

The effects and sustainability of self-talk and focus of attention with an 8-week training program on the balance in educable mentally-retarded female students (7-15 years old)

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ABSTRACT: The purpose of this study was to examine the effects and sustainability of self-talk and focus of attention with an 8-week training program on the balance in educable mentally-retarded female students (7-15 years old). Design: The statistical population of this study was female educable mentally-retarded students (7-15 years old) that 96 students were selected by available sampling. The subjects were randomly divided into 8 groups (N=12). The instrument for collecting in data is included a parental consent form, a demographic questionnaire, the static balance Sharpend Romberg test, and the Timed Get-up-and-Go (TGUG) test. The balance tests were performed in the pre-test. Then, the post-test was performed after 8 week training of self-talk and focus of attention with the balance training. The subjects participated in the retention test after two weeks without practice. The analysis of data was done by the one and two-way ANCOVA and Bonferroni post hoc test ($p<0.05$). Results: The results of this study showed that motivational and instructional self-talk and internal and external focus of attention had a significant effect on the balance in the educable mentally-retarded students (7-15 years old). Also, internal and external focus of attention improved the subjects' performance more than motivational and instructional self-talk in the dynamic balance but those did not lead to the sustainability of improvement of dynamic and static balance. It is recommended that these activities are considered in the educable mentally-retarded students' daily agenda.

Keywords: self-talk, focus of attention, balance, mentally-retarded student, educable.

INTRODUCTION

The study of different conditions of mentally-retarded individuals' life can create the effective strategies to help these people because they form the certain stratum of society. According to the statement of the office of the High Commissioner for Human Rights, mentally-retarded people have the same rights, medical care, appropriate physiotherapy, education, instruction, and rehabilitation as other persons to enable them to improve their full potential (Gradanous, 2005). The various terms are used for the mentally-retarded people in the west that those are included abnormal state and mental weakness (Gradanous, 2005). So far, the experts have presented hundreds of different definitions of the mentally-retarded term but the accurate definition of mentally-retarded term is not so simple (Leonard, 2002) due to we can not observe the same condition, extent and symptom in the all mentally-retarded people. Mentally-retarded state is not a one-dimensional phenomenon but it is a complex and subjective condition (Leonard, 2002). It is obvious that doctors are paying special attention to the brain lesions and psychologists are paying attention to the behavior in mentally-retarded people. Researchers consider the mentally-retarded state as a disorder in the central nervous system that it can lead to the intelligence quotient (IQ) score below 70 and significant deficiencies in two or more leadership and social skills, relationship, health, and job (American Association on Mental

Retardation, 2002). The mentally-retarded state is a level of general intelligence performance that its rate is significantly lower than average level so that it leads to the defects in person's adaptive behavior and he/she shows it during his/her growth (American Association on Mental Retardation, 2002). The growth period is from the time of Formation of sperm to 18 years old (Krick, 2000). The adaptive behavior refers to the coping behavior in relationship with person and social (Krick, 2000). The coping behavior is an ability to deal with the social responsibility criteria in a particular age group (Krick, 2000). The scores of intelligence test are the common criteria for to measure the mentally-retarded person. This issue is due to that there are not objective and standardized tools to measure cultural coping behaviour especially in the new cultural and economic environments (Krick, 2000). The classification criteria for educable levels are IQ 55 to 70. The individuals learn social adaptive skills for the independence in this group. The mentally-retarded children have not a different physical appearance in comparison with normal children in their age group exception specific genetic syndromes (such as Down syndrome) and mentally-retardation with cerebral palsy. However, there is a relationship between intensity of individuals' mentally-retardation and the rate of physical differences (Horvat, 2001). The mentally-retarded children's appearance level of motor abilities depends on the evolution level of the cerebral cortex and the preparation of motor part to execute specific movements and their formed motor skills. The different studies show that the mentally-retarded children and adolescents' physical growth and physical fitness level is poor and the deeper mentally-retardation is associated with lower physical performance. The awareness of body position in space requires a direct position in both the static and dynamic situations. This ability is often called balance. Children's abilities have a high relationship with static (such as standing on one leg) and dynamic balance (such as exercises on balance board) in the maintaining of contrary gravity positions (such as neck flexion in a supine or lifting trunk in the prone position) that requires the strength of contravity gravity muscles. Sustainability Skills such as balance are a part of basic motor skills that child can acquires the improvement in complex movements, success in sport, play, and rhythmic movements such as water sports after motor patterns growth, refining, and combination (Wiegersma and Van der Velde, 1983).

