Paper PO-10

Using SAS ® to Examine Aging Expectation (ERA-38) for Older Adults

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Abstract

Our population is getting older every day. The numbers of older adults (ages 65 years and older) will increase to 72 million by 2030 [CDC &MCF 2007]. Participation in healthy aging behaviors, such as physical activity and a healthy diet, is one of the few known ways to prevent the onset of chronic disease and stem the rising costs of health care.

Objectives: To test a multidimensional aging-expectation scale for older adults.

Method

This exploratory correlation study used a cross-sectional survey design. Participants were 459 older adults (65 or older) from the Greater Columbia metropolitan area of South Carolina. The 38-item Expectations Regarding Aging (ERA-38) survey was used to measure aging-expectations (Sarkisian, Hays, & Mangione, 2002). Instrument testing consisted of a series of factor analysis procedures including maximum likelihood, using squared multiple correlation and Promax rotation. Reliability was assessed using coefficient alpha estimates. Multiple imputations (MI) were used to replace the missing data for item.

Results

The missing data for the 38 items ranges from 1-30. MI method used to replace the missing value for each item. Thirty-eight items loaded on three factors of ageing expectation. The weighted variance explained by each factor was: 1) aging process (35%), 2) being isolated (33%), and 3) physical function (31%), for a total of 99% explained variance for all three factors. Factor loadings ranged from 0.32 to 0.75. Coefficient alpha estimates were 0.87 - 0.92 across the three subscales and 0.95 for the total scale. Examination of Pearson's correlation indicated each subscale was positively correlated with every other subscale and the total scale. The range of the Pearson's correlation coefficients was from 0.60 to 0.89.

Conclusion

Factor analysis showed three factor for aging- expectation (ERA-38) and excellent reliability for total scales and subscales.

Keywords

Aging-expectation, older adults, Factor Analysis, Reliability.

Introduction

The proportion and number of older Americans is expected to continue rising well into the 21st century. One out of every five Americans will be age 65 or older by 2030 (CDC & MCF, 2007). Millions of older adults (aged 65 and older) are at increased risk for chronic diseases associated with excessive health care cost, disability, and death (CDC & MCF, 2007). Gerontologists have suggested that the health and health behaviors of older adults are influenced by personal expectations regarding the aging process as well as by characteristics in their home and neighborhood environments (Balfour & Kaplan, 2002). Recent research supported that older adults' aging-expectations affect participation in physical activity, vegetable consumption and medical adherence. Measuring aging-expectation is an important tool in the study of older adults. Knowledge of aging-expectations may provide a new strategy for increasing older adults' participation in health behaviors known to prevent chronic disease and the stem the rising costs of health care.

Purpose

The purpose of this study (or presentation) is to test a multidimensional scale for assessing older adults' expectations regarding the aging process.

Background

This exploratory correlation study used a cross-sectional survey design. Participants were 459 older adults from the greater Columbia metropolitan area of South Carolina. These individuals were recruited in October and November 2007 during organized senior-related social, physical, or educational events. Eligible participants were community-residing adults of age 65 years or older who were able to participate in physical activity, able to independently perform activities of daily living, able to read English and complete a self-administered survey, and were current residents in South Carolina during the previous 3 months. Residents of assisted living facilities were excluded from the study. The 38-item Expectations Regarding Aging (ERA-38) scale was used to measure aging-expectations (Sarkisian, Hays, & Mangione, 2002). Instrument testing consisted of a series of factor analysis procedures including maximum likelihood, using squared multiple correlation and Promax rotation. Reliability was assessed using coefficient alpha estimates. Multiple imputations (MI) were used to replace the missing data for item.

Data Analyses

All data analyses were performed using **SAS/STAT** ® statistical software, version 9.2 (SAS, 2008). Multiple imputations were used to replace the missing value for 38 items. Means of each item was compared with and without imputation. Factor analyses were run to test a multidimensional aging-expectation (ERA-38) scales for older adults. Factor analysis used squared multiple correlations as prior communality estimates. The maximum Likelihood (ML) method was used to extract the factors. And this was followed by the promax (oblique) rotation. Factor extraction involved: analysis of the Eigenvalues, examination of the Scree plot of the Eigenvalues, and examination of the proportion of the Eigenvalues. The next phase required a series of factor rotations. Evaluation of the results of various rotation methods including varimax and promax rotations indicated optimal structure with extraction of three factors. In interpreting the rotated factor pattern, an item was said to load on a given factor if the factor loading was .30 or greater for that factor, and was less than 0.30 for the other. Alpha coefficients were calculated for subscales and total scale. Pearson correlation used to examine the correlation between subscales.

