

Effect Sizes of Behavioral Interventions for Turkish Students with Autism*

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Suggested Citation:

Sucuoglu, B., & Demir, S. (2012). Effect sizes of behavioral interventions for Turkish students with autism. *Egitim Arastirmalari - Eurasian Journal of Educational Research*, 48, 21-38.

Abstract

Problem statement: Two of the techniques used in the meta-analysis of single-case research are calculating the percentage of nonoverlapping data (PND) and the percentage of data points that exceed the median of the baseline phase (PEM). The PND is a nonparametric approach in which the researcher calculates the percentage of data points in the treatment phase that exceed the highest point of the baseline phase's distribution (or the lowest point if the targeted behavior is a problem behavior to be reduced). Even though PND can be calculated easily, it has a disadvantage if there is even one data point in the baseline phase over the top or below the bottom level, the PND score for that treatment phase is calculated as zero. Calculating the PEM was introduced in order to overcome this disadvantage. In this approach the effect size is calculated by finding the median of the baseline phase and drawing a horizontal line from this point through the intervention phase and then determining the percentage of data points over this line (or below this line for the problem behaviors).

* This paper was presented at the 20th National Special Education Conference held in Gaziantep, Turkey 21-23 October, 2010.

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Purpose of study: The purpose of this study was to investigate the effectiveness of the intervention studies that used single-subject design and targeted children and individuals with autism in Turkey.

Methods: Researchers reviewed studies conducted from 1990 to 2010 and calculated the PND and PEM scores for the selected studies. The researchers selected dissertations or studies that were published in peer reviewed journals that included intervention methods to teach skills/behaviors or reduce problem behaviors. Five articles, seven master's theses, and four doctoral dissertations were included.

Findings and results: The mean effect sizes for the 14 studies were .85 for PND and .90 for PEM. The most effective intervention methods for teaching skills/behaviors and reducing problem behaviors are listed.

Conclusions and recommendations: The results of this study are discussed in terms of findings, the characteristics and limitations of the intervention methods and the characteristics of the study groups.

Keywords: Autism, effect size, intervention, single-subject design

Autism is a complex and life-long developmental disability that can affect individuals in different ways and to different degrees (Wall, 2004). In order to diagnose the symptoms of autism in general terms, the following three areas are assessed: a) language and communication disorders, lacking symbolic play and imagination; b) problems in social relationships and social interactions; and c) repetitive, ritualized and stereotypical behaviors, and limited interests (Amerikan Psikiyatri Birliği, 2001; Korkmaz, 2005). Individuals with autism have complex and diverse characteristics; therefore they need intervention programs that are developmentally appropriate and effective in order to support multiple areas of development (Prizant & Rubin, 1999). Moreover, experts and teachers emphasize that they must be provided with individualized and efficacious strategies to help these individuals benefit from education (Lee, Simpson, & Shogren, 2007). On the other hand, intervention methods have been developed for teaching new skills and changing the problem behaviors of children with autism; however, the debates and arguments are still continuing over which strategies are most effective due to the controversial intervention treatments used in the field. Therefore, the literature strongly emphasized the need to identify intervention methods that are more effective for children with autism.

For the past three decades, the number of studies conducted with children and adolescents with autism in Turkey has increased. In addition, various intervention techniques—promising to parents of children and adolescents with autism but lacking scientific evidence such as dolphin therapy and sensory integration—are being used in several special education institutions. On the other hand, university special education units prefer applied behavior analysis techniques, while graduate

research studies prefer single-subject research designs that make it possible to work with one or more subjects and examine the effects of an intervention on subjects' behaviors separately (Kırcaali-İftar & Tekin, 1997). However, the evidence regarding effectiveness or the effect sizes of these studies is lacking.

