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VISUAL AND AUDITORY REACTION TIME OF MENTALLY RETARDED SUBJECTS: EFFECT OF GENDER

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Abstract:
The aim of the present study was investigate to effect of gender on visual and auditory reaction time of mentally retarded individuals. For this purpose, seventy four subjects (male=40, female=34) participated in the study. Subjects have different mental disability level (mild=29, moderate=28, severe=17). All of the measurements performed at the same time of day (14:00-19:00). Computerized reaction time tests were applied for visual reaction time (VRT) and auditory reaction time (ART) measurements. The website www.humanbenchmark.com has been used to determine the visual reaction time. The website www.cognitivefun.net has been used for the measurement of auditory reaction time. In both tests, the reaction time was measured 5 times and the average was recorded in milliseconds. Mann-Whitney U test were performed in the analysis of the data. Auditory and visual reaction time parameters show significant difference between male and female ($p<0.05$). Auditory and visual reaction time parameters showed significant difference between male and female within all disability levels ($p<0.05$). In conclusion, it can be said that reaction time shows difference between genders in mentally retarded persons like normal. Female disable persons perform slower reaction than male persons. The gender factor affect reaction sourced cerebrum, while they have mental retardation.

Keywords: reaction, gender, mental, disability

1. Introduction

Reaction time is important factor for adaptation on daily life of mentally retarded individual. It can be an advantage or disadvantage. Mental retardation can affect reaction time like other motor abilities. Initial signaling of reaction time occurs from cerebrum. Mental retardation has cerebral source as known as. As a result of a

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retardation, reaction time can be affected from the retardation (Baumeister and Kellas, 1968).

Mental retardation can be a source of cerebral lags. This lagging occurs attentional defiance. Also, this lagging shows skipping of signal transmissions into neuron to neuron (Inui et al., 1995). There is a lot of evidence for mental retardation and reaction time features (Davis et al., 1991; Berkson, 1960; Clausen, 1966; Hermelin, 1964; Hermelin and Venabes, 1964; Astrup et al., 1967; Clausen, 1968; Anwar 1981; Johnson and Olley, 1971). But effect of gender did not showed yet.

The aim of the present study is putting forth the influence of gender on reaction time feature of mentally retarded subjects. It can be hypothesized that gender could affect to reaction time of mentally retarded individuals like normal.

2. Method

Seventy four mentally retarded individual (male=40, female=34) who educated at rehabilitation centers participated in the study with permission from their families (Table 1). Subjects have different mental disability level (mild=29, moderate=28, severe=17). All of the measurements performed at the same time of day (14:00-19:00).

Table 1: Descriptive parameters

		N	Min.	Max.	Mean	Std. Dev.
Male	Age (years)	40	6.00	18.00	10.13	3.54
	Auditory reaction time (msec)		301.70	3881.00	848.77	753.75
	Visual reaction time (msec)		362.00	8899.00	1237.18	1391.90
Female	Age (years)	34	6.00	28.00	12.12	5.80
	Auditory reaction time (msec)		288.00	4027.00	940.09	804.17
	Visual reaction time (msec)		397.00	4170.00	1466.00	995.59

Computerized reaction time tests were applied for visual reaction time (VRT) and auditory reaction time (ART) measurements. The website www.humanbenchmark.com has been used to determine the visual reaction time. The website www.cognitivefun.net has been used for the measurement of auditory reaction time. In both tests, the reaction time was measured 5 times and the average was recorded in milliseconds (Kaplan et al. 2017).

SPSS 22.0 program was used for statistical analysis of the data obtained at the end of the study. After the normality test Mann-Whitney U test were performed in the analysis of the data. The data were presented as mean, standard deviation, minimum, maximum and evaluated at a significance level of 0.05.

3. Results

Table 2 shows reaction time difference between genders. Auditory and visual reaction time parameters show significant difference between male and female ($p<0.05$). Male mentally retarded person have 848.77±753.75 msec auditory reaction time, while female

persons have 940.09±804.17 msec. Besides, male mentally retarded person have 1237.18±1391.90 msec visual reaction time, while female persons have 1466.00±995.59 msec (Figure 1).

