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Research Article

Older HIV+ and HIV– Adults Provide Similar Definitions of Successful Aging: A Mixed-Methods Examination

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Abstract

Background and Objective: As HIV-infected (HIV+) individuals age, there is a need to understand successful aging (SA) from the patient perspective. This study compared SA definitions between HIV+ and HIV-uninfected (HIV–) older adults and then examined correlates of SA categories.

Research Design and Methods: Ninety-three HIV+ and 46 HIV– older (aged 50+) adults provided brief definitions of SA, which was examined using content analysis. We then compared the frequency of SA categories by serostatus and examined the correlates of SA categories within both groups.

Results: Seven SA categories emerged: General Health, Cognitive Health & Ability, Physical/Biological Health & Ability, Social Relationships, Attitudes, Psychological, & Emotional Well-Being, Proactive & Engaged Lifestyle, and Independence. While no significant differences emerged, HIV– older adults were more likely to report General Health and the subcategory of *Longevity/Survival*, while HIV+ older adults were more likely to report subcategories of *Enjoying Life & Fulfillment* and *Maintaining Balance*. Few demographic correlates of SA categories emerged. Mood and HIV characteristics were not associated with SA categories. In both groups, those without neurocognitive impairment were significantly more likely to endorse General Health than those with neurocognitive impairment.

Discussion and Implications: HIV+ and HIV– older individuals may generally perceive SA similarly, and their definitions parallel with existing models of SA. Yet, living with a chronic illness may cause HIV+ older adults to place greater value on quality of life and life satisfaction than physical health and chronological age. Observational and intervention studies may use similar approaches in evaluating and maximizing SA.

Keywords: Qualitative analysis, HIV/AIDS, Psychology of aging

The HIV/AIDS population is aging, with an estimated 50% of the U.S. HIV/AIDS population having already reached age 50, and an expected 73% to reach this age by 2030 (O’Keefe, Scheer, Chen, Hughes, & Pipkin, 2013). Older adults aging with HIV are at a higher risk for several adverse outcomes, including cognitive, physical, psychosocial, and functional declines, than their HIV-uninfected

(HIV–) counterparts (Cole et al., 2017; Friedman & Duffus, 2016; High et al., 2012; Thames et al., 2011; Valcour et al., 2004). As such, much of the research in older HIV-infected (HIV+) adults with HIV has focused on the negative aspects of aging with HIV. Yet, a subset of HIV+ older adults remain who have avoided many of the deleterious outcomes that can be associated with aging with HIV, and

are experiencing “successful aging” (SA). With that said, SA is a broad and multidimensional construct and there is no standard definition of SA in this growing vulnerable population despite the clear research need to better understand SA in this group, particularly from the patient perspective.

To date, studies examining SA in the HIV population have focused on quantitative measures and operationalizations of SA. Moore and colleagues (Moore et al., 2013) found that despite HIV+ older adults having a lower mean self-rated SA score than their HIV- counterparts, two-thirds of the HIV+ sample reported scores in the top half (≥ 5) of a 10-point scale of self-rated SA. This SA score was related to higher positive psychological factors (e.g., resilience), better emotional functioning, and better health-related quality of life (QoL), but was unrelated to HIV disease characteristics, such as duration of HIV disease, current and nadir CD4 counts, plasma HIV viral loads, and AIDS status. Among studies using more detailed successful *cognitive* aging (SCA) criteria (defined as the absence of objective neurocognitive deficits and subjective cognitive symptoms) in those with HIV, a stair-step decline in SCA in accordance with increasing age and HIV serostatus has been observed, ranging from approximately 50% of younger HIV- adults meeting criteria for SCA to only approximately 20%–30% of older HIV+ adults meeting these criteria (Malaspina et al., 2011; Moore et al., 2014). These previous studies suggest that SA, specifically SCA, is observable among those aging with HIV and these studies point to some potential risk and protective factors, as well as the association of SA with real-world everyday outcomes (e.g., instrumental activity of daily living [IADL] dependence, unemployment). Finally, a study using the current study sample (Moore et al., 2017) employed a similar, yet broader, multidomain, study-defined, SA criteria (absence of objective neurocognitive deficits, everyday functioning deficits, and major depressive disorder) and found that older HIV+ adults had a lower prevalence of SA (29%) than older HIV- controls (61%). Further, several potentially modifiable positive psychological factors were associated with this SA operationalization (e.g., resilience).