The effect size is a statistical score that shows the effect of the independent variable on the dependent variable, and it can take values from zero to one (Büyüköztürk, Bökeoğlu, & Köklü, 2008). Researchers have been trying to develop acceptable statistical methods to investigate the effect sizes of intervention techniques using single-subject research designs (Wolery, Busick, Reichow, & Barton, 2010). Various meta-analysis studies have used several techniques such as mean baseline reduction, percentage of zero data, and regression based *d*-statistics in order to objectively and quantitatively determine the findings of single-subject experimental designs in which the data are shown graphically (Allison & Gorman, 1993; Skiba, Casey, & Center, 1985-1986 as cited in Ma, 2009). However, the disadvantages of these techniques, such as the difficulty in calculating the effect sizes and the occasional information loss while using these techniques, are being discussed as current issues. Mastropieri and Scruggs (1985-1986) suggested using the percentage of nonoverlapping data (PND) to calculate the effect sizes of intervention methods used in single-subject experimental designs, and they accepted the PND scores as an indicator of the effect sizes of the studies that examine the efficacy of early intervention on socially withdrawn children. The existent literature shows research findings that demonstrate that the PND, when implemented correctly, is as effective as any other approach to conducting a meta-analysis of single-subject experimental designs (Campbell, 2003, 2004; Olive & Smith, 2005). The PND approach has the advantages of being easily calculated and its findings can be easily interpreted quantitatively while also being criticized in some points (Preston & Carter, 2009). For example, Ma (2009) stated that if there are data points in the baseline phase over the top or below the bottom level of the data points in the intervention phase, the PND score for that treatment phase is lower than expected, meaning that the intervention is interpreted as ineffective. Therefore, in order to eliminate the disadvantages of the PND, Ma (2006) introduced calculating the percentage of data points exceeding the median of baseline phase (PEM). Even though there is evidence that the correlation between researcher judgment and the PEM is higher than the PND (Ma, 2006), it has been seen that the PND approach is more widely used than the PEM approach. On the other hand, Preston and Carter (2009) found that it is important to calculate the effect sizes of intervention methods conducted by single-subject experimental designs with more than one approach, and the scores found using these two approaches should match each other. The PND and PEM scores can be calculated for any single-case design if there are data points in the baseline and treatment phases.

Review studies of treatment methods used with children with autism try to determine the most effective intervention methods. Campbell (2003) examined the effects of behavioral techniques on problem behaviors by conducting a meta-analysis and he found no difference between the efficacies of using aversive stimulus, positive methods, these two methods together or extinction on the problem behaviors of

children with autism. He determined that all four behavioral strategies were significantly effective in reducing inappropriate behaviors of individuals with autism. Another meta-analysis study calculated the effect sizes of 11 studies focusing on self-management of learners with autism using the PND approach. This study also compared the impact of intervention programs based on variables such as instruction materials, participants characteristics, intervention characteristics, target behaviors (positive or negative), and type of trainers (Lee et al., 2007). This study calculated 78 PND scores and the mean effect size for self-management intervention programs was .81, meaning that these programs were generally effective in terms of Scruggs and Mastropieri's criteria (1998).

Ma (2009) reviewed 163 studies using the PEM approach and examined the effectiveness of intervention methods such as systematic desensitization, self-control, instruction, usage of positive reinforcement and punishment as well as use of preferred reinforcement on the behaviors of individuals with autism. He calculated 1502 effect sizes and found the mean effect size of six methods (systematic desensitization, priming, self-control, training, positive reinforcement and punishment, and presenting preferential activities or reinforcers) to reduce problem behaviors was more than .90. In addition, he stated the interventions were more effective on social behaviors, language skills, and attention of individuals with autism (the effect sizes were larger than .90), and the most difficult behavior to teach individuals with autism was taking the perspective of others (the effect size was .67). Recently, single-subject experimental designs have been used especially in studies targeting children and adolescents with autism in Turkey (e.g., Akmanoğlu, 2008; Altunel, 2007; Ardiç, 2008; Çuhadar, 2008; Kurt, 2006; Ülke-Kürkçüoğlu, 2007) that investigated the impact of intervention methods on these children's behaviors. Examining these research studies, it can be seen that researchers have used various methods to decrease inappropriate behaviors and increase appropriate behaviors. However, Turkish literature has not investigated the findings indicating the effectiveness or effect sizes of these methods. On this account, it is important to determine effective intervention methods to increase positive behaviors and reduce problem behaviors in children with autism. It is also essential to assess the power of the findings obtained from more than one study. Therefore, the purpose of this study was to assess the effect sizes of intervention methods used with children and individuals with autism conducted by using single-subject experimental research from 1990 to 2010 in Turkey, by calculating the PND and PEM values.