Many studies show that the mentally-retarded children do not have a balance control as well as normal children. Other studies have showed that the increasing of balance in the mentally-retarded children is possible with a special designed program. The designers of program should design the activities that it includes the increasing of muscle strength, circulatory system and cardiovascular endurance, coordination of the whole body, and voluntary control of movements, over coming the balance and speed problems, static and dynamic balance activities and skills to enable a person to perform recreational and excited activities (Wiegersma and Van der Velde, 1983). The application of cognitive strategies is also noticeable in the mentally-retarded people along with physical activities. Self-talk (ST) is very effective as an important cognitive strategy to improve the execution and increasing of internal factors such as concentration, self-confidence, and feel relaxed. Hardy, (2005) define ST as a multidimensional, dynamic phenomenon that deals with the verbalization of the athletes as they address themselves (Hardy, 2005). The application of ST takes priority in complex tasks and the application of motivational self-talk are effective in simple tasks (Sellars, 1997). According to the literature, the effect of ST on performance may be negative or positive and sometimes neutral (Sellars, 1997). Theodorakis, (2000) stated that when the task requires fine motor movements, an instructional ST strategy is more effective. Motivational and instructional ST strategy can be useful so that those increase athletes' motivation, self-confidence, and fitness (Van Raalte, 1994; Weinberg, 1992). Two major types of ST have been identified, namely instructional and motivational ST. Instructional ST refers to statements designed to enhance performance by stimulating desired actions through focus of attention on the technical aspects of a skill (Theodorakis, 2000). Motivational ST refers to statements designed to facilitate performance by building confidence, increasing effort and energy expenditure and creating a positive mood (Hardy, 2005). The recent studies have shown that task-specific ST appears to have a beneficial effect on physical performance (Gibson and Foster, 2007). Hatzigeorgiadis, (2004) examined the ST in the water-polo tasks. The results of the study provide further support for the effectiveness of motivational and instructional ST and give preliminary evidence regarding likely mechanisms through which self-talk influence performance, that is through indications that ST reduces thoughts not related to task execution, thus enhancing concentration to the task (Hardy, 2006). Researchers have expressed that ST sometimes may work through the focusing of individuals' attention (Mallet and Hanrahan, 1997). The attention model is an approach to study attention that it expresses athletes' ability for shift attention from one target to another target. ST is effective in the capacity of the focusing of individuals' attention (Mallet and Hanrahan, 1997; Perkos, 2002). Attention is a cognitive prerequisite that it plays an important role in the successful sports performance. There are two types of focus of attention in sports activities: a. wide and narrow (in terms of width) b. internal and external focus of attention (in terms of direction). If attention is one of the most important effective limitations on human's learning and performance, the focusing of it will be a method to increase efficiency and learning. But researchers are seeking to answer a question about the type of presented attention instructions to performers based on internal and external attention. The results of studies show that a performer's focus of attention plays an important role in the learning and

performance of motor skills and there are studies that show external focus of attention is affective on the improvement of balance and postural control. Wulf, (2001, 2007) stated that individuals try to consciously control their movements when they are asked to adopt internal focus instructions. In contrast, the concentration on the effects of movement or adopting of external focus of attention instructions allows automatic and unconscious processes to control movement. So, this leads to more effective performance. Inner ST occurs in children when they are alone and children decrease it with the increasing of their age. These changes indicate that children become aware of the social outcomes of their inner ST with the increasing of their age without control (Gibson, 2007). The findings confirm this claim that the use of ST can improve performance and this work is possible through the focusing of attention. Let's remind that the possible impact of ST on performer's attention does not justify completely the effects of ST (Hardy, 2006). In this regards, Jackson, (2011) examined the effects of focus of attention of task objective consistency on learning a balancing task. The results of this study showed that the subjects who have received the external real task had more efficient performance during acquisition than the subjects who have received the internal focus of attention. However there was no significant difference between groups in the performing of path of attention when the subjects received internal real task. Samia and Shaheen (2010) studied efficacy of weight bearing exercises on balance for 6 weeks in children with Down syndrome (2-5 years old). The results showed that the experimental group had higher improvement than control group in the static and dynamic balance. Tod, (2009) examined the effects of instructional and motivational self-talk on the vertical jump. The results of this study showed that instructional and motivational ST groups led to greater center-of-mass displacement and greater impulse than neutral self-talk group. This study showed that ST led to greater angular velocity about the knee, thus generating greater impulse and increased jump height-a conjecture. The results showed that ST may contribute to improved performance in sports requiring power-based skills. Chroni, (2007) studied the function and preferences of motivational and instructional Self-talk for adolescent basketball Players. Athletes reported a significant preference for motivational ST when dribbling and shooting, while they did not favor one ST type over the other when passing in this study. Moreover, athletes' motivational ST was perceived as a significant aid for their concentration, confidence, and sense of relaxation during shooting, while instructional ST as more beneficial for improving their technique during passing. Results offer some substantiation for possible mechanisms through which ST can influence performance at a young age.