While the SA definitions applied in HIV+ samples have to some extent drawn upon existing conceptual frameworks and models used in the gerontological literature, a significant criticism of the SA literature is the focus on absence of disease and maintenance of optimal physical functioning as criteria for SA, which automatically excludes HIV+ persons as meeting such SA criteria. For example, the early Rowe and Kahn (Rowe & Kahn, 1997) model of SA posits the following criteria are needed to achieve SA: avoidance of physical illness and disability, maintenance of high physical and cognitive function, and continued engagement in social and productive activities. The Baltes and Baltes (Baltes & Baltes, 1990) model of SA proposes a broader, more multidisciplinary definition of eight components: length of life, biological health, mental health, cognitive efficiency, social competence, productivity, personal control, and life satisfaction. Vance and colleagues (Vance, McGuinness, Musgrove, Orel, & Fazeli,

2011) approach these components as areas in which individuals aging with HIV may face unique obstacles and thus should be focused on in interventions to promote SA. As a response to earlier restrictive definitions of SA, the first HIV-specific model of SA was developed by Kahana and Kahana (Kahana & Kahana, 2001), named the “Preventative and Corrective Model of Successful Aging,” which approaches SA in a positive light by focusing on activities associated with QoL outcomes such as meaning in life and maintenance of relationships. Recent models of SA in the nonpathological aging literature include a focus on subjective factors (i.e., self-rated SA), as well as modifiable psychosocial factors that may promote SA, such as optimism and resilience (Vahia, Thompson, Depp, Allison, & Jeste, 2012).

These prior studies developing operational definitions in HIV are important advancements on the understudied topic of SA in HIV and have taken into account some subjective indices (e.g., subjective cognitive complaints, self-rated SA); however, there is a gap in the literature on how HIV+ aging individuals define and perceive SA. In one of the few studies to examine self-definitions of SA in older adults with HIV (Solomon et al., 2018), a Canadian cohort of 24 middle-aged HIV+ participants (mean age 47) were asked how they would define SA and whether they considered themselves to be aging successfully. Six themes emerged, which all focused on an overall theme of individual control: accepting limitations, staying positive, maintaining social supports, taking responsibility, healthy lifestyle, engaging in meaningful activities. Few participants mentioned chronological age or “good health” as indicators of SA. These findings overlap with prior qualitative work (Emlet, Tozay, & Raveis, 2011) examining resilience in older adults with HIV, in which similar themes of self-acceptance, optimism, relational living, and self-management emerged. Similarly, recent work by Emlet and colleagues examining perspectives on SA using in-depth interviews with HIV+ older adults self-identifying as “aging successfully” yielded themes of resilience, which involved strategies such as self-care, spirituality, generativity, attitudes, and social support (Emlet, Harris, Furlotte, Brennan, & Pierpaoli, 2017). Another qualitative study in the same sample conducted a deeper exploration of how spirituality fit into the process of SA with HIV and identified the importance of creating connections, feeling a sense of gratitude for the opportunity to age, and fostering mindfulness (Emlet, Harris, Pierpaoli, & Furlotte, 2018). The overall themes derived from these studies are conceptually in line with those that have emerged in studies of HIV- older adults (Tate, Lah, & Cuddy, 2003; Tate, Swift, & Bayomi, 2013), suggesting definitions of SA between HIV+ and HIV- individuals may be more similar than different. Direct group comparisons of SA definitions between aged-matched HIV+ and HIV- individuals have not been formally conducted.

Operational SA definitions in the broader aging literature have evolved and adapted to allow for success in chronic disease populations such as HIV, with a shift in focus from longevity and absence of illness to adaptation and resilience; nonetheless,

there is no consensus definition of SA. Consequently, estimated prevalence rates of SA vary drastically (Depp & Jeste, 2006). In contrast to theory-driven and data-driven objective definitions, perhaps equally, if not more, important and informative is examination of how individuals aging with HIV define SA (Cosco, Prina, Perales, Stephan, & Brayne, 2013; Entwistle, Renfrew, Yearley, Forrester, & Lamont, 1998). Moreover, it is important to know whether definitions of SA from those living with HIV differ from those who are not living with HIV as well as whether other person-specific factors (e.g., demographics, health) impact SA definitions. Knowledge of such definitions and correlates will ultimately inform both future research on SA as well as development of person-centered intervention strategies on ways to improve SA in this population. Thus, merging qualitative and quantitative SA data may be the most informative for future research and practice. Thus, the purpose of this concurrent mixed-methods design study is to expand the prior literature on SA in older adults with HIV by merging both quantitative and qualitative data using a sample of HIV+ and HIV- adults aged 50 years or older. Our primary aim was to identify categories of SA definitions and compare the frequency of these categories by HIV serostatus. Our second aim was to examine correlates of these categories and to determine whether differential correlates emerged by HIV serostatus.