Method

Identification and Selection of Studies

Published articles, unpublished master's theses and doctoral dissertations were reviewed through online data bases of the libraries of the universities and the Documentation Center of Higher Education Council in order to identify the single-subject studies of individuals with autism. These searches used keywords such as autism, autism spectrum disorders, autistic disorder, single-subject design, and meta-

analysis. The following criteria were determined to select the studies: (1) the intervention was conducted with children and adolescents with autism; (2) the study was either a master's thesis, a doctoral dissertation or an article published in a peer reviewed journal; (3) there were data points in the baseline and treatment phases and there was no gap between the baseline and the treatment level; (4) the study data were graphically represented (Mastropieri & Scruggs, 1985-1986); and (5) there were more than three data points in both the baseline and the treatment phases (Wolery et al., 2010). After identifying the studies, five articles, eight master's theses, and four doctoral dissertations focusing on children and adolescents with autism from 1990 to 2010 were selected. One of the master's theses was excluded from this study because the graphical representation showed only the last three data points of the treatment phase (Göriş, 2006). In addition, two other master's theses in which a specific intervention method was not used were also excluded from this review (Ardıç, 2008; Yazkaç, 2001). At the end of the selection procedure, a total of 14 single-subject studies examining the effectiveness of intervention strategies on the behaviors of individuals with autism were included. Lipsey and Wilson (2001) emphasized that even if many studies about the same constructs are needed to conduct a meta-analysis, if the studies that include the same ideas and relationships and the results can be compared and organized in comparable forms of statistics, it is possible to conduct a meta-analysis. Therefore, in this study, although there were a limited number of single-subject studies including individuals with autism in Turkey, a meta-analysis was conducted and the effect sizes of the intervention strategies used in these research studies were calculated.

In nine of the studies, a multiple probe design was used (Akmanoğlu, 2008; Akmanoğlu & Batu, 2004; Altunel, 2007; Canay, 2003; Çuhadar, 2008; Doğru, Önal, & Bek, 2007; Kanpolat, 2008; Tekin-İftar, 2008; Yılmaz, Birkan, Konukman, & Erkan, 2005). One of the remaining studies used an adapted alternating treatment design (Kurt, 2006) and another used a multiple baseline design across behaviors (Birkan, 1999). One of the remaining studies was conducted with a multi-element treatment design (A-B-A-C-A-BC) (Ülke-Kürkçüoğlu, 2007) and another one was conducted with A-B-A-B design (Esirgemez, 1999). The last study was conducted with an A-B design (Gültekin, 1999). The studies in this review were categorized in terms of their independent variables (intervention strategies). The independent variables of the studies reviewed here are errorless teaching methods (simultaneous prompting, constant time delay, graduated guidance, most to least promoting, adapting antecedent prompts), direct teaching, teaching activity schedules, and offering choice opportunities. The dependent variables of the studies, or the behaviors to be changed using intervention programs, are protecting oneself from the lures of strangers, community and leisure skills, identifying items of clothing that are named and presented by computers, shopping, answering questions, balance-wheeled bicycle riding, task engagement and self stimulatory behaviors, pointing to numerals that are named, following instructions, aquatic play skills, and inappropriate behaviors (noncompliance and walking around). Table 1 presents the summaries of the research studies of children and adolescents with autism.

Table 1
Summary of the Studies

Authors	# of subjects	Diagnosis	Ages	Research Design	M\G*	Dependent variables
Akmanoğlu (2008)	4	Autism	6-11	Multiple probe design across subjects	M\G	Protecting oneself from the lures of strangers
Çuhadar (2008)	3	Autism	4-6	Multiple probe design with probe conditions across subjects	M\G	Engagement in activities, leisure skills (hitting pins, toy building using bricks, sticking Mr. Potato Man)
Kanpolat (2008)	3	Autism	8-12	Multiple probe design across subjects	M\G	Identifying items of clothing that are named and presented by computers
Tekin-Iftar (2008)	3	Autism, mental retardation	7-9	Multiple probe design with probe conditions across behaviors	M\G	Community skills (shopping)
Altunel (2007)	3	Autism	5-7	Multiple probe design with probe conditions across behaviors	M\G	Answering questions (where, when, and what happens) verbally
Doğru et al. (2007)	3	Autism	3-6	Multiple probe design with probe conditions across subjects	M\G	Balance wheeled bicycle riding skill
Ulke-Kürkçüoğlu (2007)	4	Autism	5-8	Multi-element treatment design (A-B-A-C-A-BC)	-	Task engagement and self-stimulatory behaviors
Kurt (2006)	4	Autism	6-8	Adapted alternating treatment design	M	Leisure skills (taking pictures with a camera and playing CD on a CD player)
İlmaz et al. (2005)	4	Autism	7-9	Multiple probe design with probe conditions across behaviors	M\G	Aquatic play skills (aquatic kangaroo, cycling, and snake play)
Akmanoğlu & Batu (2004)	3	Autism	6-17	Multiple probe design across subjects	M\G	Pointing to numerals that are named
Canay (2003)	3	Autism	5-6	Multiple probe design with probe conditions across subjects	M\G	Following instructions
Birkan (1999)	1	Autism	4	Multiple probe design across behaviors	-	Following instructions
Esirgemez (1999)	2	Autism	-	A-B-A-B	-	Task engagement
Gültekin (1999)	2	Autism	5-8	A-B	-	Inappropriate behaviors (noncompliance, walking around) and incompatible behaviors (compliance, task engagement)