According to the mentioned studies, most of studies have examined the effects of physical factors on mentally-retarded people and the effects of cognitive interventions such as self-talk on healthy athletes. So the conducting of a study is essential to study ST and balance in the mentally-retarded people especially at an early age that it is a sensitive stage of growth. The conducting of this study will present practical approaches to improve the living conditions of the mentally-retarded people. Therefore, this study was conducted to examine the effects and sustainability of self-talk and focus of attention with an 8-week training program on the balance in educable mentally-retarded female students (7-15 years old).

MATERIALS AND METHODS

This study was a semi empirical research and design of it included pre-test, post test, and retention test with control group.

Participants

The statistical population of this study was all educable mentally-retarded female students (7-15 years old) of Alborz province. 96 students were selected from by available sampling. The subjects were randomly divided into 8 groups.

Instruments and Tasks

The instrument was the static balance Sharpend Romberg test and the The Timed Get-up-and-Go (TGUG) test.

Procedure

A meeting was held between researcher, managers, coaches, and subjects' parent for the familiarity with the goals and strategies of research program and the ensuring the safety of this study and satisfactions before the starting this study. Then the subjects were randomly divided into 8 groups (N= 12): 1. Control 2. Instructional ST with internal focus of attention control 3. Instructional ST with external focus of attention control 4. Motivational ST with internal focus of attention control 5. Motivational ST with external focus of attention control 6. Motivational and instructional ST with internal and external focus of attention control 7. Internal and external focus of attention 8. Motivational and instructional ST. The balance tests were performed in a safe and quiet environment. Then the

experimental groups participated in an 8-week training program of ST type and focus of attention with Balance training. The subjects participated in the post-test and they participated in the retention test after 2 weeks without practice.

Data Analysis

The collected data were classified by descriptive statistical methods and were analyzed by the one and two-way ANCOVA and Bonferroni post hoc test. The SPSS software (version 20) was used for data analysis ($\alpha \leq 0.05$).

RESULTS AND DISCUSSION

Results

The results of table (1) show the mean and standard deviation of subjects' age, height, and weight in 8 groups. The results of table (2) show the mean and standard deviation of static and dynamics balance in the pre-test, post-test, and retention test stages. The results of Kolmogorov-Smirnov Test show the normality distribution of data (table 3).

Table1. The mean and standard deviation of subjects' age, height, and weight in 8 groups

Group	Weight (kg)		Age (year)		Height (Meter)	
	Mean	SD	Mean	SD	Mean	SD
Control	39/83	3/42	11/36	1/14	1/37	0/030
2	40/25	3/31	10/33	1/02	1/37	0/030
3	41/25	4/05	10/87	1/08	1/36	0/043
4	43/91	3/40	11/41	1/16	1/37	0/030
5	41/51	3/45	9/16	0/96	1/35	0/030
6	42/08	4/00	11/21	1/11	1/34	0/039
7	41/58	4/27	10/78	1/33	1/34	0/035
8	36/58	3/69	11/19	1/12	1/35	0/038
Total	40/92	1/25	10/91	3/73	1/36	0/119

Table 2. The mean and standard deviation of static and dynamics balance in the pre-test, post-test, and retention test stages