Table 2: Reaction time difference analysis between genders

		Mean	Std. Dev.	p
Auditory reaction time (msec)	Male	848.77	753.75	**0.039**
	Female	940.09	804.17	
Visual reaction time (msec)	Male	1237.18	1391.90	**0.043**
	Female	1466.00	995.59	

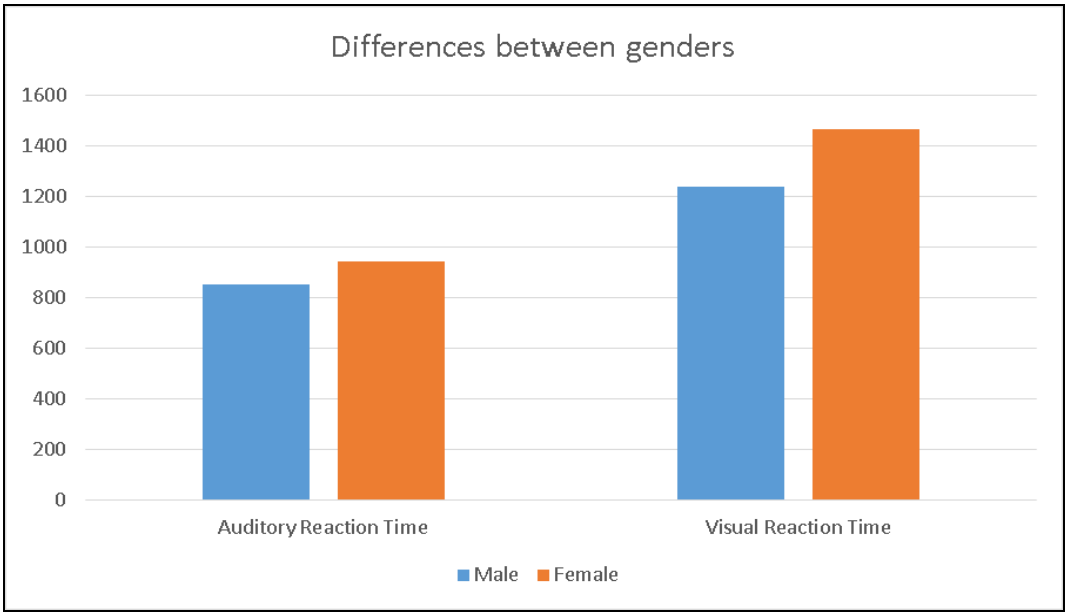

Figure 1: Differences between genders

Table 3 shows reaction time difference between genders within different disability levels. Auditory and visual reaction time parameters showed significant difference between male and female within all disability levels ($p<0.05$). In mild disability level, male mentally retarded person have 699.02±849.22 msec auditory reaction time, while female persons have 998.02±674.67 msec; male mentally retarded person have 1178.82±2006.43 msec visual reaction time, while female persons have 1370.50±1047.86 msec. In moderate disability level, male mentally retarded person have 728.46±440.12 msec auditory reaction time, while female persons have 1137.24±1148.80 msec; male mentally retarded person have 1219.50±749.43 msec visual reaction time, while female persons have 1621.00±1213.80 msec. In severe disability level, male mentally retarded person have 1487.46±841.10 msec auditory reaction time, while female persons have 1633.98±203.54 msec; male mentally retarded person have 1419.29±635.88 msec visual reaction time, while female persons have 1394.60±664.67 msec (Figure 2).

Table 3: Reaction time differences between disability level within genders

Disability			Mean	Std. Dev.	p
Mild	Auditory (msec)	Male (n:17)	699.02	849.22	**0.040**
		Female (n:12)	998.02	674.67	
	Visual (msec)	Male (n:17)	1178.82	2006.43	**0.037**
		Female (n:12)	1370.50	1047.86	
Moderate	Auditory (msec)	Male (n:16)	728.46	440.12	**0.040**
		Female (n:12)	1137.24	1148.80	
	Visual (msec)	Male (n:17)	1219.50	749.43	**0.048**
		Female (n:12)	1621.00	1213.80	
Severe	Auditory (msec)	Male (n:7)	1487.46	841.10	**0.029**
		Female (n:10)	1633.98	203.54	
	Visual (msec)	Male (n:7)	1394.60	664.67	0.059
		Female (n:10)	1419.29	635.88	