* M: maintenance, G: generalization

Calculating the Effect Sizes

This study calculated the effect sizes of each intervention strategy by using the PND and PEM approaches, but the effect sizes for generalization and maintenance phases were not calculated. For a multi-element treatment design, the effect sizes were calculated for each phase. Then, because the treatment in this design provided choices within, between, and within and between activities, it was thought that all treatment phases could be combined as “providing choice opportunities,” and the mean of all the PND and PEM scores for the treatment phases were calculated. For the reversal design, for every AB phase, the PND and PEM scores were calculated separately, and the average scores for every child and study were calculated.

The PND was calculated as Mastropieri and Scruggs (1985-1986) described. The highest data point (for the problem behaviors to be reduced the lowest point) in the baseline level was found and a horizontal line was drawn from this point through the end of the treatment level. Second, the number of data points above this line in the treatment level (or below for the problem behaviors) was divided by the number of data points in this level. The PND score results from this operation. As suggested by Scruggs, Mastropieri, Cook, and Escobar (1986), a PND score above .90 shows that the intervention is very effective, a score between .70-.90 indicates it is quite effective; scores between .50 and .69 mean it is a little effective and a score below .50 shows that the intervention is ineffective.

The PEM score for every study was calculated as Ma (2006) described, and the median of the data points in the baseline level was found. One of the limitations of the PND approach in which even though there is only one data point of zero (or 100 for the behaviors to be reduced) in the baseline level is that the PND score is also zero and the intervention that is ineffective eliminated. Then, the data points in the baseline level were ranked from the lowest to the highest. If the total number of data points in the baseline level was odd, the data point in the middle was the median. If the total number of data points was even, the average of two data points remaining in the middle of all data points was the median. Then a horizontal line was drawn from this median point through the treatment level. Later, for the behaviors to be increased, the number of data points over this line (or for the behaviors to be decreased, the number of data points below this line) was divided by the total number of data points in the treatment level. The result gives the PEM score. The PEM scores can be higher than the PND scores because a median line of the data points in the baseline level is drawn. The PEM scores are interpreted like PND scores—more than .90 means very effective, .70-.90 effective, .50-.69 a little effective and below .49 is ineffective (Ma, 2006).

In this meta-analysis, the PND and PEM scores were calculated separately for every graphical representation, participant, and intervention method. Because it would cause misconceptions to give all the effect sizes calculated, the mean of the PND and PEM scores were calculated (Lee et al., 2007) so that only one PND and one PEM score was obtained for every intervention strategy. Table 2 lists the average

effect sizes obtained for every study (or intervention method) reviewed in this meta-analysis.

Table 2

The PND and PEM Scores of the Studies' Independent Variables

Independent Variable	Study	PND	PEM
Simultaneous prompting procedure	Kanpolat (2008)	1.00	1.00
	Tekin-İftar (2008)	1.00	1.00
	Akmanoğlu & Batu (2004)	.69	.82
	Altunel (2007)	.78	.78
Constant time delay procedure	Kurt (2007)	1.00	1.00
	Yılmaz et al. (2005)	.79	.79
Graduated guidance	Akmanoğlu (2008)	.49	.49
Most to least prompting procedure	Canay (2003)	1.00	1.00
Adapting antecedent prompts procedure	Birkan (1999)	.81	.90
Direct teaching	Doğru et al. (2007)	1.00	1.00
		.98	1.00
	Esirgemez (1999)	.82	.98
	Gültekin (1999)		
Activity schedules	Çuhadar (2008)	.96	.96
Offering choice opportunities	Ülke-Kürkçüoğlu (2007)	.79	.91

Inter-coder reliability

The second author calculated 114 effect sizes for 14 studies reviewed in this study and then the first author calculated the PND and PEM scores for 30 percent of the effect sizes. Inter-coder reliability was calculated by the formula of "number of agreements on calculations/number of all the calculations X 100" (Kırcaali-İftar & Tekin, 1997). The initial inter-coder reliability was 87 percent. The disagreements between the coders were resolved by discussing the PND and PEM values until the same scores were obtained.

