



## INVESTIGATION OF VISUAL AND AUDITORY SIMPLE REACTION TIME OF INDIVIDUALS WITH MENTAL RETARDATION

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### Abstract:

The aim of this study is investigation of visual and auditory basic reaction time differences of individuals with mild, moderate, and severe mental retardation. Totally 57 males (n = 40) and female (n = 17) individuals with mild (n = 23), moderate (n = 22), and severe (n = 12) mentally retarded participated in this study. Computerized reaction time tests (VRT: [www.humanbenchmark.com](http://www.humanbenchmark.com); ART: [cognitivefun.net](http://cognitivefun.net)) was used for visual reaction time (VRT) and auditory reaction time (ART). Reaction time was measured five times, and the mean variable saved as millisecond in both tests. Kruskal Wallis and Mann-Whitney U tests were used for analysis of obtained data. There was no significant difference in VRT and ART between male and female individuals ( $p > 0.05$ ). Significant difference was found in VRT and ART parameters between mental retardation categories ( $p < 0.05$ ). Significances were observed between mild and severe mental retardation categories both VRT and ART ( $p < 0.05$ ). In summary, it could be said that gender isn't affect visual and auditory basic reaction time in individuals with mental retardation; however, the severity of mental retardation may have negative effect on basic reaction time.

**Keywords:** mental retardation, reaction, visual, auditory, gender

### 1. Introduction

The education and training style that the individual who is an integral part of society, takes using for the benefit of the society his creativity and talents have a big importance.

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Today, education has begun to be implemented taking into account the needs of individuals. Training programs have begun to be prepared to mature the existing physical, mental and social characteristics of individuals with special needs to connect the society (Diken and Sucuoğlu, 1999). The tendencies and the skills of individuals with mental retardation may show some differences in terms of educational needs. Mentally retarded children are the most common group of children with disabilities. Despite this difficulty, these children are not well known by society. There are some prejudices and behaviors that target these children. The first of these is convinced that everything is too late for children with mental disabilities. However, the majority of mental retardation constitutes educable mental retardation (İlhan, 2008).

Physical activity in mentally retarded children has a great deal of progress in the development stage. It is known that the human body has a structure that supports muscular and nervous system, mental and physical reactions, physiological and metabolic development of the body. Physical activity has some form of rehabilitation. Mentally retarded children are less developed than children in normal development even though they pass through the same developmental stages. It is known that the children with mentally retarded are weaker than normal children in terms of physical and motor compatibility factors such as strength, strength, agility, balance, control, flexibility, speed (Biçer et al. 2004). It is only possible for an individual to discover his or her own abilities, to learn self-fulfillment, through rehabilitation and education. Sports in the rehabilitation of children with mental disabilities may use for gain the self-confidence, balance, muscle control, freedom of movement and coordination. The importance of physical activities is great in educational programs specially prepared for children with mental retardation. Physical activity plays an important role in helping children with mental retardation in achieve self-sufficiency in the future. The progress of their mobility and their progress in the spiritual sense can change the life in the future (Ergun, 2011).

The purpose of this study is to examine simple reaction times according to the level of mental retardation of mentally retarded individuals in the light of information given. The examination of visual and auditory simple reaction times in mild, moderate and severe mentally retarded individuals is important for shedding light on the development programs to be implemented. The sporting activities applied to mentally retarded people generally have great importance in terms of their rehabilitation. Developing programs to be created by considering simple reaction time differences that vary according to the severity of the mental disability may be prepared more carefully and consciously.

## 2. Method

### 2.1 Participants

Fifty-seven mentally retarded individuals educated at the Rehabilitation Centers in Gaziantep participated in the study with permission from their families. Twenty-three of these individuals are mild, twenty-two are moderate, and twelve are severe with mental retardation (Table 1). Separate groups were formed according to the severity of mental disability. It was determined that they were severe, moderate and mild mentally retarded individuals according to the guidance counseling center scales. The research was conducted during the first semester of the 2015-2016 education period. Measurements were made between 9.00-11.00 hours. 40 of the examined individuals are male and 17 of them are female mentally retarded individuals.

