was calculated and used in the analysis as a composite representation of BREQ-2 as an interval level of measurement. Higher RAI mean scores are indicative of higher levels of autonomy (Chemolli & Gagne, 2014; Ryan & Connell, 1989).

Exercise Self-Definition Scale (ESDS) is an 11-item, continuous scale used to assess individuals’ perception of self as an exerciser. The scale is constructed on three

subscales: perceived value of exercise (4 statements), perceived acknowledgment (4 statements), and perceived competence (3 statements). The responses for each item are rated on an 11-point scale ranging from “0- not at all” to “10- very much” for all items. The following is an example question from the scale: “To what extent do you consider yourself an exerciser?” Scores range from 0 to 110, where higher mean scores are indicative of a stronger, positive exercise self-definition (i.e., identity). The ESDS has been used to assess the construct of exercise identity among African Americans.

Godin Leisure-Time Physical Activity Questionnaire (LTPA) is a brief, four-item, continuous self-report inquiry of usual leisure-time exercise habits over a seven-day period. The numerical values range from zero to any value up to or greater than one hundred. A sample question from the questionnaire: “Considering a seven-day period, during your leisure time, how often do you engage in any regular activity long enough to work up a sweat (make heartbeat rapidly)?”. The responses are often/sometimes/never-rarely. The scores range from less than 14 units (insufficiently active/sedentary), between 14-23 units (moderately active), and 24 units or more (active) (Amireault & Godin, 2015). Higher mean scores are indicative of more PA engagement. Basic Psychological Need Satisfaction in Exercise Scale (BPNSSES) is a 12-item, likert self-report scale created by Vlachopoulos and Michailidou (2006). It was designed to assess the extent to which the three basic psychological needs are met in relation to exercise based on the self-determination theory. Hence, the three subscales of the BPNSSES are autonomy, competence, and related; each subscale had four items. The item response format is a 5-point Likert-scale ranging from “1- totally disagree” to “5- very strongly agree.” The total scores can range from 12 to 60 points; higher total scores are suggestive of greater perceived needs satisfaction. The following is a sample statement from the scale: “I feel very strongly that the way I exercise fits perfectly the way I prefer to exercise”.

After participants completed the demographic sheet and survey instruments, the data were analyzed using IBM SPSS Statistical software, version 24. Spearman Rho correlations coefficients were conducted on the following variables: LTPA, BREQ2RAI, ESDS, and BPNSSES subscales: competence, autonomy, relatedness to determine strength of variable relationships. Due to the diverse mobility capabilities among participants both within and between groups as well as skewed data, the Spearman Rho correlation was appropriate for analyzing relationships among this skewed distribution of scores (Field, 2013).

The statistical plan for addressing the research hypotheses were as follows. For research hypothesis one, the exercise self-definition and leisure time physical activity variables mean scores for men and women were calculated and compared with L-SES women mean scores from a previous study. For research hypothesis two, two age cohort groups were created to compare the sample means for leisure time physical activity and exercise self-definition scores as age increased: 60-74 years old and 75 years old & older cohorts.

For research hypothesis three, a hierarchical regression analysis was used to determine if exercise self-definition was a significant predictor of physical activity participation. For the regression model, the following independent variables entered in the following blocks: demographics-income, gender, education (Block 1); BPNSES subscales: competence, autonomy, relatedness (Block 2); BREQ2RAI (Block 3); and ESDS (Block 4).

RESULTS

One-hundred and forty-nine (N = 149) African American retirees between the ages of 60 to 94 years (M (mean) = 71.25; SD (standard deviation) = 7.08) were included in the final analysis. The total sample included 73 (49.0%) men and 76 (51.0%) women. The years of education ranged from 3 to 21 years (M = 16.28; SD = 3.39). Approximately 70% of the sample had at least a bachelor's degree and 17% had an earned doctorate degree. For the total sample, over 60% of residents reported having monthly incomes of \$3,000 or greater (Table 1).