Methods

Participants and Procedure

The study included a community-dwelling sample of 100 HIV+ and 48 HIV- older (i.e., aged 50 years and above)

adults recruited from Southern California (mostly San Diego County). The age of the overall sample ranged from 50 to 79 years and was largely non-Hispanic White. These participants were part of the Successfully Aging Seniors with HIV (SASH) study, which was approved by the UC San Diego Institutional Review Board. Informed consent was obtained from all participants. Exclusion criteria included acute drug or alcohol intoxication (e.g., positive urine toxicology screen), significant neurologic/neurodegenerative disorders or conditions (e.g., Parkinson's disease), and serious psychotic disorders (e.g., schizophrenia). In this parent study, all participants completed an approximately 2-hr visit including the measures and assessments listed below. Our mixed-methods research uses a convergent parallel design in that we collected quantitative and qualitative data at the same study visit. The qualitative data analyzed in this study included a single written item from a self-rated SA questionnaire (see Measures below). After qualitative analyses were conducted (more detail below), qualitative categories were transformed into quantitative variables and were added into the main dataset, which included all study quantitative data. Table 1 includes the sample characteristics for the $n = 139$ participants included in quantitative analyses, stratified by HIV status.

Measures

Self-rated SA Questionnaire

This questionnaire contained the following three items:

Table 1. Demographic and Health Differences Between HIV+ and HIV- Groups

Variable	HIV+ ($n = 93$)	HIV- ($n = 46$)	p Value
	<i>M (SD)</i> or %	<i>M (SD)</i> or %	
Demographics			
Age	58.2 (6.3)	59.8 (7.3)	.19
Sex (% Male)	89%	61%	.01
Education	14.6 (2.5)	14.1 (2.7)	.28
Race (% Non-Hispanic White)	85%	67%	.02
Sexual Orientation (% Heterosexual) ^a	17%	71%	<.01
HIV Characteristics			
Current CD4	629.7 (321.4)	--	--
Nadir CD4	191.9 (199.8)	--	--
AIDS Status (% Yes)	67%	--	--
ART status (% On)	99%	--	--
% Undetectable Plasma	93%	--	--
Estimated Duration of HIV (years)	18.2 (8.0)	--	--
Cognitive & Functional Characteristics			
IADL Dependence	21%	4%	.01
IADL Complaints	1.08 (2.05)	0.18 (0.49)	.01
Global Neurocognitive Impairment	57%	33%	.01
Beck Depression Inventory-II Score	11.4 (10.3)	4.3 (5.2)	.01

Note: ART = Antiretroviral therapy; IADL = Instrumental activities of daily living.

^a1 HIV+ and 1 HIV- missing data for sexual orientation. For HIV-, all others were homosexual while HIV+ included 73% homosexual and 10% bisexual).

Qualitative item

First was an open-ended item: "People define "successful aging" in different ways. How would you define "successful aging?" which was followed by several lines allowing for written responses up to a few sentences. This item was used for coding in qualitative analyses.

Quantitative items

Next, was the question "Using your own definition, where would you rate yourself in terms of "successful aging?" with responses on a 10-point Likert scale, ranging from 1 (worst) to 10 (best) (Montross et al., 2006). Hereafter, this item is referred to as self-rated SA (SRSA). The last question was "How old/young do you feel? (Please write a specific age, e.g., 75.)". This value was subtracted from chronological age to create a Perceived Age variable, such that negative values reflect feeling older than one's chronological age, positive values reflect feeling younger than one's chronological age, and values of zero reflect feeling one's age.

Neurocognitive Impairment

Neurocognitive functioning was assessed with a comprehensive neurocognitive battery covering seven domains using the most current consensus research nosology (i.e., Frascati criteria; (Antinori et al., 2007). Raw test scores were converted to demographically-corrected T-scores using standard methods as we have previously published (Heaton et al., 2010). Neurocognitive impairment was defined using the clinical ratings approach, such that those with a global clinical rating of five or greater (which reflects at least two impaired individual cognitive domains) were classified as neurocognitively impaired (Blackstone et al., 2012).

Everyday Functioning

Everyday functioning was assessed with a modified version of the Lawton and Brody IADL questionnaire (Fazeli et al., 2014; Lawton & Brody, 1969). A total IADL complaints value is derived which is further used to determine IADL dependence which includes decline and need for assistance in ≥ 2 of 11 IADL domains (e.g., finances, managing medications). This measure has shown concurrent validity with neurocognitive functioning (Heaton et al., 2004) and is commonly used in the neuroAIDS literature to determine syndromic neurocognitive impairment in individuals with HIV (e.g., Woods et al., 2008).

Other Correlates

All participants underwent a neuromedical assessment in which HIV disease was characterized using standard measures. Nadir CD4+ count was self-reported unless a study lab value was lower than the self-reported value. AIDS diagnosis was derived using CDC criteria (Castro et al. 1992). Plasma HIV viral load was considered "undetectable" below 48 copies/mL and was gathered at the same

time as other study data. Depressive symptomology was assessed using the Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996), which has shown good internal consistency ($\alpha = 0.93$) and test-retest reliability (intraclass correlation coefficient [ICC] = 0.83) in people with HIV (Hobkirk et al., 2015), which is consistent with other clinical and nonclinical populations (Wang & Gorenstein, 2013).

