**A Validity Study of the Modified Checklist for Autism in Toddlers (M-CHAT)
on a Turkish Sample**

Thesis submitted to the
Institude for Graduate Studies in Social Sciences
in partial satisfaction of the requirements for the degree of

Master of Arts
in
Psychology

by

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2005

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ABSTRACT

The main purpose of the present study was to establish the validity of the Modified Checklist for Autism in Toddlers (M-CHAT). Eighty children representing four different groups, namely; normal development, Down syndrome, children with suspicion of autism, and children with a diagnosis of autism, were evaluated by the M-CHAT, the CHAT, the DSM-IV Autistic Disorder Criteria and the AGTE. One major finding of the study was that the M-CHAT discriminated children with autistic signs from those with no autistic signs. It successfully detected children with suspicion of autism and those with a diagnosis of autism. However, it's rate of misclassifying nonautistic children as autistic was found to be quite high. One of the two criteria of the M-CHAT (any three of the 23 items) increased the rate of these misclassifications. The other criterion (six critical items) was a better discriminator between the autistic and nonautistic children. In addition to these six critical items, item 6 (imperative pointing) was found to increase the sensitivity of the M-CHAT. In light of these findings, recommendations were made for effective screening of young children.

Key Words: M-CHAT, early screening of autism, early signs of auitsm, autism.

ÖZET

Bu çalışma 'Değiştirilmiş Erken Çocukluk Dönemi Otizm Tarama Ölçeği'nin geçerliğini saptamayı amaçlamıştır. Dört farklı gruptan oluşan 80 çocuk; normal gelişim gösteren çocuklar, Down Sendromlu çocuklar, otizm şüphesi olan çocuklar ve otizm tanısı almış çocuklar, Değiştirilmiş Erken Çocukluk Dönemi Otizm Tarama Ölçeği, Erken Çocukluk Dönemi Otizm Tarama Ölçeği, DSM-IV-TR Otistik Bozukluk Kriterleri ve AGTE üzerinden değerlendirilmiştir. Araştırmada ortaya çıkan önemli bir sonuç Değiştirilmiş Erken Çocukluk Dönemi Otizm Tarama Ölçeği'nin otistik çocukları otistik olmayan çocuklardan ayırabildiğini göstermiştir. Değiştirilmiş Erken Çocukluk Dönemi Otizm Tarama Ölçeği otizm tanısı almış ve otizm şüphesi olan çocukları başarıyla belirleyebilmiştir. Ancak otistik olmayan çocuğu otistik olarak sınıflama oranının da yüksek olduğu görülmüştür. Buna ölçeğin iki kriterinden birinin (23 maddenin herhangi üçü) yol açtığı tespit edilmiştir. Ölçeğin diğer kriterinin (6 kritik maddeden ikisi) otistik olan ve olmayan çocukları ayırmada daha başarılı olduğu ortaya çıkmıştır. Bu altı kritik maddeye ek olarak 6. maddenin (işaret parmağını kullanarak istek belirtme) Değiştirilmiş Erken Çocukluk Dönemi Otizm Tarama Ölçeği'nin duyarlılığını arttırdığı belirlenmiştir. Bu bilgiler ışığında, erken yaştaki çocukların daha sağlıklı bir biçimde taranabilmesi için çeşitli önerilerde bulunulmuştur.

Anahtar Kelimeler: M-CHAT, erken tarama, otizmin erken belirtileri, otizm.

INTRODUCTION

Autism is a physical/biological disorder of the brain that causes a lifelong developmental disability (Powers, 1989; Peeters & Gillberg, 1999; Mesibov & Shea, 2003). Kanner (1943) was the first person who described autism (Simpson & Myles, 1998; Holmes, 1997). According to Kanner's definiton, these children manifest several developmental delays during their early childhood including "a) inability to relate normally to other people and situations; b) delayed speech and language development, failure to use developed language for communication purposes; c) normal physical growth and development; d) an obsessive insistence on environmental sameness; e) an extreme fascination and preoccupation with objects; and f) stereotypic, repetitive and other self-stimulatory responses" (Simpson et al., 1998, p. 2). Currently, the most widely accepted definition of autism is in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association [APA], 1994). In the DSM-IV, the definition of autism is included under the category of 'pervasive developmental disorders (PDD)'. The criteria for autism in the DSM-IV are grouped in three major areas: qualitative impairment in social interactions, qualitative impairment in communication and restricted, repetitive and stereotypic behaviors, interests and activities. The DSM-IV criteria for autism are:

a) Qualitative impairment in social interactions: Lack of eye contact and awareness of other people, lack of appropriate peer relationships and not sharing joy and interests, lack of social and emotional reciprocity,

b) Qualitative impairment in communication: Delay or total lack of spoken language, stereotyped and repetitive usage of language, not being able to engage in conversation with other people,

c) Restricted, repetitive and stereotypic behaviors, interests and activities: Preoccupation with one restricted interest with abnormal intensity or focus, inflexible obedience to

specific nonfunctional rituals or routines, stereotyped motor mannerism, persistent

preoccupation with parts of objects (DSM-IV, American Psychiatric Association

[APA], 1994).

In the current literature, autism is considered as a spectrum (Stone et al., 1999). The

'autistic spectrum' includes individuals 'who share a triad of impaired social interacion,

communication, and imagination, associated with a rigid, repetitive pattern of behavior'

(Wing, 1996, cited in Howlin, 1998, p. 307). Therefore, in this spectrum, besides

traditionally defined autism, Asperger Syndrome, Rett Disorder, Childhood Disintegrative

Disorder (CDD) and Pervasive Developmental Disorder Not Otherwise Specified (PDD-

NOS) are also included.

Besides the impairments in autism listed in the DSM-IV criteria, stimulus

overselectivity, diminished motivation, difficulty with generalizing and attention problems are

also stated as other defects in autism (Mesibov et al., 2003; Simpson et al., 1998). As another

impairment, Hobson and Lee highlighted imitation difficulties in autism (1999). They stated

that people with autism are not successful at especially imitating self-orienting behaviors.

In autism, gross motor impairments are not frequently observed. Generally, they

crawl, walk at age-appropriate times (Filipek et al., 1999). However, mental retardation in

autism is common. For Ghazuiddin (2000), the prevalence of mental retardation in children

with autism is 75 per 100 cases.

DSM-IV gives the prevalence rate of Autistic Disorder as 2-5 cases per 10,000

individuals. In a review study by Fombonne (2003), 10 cases per 10,000 was stated as a

reasonable prevalence rate for traditionally defined autism. However, if autistic spectrum

definition is considered, Wing (1996) concludes that the prevalence rate for this spectrum

may be as high as 91 per 10,000 (cited in Howlin, 1998).

There is no defined evidence for the etiology of autism. Neurochemical causes, neurobiological findings, infectious diseases, prenatal, perinatal, neonatal factors and genetic factors are asserted as some underlying causes (Jordan, 2001). Family and twin studies indicate a genetic component as an underlying liability for autism (Rutter, Silberg, O'Connor & Simonoff, 1999), and even some candidate chromosomes have been hypothesized by some researchers (Laoritsen, Mors, Mortensen, & Ewald, 1999).

Presently, the outcomes of autism are not totally reversible (Mesibov et al., 2003), indicating that there is not a cure for autism yet. As interventions for autism, various kinds of approaches are applied such as dietary interventions, biomedical interventions and special education (Hamilton, 2000; Howlin, 1998). Howlin (1998) concluded that there is not a single kind of treatment which is effective for all kinds of children and all families. Instead, she stated that interventions need to be designed as appropriate for each child's developmental needs.