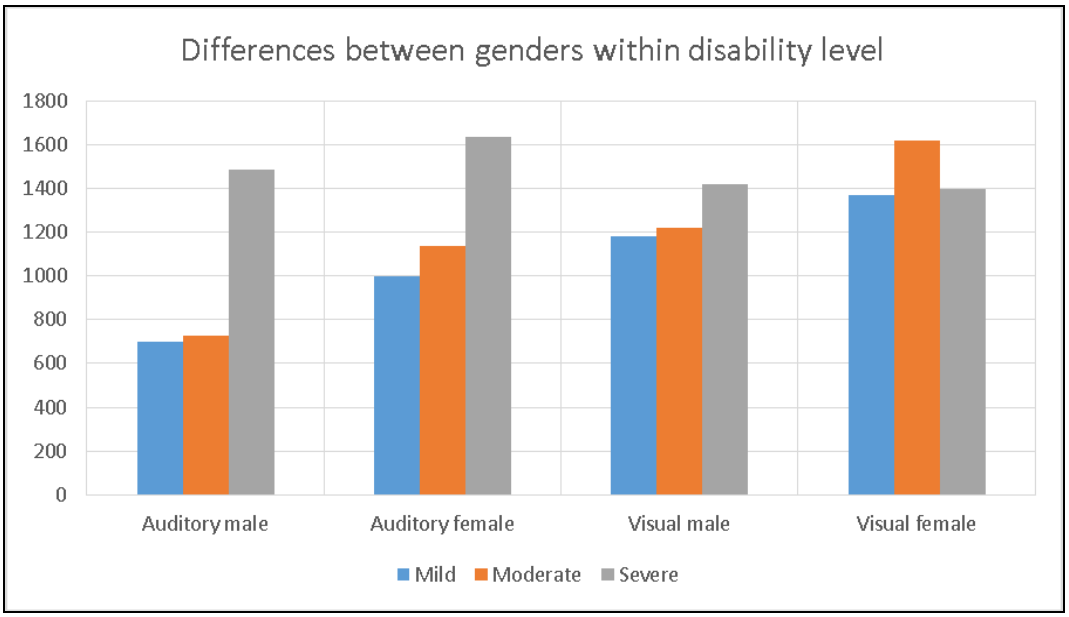

Figure 2: Reaction time differences between genders within disability level

4. Conclusion

Researches showed that mental retardation integrates to the sensory-perception-motor functions, and being reason of insufficiency for the disability table (Seaman and Depauw, 1989). Mentally retarded persons who already have above insufficiencies maintain their motoric life behind four years from their normal equals (Krebs, 1995; Gallahue ve Ozmun, 1995; Yılmaz, 1993). These information show us the importance of the present study's aim.

In the present study, auditory and visual reaction time parameters show significant difference between male and female ($p<0.05$). Male mentally retarded person have 848.77±753.75 msec auditory reaction time, while female persons have 940.09±804.17 msec. Besides, male mentally retarded person have 1237.18±1391.90 msec visual reaction time, while female persons have 1466.00±995.59 msec. Auditory and

visual reaction time parameters showed significant difference between male and female within all disability levels ($p<0.05$). In mild disability level, male mentally retarded person have 699.02±849.22 msec auditory reaction time, while female persons have 998.02±674.67 msec; male mentally retarded person have 1178.82±2006.43 msec visual reaction time, while female persons have 1370.50±1047.86 msec. In moderate disability level, male mentally retarded person have 728.46±440.12 msec auditory reaction time, while female persons have 1137.24±1148.80 msec; male mentally retarded person have 1219.50±749.43 msec visual reaction time, while female persons have 1621.00±1213.80 msec. In severe disability level, male mentally retarded person have 1487.46±841.10 msec auditory reaction time, while female persons have 1633.98±203.54 msec; male mentally retarded person have 1419.29±635.88 msec visual reaction time, while female persons have 1394.60±664.67 msec.

In almost every age group, males have faster reaction times than females, and female disadvantage is not reduced by practice (Noble et al., 1964; Welford, 1980; Adam et al., 1999; Dane and Erzurumlugoglu, 2003; Der and Deary, 2006).

Bellis (1933) reported that mean time to press a key in response to a light was 220 msec for males and 260 msec for females; for sound the difference was 190 msec (males) to 200 msec (females). In comparison, Engel et al. (1972) reported a reaction time to sound of 227 msec (male) to 242 msec (female).

However, things may be changing- Silverman (2006) reported evidence that the male advantage in visual reaction time is getting smaller, possibly because more women are participating in driving and fast-action sports. Spierer et al. (2010) reported that when male soccer players were compared with female lacrosse players, males were able to respond faster to both visual and auditory stimuli. They said that the male advantage was greatest when using visual stimuli. Botwinick and Thompson (1966) found that almost all of the male-female difference was accounted for by the lag between the presentation of the stimulus and the beginning of muscle contraction. Muscle contraction times were the same for males and females.

Adam et al. (1999) reported that males use a more complex strategy than females. Barral and Debu (2004) found that while men were faster than women at aiming at a target, the women were more accurate. Bayless et al. (2012) found that when a choice reaction time task was made more challenging for rats by weak stimuli and distraction, male rats tended to "jump the gun" and make premature responses, but female rats were more likely to miss valid stimuli. Note that this study used rats, not humans. Jevas and Yan (2001) reported that age-related deterioration in reaction time was the same in men and women (Kosinski, 2008). Also, some studies shows intelligence and brain health situation affect reaction tasks (Deary et al., 2001; Nettelbeck, 1980; Schweitzer, 2001; Lee and Chabis, 2013; Bashore and Ridderinkhof, 2002; Collins et al., 2003; Eckner et al., 2010; Leuthcke et al., 2011; Kaminski et al., 2008).

In conclusion, it can be said that reaction time shows difference between genders in mentally retarded persons like normal. Female disable persons perform slower reaction than male persons, because of the physiological differences from genders. The gender factor affect reaction sourced cerebrum, while they have mental retardation.

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