African-American (men and women) with moderate to high SES (MH-SES) will have higher mean exercise self-definition scores compared to African-American women with low SES (L-SES).

In this MH-SES sample, the overall mean exercise self-definition scores were higher for women compared to men. However, there was no statistically significant difference between exercise self-definition group gender scores ($p < .05$) (See table two). The overall exercise self-definition mean sample score for African Americans with MH-SES was M = 73.8; SD = 21.5. By gender, the exercise self-definition scores for MH-SES African-American men and women in this study were M= 73.19, SD=23.51 and M= 74.41, SD=19.48, respectively. Based data from the Hays & colleagues (2010) study, mean exercise self-definition score for the sample of L-SES African- American women was M= 55.37; SD=21.85. Based on the findings of this study, African- American (men and women) with MH-SES did have higher mean exercise self-definition scores compared to African-American women with L-SES. Therefore, research hypothesis one was supported (Table 2).

As African American retirees age, both leisure time physical activity questionnaire and exercise self-definition mean scores will decrease.

This study is unique in that it had a MH-SES population and an equal representation of both African American men and women with ages ranging from 60 to 94 years. To address

this research question, the range between ages was determined. The difference between ages was found (lowest age & highest age). That score (n=34) was divided by two to give us the midpoint of age range (17 was midpoint). This created a "low old age group" and an "older old age group". The ages were divided into two groups at age 74 because no participant was 77 years of age. Hence, two new age cohorts were created: 60 -74 and 75- 94 years of age. Researchers then compared the exercise self-definition and leisure time physical activity questionnaire mean scores of these two new cohorts to see if there was a significant change in mean scores as individuals aged (Table 4). In the 60 to 77-year-old cohort, the mean leisure time physical activity questionnaire score was 57.18 and exercise self-definition score mean score of 73.61. For the 78-year-old and older cohort, the mean leisure time physical activity questionnaire score was 54.69 and mean exercise self-definition score was 74.19. The exercise self-definition score means remained stable, while the leisure time physical activity questionnaire scores slightly decreased for the older group. As the older African Americans aged (men & women), only the mean leisure time physical activity scores decreased while the & exercise self-definition scale scores remained stable. Based on this finding, the research hypothesis was not fully supported and therefore rejected (Table 3)

Exercise self-definition scores will be a significant predictor of physical activity participation (LPTA) among an African American population with MH-SES.

Step one analysis revealed that income, education, and gender explained 2.4% of the model and only gender was statistically significant. In Step two, the addition of the psychological needs of autonomy, relatedness, and competence reduced the explained variance by 1.1 % to the total model explained variance of 1.3%. In Step three, the addition of the BREQ-2RAI made a significant contribution by increasing the model variance by 13.1%, increasing the total model variance to 14.4%. Neither of the psychological variables in step two nor step three were statistically significant in the model. Lastly, in Step four, exercise self-definition scale added an additional 1.8 % variance to the overall model; however, it too was not a statistically significant predictor in the model. Overall, these collective predictors accounted for only 16.2 % of the total model variance. Hence, exercise self-definition was not a significant predictor ($p < .05$) of physical activity participation among African American retirees (men & women), of which the majority of whom had MH-SES. Therefore, this research hypothesis was not supported. See Table 3 below for hierarchical linear regression (Table 4).