Currently, it is well known that early intervention with children with autism is effective (Rogers, 1996). Together with the research about early intervention with these children, some research about early identification of autism has begun to appear in the literature. Several studies were carried out in order to detect early indicators. Signs of autism occurring before 36 months of age are accepted as early indicators for autism (Young, Brewer, & Pattison, 2003). Reliabiliy and stability of the diagnosis of autism before 36 months of age is also discussed in the literature. Baron-Cohen et al. (2000) detected disabilities in "joint attention and pretend play" areas in a group of children at risk for autism. They focused on social behaviors in order to detect autism before 36 months of age. A review study by Charman and Baird (2002) indicated that at 2 years of age, repetitive and stereotyped behaviors may be seen less often compared to the 4 – 5 years of age. These authors concluded that compared to repetitive and stereotyped behaviors, social and communicative difficulties

are higher indicators for autism. Baranek (1999) used video analysis of sensorimotor and social behaviors of autistic children at 9 – 12 months of age as a retrospective analysis. Besides social behaviors such as "poor visual orientation/attention, prompted/delayed response to name", sensory-motor abnormalities such as "excessive mouthing of objects and social touch aversions" are also found as early indicators of autism. 'Delayed response to name' was also found in another retrospective video analysis of autistic children. Werner et al. (2000) detected "delayed response to name" in children at 8 to 10 months of age (cited in Freeman et al., 2002, p.3).

Stone et al. (1999) studied the reliability and stability of diagnosis of autism in children younger than three years of age. Their results revealed high inter-rater reliability and high stability for the diagnosis of autism before three years of age. However, the stability of the diagnosis of pervasive developmental disorder- not otherwise specified (PDD-NOS) was lower than the stability of the diagnosis of autism. Cox et al. (1999) investigated the reliability and stability of the scores on the Autism Diagnostic Interview- Revised (ADI-R) diagnosed at 20 and 42 months of age. Results revealed that the diagnosis of autism is stable and sensitive from 20 months to 42 months. Similar to the results of the study conducted by Stone et al. (1999), the stability and sensitivity were lower for the diagnosis of Asperger Syndrome and Pervasive Developmental Disorder- not otherwise specified (PDD-NOS). Moore's study (2003) yielded similar results. Diagnosis of autism at age 2 was found to be stable and reliable. For specific diagnosis, results were less reliable paralel to the studies of Stone et al. (1999) and Cox et al. (1999).

For children who are at risk for autism under 3 years of age, screening is a method to detect early indicators of autism and pervasive developmental disorders. Considering the Report of Quality Standards Subcommittee of the American Academy of Neurology and the Child Neurology Society (2000), screening is the necessary step before detecting absolute

indicators for diagnosis and evaluation of autism. Baird and colleagues (2001) defined screening as 'prospective identification of unrecognised disorder by application of specific tests or examinations' (p. 468). For Watson and coworkers (2003), the purpose of screening is 'to identify those children who are at risk for autism and will need to undergo more focused diagnostic procedures'(p. 207). Some tools are available for screening autism. The Subcommittie of the American Academy of Neurology and the Child Neurology Society (2000) mentioned the Checklist for Autism in Toddlers (CHAT), the Autism Screening Questionnaire, the Pervasive Disorders Screening Test-II (PDDST-II) and the Modified Checklist for Autism in Toddlers (M-CHAT) as screening tools for autism. According to the report of the Subcommittee of the American Academy of Neurology and the Child Neurology Society (2000), only the CHAT and the Autism Screening Questionnaire were validated on a large sample of American children. Studies for the other two are still being carried out.

Screening requires two different levels of investigation (Filipek et al., 1999). The first type of screening is called Level I screening and "it should be performed on all children and involves identifying children at risk for any type of atypical development" (Filipek et al., 1999, p. 449). Level II screening "involves a more in-depth investigation of children already identified to be at risk for a developmental disorder, differentiates autism from other kinds of developmental difficulties, and includes evaluations by autism specialists aimed at determining the best means of intervention based on the child's profile of strengths and weaknesses" (Filipek et al., 1999, p. 449). For Filipek and coworkers, screening should be applied to 'the child whose parents are concerned about speech and language delay; the child with a suspected problem in social development or behavior; the younger sibling of and older child with known or suspected autism'(p.452).