Results

A total of 114 effect sizes were calculated in the meta-analysis of 14 studies of children and adolescents with autism in Turkey. The average of effect sizes for all the interventions was .85 for PND and .90 for PEM (highly effective). On the other hand, the study found that offering choice opportunities was an effective strategy (Ülke-Kürkçüoğlu, 2007) to reduce self-stimulatory behaviors and increase task engagement (PND=.79, PEM=.91). In addition, parents' use of differential reinforcement of incompatible behaviors was also found to be an effective strategy for noncompliance (PND=.81, PEM=1.00) and walking around behaviors (PND=.81, PEM=1.00) of an individual with autism.

Discussion and Conclusion

The results of this meta-analysis show that the intervention methods used with children with autism are generally effective. Because the average PND and PEM scores for 14 studies (except one study) are more than .85, in terms of effect size criteria, intervention methods used with children with autism in Turkey are very effective in general (Scruggs et al., 1986; Ma, 2009). One of the outcomes of this study indicates that errorless teaching is the most widely used strategy for teaching children with autism in Turkey (Akmanoğlu, 2008; Akmanoğlu & Batu, 2004; Altunel, 2007; Birkan, 1999; Canay, 2003; Kanpolat, 2008; Kurt, 2007; Tekin-İftar, 2008; Yılmaz et al., 2005). According to the results of this meta-analysis, when the studies are reviewed without taking their dependent variables into account, the most effective strategies of errorless teaching methods are constant time delay, simultaneous prompting, most to least prompting, and adapting antecedent prompts procedures. The literature suggests that children with autism benefit from errorless teaching, and the effect sizes of these teaching methods are very high (Morse & Schuster, 2004). However, in this study, we could not examine which errorless teaching methods are more effective on which behaviors or skills of students with autism, because there are only a few studies of errorless teaching used with these students in Turkey.

The lowest effect size belongs to the graduated guidance technique of the errorless teaching methods (Akmanoğlu, 2008). When the PND and PEM scores of this strategy are taken into account, graduated guidance is ineffective in teaching children to protect themselves from the lures of strangers. However, this finding should be interpreted carefully. Since the graduated guidance technique was used in only one study with individuals with autism in Turkey, it is impossible to compare different studies of graduated guidance at this point. Also, in the treatment level of that study, there was no change in the behaviors in the desired way for a very long time. On the other hand, Akmanoğlu (2008) stated in her study that she did not come across any studies related to teaching this skill to children with autism. Future studies are needed to determine the efficacy of graduated guidance and the effectiveness of this technique on different dependent variables should be investigated.

Other effective methods include direct teaching, offering choice opportunities, and activity schedules. Previous literature suggests that the most effective intervention methods used with individuals with autism are priming, self-control, reinforcing desired behaviors and punishing undesired behaviors, and offering the child or the individual the activity or reinforcement she/he wants (Ma, 2009). As seen in Table 1, in Turkey, offering choice opportunities and activity schedules were used in only one study; therefore, future research focusing on different methods is needed to determine whether these methods are effective on various behaviors or skills of children with autism.