Table 1
Demographic variables of African American retirees 60 years older or older

Variable	N	%
Race: African Americans	149	100
Gender		
Men	73	49
Women	76	51
Education		
Less Than High School	5	3
High School Graduate/GED	12	8
Some College	30	20
Bachelors	41	28
Masters	36	24
Doctorate	26	17
Income per Month		
<\$1,000	6	4
\$1,000<>\$2,999	45	30.9
\$3,000<>\$4,999	45	30.9
\$5,000	46	30.2

Note: Practice & Policy, 11

Table 2
Exercise Self-Definition Scale scores

Gender	N=149	Value of Exercise M(SD)	Competence M(SD)	Social Acknowledgement M(SD)	Total ESDS score M(SD)
Men	73	28.41 (8.57)	21.73 (7.03)	22.77 (11.15)	73.19 (23.51)
Women	76	29.93 (6.79)	20.93 (6.83)	23.28 (9.51)	74.41(19.48)

Table 3
Hierarchical multiple regression analyses predicting physical activity participation from demographic, Self-Determination Theory, and Exercise Self-Definition Variables

Predictor	ΔR^2	B	SEB	β	p-value
Step 1	.024				

Predictor	ΔR^2	B	SEB	β	p-value
Demographic Variable: Gender		-17.86	7.34	-.218	.016*
Step 2	.013				
BPNES Autonomy		.704	.464	.135	.132
BPNES Competence		.731	.386	.169	.061
BPNES Relatedness		.589	.312	.163	.061
Step 3	.144				
BREQ2RAI		.294	.164	.163	.076
Step 4	.162				
ESD		.414	.211	.216	.052

Note: Demographic variables: gender, income, and education; BPNES= Basic Psychological Need for Exercise Scale (subscales: autonomy, competence, relatedness); BREQ2RAI= Behavioral Regulation for Exercise Questionnaire-2 with Relative Autonomy Index; ESD= Exercise Self-Definition Scale; *p<.05

Table 4
Influence of aging on physical activity participation and exercise identity

Age cohorts	ESDS	GSLTPQ
60 to 77 years old	73.61	57.18 units
78 years old and older	74.19	54.69 units

DISCUSSION

Perhaps it is not ones' race as an African American that leads to disparities in exercise participation, but rather disparities as it relates to SDOH (resources) are driving exercise behavior inequities. As studies have suggested, physical activity tends to improve when Blacks have higher education levels and economic resources (i.e., higher SES) compared to their White counterparts (Braveman et al., 2010; Zimmerman et al., 2015). Hence, many of the issues related to the development of sedentary behavior and chronic disease disparities among certain races may be mitigated with improvements in economic resources, particularly among the poor. Studies have shown impoverished areas which lack community safety, lack quality alternatives to safe exercise venues and programs, and food deserts hinder the promotion of healthy living behaviors (Gasken et al., 2014; Hilmers et al., 2012). Cohn and colleagues (2013), in their study which observed sedentary and physical activity behavior patterns in low-income African Americans and Whites in the southeastern region of the United States, found that both low SES whites and blacks exercised (i.e., sedentary) at

similar rates. Additionally, that report revealed that the study participants reported annual incomes of less than \$15,000 (i.e., \$1,250 per month).

In this study, most African Americans reported above average physical activity participation rates. A previous study reported that individuals with high SES participated in leisure time physical activity at higher rates than L-SES individuals, perhaps playing a "protective role" against sedentary behavior adoption associated with chronic disease development (Stalsberg & Pedersen, 2018). This present study supports that narrative. A MH-SES was associated with a strong exercise self-definition and having an "active" leisure time physical activity participation. The physical activity guidelines for all Americans published by the CDC & U.S. Department of Health and Human Services (USDHHS, 2018) recommends adults and older adults "should move more and sit less throughout the day". In this study, the physical activity or exercise standard being assessed is in alignment with the national recommendation of 150 minutes of moderate-vigorous physical activity (MVPA) five days a week for at least 30 minutes per day for individuals over 65. Additionally, this population should

strength train twice a week to assist in the management or prevention of chronic diseases and promote longer independence. While units of physical activity participation in this study (e.g., LTPA -units vs MVPA- minutes/week) will not allow for direct physical activity comparison, the findings in this study suggest that these individuals are perhaps more engaged in regular physical activity than once thought. However, it should also be mentioned that “what it means to be physically active” can differ for older African Americans. For example, an elderly African-American woman defined physical activity as performing a household chore such as dusting while another African-American woman stated walking to her job less than five blocks away was her physical activity (Liu et al., 2020). In a study conducted by Sebastiao & colleagues (2015), an African-American woman defined physical activities as “informal” activities such as skating, walking, bicycling, and any type of sport.