Group	Focus of attention Group	Self-talk Group	Test	Mean	SD
1 (Control)	Without of focus of attention	Without of self-talk	Pre-test	46/58	17/35
			Acquisition	26/83	20/153
			Retention	26/83	20/15
2	Internal	Instructional	Pre-test	38/91	8/20
			Acquisition	47/16	11/09
			Retention	47/16	11/09
3	External	Instructional	Pre-test	25/33	16/24
			Acquisition	47/41	10/92
			Retention	47/41	10/92
4	Internal	Motivational	Pre-test	36/41	11/91
			Acquisition	49/50	11/30
			Retention	49/50	11/30
5	External	Motivational	Pre-test	36	15/53
			Acquisition	46/41	15/60
			Retention	46/41	15/60
6	Internal/External	Motivational/Instructional	Pre-test	26/58	14/61
			Acquisition	41/58	15/37
			Retention	41/58	15/37
7	External/Internal	Without of self-talk	Pre-test	27/41	16/58
			Acquisition	47/50	10/74
			Retention	47/50	10/74
8	Without of focus of attention	Motivational/Instructional	Pre-test	32/33	10/52
			Acquisition	49/75	8/40

			Retention	49/75	8/40
Total			Pre-test	33/96	15/28
			Acquisition	47/02	13/13
1) Control	Without of focus of attention	Without of self-talk	Retention	46/12	12/10
			Pre-test	20/50	5/96
			Acquisition	28/91	5/56
2	Internal	Instructional	Retention	29/92	5/50
			Pre-test	17/08	3/75
			Acquisition	12/00	3/86
3	External	Instructional	Retention	16/58	3/47
			Pre-test	27/25	9/88
			Acquisition	18/91	4/48
4	Internal	Motivational	Retention	27/75	10/43
			Pre-test	19/75	4/00
			Acquisition	14/91	4/50
5	External	Motivational	Retention	19/00	3/90
			Pre-test	28/00	6/56
			Acquisition	18/50	3/52
6	Internal/External	Motivational/Instructional	Retention	28/75	8/18
			Pre-test	16/83	3/01
			Acquisition	13/58	2/90
7	External/Internal	Without of self-talk	Retention	17/58	2/77
			Pre-test	22/50	6/33
			Acquisition	15/41	4/46
8	Without of focus of attention	Motivational/Instructional	Retention	22/83	6/73
			Pre-test	16/75	4/73
			Acquisition	12/50	2/77
Total			Retention	17/00	5/23
			Pre-test	21/08	7/10
			Acquisition	15/59	4/78
			Retention	21/05	7/56

Table 3. The results of Kolmogorov-Smirnov Test for determining of normality distribution of data

Group	Pre-test Static Balance	Acquisition Static Balance	Retention test Static Balance	Pre-test Dynamic Balance	Acquisition Dynamic Balance	Retention test Dynamic Balance
1.Control	0/200	0/200	0/200	0/200	0/200	0/114
2.Internal focus of attention, instructional ST	0/185	0/200	0/200	0/200	0/110	0/200
3.External focus of attention, instructional ST	0/150	0/200	0/075	0/200	0/200	0/200
4.Internal focus of attention, motivational ST	0/200	0/123	0/051	0/058	0/20	0/200
5.External focus of attention, motivational ST	0/125	0/111	0/073	0/840	0/200	0/037
6. Internal and external focus of attention, instructional and motivational ST	0/193	0/200	0/200	0/200	0/127	0/200
7. Internal and external focus of attention,	0/200	0/145	0/330	0/129	0/129	0/169
8. instructional and motivational ST	0/143	0/200	0/200	0/200	0/407	0/126

Table 4. The results of two-way ANCOVA for determining of effects of ST and focus of attention on post-test of static balance

Source	Df	Mean square	F	P
ST	2	53/476	0/441	0/645
Focus of attention	2	80/553	0/664	0/517
ST x Focus of attention	2	528/710	4/361	0/016

According to the table (4), the effects of ST and focus of attention ($P=0.517$) is not significant on the post-test scores of static balance ($P=0.645$) and ($P=0.517$). But there is a significant effect between the interaction effect of ST and focus of attention ($P=0.016$).

Table 5. The results of one-way ANCOVA for the post hoc analysis-of significant interaction in static balance

Source	Df	Mean square	F	P
Group	7	126.969	10.747	0.002

According to the table (5), the equality assumption of mean of 8 groups is rejected ($P=0.002$) so Bonferroni post hoc test was used for the pair comparison in between groups.