Ma (2006, 2009) stated that calculating PND scores to determine the efficacy of the studies may be misleading, and calculating the PEM scores is a more accurate way to identify the efficacy of an intervention method. That the PND and PEM scores are close to each other indicates that there are no outliers in the baseline level so the PND score is not calculated as low (Scruggs, Mastropieri, & Casto, 1987). Therefore, the effect sizes of the intervention methods used with individuals with autism in Turkey were calculated using both the PND and PEM approaches in this meta-analysis. The PND and PEM scores of 11 out of 14 studies were the same, while the scores were different for intervention methods such as offering choice opportunities (Ülke-Kürkçüoğlu, 2007), direct teaching (Gültekin, 1999) and simultaneous prompting procedure (Akmanoğlu & Batu, 2004). When the graphical representations of the data were examined in these studies, the data points in the baseline level varied in studies by Ülke-Kürkçüoğlu (2007) and Gültekin (1999), and some of the data points in the treatment level were zero in a study by Akmanoğlu and Batu (2004). Ma (2006, 2009) indicated that even if the treatment seems effective in the graphical representation of some studies, the PND score may show the opposite. This is evident especially when the data points in the baseline level vary, there is more than one data point in the baseline level on the floor (for behaviors to be decreased) or the ceiling (for the behaviors to be increased), and the tendencies of the data points vary (increases and decreases of the data points in the treatment level coexist).

The existing literature highlighted the importance of examining treatment integrity, and it is accepted as the prerequisite to determine the efficacy of an intervention (Preston & Carter, 2009; Wolery et al., 2010). The researchers also stated that it is important that each intervention method is carried out in the same way in every study and that treatment integrity data are collected. In this meta-analysis, treatment integrity data were lacking in only three of 14 studies (Birkan, 1999; Esirgemez, 1999; Gültekin, 1999). Treatment integrity refers to the degree to which a researcher implements what she/he intends to in an intervention or the independent variable (Peterson, Homer, & Wonderlich 1982; Yeaton & Sechrest, 1981). If no treatment integrity data is given in a study, the results and effect size of that intervention should be judged carefully.

Social validity data were missing in eight of 14 studies reviewed here (Altunel, 2007; Birkan; 1999; Canay, 2003; Dođru et al., 2007; Esirgemez, 1999; Gültekin, 1999; Kanpolat, 2008; Yılmaz et al., 2005). Social validity refers to the participants' perception of how much the effects of the intervention benefited them; it may involve

asking the participants about the importance of the purpose of the intervention, the appropriateness of the method, and the importance of the effects (Wolf, 1978). If a study lacks social validity data, it means the opinions of the individuals who participated in that study have not been examined.

In meta-analysis studies, the effect sizes of the interventions are compared in terms of independent variables and dependent variables such as age and gender of the participants, settings, or behaviors to be increased or reduced (e.g., Lee et al., 2007; Ma, 2006). In the current study, the effect sizes of the interventions are only compared in terms of independent variables because of the limited number of studies conducted with the same intervention method. The design of the study is important in calculating effect sizes. For example, reversal models can only be used with behaviors that can be reversed; that is to say, when the intervention is withdrawn, the behaviors can turn back to the levels in the baseline. However, when the intervention was withdrawn in previous research studies, the behaviors sometimes did not turn back to the levels in the baseline level (Kazdin, 1982; as cited in Lee et al., 2007). Ma (2009) suggests that the PND and PEM scores should not be calculated for the AB designs because their internal validity is low. Therefore, even though we calculated the effect size of a study in an AB design (Gültekin, 1999), the results of this study should be considered carefully (PND=.82, PEM=.98).

This meta-analysis should be considered a pilot study that examines the effect sizes of intervention methods of single-case designs used with children with autism in Turkey. Wolery and his colleagues (2010) emphasized that, in single-subject research studies, calculating effect sizes and finding a match between the effect sizes and graphical representation of the data (a match between the efficacy of the researcher's opinions and the effect size) give more accurate and valid information about the intervention method. Therefore, when the studies of single-case designs of children with autism increase in Turkey, it will be possible to compare the effectiveness of the different methods on different behaviors by calculating the effect sizes and to determine the most effective method on behaviors and skills of children with autism. In conclusion, although various intervention techniques have been used with individuals with autism in Turkey, more studies which examine their effectiveness and efficacy are needed.

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Türkiye’de Otizmli Öğrencilerle Gerçekleştirilen Davranışsal Müdahalelerin Etki Büyüklükleri

(Özet)

