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ABSTRACT

Rigidity, as it relates to aging, refers to motor/cognitive, personality/perceptual, and psychomotor functioning. To investigate the relationship of rigidity to intelligence and educational level in younger and older adults, and of rigidity to age and sex, 48 young adults (25 male, 23 female), with a mean age of 23, and 45 older adults (21 male, 24 female), with a mean age of 65, completed the Test of Behavioral Rigidity and the Quick Test. An analysis of the results showed that intelligence and educational level were significantly correlated with rigidity in the older group but not in the younger group. Contrary to expectations, younger individuals were found to be more rigid, except in psychomotor speed, than older adults. Males were more rigid than females in both age groups. (Author/BL)

Age and Sex Differences in Behavioral Rigidity

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Abstract

The present study investigated the relationship among rigidity, IQ, and education level in younger and old adults, and age and sex differences in rigidity. The Test of Behavioral Rigidity and the Quick Test were administered to 48 young adults, 25 male and 23 female, (M age = 22.92) and 45 old adults, 21 male and 24 female, (M age = 65.00). Results indicated IQ and education level were significantly correlated with rigidity in the old group, but not the young. Contrary to expectations younger individuals were found to be more rigid than older adults. Implications of results were discussed.

Age and Sex Differences in Behavioral Rigidity

Within psychology, especially in the field of aging, the concept of rigidity has been of interest for many years (e.g., Botwinick, 1978; Cattell & Tiner, 1946; Chown, 1959, 1961; Goldstein, 1943; Ryans, 1939; Werner, 1946). While the concept has enjoyed great facination, there has been great difficulty in defining it theoretically and specifically (see Botwinick, 1978; Chown, 1959). In fact, the term or concept has been used to explain a multitude of phenomenon, traits and behaviors such as, perception, intelligence, personality, and the behavior of old adults. In addition to the concept being rather elusive in terms of a theoretical definition, there has been great difficulty in obtaining reliable and valid measures of the construct (Looft, 1972).

Schaie (1962) was perhaps the first researcher in the field of aging to attempt to isolate the multiple components of rigidity, which were labeled: a) Motor-cognitive rigidity, b) Personality-perceptual rigidity, and, c) Psychomotor speed. This work led to the development of the Test of Behavioral Rigidity (TBR) by Schaie and Parham (1960, 1975) which was designed to measure the ability of the individual to adjust to the stress imposed upon them by constant environmental change.

According to Schaie and Parham (1960, 1975) Motor-cognitive rigidity refers to an individual's ablity to shift without difficulties from one activity to another. Personality-perceptual rigidity indicates the individual's ability to adjust readily to new surroundings and change in cognitive and environmental patterns. Finally, Psychomotor speed indicates the individual's rate of emission of familiar cognitive responses. Additionally, Schaie and Parham (1960, 1975) and Patterson (1963) suggest rigidity scores are affected by factors such as intelligence, age, sex, and motivational level.

The purpose of the present investigation was to: 1) determine the intercorrelation among the IQ and education level, in younger and old adults; and, 2) determine if the subscales of the TBR differ significantly as a function of age and sex.

Participants were 81 individuals from a rural midwestern region who were placed into one of two distinct age groups on the basis of their chronological age. All participants in both groups were in self-reported good health. The young group (N = 48; M age = 22.92, SD = 5.04) was composed of 25 males (M age = 24.20, SD = 6.60) and 23 females (M age = 21.52, SD = 1.73) recruited from undergraduate psychology courses at a midwestern state university. These participants received course credit for participation in the study. The mean number of years of education was 14.25 (SD = 1.48); for males ($\bar{X}$ = 14.12, SD = 1.39) and ($\bar{X}$ = 14.39, SD = 1.59) for females.