Analyses

Qualitative analysis

In order to examine our qualitative data, directed content analysis (Hsieh & Shannon, 2005) was used to derive descriptive categories of SA definitions. While this was an iterative process and a general inductive approach to analysis was used (Thomas, 2006), responses were generally coded using an a priori theoretical coding structure based broadly on Baltes and Baltes comprehensive SA criteria (i.e., length of life, biological health, mental health, cognitive efficiency, social competence, productivity, personal control, and life satisfaction); however, as the coding system developed, categories/subcategories emerged beyond those initial criteria. Thus, we adopted a hybrid technique (Fereday & Muir-Cochrane, 2006) that was both deductive (i.e., examination of the data with a theory-guided template of categories (Crabtree & Miller, 1999) as well as initial scanning of the data) and inductive (i.e., allowing categories to emerge via data-driven in-depth analysis). After preliminary categories were established, in order to create a more parsimonious coding structure for later quantitative analyses as well as for greater interpretability of the findings, categories were then structured into larger parent categories with conceptually-related subcategories classified under each. Coding was conducted using NVivo version 10 software, and was first coded by two independent qualitative analysts (one Masters-level and one Doctoral-level) at the University of Alabama at Birmingham Research and Informatics Service Center, and was finally verified by the lead author (P. L. Fazeli). Specifically, the independent analysts established the preliminary categories, then the lead author verified these categories and restructured these into parent categories. Given that participant responses may have mentioned multiple categories, each response could be assigned to as many categories as were appropriate (i.e., one to all).

Quantitative Analysis

In order to conduct quantitative analyses, categories derived from the NVivo analysis were used to create dichotomous variables within JMP, such that each subject had one row in the data set and a value of 0 or 1 for whether or not their response was coded within each category (i.e., a participant identified this category as a defining component of SA). These data were then added into the parent data set from the study visit that included all other quantitative data.

T-tests and Chi-square analyses were used for examining comparisons by HIV status for frequency of SA categories, and correlates of SA categories within the HIV+ and HIV- samples. Odds ratios (OR) and Cohen's *d* effect sizes were reported when appropriate.

Results

Sample Descriptives

Table 1 includes the sample characteristics for the *n* = 139 participants with valid SA definitions (see Qualitative Results section below for detail on the nine uncodeable responses) included in quantitative analyses stratified by HIV status. The HIV+ and HIV- samples were comparable on age and education; however, the HIV+ group had a greater proportion of homosexual and bisexual participants, as well as non-Hispanic white and male participants, compared to the HIV- group. While the overall sample was largely non-Hispanic White (85% in the HIV+ group and 67% in the HIV- group), there were 10 Black, 3 Hispanic, and 2 participants reporting "other" in the HIV- group, and 10 Black, 2 Hispanic, and 2 participants reporting "other" in the HIV+ group. The HIV+ group also reported greater depressive symptoms and IADL complaints, and were more likely to be defined as IADL dependent and neurocognitively impaired. In the overall sample, the most common IADL declines were in the domains of housekeeping (16%), understanding written material/television (11%), and home repairs (11%). The HIV+ group overall had well-controlled HIV, with a majority of participants on antiretroviral therapy and having suppressed plasma viral load.

Qualitative Results

Seven parent categories emerged in participants' SA definitions, some of which contained subcategories. (1) *General Health* included responses mentioning the importance of optimal general health or "being healthy" but did not state a specific health component (e.g., physical health). (2) *Cognitive Health & Ability* encompassed responses involving maintenance of cognitive or mental abilities. (3) *Physical/Biological Health & Ability* consisted of responses about possessing good physical outcomes and included three subcategories: (a) *Maintaining Physical Abilities/Functioning*, (b) *Limiting Pain*, and (c) *Longevity/Survival*. (4) *Social Relationships* referred to responses endorsing the importance of supportive relationships and spending time with family, friends, or other social ties. (5) *Attitudes, Psychological, & Emotional Well-Being* was a generally broad category which captured five subcategories describing feelings or individual stances and perspectives: (a) *Aging Gracefully* (any definition that used this term), (b) *Enjoying Life & Fulfillment* (e.g., having fun, peace, wisdom, and QoL), (c) *Maintaining Balance* (including spiritual balance), (d) *Optimism & Happiness*, and (e) *Adapting*

to Changes & Accepting Limitations. (6) *Independence* included two subcategories: (a) *Self-sufficiency* (e.g., able to care for one's self without much difficulty or assistance, remaining in one's home) and (b) *Financial Security*. (7) *Proactive & Engaged Lifestyle* encompassed five subcategories representing responses mentioning action and activities: (a) *Planning, Managing, & Taking Responsibility for Health & Self-care*, (b) *Being Active (general)*, (c) *Physical Activity*, (d) *Mental Activity*, and (e) *Productivity, Learning, & Growth* (includes responses involving new experiences, hobbies, interests, challenges, etc.).