Results

The frequency distribution indicated that the missing value for 38 items ranged from 1 to 30. The results indicate there was no difference between means of no imputation, and multiple imputations (Table 1). A Scree test, Eigen values, and the proportion variance explained with each factor suggested three meaningful factors which yielded a 37-item scale. Ultimately, optimal factor solution involved a three-factor structure which yielded a 37-item scale. All 37 items loaded positively on three different factors at 0.30 or above factor loadings. Factor loading ranged from 0.32 to 0.75. One item (ERA13) loaded on two factors, was conceptually incongruent, and was dropped. Three factors emerged to describe the dimensions of aging- expectation for older adults. The three factors and the weighted proportion of variance explained by each factor were as follows: 1) aging process (35%), 2) being isolated (33%), and 3) physical function (31%), for a total of 99% explained variance for all three factors. The factor structure for the instrument is presented (see Table 2). Scale reliability in this study was examined by calculating coefficient alpha. The reliability of each subscale ranged from 0.87 to 0.92 with a total scale reliability estimate of 0.95. Examination of Pearson's correlation indicated each subscale was positively correlated with every other subscale and the total scale. The range of the Pearson's correlation coefficients was from 0.60 to 0.89 (Table 3).

Conclusion

Our study indicated that there were three meaningful factors for the aging-expectation (ERA-38) scale. Ninety-nine percent of variance was explained by three factors. Our results indicated excellent reliability coefficient for total scales and subscales. Correlation analysis showed each subscales was positively correlated with every other subscales and total scale. The ERA-38 is an effective tool for understanding older adults' aging-expectations and health behaviors.

Table1. N, mean, and Standard deviation for selected items with no imputation, and MI imputation

Items	Description of Items	No Imputation			MI Imputation (N=459)	
		N	Mean	STD	Mean	STD
ERA1	I get older expect will be able to everything	451	2.62	0.915	2.62	0.905
ERA2	more forgetful	451	1.82	0.720	1.82	0.720
ERA3	more difficult to do my daily activities	453	1.85	0.653	1.85	0.652
ERA4	spend more time alone	452	2.29	0.861	2.29	0.860
ERA5	spend less time with friends and family	452	2.55	0.898	2.55	0.898
ERA6	will have more aches and pain	449	1.58	0.659	1.58	0.659
ERA7	not be able to work as well as I do now	452	1.66	0.667	1.65	0.667
ERA8	will get tired quickly	454	1.56	0.637	1.55	0.637
ERA9	enjoy my life	447	3.38	0.721	3.38	0.720
ERA10	more dependent on others	451	1.97	0.708	1.96	0.707
ERA11	able to take care of myself	450	2.48	0.807	2.48	0.807
ERA12	become less attractive	451	2.08	0.831	2.08	0.830
ERA13	become lonelier	458	2.45	0.866	2.45	0.865
ERA14	quality of life will decrease	455	2.18	0.809	2.18	0.809
ERA15	get depressed	447	2.68	0.885	2.68	0.884
ERA16	sexual desire will decrease	429	1.85	0.821	1.85	0.820
ERA17	body ability to have sex will decrease	433	1.82	0.845	1.82	0.845
ERA18	have more trouble sleeping	452	2.23	0.878	2.23	0.878
ERA19	one thing or other will go wrong with body	453	1.52	0.659	1.52	0.659
ERA20	part of aging is different parts breaking down	455	1.63	0.702	1.63	0.702
ERA21	when get older need to lower expectations	455	2.24	0.950	2.24	0.950
ERA22	accepted part of aging to have trouble remembering names	458	1.78	0.762	1.78	0.762
ERA23	forgetfulness is natural	455	2.04	0.845	2.04	0.845
ERA24	impossible to escape	451	2.39	0.851	2.39	0.850
ERA25	there isn't any way to escape the mental slowness that happens with	452	2.26	0.871	2.26	0.871
ERA26	there isn't any way to escape the physical deterioration of aging	436	1.84	0.741	1.83	0.740
ERA27	age slows people down	454	2.02	0.813	2.02	0.813
ERA28	having more aches and pains is an accepted part of aging	451	1.95	0.784	1.94	0.784
ERA29	decreased energy in older people is just part of nature course	453	1.93	0.779	1.92	0.778
ERA30	every year people age their energy level go down a little more	448	2.12	0.826	2.11	0.826
ERA31	needing tousle adult diapers is just an expected part of getting old	452	3.14	0.817	3.13	0.816
ERA32	being lonely Is just something that happens where people get old	451	3.01	0.835	3.00	0.834
ERA33	becoming more lonely is a natural part of aging process	445	2.99	0.865	2.99	0.865
ERA34	old age is a time to enjoy life	451	3.38	0.721	3.37	0.721
ERA35	quality of life declines as people age	450	2.34	0.856	2.34	0.856
ERA36	as people get older they worry more	452	2.51	0.837	2.50	0.837
ERA37	its normal to be depressed when you are old	453	3.18	0.809	3.17	0.809
ERA38	it's a normal part of aging that older people have trouble sleeping	451	2.62	0.836	2.62	0.835

Table2. Factor Structure of the 38-Item Aging- Expectation (ERA-38) Scale for Older Adults (N=459)