The old adult group (N = 45; M age = 65.00, SD = 7.60) was composed of 21 males (M age = 62.86, SD = 5.44) and 24 females (M age = 66.88, SD = 8.76) recruited from various local senior citizens organizations. These participants ranged in age from 55 to 83 years and received $10.00 for participation in the study. The mean number of years of education was 12.36 (SD = 3.33); for males ($\bar{X}$ = 12.05, SD = 2.87) and ($\bar{X}$ = 12.63, SD = 3.73) for females.

Participants were individually administered the Test of Behavioral Rigidity (TBR) (Schaie & Parham, 1960, 1975). The TBR consists of three subtests, Motor-cognitive rigidity (MCR), Personality-perceptual rigidity, (PPR) and Psychomotor speed rigidity (PSR), each of which result in a separate Rigidity Quotient (RQ). Additionally, the TBR yields a composite RQ.

Schaie and Parham (1960, 1975) suggest each of these types of rigidity are basically independent of each other, since rigidity cannot be considered a unitary trait.

The TBR was administered and scored according to standard instructions in the manual (see Schaie & Parham, 1960, 1975). In general, the higher the RQ the more flexible the individual, while the lower the RQ the more rigid the individual.

Since rigidity is thought to be affected by intelligence participants were administered Forms 1+2+3 of Ammons and Ammons Quick Test (QT) of intelligence (Ammons & Ammons, 1962,a,b). The QT has been used effectively with old adults and results in IQ's that are highly correlated with other measures of intelligence (Gendreau, Roach & Gendreau, 1973). Additionally, the QT can be administered in approximately 10 minutes and only requires recognition of the meaning of vocabulary items. After the QT was administered, participants were administered the TBR according to instructions.

In accordance with the goals of the present study a number of analyses were performed. First, Pearson Product-Moment Correlations were computed among the TBR subscales, IQ, and education level, for the old and young groups, separately (see Tables 1 and 2).

For the old group (Table 1), IQ was significantly correlated with

Insert Table 1 About Here

Psychomotor speed RQ ($r = .36$, $p < .01$), and the composite RQ ($r = .42$, $p < .01$). These findings support those of Schaie (1958) in that there are substantial correlations between measures of intelligence and rigidity. Also, the three rigidity components appear to be independent of each other

since each of these components is only significantly correlated with the composite RQ. This supports the assumptions of the TBR presented in the manual (Schaie & Parham, 1960, 1975). Finally, education level was found to be significantly correlated with IQ (r = .64, p < .001), Psychomotor speed RQ (r = .51, p < .001) and composite RQ (r = .51, p < .001). It appears as though IQ and education level are important moderator variables for these cohorts.

With regard to the young group (Table 2) IQ was significantly correlated

Insert Table 2 About Here

with Personality-perceptual RQ (r = .28, p < .05) and Psychomotor speed RQ (r = -.29, p < .05). Interestingly, these results are quite dissimilar to those for old adults. Contrary to what was observed for old adults, the young adults IQ and education level were not significantly correlated, nor were they significantly correlated with the TBR subscales, except for Psychomotor speed RQ, but in a negative direction.

Since IQ and education level are assumed to affect rigidity scores (see Schaie & Parham, 1960, 1975) a 2(Sex) x 2(Age Group) ANOVA was conducted for IQ and education level. These analyses indicated there were no significant differences in IQ for either main effects of sex ($F_{1,89}$ = 1.31, NS) or age group ($F_{1,89}$ = 1.77, NS). Concerning education level, analyses indicated there was a significant difference in education level among the age groups ($F_{1,89}$ = 12.91, p < .001), but not for sex of participant ($F_{1,89}$ = .62, NS). Therefore, since there were significant differences among the groups in terms of education level, and these differences could potentially affect rigidity scores, analyses for the TBR subscales would be performed partialing-out the effects of education level.

Since our preliminary results, as well as the reports of Schaie and Parham, 1960, 1975), indicated an independence among the TBR subscales and there are separate age gradiants for each, separate 2(Sex) x 2(Age Group) analysis of covariance (with education level as the covariate) were performed for each of the three TBR subscales and the composite RQ. The means and standard deviations for the TBR subscales and composite RQ are presented in Table 3.