Note that the *Productivity, Learning, & Growth* subcategory differs from the *Enjoying Life & Fulfillment* subcategory in that this subcategory includes specific activities and involves action while *Enjoying Life & Fulfillment* involves feelings or general statements of enjoyment, possessing wisdom, and/or high QoL. Furthermore, note that the (7) *Proactive & Engaged Lifestyle* parent category goes beyond a static response and represents responses of actual activity and action (i.e., this category is more process-oriented) whereas the parent categories (2) *Cognitive Health & Ability* and (3) *Physical/Biological Health & Ability* represent static responses stating that physical and cognitive health are important without necessarily providing a means to achieve those outcomes.

Additionally, there was one missing data point as well as responses that were not coded in the aforementioned coding system. This included two "Don't Know" responses, two one-word responses that were uncodeable (i.e., "golden" and "great"), and four uncodeable responses that did not sufficiently provide definitions of SA (e.g., "Age is only a number"). Therefore, the subsequent analyses include *n* = 139 participants with valid responses that included endorsement of at least one of the seven parent categories.

Responses within each category were compared between HIV+ and HIV- participants to examine whether the content of responses differed. This examination revealed that the two groups expressed these categories similarly. Two example comprehensive responses (one from an HIV+ and one from an HIV- participant) and their corresponding parent category assignments are presented in Figure 1. Table 2 includes example items for each parent category and subcategory by HIV serostatus.

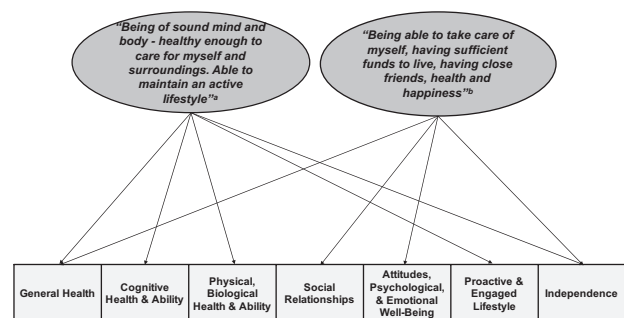


Figure 1. Example responses and parent node assignment. Note. ^a = HIV+ participant; ^b = HIV- participant.

Table 2. Example Items for Each Successful Aging Category by HIV Serostatus

Category	HIV+	HIV-
(1) General Health	<i>Being in good health</i>	<i>Aging gracefully in the normal progression staying as healthy as possible</i>
(2) Cognitive Health & Ability	<i>Keeping a sound mind</i>	<i>Being of sound mind, active - healthy mobile interested in life.</i>
(3) Physical/Biological Health & Ability		
Maintaining Physical Abilities/ Functioning	<i>Being cognitive, physically agile, good physical shape, healthy, financially secure</i>	<i>Keeping mentally alert and physically able as a person ages</i>
Limiting Pain	<i>Still being active & interested in things, moderate pain, having interests in things</i>	<i>Being able to walk/exercise w/o pain, remember things, take care of myself and others</i>
Longevity/Survival	<i>Not dying</i>	<i>Staying alive. Taking care of ones self.</i>
(4) Social Relationships	<i>As growing older maintaining physical independence and maintaining relationships</i>	<i>Maintaining interests and activities. stay engaged with people</i>
(5) Attitudes, Psychological, & Emotional Well-Being		
Aging Gracefully	<i>Having grace and dignity.</i>	<i>Moving gracefully into next chapter</i>
Enjoying Life & Fulfillment	<i>Being able to enjoy life as much as I did when I was younger</i>	<i>Being physically+mentally fit:being active, living life to the fullest</i>
Maintaining Balance	<i>Feeling healthy, managing life, balancing body-mind-spirit with ease. Engaged in activities to stay alert & fit</i>	<i>Taking care of one`s health. Mental, spiritual and physical. Eating well, keep learning to exercise your brain. Have financials in order</i>
Optimism & Happiness	<i>Being healthy and happy as we get older</i>	<i>Being happy with who you are</i>
Adapting to Changes & Accepting Limitations	<i>Adjusting to aging and changes with grace, patience and understanding of the reality. Being a positive example to other. Remaining active and productive in some ways.</i>	<i>Accepting limitations due to aging: ie hearing loss, knee replacement; keep physically fit, keep in contact with friends</i>
(6) Independence		
Self-sufficiency	<i>Unassisted lifestyle</i>	<i>Growing old gracefully and independently</i>
Financial Security	<i>Having enough money to retire, being healthy and in good shape</i>	<i>Great career, planned retirement, healthy daily exercise, proper diet, friends worship of one`s choice. Happy married or happy single.</i>
(7) Proactive & Engaged Lifestyle		
Planning, Managing, & Taking Responsibility for Health & Self-care	<i>Keeping physically active, being responsible and caring for oneself, feeling sharp and youthful, and good social skills</i>	<i>Being responsible for your health by being aware of eating a well balance diet, exercising and get enough sleep. Keeping a positive and active life.</i>
Being Active (general)	<i>Living a healthy and active life</i>	<i>Good health, staying active, working as long as your health allows. constant interaction with family and friends</i>
Physical Activity	<i>Getting exercise maintain flexibility, eat balanced diet, remain interest in creative activities</i>	<i>Feeling young, staying active, have energy, staying informed, healthy, exercising</i>
Mental Activity	<i>Watch your diet, get exercise, take medication right dose right time, stimulate your mind by reading, crossword puzzles</i>	<i>Maintaining health/finances/relationships keeping mind busy, reasoning new and challenging tasks, volunteering time to less fortunate, help others, younger teach others/ younger people about successes of life</i>
Productivity, Learning, & Growth	<i>Continue being productive and being able to work and take care of yourself</i>	<i>Continuing to participate in activities I enjoy regardless of age.</i>