Problem Durumu

Tek denekli araştırma desenleri kullanılarak gerçekleştirilmiş olan çalışmaların etkililiğini değerlendirmek üzere kullanılan meta analiz yöntemlerinden birisi Örtüşmeyen Veri Yüzdesinin (ÖVY) hesaplanmasıdır. ÖVY hem birden fazla müdahalenin etki büyüklüklerini karşılaştırmak hem de herhangi bir çalışmanın etki

büyükliğini hesaplamak için kullanılabilir. Parametrik olmayan bir yaklaşım olarak kabul edilen ÖVY, başlama düzeyinin en yüksek veri noktasının üzerinde kalan müdahale aşaması veri noktalarının (uygun olmayan davranışlar azaltılmak istendiğinde başlama düzeyinin en düşük veri noktasının altında kalan veri noktaları) yüzdesidir. Araştırmacılar tarafından kolayca hesaplanabilen ÖVY'nin önemli bir dezavantajı olduğu, başlama düzeyinde en üst ya da en altta veri noktası olması durumunda ÖVY değeri sıfır olarak bulunduğu açıklanmaktadır. Bu durum, görsel veriler müdahalenin etkili olduğunu göstermesine karşın müdahalenin etkili olmadığını düşünülmesine neden olabilmektedir. Bu dezavantajın ortadan kaldırılması için müdahale yöntemlerinin etki büyüklüklerinin hesaplanmasında başlama düzeyinin ortancasını geçen veri noktaları yüzdesini (BOY) hesaplama yaklaşımının kullanılması önerilmektedir. Bu yaklaşıma göre bir araştırmanın etkililiğini hesaplamak için başlama verilerinin ortancası bulunur, bu noktadan hem başlama hem de müdahale aşamalarını içeren X eksenine paralel bir çizgi çizilir. Bu ortanca çizgisinin üzerinde kalan (uygun olmayan davranışlar için ortanca çizgisinin altında kalan) veri noktalarının yüzdesi hesaplanarak BOY, diğer bir deyişle etki büyüklüğü hesaplanmaktadır. Etki büyüklüğü .90'ın üzerinde olan ÖVY ve BOY değerleri müdahalenin çok etkili, .70-.90 arası orta derecede etkili, .50-.69 arası çok az etkili olduğunu .50'nin altı ise etkisiz müdahale olduğunu göstermektedir.

Araştırmanın Amacı

Bu çalışmanın amacı Türkiye'de 1990-2010 yılları arasında otizmlili çocuk ve bireylerle gerçekleştirilmiş tek denekli desenlere dayalı müdahale araştırmalarının etkililiklerini ÖVY ve BOY yaklaşımlarıyla incelemektir.

Araştırmanın Yöntemi

1990-2010 yılları arasında Türkiye'de gerçekleştirilen makaleler ve tezler incelenerek otizmlili bireylere beceri/davranış kazandırmayı ve uygun olmayan davranışları azaltmayı amaçlayan müdahale yöntemlerinin kullanıldığı tek denekli araştırmalar belirlenmiştir. Belirlenen araştırmalarda kullanılan müdahale yöntemlerinin etki büyüklükleri ÖVY ve BOY yaklaşımları kullanılarak analiz edilmiştir. Buna göre otizmlili öğrencilerle tek denekli araştırma desenleri kullanılarak yapıldığı belirlenen beş makale, sekiz yüksek lisans tezi ve dört doktora tezinden bu çalışma kriterlerine uygun olmadığı belirlenen üç çalışma meta analiz dışı bırakılarak toplamda 14 çalışma incelenmiştir.

Araştırmanın Bulguları

Bu çalışmada, otizmlili çocuk ve gençlere farklı müdahale yöntemlerinin uygulandığı 14 çalışmanın analizinde, araştırmalar bağımsız değişkenlere (kullanılan öğretim/müdahale yöntemlerine) göre gruplanmış; 12 çalışmada olumlu davranışları artırma, iki çalışmada ise problem davranışları azaltma yöntemlerinin kullanıldığı belirlenmiştir. On dört çalışma için toplam 114 etki büyüklüğü hesaplanmıştır. Hesaplanan 114 etki büyüklüğünün %30'u için kodlayıcılar arası güvenilirlik incelenmiştir. Kodlayıcılar arası güvenilirlik katsayısının %87 olduğu