**Table 1:** Descriptive characteristics of subjects with mental retardation

Category	Variable	Mean ± SS
Mild Mental Retardation (n = 23)	Age (year)	8.65 ± 1.90
	Height (m)	1.20 ± 0.18
	Weight (kg)	31.30 ± 7.72
	BMI (kg/m <sup>2</sup> )	22.20 ± 2.98
Moderate Mental Retardation (n = 22)	Age (year)	9.41 ± 3.00
	Height (m)	1.27 ± 0.27
	Weight (kg)	35.68 ± 11.26
	BMI (kg/m <sup>2</sup> )	21.01 ± 3.43
Severe Mental Retardation (n = 12)	Age (year)	17.08 ± 4.27
	Height (m)	1.58 ± 0.17
	Weight (kg)	53.75 ± 15.09
	BMI (kg/m <sup>2</sup> )	24.02 ± 6.69

### 2.2 Simple reaction time measurement

Computerized reaction time tests were applied for visual reaction time (VRT) and auditory reaction time (ART) measurements. The website [www.humanbenchmark.com](http://www.humanbenchmark.com) has been used to determine the visual reaction time. The website [www.cognitivefun.net](http://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 (Pancar et al. 2016).

### 2.3 Statistical Method

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

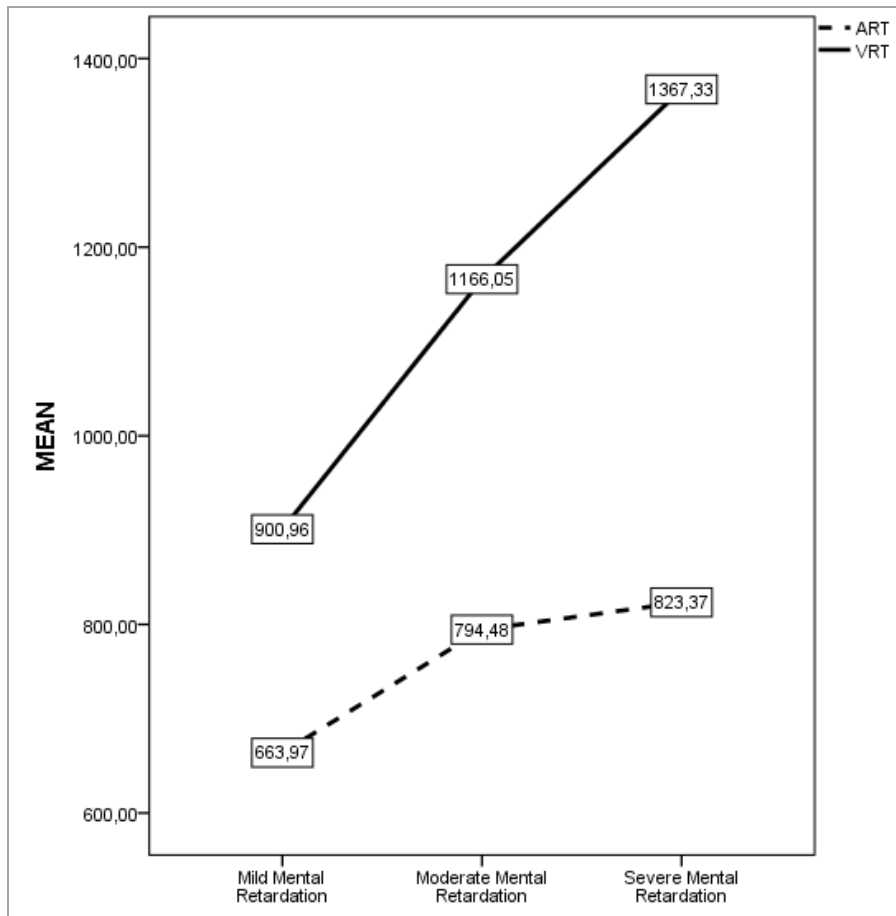
### 3. Results

It is given that the analysis of VRT and ART parameters by disabled groups in table 2. When male and female subjects participating in the study were compared there was no significant difference in VRT and ART parameters ( $p > 0.05$ ). When the data obtained from VRT and ART characteristics between the disabled categories were examined significant differences were observed ( $p < 0.05$ ). Both reaction time measurements revealed a significant difference in favor of mild mentally retarded individuals between mild mentally retarded and severe mentally retarded individuals.