Note: If a response was coded under multiple categories, the content that applies to the corresponding category is bolded.

Quantitative Results

Comparisons With HIV- Group on Frequency of SA Categories

Table 3 includes comparisons, including corresponding effect sizes, between HIV- and HIV+ on the frequency

of SA categories. There were no significant differences ($p = .45$) between the HIV+ and HIV- subjects in terms of total number of parent categories (mean [SD] for the total number of parent categories endorsed from 0 to 7; HIV+ = 2.23 [1.25]; HIV- = 2.39 [1.16]). Overall, for

Table 3. Comparison Between HIV+ and HIV- Groups on Successful Aging Definition Categories

Category	HIV+ (n = 93)	HIV- (n = 46)	p Value	Odds ratio
(1) General Health	16%	30%	.05	2.28
(2) Cognitive Health & Ability	25%	26%	.86	1.07
(3) Physical/Biological Health & Ability	29%	26%	.72	1.16
Maintaining Physical Abilities/Functioning	24%	17%	.40	1.47
Limiting Pain	2%	2%	.99	1.01
Longevity/Survival	3%	9%	.17	2.86
(4) Social Relationships	23%	20%	.68	1.20
(5) Attitudes, Psychological, & Emotional Well-Being	52%	59%	.43	1.33
Aging Gracefully	10%	13%	.55	1.40
Enjoying Life & Fulfillment	20%	9%	.08	2.70
Maintaining Balance	9%	2%	.15	4.24
Optimism & Happiness	16%	15%	.89	1.07
Adapting to Changes & Accepting Limitations	12%	22%	.12	2.07
(6) Independence	28%	24%	.61	1.23
Self-sufficiency	22%	20%	.79	1.13
Financial Security	8%	11%	.51	1.50
(7) Proactive & Engaged Lifestyle	51%	54%	.67	1.17
Planning, Managing, & Taking Responsibility for Health & Self-care	23%	20%	.68	1.20
Being Active (general)	11%	17%	.27	1.75
Physical Activity	16%	17%	.85	1.09
Mental Activity	5%	7%	.79	1.23
Productivity, Learning, & Growth	28%	35%	.41	1.37
Total Sum of Parent Themes	2.23 (1.25)	2.39 (1.16)	.45	--

Note: Odds ratio reflects odds for the relative reference group (i.e., HIV+ or HIV- with higher proportion of theme endorsement).

both groups *Attitudes, Psychological, & Emotional Well-Being* and *Proactive & Engaged Lifestyle* were the most commonly reported categories (parent categories). There were no significant differences in the frequency of HIV- and HIV+ participants' responses across any of the parent categories or subcategories. However, there were small effects for frequency of the parent category of *General Health* and the subcategory *Longevity/Survival*, such that HIV- older adults were more likely to report such categories (OR = 2.28 and 2.86, respectively). There were small and medium effects for the subcategories of *Enjoying Life & Fulfillment* and *Maintaining Balance*, such that HIV+ older adults were more likely to report these categories (OR = 2.70 and 4.24, respectively). In fact, only one HIV- participant reported *Maintaining Balance* in their SA definition. Noteworthy is the fact that only one HIV+ participant's response included the term HIV or AIDS, which was reported in the context of "...using my health status to educate people who just learned they were HIV+."

Correlates of Parent Categories Within HIV+ and HIV- Groups

We first examined associations between the parent categories and the self-rated SA variables within HIV+ and HIV- groups separately. There were no significant ($p < .05$) associations in either group between parent categories and the SRSA continuous score or a dichotomous cut point (≥ 7 ; (Moore et al., 2017) of this variable used to operationalize

"successful" versus "unsuccessful" SRSA. Finally, we examined whether there were any differences between the categories and the Perceived Age variable and found that HIV+ participants who endorsed *Social Relationships* and *Independence*, on average, felt significantly (Cohens $d = .56$ for both; $p < .05$) older than their chronological age, while no associations were found between Perceived Age and categories in the HIV- group. Interestingly, HIV+ participants had significantly ($p < .01$) lower scores on the Perceived Age variable, indicating they felt significantly older than their chronological age, on average, as compared with HIV- participants.