Parental reports are a crucial part of the screening process and are used in some well-known screening instruments like the CHAT, the Modified Checklist for Autism in Toddlers (M-CHAT) and the Autism Diagnostic Interview-Revised (ADI-R) (Cox et al., 1999; Robins et al., 2001; Baron-Cohen et al., 1992). De Giacomo and Fombonne (1998) found that the most common parental concerns are about speech and developmental problems of their child. The next concern is about abnormal socio-emotional response, any medical problem or any delay in developmental milestone (De Giacomo & Fombonne, 1998). Glascoe (1997) asserted that parents'concerns can be used as a screening tool.   In line with Galscoe's views, Erden, Ertem, & Akçakın (2003) found that parents are the first people who detect the developmental problems in their children even more than pediatricians in Turkey. Parents' concerns about developmental delays in their children in several areas such as language, motor, global/cognitive development, medical problems especially hearing and school skills were found as highly sensitive predictors of developmental problems of children who are 4 years old and older (Glascoe, 1997). Glascoe concluded that 'combined parental concern with a standardized parental report is effective also for early behavioral and developmental screening' (cited in Beauchesne et al., 2004, p. 64). The study of Young et al. (2003) revealed similar results. These authors tried to identify early signs of autistic disorder based on parental reports. Results revealed that 95 % of the respondents had noticed abnormalities in social development before the age of two. Furthermore, the concerns of the parents about the developmental level of their child were similar to early indicators of autism mentioned in previous studies. These areas were related to social awareness such as empoverished shared enjoyment and poor eye contact, little interest in play and peer and unusual preoccupations (Young et al., 2003).

The M-CHAT as a Screening Instrument for Autism

The M-CHAT follows the logic that parental concerns are strong indicators in terms of early detection of autism in toddlers. It is a screening instrument totally based on parental report about child's skills and behaviors. The major difference between the CHAT and the M-CHAT is that the CHAT combines observations of the clinician and parental report whereas the M-CHAT is only based on parental report. This difference together with other differences between two questionnaires created arguments between the creators of the CHAT and the M-CHAT. Baron-Cohen et al. (2001) asserted that although parents may assert the presence of an indicator, during the clinical observation of the child, a reverse condition can be observed by clinicians and vice versa. Based on the research done by Glascoe et al. (1997), Robins et al. (2001) stated that parental concerns are found to be justified enough. Arguments between the two groups of researchers led to contraversies in other areas related to the utility of these two screening tools. First, Charman et al. (2001) mentioned that during the initial study of the M-CHAT, a clinical sample was used and they asserted that this is against to the purpose of screening which is to detect an unrecognised disorder on a population sample. Robins et al. (2001) replied that their study on a population sample, which will enable them to compare the two samples, is on process. Another issue of argument is the age of screening. The CHAT has a sample of children around 18 months of age, while the M-CHAT has a sample of children around 18 months of age and 24 months of age. Robins et al. (2001) aimed to detect children who possibly regressed after 18 months of age. Charman et al. (2001) indicated that in the follow-up study of the CHAT results did not reveal significant regression after 18 months of age.

Young et al. (2003) indicated that parents reported a significant delay between the onset of disorder and the age at which a diagnosis was made. They added that this delay has great implications in terms of intervention as it leads to loss of critical intervention time.

These arguments have prompted the present study which aimed to establish the validity of the M-CHAT on a sample of Turkish children. Studies of the reliability and validity of screening tools like the M-CHAT will expedite the detection of autistic or autistic like symptoms, and will advance interventions for these children. This study may also contribute to increment in expertise about autism among Turkish professionals. A screening tool can be applied to related clinical and population samples. Erden et al. (2003) found that pediatricians in Turkey could detect only the 4.1 % of developmental problems in children. Therefore, the use of the M-CHAT in different settings by various professionals such as psychologists, psychiatrists or pediatricians may increase awareness about autism among these professionals.

The present study aimed to establish the validity of the M-CHAT by examining its accuracy in discriminating children with autistic signs from those with no autistic signs. For this purpose, children with autism (one group with the autism diagnosis and one group with suspicion of autism), as well as children with another developmental disability, Down syndrome, and children with normal development were included in the sample. The reason for dividing the autistic sample into two groups was to further assess the sensitivity of the M-CHAT in detecting autism.

On these four groups of children, this study aimed to explore the following questions:

1. Does the M-CHAT discriminate children with autistic signs (children with suspicion of autism and children with the diagnosis of autism) from those with no autistic signs (children with normal development and children with Down syndrome)?