**Table 2:** Analysis of ART and VRT measurements between categories of mental retardation

Parameters	Category	N	Mean ± SS	p	Significance between categories
ART (ms)	Mild	23	663.97 ± 506.56	<b>0.049</b>	Mild –Severe
	Moderate	22	794.48 ± 754.46		
	Severe	12	823.37 ± 288.91		
VRT (ms)	Mild	23	900.96 ± 717.99	<b>0.009</b>	Mild – Severe
	Moderate	22	1166.05 ± 897.13		
	Severe	12	1367.33 ± 584.26		

It has been observed that as the severity of the disability levels of the mentally retarded individuals increased, the response time was prolonged and the reaction characteristics decreased (Figure 1). This situation proved that the intellectual disability caused the perception, reaction and retraction at the time of movement.



**Figure 1:** Change of VRT and ART parameters according to disabled level

#### 4. Discussion and Conclusion

Non-disabled individuals are knowledgeable about the risks caused by inadequate physical fitness levels and about preventive measures, or have the opportunity to learn for themselves. Mentally retarded individuals have no this chance. In order to continue their daily lives, their physical fitness and motor skills must be brought to the desired level (Yılmaz, 1993).

The researches show that the mental retardation enlarge the insufficiency table by combining with sense-motor integration dysfunction the. Physical problems are evident by affecting each other with the inadequacy of mental and sensory-perception-motor development and result of this complex growth retardation is emerging (Seaman and Depauw, 1989). In addition, it has been determined that the mentally retarded individuals are 4 years behind in terms of their motor characteristics compared to normal children (Krebs, 1995; Gallahue and Ozmun, 1995; Yılmaz, 1993). This information explains the numerical deficiency in the VRT and ART parameters that we have obtained in our study and supports our results.

Reaction time is one of the important components in order to show the performance. The performance of children with mental retardation in sporting events and the performance of normal children are of course different.

The responses of children with mental retardation may vary during sports. These reactions are known as the reaction time. The speed of the reaction which known as a part of the motion speed, is known as the time it takes to initiate the conscious action when a signal is given to the time and is related to neurophysiological properties (Açak et al., 2012). The results of the study show that the response time was delayed as the severity of the disability increases in mentally retarded individuals. Reaction time is a neurophysiological characteristic and this can explain that the formation of changes in relation to the severity of the mental disability.

The "reaction time", known as the time at which the stimulus begins and the time that elapses between when the reaction begins, is a decisive factor for performance. According to some scientists, the reaction time is defined as an internal outflow between the receipt of the stimulus and the response to it. The duration of the action includes the duration that from the beginning of the reaction to the end of the reaction. The duration of the action follows the time in sportive activity (Açak et al. 2012). In mentally retarded individuals, it is thought that besides the reaction time which is including such factors that create the of the reaction speed, the speed of perception and the speed of movement are weak. Since the reaction tests we use in the study were measured the simple reaction time, it was ensured that reveal the perception speed and reaction time characteristics. Thus, it is considered that the results obtained reveal that the mentally retarded individual's reaction time is independent of other factors.

There are many factors that affect the reaction time positively and negatively. Being in sportive events positively affects the reaction time. According to many studies, it has been concluded that the athletes have better reaction times than the non-athletes (Çankaya et al., 2014; Mayda et al., 2016). In addition, according to a study carried out on 802 children, it was reported that age also affected the reaction time (Pancar et al., 2016).

Reaction time can be improved by regular training. According to Welford (1971), the reaction time can be improved by warm-up exercises. If taken into account the education of children with mental retardation is directed at using their bodies rather than their mental skills, it is clear that the development of physical and motor suitability is a precondition for children to benefit from lessons such as physical education (Uğurlu and Alıncak, 2016; Alıncak et al., 2016; Ayan et al., 2017) and vocational training. In the external world, they need to be trained according to severity of the disability and in the direction of a specific program since they can meet their needs seamlessly and

independently. In addition to the benefits that the sport provides to the physical and spiritual structure, it is also ensure to become adapting of social life by providing discipline, confidence, and competitive emotions. There are many physical and physiological benefits of sports for disabled individuals (Yıldız et al., 2016). In addition, sports, which are an educational activity for disabled people, reveal the power to express common goals and the emotions of appreciation.

As a result, it can be said that the mental retardation affects the reaction time and the reaction time is adversely affected as the severity of the disability increases. It may be advisable to incorporate various exercises and warm-up activities that will positively affect the reaction time of mentally retarded individuals into treatment programs.

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