bulunmuştur. Kodlamalardaki anlaşmazlıklar üzerinde durularak araştırmacılar arasında anlaşma sağlanuncaya kadar tartışmalar yürütülmüş ve hesaplamaların sonuçları aynı çıkıncaya kadar analizler tekrarlanmıştır. Tüm çalışmalardan elde edilen etki büyüklüklerinin genel ortalaması ÖVY için .85 ve BOY için .90 bulunmuştur. Etki büyüklükleri aralığı ÖVY ve BOY değerleri için .49-1.00 arasında değişmektedir. Analizler sonucunda 13 çalışma için ÖVY ve BOY değerlerinin oldukça yüksek, bir çalışma için bu değerlerin .49 olduğu görülmüştür. Hesaplanan ÖVY ve BOY değerlerine bakıldığı zaman, kendini uyarma davranışları ile etkinlikle ilgilenmeme davranışını azaltmak için kullanılan “seçim yapma” yönteminin ÖVY değerinin .79, BOY değerinin ise .91 olduğu görülmektedir. Problem davranışları azaltmayı hedefleyen ikinci çalışmada ise yönergeye uymama ve gezinme davranışları, “uyuşmayan davranışların ayrımlı pekiştirilmesi” ile azaltılmaya çalışılmış; bu yöntemin yönergeye karşı koyma davranışına ilişkin ÖVY değeri .81, BOY değeri 1.00 bulunurken, gezinme davranışı için ise ÖVY .80 ve BOY 1.00 olduğu bulunmuştur.

Araştırmanın Sonuçları ve Önerileri

Bu çalışmanın bulguları genel olarak otizmlili çocuklarla kullanılan öğretim/müdahale yöntemlerinin etkili olduğunu göstermektedir. On dört çalışmanın ortalama ÖVY ve BOY değerlerinin .85’den daha fazla olması, etki büyüklüğü ölçütlerine göre otizmlili çocuklara uygulanan müdahale yöntemlerinin genel olarak çok etkili olduğu şeklinde yorumlanabilir. Bu çalışma sonuçları, ülkemizde otizmlili çocukların eğitimi sürecinde en fazla yanlışsız öğretim yöntemlerinin kullanıldığını göstermiştir. Analiz sonuçları, “her araştırmada üzerinde çalışılan bağımlı değişkenler göz önüne alınmaksızın” incelendiğinde, yanlışsız öğretim yöntemleri arasında yer alan ve en etkili görülen yöntemlerin “sabit bekleme süreli öğretim, eş zamanlı ipucuyla öğretim, ipucunun giderek azaltılmasıyla öğretim, davranış öncesi ipuçlarının uyarlanmasıyla öğretim” olduğu görülmektedir. Yanlışsız öğretim yöntemlerinden olan “aşamalı yardımla öğretimin” etki büyüklüğünün en düşük olduğu görülmektedir (.49). Yanlışsız öğretim yöntemleri dışında en etkili görülen yöntemlerin doğrudan öğretim, seçim fırsatları sunma ve resimli etkinlik çizelgeleri ile sunulan öğretim süreci olduğu görülmektedir. Bu araştırma kapsamında incelenen çalışmaların 11’inde uygulama güvenilirliği verisi toplandığı, üçünde ise uygulama güvenilirliği verisinin olmadığı görülmektedir. Diğer taraftan, incelenen araştırmaların altısında sosyal geçerliğe ilişkin veri toplandığı, sekizinde ise sosyal geçerliğe ilişkin verilerin yer almadığı belirlenmiştir. Bu meta analiz çalışması ülkemizde, tek denekli çalışmaların etki büyüklüklerinin incelendiği pilot bir çalışma olarak kabul edilmelidir. Tek denekli araştırma yöntemlerinin kullanıldığı çalışmalarda, müdahale yöntemlerinin etkililiği açıklanırken etki büyüklüklerinin de hesaplanması ve grafiksel verilerle etki büyüklükleri arasında uyuma olup olmadığının belirlenmesi, bir başka deyişle, araştırmacının yöntemin etkisine ilişkin görüşü ile etki büyüklüğünün uyumu, uygulanan yöntemin etkisine ilişkin daha doğru ve geçerli bilgi vermektedir. Bu nedenle sonraki çalışmalarda, uygulanan müdahale yöntemlerinin grafiksel

analizleri yanı sıra etki büyüklüklerinin hesaplanması önemli görölmektedir. Ülkemizde otizmli çocukların eğitimi/öğretimine odaklanan tek denekli araştırma sayısı arttıkça, öğretim yöntemlerinin farklı davranışlar ya da beceriler üzerinde etkisinin belirlenmesinin ve yöntemlerin etkililiğinin karşılaştırılmasının araştırmacılar için bir gereklilik olduđu düşünölmektedir.

Anahtar Sözcükler: Otizm, etki büyüklüğü, müdahale, tek denekli araştırma desenleri