Table 6. The results of one-way ANOVA for retention scores in static

Source	Df	Sum of Mean square	Mean square	F	P
Between group	7	4440/458	634/351		
Within group	88	16271/167	184/900	4/361	0/016
Total	95	20711/625			

According to the table (6), the effects of group in scores of sustainability is significant between 8 groups ($P=0.016$). Thus, post hoc Tukey test was used to compare the groups in pairs.

The results of Bonferroni post hoc test between control group and experimental groups in post-test of Static balance showed the effect of instructional ST with internal focus of attention is effective on static balance ($P\leq 0.05$). Also there is a significant difference between control group and experimental groups (3), (4), (5), (6), (7), and (8) ($P\leq 0.05$).

The results of post hoc Tukey test between control group and experimental groups in post-test of Static balance showed that there was a significant difference between control group and all experimental groups in the retention of static balance score ($P\leq 0.05$).

The results of Bonferroni post hoc test for the pair comparison of groups in post-test showed that interaction effect between ST and focus of attention is significant in 8 groups. Also, there was no significant difference between any of the pairs in the post-test ($P\geq 0.05$).

The results of post hoc Tukey test for the pair comparison of groups showed that the effect of group was significant in retention scores of 8 groups. Also, there is no significant difference between any of the pairs in the post-test ($P\geq 0.05$).

The results of ANCOVA for the assessing of the effect of group in dynamics balance showed that the main effect of ST and focus of attention factors on the post-test scores of dynamic balance was not significant. But the interaction effect between ST and focus of attention factors was significant ($P\leq 0.05$).

The results of ANOVA test related to the retention of dynamics balance have been significant so post hoc Tukey test was used for the pair comparison of groups in the retention scores.

The results of Bonferroni post hoc test between groups in the post-test score of dynamics balance showed that there is a significant difference between control group and all experimental groups in dynamics balance ($P\leq 0.05$).

The results of post hoc Tukey test between groups in the post-test score of dynamics balance showed that there is a significant difference between control group and experimental groups (2), (3), (4), (6), (7), and (8) ($P\leq 0.05$) in dynamics balance. But there is no significant difference between control group and experimental group (5) in the dynamics balance ($P\geq 0.05$).

The results of Bonferroni post hoc test for the pair comparison of groups in the post-test showed that there is a significant difference between two pair experimental groups (2-3) in favor of group (3), two pair experimental groups (3-8) in favor of group (8), and two pair experimental groups (5-8) in favor of group (8) ($P\leq 0.05$). But there is no significant difference between other pair groups ($P\geq 0.05$).

The results of post hoc Tukey test for the pair comparison of groups in the post-test showed that there is a significant difference between two pair experimental groups (2-3) in favor of group (3), two pair experimental groups (2-5) in favor of group (2), two pair experimental groups (3-4) in favor of group (3), two pair experimental groups (3-6) in favor of group (6), two pair experimental groups (3-8) in favor of group (8), two pair experimental groups (4-5) in favor of group (4), two pair experimental groups (5-6) in favor of group (6), and two pair experimental groups (5-8) in favor of group (8) ($P\leq 0.05$).

Discussion and conclusion

The purpose of this study was to examine the effects and sustainability of self-talk and focus of attention with an 8-week training program on the balance in educable mentally-retarded female students (7-15 years old). The results of this study showed that the effects of instructional and motivational ST and internal and external focus of attention was significant in comparison of control group in post-test and retention scores of statistic balance. These findings are consistent with the findings of Tod, (2009); Cutton, (2007); Stamou, (2007); Hatzigeorgiadis, (2007); Chroni, (2007) Hardy, (2005); Theodorakis, (2000); Samia and Shaheen (2010); and Boswell's (1991,) study. These studies examined respectively the effects of instructional and motivational ST on the vertical jump, the effects of ST and augmented feedback on learning the tennis forehand, the effect of ST on the penalty execution in goal ball, the moderating effect of self-talk functions, function and preferences of motivational and instructional ST for adolescent basketball players, the effect of motivational and instructional ST on pmpo improving Motor Performance, study The effect of self-talk on the penalty execution in goal ball, and Comparison of tow methods of improving dynamic balance of mentally retarded children.