In this study, African-American women with MH-SES had higher exercise self-definition scores than L-SES women previously reported. Hays and colleagues (2010) investigated the role of self-definition by facilitating physical activity adoption among L-SES African-American women using the exercise self-definition scale. As reported in table two, the mean exercise self-definition scores for the women in that study were significantly lower than both men and women exercise self-definition scores reported in this current study. Higher exercise self-definition scores and “active” physical activity engagement status suggests that one’s income may allow for more exposure to exercise resources and access to support or exercise training. Hence, leading to an enhanced exercise identity. Additionally, because of their higher incomes, elderly individuals with MH-SES may be more likely to have more to spend exercising compared to L-SES individuals.

The second research hypothesis was not fully supported by the results of this study. As African Americans’ physical activity levels decreased with age, their exercise self-definition remained the same. Because of this cross-sectional design of this study, causation between exercise identity and decreased physical activity participation cannot be made. However, this finding implies that how one perceives him or herself in the context of being an exerciser may not always be aligned with their actual physical activity levels as they age (Hays et al., 2005; 2010). While an inverse relationship between increasing age and decreased physical activity participation has been established (Langhammer et al., 2018), the same association between increasing age, physical activity, and exercise self-definition cannot be made in this current study.

For the last research hypothesis, exercise self-definition did not predict exercise participation among African-American retirees, therefore research hypothesis three was not supported in this study. One reason why exercise self-definition scores may not have been a significant predictor in the regression model may be due to a low sample size. However, gender (i.e., men) was a significant predictor of physical activity participation in this study. It

has been shown that men participate in physical activities at higher rates than women (Ransdell et al., 2004).

There are several limitations of this study that should be acknowledged. Because of the non-experimental design of this study, causation between variables could not be established. Hence, while physical activity means decreased and exercise self-definition remained stable as participants increased in age, it cannot be directly stated that this relationship is solely due to aging. A study using a longitudinal, experimental study design would be needed to establish this cause-and-effect relationship.

Due to how Hays and colleagues (2010) collected physical activity data for women in their study, the researchers could not directly compare physical activity performance levels between the two studies as they did exercise self-definition scores. Future research is needed on exercise self-definition and physical activity participation among African Americans using activity tracking devices will allow for better quantification of physical activity across different African-American SES groups. Additional research is needed to investigate why individuals who report having competence (i.e., “value exercise”) about exercise, yet do not demonstrate physical activity participation aligned with nationally recommended thresholds. Also, more knowledge about where seniors live (e.g., apartment, senior independent living community, a home in the city or suburbs) and what exercise opportunities are available (e.g. yoga, tennis, or aerobics classes) to them could provide useful information for future studies.

As a new focus Healthy People 2020, identifying social determinants of health that impede optimal health and well-being for all Americans is prudent. Each American deserves an increased quality of life. However, with institutional barriers in place, marginalized groups are among the least likely to experience this decreased quality of life. African Americans are among these marginalized groups. By providing financial resources to underserved communities to increase access to exercise resources, perhaps exercise behaviors within these communities could improve (Barte & Wendel-Vos, 2017). Chokshi & colleagues (2018) saw a significant increase in “daily steps” taken by ischemic heart patients when providing a financial incentive to participate in regular physical activity.

CONCLUSION

Based on findings from this study, older African Americans with MH-SES exercised at moderate to high rates and had strong exercise self-definition scores. Male gender was the only significant predictor of physical activity participation, not exercise self-definition as proposed in this study. Lastly, while older African Americans maintained their strong exercise identities as they aged, their levels of physical activity decreased. However, this relationship between identity stability and decreased physical activity can only be viewed as an association.

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