We then examined demographic and health correlates of the parent categories within HIV+ and HIV- groups. Those HIV+ participants who endorsed *Cognitive Health & Ability* had higher years of education than their HIV+ counterparts not endorsing this category (Cohens $d = .62$; $p = .02$). HIV+ females were more likely to endorse *General Health* (OR = 4.36; $p = .03$) than HIV+ males. Age, race, and sexual orientation were not significantly associated with any parent categories in either group. CD4 nadir and current CD4, plasma viral load detectability, HIV duration (years), AIDS status, and depressive symptoms were also not significant correlates of any parent category. We then examined whether IADL complaints or IADL dependence were associated with parent categories, and found that those HIV+ participants who endorsed *General Health* were more likely to be IADL Independent than their HIV+

counterparts not endorsing this category (in fact, no HIV+ individuals with IADL dependence endorsed General Health; $p = .04$). Similarly, in both groups, those without neurocognitive impairment were more likely to endorse *General Health* (HIV+ OR = 3.2; $p = .04$; HIV- OR = 9.3; $p = .02$) than those with neurocognitive impairment. HIV- participants without neurocognitive impairment were also more likely to endorse *Cognitive Health & Ability* (OR = 8.1; $p = .03$) than those with neurocognitive impairment.

Discussion and Implications

Examining SA in individuals with HIV is a growing and significant research and clinical area, given the graying of the HIV epidemic. While quantitative studies have examined laboratory-defined operationalizations of SA in this population, fewer studies have examined SA using self-definitions provided by persons living with HIV and no studies have compared SA definitions between HIV+ and HIV- individuals. Therefore, the purpose of this mixed-methods study was to compare self-defined SA as well as correlates of SA categories between HIV+ and HIV- older adults. Consideration of both qualitative data and quantitative data provided a richer conceptualization of SA and allowed for examination of potential SA correlates in this population.

The following seven parent categories emerged from respondents' definitions: General Health, Cognitive Health & Ability, Physical/Biological Health & Ability, Social Relationships, Attitudes, Psychological, & Emotional Well-Being, Proactive & Engaged Lifestyle, and Independence. These categories are consistent with prior qualitative work in both HIV+ (Emlert et al., 2011; Solomon et al., 2018) and HIV- populations (Tate et al., 2003, 2013), as well as existing theoretical models (Baltes & Baltes, 1990; Rowe & Kahn, 1997), and studies examining research-defined definitions (Moore et al., 2017). Interestingly, there were no significant differences by serostatus on frequency of any of the parent categories or subcategories, or on the total sum of parent categories endorsed, suggesting that both groups had similar and equally comprehensive definitions. Further, the content and forms of expressions used in each category did not differ by HIV status, adding further evidence that individuals aging with HIV perceive SA similarly as those without HIV. Indeed, only one HIV+ participant's response included the term "HIV" or "AIDS" (which was used in the positive context of generativity), which again speaks to the limited effect of HIV status on, and the universality of, definitions of SA.

Despite similar quality of responses and no significant differences in frequency of categories by serostatus, a few small and medium effect sizes emerged. HIV- older adults were more likely to report the General Health category and the subcategories *Longevity/Survival*. HIV+ older adults were more likely to report *Enjoying Life & Fulfillment*

and *Maintaining Balance* subcategories. This suggests that HIV+ older adults may be less concerned about maintaining general health and longevity given they are already living with a chronic illness. Consequently, HIV+ older adults may have shifted their focus on enjoying life, fulfillment, and maintaining balance in their later years. Although HIV- participants were more likely to report longevity in their definitions than HIV+ participants, similar to another published study examining brief SA definitions in older HIV+ adults (Solomon et al., 2018) we found that overall very few HIV+ (and HIV-) older adults reported longevity in their definitions. Furthermore, *General Health* was not one of the most common categories while the most commonly reported categories in both groups were *Attitudes, Psychological, & Emotional Well-Being* and *Proactive & Engaged Lifestyle*. This suggests that while our findings may have parallels to existing SA models (e.g., Baltes and Baltes), our results highlight that these components may not have equal weight in subjective SA definitions. This is consistent with work suggesting that QoL outcomes and active engagement in life are rated as more important than physical health and general health (Kahana & Kahana, 2001; Vahia et al., 2012). In fact, a meta-analysis of 26 international studies of SA definitions showed that engagement and perspective/attitudes were the most commonly reported themes of SA, while longevity and physical functioning were among the least frequently reported (Cosco et al., 2013).

Our second aim was to examine correlates of SA categories within the HIV+ and HIV- groups. Across both groups, SA categories were not significantly associated with self-rated SA variables derived from the Likert scale item, suggesting these categories may be equally represented in SA definitions of both those who view themselves as aging successfully and those who do not, regardless of HIV serostatus. In other words, even those who do not believe they are meeting their criteria of SA still have multidimensional definitions. We did, however, find that those HIV+ older adults who endorsed *Social Relationships* and *Independence*, on average, felt significantly older than their chronological age. One potential interpretation is that HIV+ older adults who feel significantly older than their chronological age may fear losing independence on one hand and then may place a higher value on social relationships, which may appear as a more achievable activity/goal.