Also, these findings are consistent with the results of Hatzigeorgiadis, (2007); Stamou, study (2007) that they stated the motivational ST can improve the penalty execution in goal ball; and Edwards, (2008) study that they studied the effects of ST on vertical jump performance and kinematics in male rugby union Players and expressed. But these results are conflict with the results of the results of Wulf, (2004) study that showed an internal focus of attention decreased the performance. The lack of this consistent can be due to the subjects' type (educable mentally-retarded female students who has a special condition) and use of internal ST intervention in this study. In addition, these findings are consistent with the results of Chiviacowsky, (2010) study that they stated an external focus of attention can enhance balance learning in older adults; Wulf, (2009) that expressed external focus instructions can reduce postural instability in individuals With Parkinson disease; and Landers, (2004) study hat they expressed an external focus of attention can increase attenuates balance impairment in patients with Parkinson's disease who had a fall history. The results of this study showed hat there is no significant difference between any of the pairs in the post-test and retention test. The reviewed literature showed no similar study in this part. It seems that the individuals' performance level can improve in static balance with the presenting of ST and focus of attention in their training programs. But the special type of program has not Superiority than other groups. The results of this study showed that there is a significant difference between the effects of different programs of ST and focus of attention on the performance of dynamic balance in post-test and retention test. This finding is consistent with the results of Samia and Shaheen (2010) and Boswell's (1991) study. The mentally-retarded people have lower and weaker performance than their peers in the starting and movement execution, reaction time, and movement time. They walk unbalance and unstable that it show their poor coordination. Moreover their attention and the accuracy problems lead to the disorder in the perception spatial relationships, orientation, remember, correct diagnosis, learning and shaping concepts. Carmeli, (2008) study showed that the mild mentally-retarded people have lower scores than normal people in perceptual- motor tests due to the disorder in the integration of sensory and motor information and their balance state is more unstable than healthy individuals. ST as an important cognitive strategy is very effective for improvement of performance and the increase inner factors such as concentration, self-confidence, and relaxation feeling. The results of Theodorakis, (2000) study showed that when the task requires fine motor movements, an instructional ST strategy is more effective than motivational ST due to the concentration on technical aspects of performance. ST is effective in the individuals' capacity of focusing of attention (Perkos, 2002; Mallet and Hanrahan, 1997). Also, attention is a cognitive prerequisite that it plays an important role in the successful sports performance. There are two types of focus of attention in sports activities: a. wide and narrow (in terms of width) b. internal and external focus of attention (in terms of direction). If attention is one of the most important effective limitations on human's learning and performance, the focusing of it will be a method to increase efficiency and learning. The results of studies showed that the performer's focus of attention plays an important role in the learning and performance of motor skills. There are some studies that show external focus of attention is affective on the improvement of balance and postural control. Wulf, (2001, 2007) stated that individuals try to consciously control their movements when they are asked to adopt internal focus instructions. In contrast, the concentration on the effects of movement or adopting of external focus of attention instructions allows automatic and unconscious processes to control movement. So, this leads to more effective performance. The superiority of focus of attention is assigned to the performer's more use of automated processes. The results of this study showed that the mentally-retarded children can improve their balance with special exercises and organized activities and modify their movements and over come their disability. The mentally-retarded students' static balance improved significantly after an 8-week training program along with self-talk and focus of attention in this study. Also the dynamic balance improved significantly with focusing of internal and external attention in an 8-week training program than other dynamic balance training along with ST and focus of attention types in this study. The mentally-retarded students needed more frequent trainings and tests due to their

high defects in the postural control mechanism so that it was essential to perform many times the desired movement to achieve the correct execution of movement. Low accuracy was more visible in dynamic balance. The lack of this accuracy may be due to these individuals' special less attention and their postural abnormalities (Bow and X Legs, obesity, and physical disability). In addition, the mentally-retarded students' static and dynamic balance improves by balance trainings along with ST and focus of attention types in this study. According to the results of this study that those showed the trainings can affect positively on the educable mentally-retarded students' balance so it is essential that we encourage these students to perform these types of trainings. It is recommended that these activities to be considered in the educable mentally-retarded students' daily agenda. Also, Practitioners, teachers, and coaches can use a balance trainings period along with self-talk and focus of attention types as a strategy to improve balance in the mentally-retarded people.

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