Insert Table 3 About Here

Analysis for Motor-cognitive RQ indicated a significant main effect for age group ($F_{1,88} = 10.11$, $p < .01$, $ETA^2 = .32$). No other main effects or interactions were significant. Concerning Personality-perceptual RQ, analysis indicated a significant main effect for age group ($F_{1,88} = 7.10$, $p < .01$, $ETA^2 = .25$). Neither the main effect for sex nor Sex x Age Group interaction were significant. For Psychomotor speed RQ no main effects or interactions were significant.

Finally, for the composite RQ, analysis indicated significant main effects for sex ($F_{1,88} = 5.08$, $p < .05$, $ETA^2 = .25$) and age group ($F_{1,88} = 11.83$, $p < .001$, $ETA^2 = .26$); the Age x Sex interaction was not significant. This analysis indicates males were more rigid than females for both age groups and old adults were less rigid than young adults.

These findings are important because they argue against the pervasive myth that old adults are more rigid than young adults. Contrary to this myth, findings of the present investigation indicated on all forms of rigidity, except for Psychomotor speed, old adults were less rigid than young adults.

Overall, results of the present investigation support those of Schaie and Parham (1960, 1975) with regard to the independence of the subscales of the TBR and that rigidity is a multidimensional construct. Also, results suggest there are substantial correlations between IQ education level and rigidity for old adults, but not for young.

Perhaps, the most important finding of the present investigation was the fact that on all subscales of the TBR, except for Psychomotor speed, and the composite RQ, results indicated young people were more rigid than old adults. Results also indicated males were more rigid than females in both age groups. These findings warrant further experimental verification.

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Table 1

Correlations among TBR, Quick Test and Education Level

for the Old Group (n = 45)

	2	3	4	5	6
1. Quick Test IQ	.20	.27	.36***	.42***	.64***
2. Motor-cognitive RQ	-	.19	.06	.62***	.27
3. Personality-perceptual RQ		-	.23	.66***	.18
4. Psychomotor speed RQ			-	.69***	.51***
5. Composite RQ				-	.51***
6. Education level					-

*** $p < .001$

Table 2

Correlations among TBR, Quick Test and Education Level for the Young Group (n = 48)

	2	3	4	5	6
1. Quick Test IQ	.04	.28*	-.29*	.10	.29
2. Motor-cognitive RQ	-	.23	.16	.67***	-.24
3. Personality-perceptual RQ	-	-	.18	.74***	.07
4. Psychomotor speed RQ	-	-	-	.60***	-.08
5. Composite RQ	-	-	-	-	-.09
6. Education level					-

*p < .05

***p < .001

Table 3

Means and Standard Deviations for TBR by Sex and Group (N = 93)

Variable	Young (n = 48)			Old (n = 43)		
	Males	Females	Combined	Males	Females	Combined
	(n = 25)	(n = 23)	(n = 48)	(n = 21)	(n = 24)	(n = 45)
Motor-cognitive IQ						
$\bar{X}$ =	87.96	92.65	90.21	96.95	102.58	99.96
SD =	(16.97)	(11.23)	(14.54)	(16.50)	(13.39)	(15.02)
Personality-perceptual RQ						
$\bar{X}$ =	92.40	93.61	92.98	95.86	101.50	98.87
SD =	(13.49)	(10.03)	(11.85)	(10.10)	(11.28)	(11.00)
Psychomotor speed RQ						
$\bar{X}$ =	97.64	102.61	100.02	94.29	99.25	96.93
SD =	(11.31)	(9.08)	(10.50)	(17.77)	(15.82)	(16.75)
Composite RQ						
$\bar{X}$ =	92.60	96.00	94.23	96.05	101.67	99.04
SD =	(9.60)	(7.73)	(8.83)	(10.29)	(8.02)	(9.48)