Items	Description of variables	Aging process	Being isolated	Physical function
ERA28	having more aches and pains is an accepted part of aging	75		
ERA29	decreased energy in older people is just part of nature taking its course	74		
ERA26	there isn't any way to escape the physical deterioration of aging	69		
ERA27	age slows people down	66		
ERA20	part of aging is different parts breaking down	60		
ERA30	every year people age their energy level go down a little more	60		
ERA19	one thing or other will go wrong with body	56		
ERA25	there isn't any way to escape the mental slowness that happens with aging	54		
ERA23	forgetfulness is natural	49		
ERA22	accepted part of aging to have trouble remembering names	48		
ERA21	when get older need to lower expectations	42		
ERA24	impossible to escape	41		
ERA33	becoming more lonely is a natural part of aging process		75	
ERA32	being lonely is just something that happens where people get old		74	
ERA37	its normal to be depressed when you are old		74	
ERA31	needing tousle adult diapers is just an expected part of getting old		57	
ERA15	get depressed		53	
ERA38	it's a normal part of aging that older people have trouble sleeping		52	
ERA13	become lonelier		48	44
ERA36	as people get older they worry more		47	
ERA9	enjoy my life		38	
ERA34	old age is a time to enjoy life		36	
ERA18	have more trouble sleeping		32	
ERA35	quality of life declines as people age		32	
ERA8	will get tired quickly			64
ERA3	more difficult to do my daily activities			59
ERA7	not be able to work as well as I do now			57
ERA17	body ability to have sex will decrease			55
ERA16	sexual desire will decrease			54

ERA4	spend more time alone	53
ERA5	spend less time with friends and family	52
ERA14	quality of life will decrease	49
ERA6	will have more aches and pain	49
ERA10	more dependent on others	47
ERA12	become less attractive	40
ERA2	more forgetful	36
ERA1	I get older expect will be able to everything	34
ERA11	able to take care of myself	32

Note: ERA13 is Complex structure and eliminated.

Table3. Pearson correlation for Aging-Expectation (ERA38) total Scale and subscales (N=459)

Pearson Correlation Coefficients, N = 459 Prob > |r| under H0: Rho=0				
	fact1	fact2	fact3	totera
fact1	1.00000	0.67999 <.0001	0.64126 <.0001	0.88801 <.0001
fact2		1.00000	0.60423 <.0001	0.86341 <.0001
fact3			1.00000	0.86368 <.0001
totera				1.00000

Note: totera = total aging expectation, fact1=aging process, fact2= being isolated , and fact3= physical function.

SAS Syntax

```
*** multiple imputation   ****;

proc mi data=two seed=37851  out=outmi noprint;
var era1-era38;
title ' Multiple imputation ';  run;
proc univariate data=outmi noprint;
var era1-era38;
output out=outuni mean =mera1-mera38;
by _imputation_;

run;
data outunib;
     set outuni;
drop _imputation_;

data avg;
   set outunib;
proc univariate data=avg noprint;
var mera1-mera38 ;
output out=outmib mean = mera1-mera38 ;

data all;
  if _N_ = 1 then set outmib(keep = mera1-mera38);
  set two;
run;

data final;
   set all;

array items era1-era38;
     array itemsb mera1-mera38;
        do over items;
             if items =. then items=itemsb;
        end;
totera = sum (of era1-era38);

fact1= sum (of era28 era29 era26 era27 era20 era30 era19 era25 era23 era22 era21 era24
);
fact2= sum (of era33 era32 era37 era31 era15 era38 era36 era9 era34 era18 era35 );
fact3= sum (of era8  era3  era7  era17 era16 era4  era5  era14 era6  era10 era12 era2
era1 era11);


ods rtf;
ods listing close;

proc freq data=one;
     tables era1-era38;
     title ' frequency tables ';
run;

proc means data=two;
   var era1 - era38 ;
     title ' means ';
run;

proc means data=final;
   var era1 - era38 ;
     title ' means / with mi imputation';
run;
ods rtf close;
```

```
ods listing;
run;

ods rtf;
ods listing close;
%macro fact (q,n,t);

proc factor data=final method=prin priors=smc scree rotate=promax reorder
             flag=.35 nfact=&n msa ;
     var &q  ;
      title ' factor analysis      ' &t;

%mend fact;

%fact (era1-era38,3, era aging expectation);
run;
ods rtf close;
ods listing;
run;

ods rtf;
ods listing close;
**** reliability coefficient                    ****;
%macro corr (q) data=two;

proc corr nocorr alpha nomiss data=two;
      var   &q;
      title ' Reliability coeffcient';

%mend corr;

%corr (era1- era38 );
%corr (era28 era29 era26 era27 era20 era30 era19 era25 era23 era22 era21 era24 );
%corr (era33 era32 era37 era31 era15 era38 era36 era9 era34 era18 era35 );
%corr (era8  era3  era7  era17 era16 era4  era5  era14 era6  era10 era12 era2 era1
era11);

run;
ods rtf close;
ods listing;
run;

ods rtf;
ods listing close;
proc corr data=final;

     var  fact1- fact3 totera;

     title ' correlation ';

run;
ods rtf close;
ods listing;
quit;
run;
```

References

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