Regarding demographic and health correlates of SA categories, age and race were not significantly associated with any parent categories in either group, while education and gender showed associations within the HIV+ group. We found that HIV+ older adults who endorsed *Cognitive Health & Ability* had higher years of education. This suggests that HIV+ individuals with more education value maintaining their high level of intellectual functioning more than those with lower education and that these individuals may also be more aware of the risk of cognitive abilities declining with both HIV and aging. The finding that HIV+

females were more likely to report definitions mentioning *General Health* suggests that women aging with HIV are more concerned with health than their male counterparts, however the sample size for HIV+ women was small in this sample, and this result may not generalize to the larger HIV population. Consistent with prior studies using operational definitions of SA in older adults with HIV, no HIV disease characteristics were associated with any of the SA categories (Moore et al., 2013, 2017). Next, we found that both HIV+ and HIV- older adults who endorsed *General Health* were less likely to have neurocognitive impairment and HIV+ older adults whose SA definitions included *General Health* were also less likely to have IADL difficulties. Finally, HIV- older adults reporting *Cognitive Health & Ability* in their definitions were less likely to have neurocognitive impairment. These associations may be similar to the finding with education, such that those with optimal everyday and cognitive functioning may be more aware of and value the importance of cognitive health and general health, respectively.

Strengths of this study include a large sample of HIV+ individuals and our mixed-methods approach. Our HIV+ and HIV- samples were overall well matched, particularly on demographic factors that might significantly influence SA definitions—age and education—which supports the validity of our findings. On one hand, these similarities may reduce the confounding effects of age and education (or socioeconomic status) on findings, yet our sample may not be representative of the larger U.S. HIV population. For example, this sample may not generalize to women, African Americans, and those with low levels of education (e.g., less than high school), which represent populations especially burdened by HIV/AIDS in the Deep South. Limitations include a largely white and male sample in Southern California, limiting generalizability to diverse aging HIV populations in other regions of the United States. Another limitation was the relatively small sample of HIV- older adults which was due to oversampling of HIV+ participants in the parent study, as the focus of this study was examining correlates of SA outcomes in HIV+ adults. This resulted in less power to examine correlates of frequency of SA categories in the HIV- group in the current study. Similarly, while our age cutoff of 50+ is consistent with studies of aging with HIV, we did not explicitly recruit equal numbers within each decade, resulting in a sample with a mean age in the mid 50s and few individuals in “oldest old” categories. Future studies using designs such as structured Multicohort Longitudinal Design (sMLD), recruiting balanced numbers of participants in each age group, would be better equipped to tease apart aging effects as well as cohort effects on SA. Furthermore, the HIV+ sample overall had well-controlled HIV disease, which may have impacted the findings. Lastly, the qualitative question examined in the current study was only one brief (i.e., only a few lines provided for a response), open-ended question provided in a written (rather than verbally promoted) format, limiting the

ability for robust exploration of this phenomenon. Future work examining self-definitions of SA in those aging with HIV should include questions explicitly tapping into environmental barriers and facilitators to SA, such as stigma, poverty, and social support.

Overall, this study adds a significant contribution to the limited literature on qualitative definitions of SA in older adults with HIV. In the first direct comparison of SA categories between HIV+ and HIV- older adults, our results suggest that both populations may generally perceive SA similarly, and thus future observational and intervention studies may be able to approach the populations similarly. Thus, despite evidence in the literature on negative effects of HIV on objective definitions of SA, the current findings suggest that HIV does not seem to affect subjective definitions of SA. Future work should examine SA definitions longitudinally among people living with HIV, as has been done in the nonpathological aging population (Tate et al., 2013), as this might yield insights into the aging process as HIV+ individuals reach greater ages than they have historically. Our results also converge with many prior qualitative and quantitative studies, as well as theoretical models of SA, suggesting that there are indeed universal common components of SA that are both meaningful at the individual level as well as in studies using operational criteria to predict outcomes.

Implications

The current study provides important research and clinical implications. From a research standpoint, these results suggest that future studies should take into account individual perspectives when operationalizing SA, with a particular focus on active engagement in life and psychological adaptation to aging. Including such perspectives and factors will allow for a better examination of predictors of, as well as outcomes associated with, SA, and ultimately in identifying priorities for interventions for achieving SA. Furthermore, such insights focus on SA as an active process, rather than a static end point. Similarly, from a clinical standpoint, practitioners should be aware of the value of self-definitions of SA and use this information to develop patient-centered interventions. Indeed, patient identification of areas deemed important to achieving SA may facilitate both adherence to interventions, as well as ultimately downstream positive effects on other outcomes.

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Conflict of Interest

None reported.

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