2. A parallel study was carried out by Tetik-Kabil (2005, unpublished) to explore the validity of the Checklist for Autism in Toddlers (CHAT) by using the same sample. Do children who fail the M-CHAT also fail the CHAT?

3. Do the children who fail the M-CHAT also fail the DSM-IV Autistic

    Disorder criteria?

4. a) Does the M-CHAT discriminate children with developmental delays (as

    determined by a developmental assessment measure) from normally

    developing children?

    b) In the developmentally delayed group, do the M-CHAT results differ for

    children with autism from children with Down syndrome?

5. How do the two M-CHAT criteria (to fail two of the six critical items or any

    three of the overall 23 items) differ for children with and without autism?

METHOD

Sample

A total of 80 children, representing four groups, with an age range of 18-to-72 months were assessed for this study. Their mothers served as informants. The first group consisted of 20 children who had already received the diagnosis of autism. Their ages ranged between 3 to 6 years. The second group consisted of 20 children who had early indicators of autism and were younger than 3 years of age. None of the children in both groups had received any special education prior to these administrations that could have enhanced their development. Since both autism and PDD-NOS diagnosis are under the umbrella of Autistic Spectrum Disorders, the children diagnosed as PDD-NOS were also included in the sample, besides the ones diagnosed as autistic. The third group consisted of 20 children with Down syndrome, and the fourth group consisted of 20 normally developing children.

Because the developmental screening scale used in this study, Ankara Developmental Screening Inventory (Ankara Gelişim Tarama Envanteri - AGTE), detected developmental delays in 5 children in the normal group, these 5 children were excluded from the sample. Thus, 75 children composed the final sample of this study. Table 1 presents the gender and age distributions of these children.

Table 1: Gender and Age Distributions of the Four Groups of Children

	Normally developing children (n=15)	Children with Down Syndrome (n= 20)	Children with early indicators of autism (n=20)	Children with autism (n=20)
Male	11	12	17	18
Female	4	8	3	2
Mean Age (in months) (SD)	36,80 (14,19)	36,65 (14,36)	29,10 (5,60)	46,75 (8,71)
Minimum Age (in months)	19	18	16	36
Maximum Age (in months)	64	71	35	70

Children with Down syndrome and children with the diagnosis or early indicators of autism were recruited from a group who consulted to the following hospitals and foundations: Türkiye Otizm Erken Tanı ve Eğitim Vakfı (TOHUM), Türkiye Otistiklere Destek ve Eğitim Vakfı (TODEV), Türkiye Dost Yaşam Vakfı, Güzel Günler Sağlık Hizmetleri, İstanbul Zihinsel Engelliler Vakfı (İZEV). All children with a diagnosis or early indicators of autism were sent to the researcher by a child psychiatrist or a neurologist. Normally developing children and their parents were recruited from the Kurtuluş and Mecidiyeköy neighbourhoods.

The age range for the M-CHAT was 18 months to 30 months in the original study of the M-CHAT (Robins et al., 2001). However, since parents rarely consult professionals until their children reach a certain stage in autism, usually after three years of age, 18-30 months age range would have seriously limited the sample size. In order to reach more children, the

upper age limit was extended to 6 years of age. The lower age limit was 18 months of age as in the original research of the M-CHAT. Children older than 72 months were not included in the study, since after 6 years of age children usually attend some sort of special education. Children with epileptic seizures were eliminated from the sample.

The age range for children with normal development and with Down syndrome was from 18 months to 6 years old. In these groups, an attempt was made to balance the number of children younger and older than 3 years of age. Children with epileptic seizures were again eliminated. For the children with Down syndrome special education background was not considered. Since the indicators of autism and indicators of Down syndrome are different, any possible effect of the special education that might have led to improvement in this group was not expected to affect results of this research considerably.

Instruments

The Modified Checklist for Autism in Toddlers (M-CHAT) and The Checklist for Autism in Toddlers (CHAT)

The Modified Checklist for Autism in Toddlers (M-CHAT) was developed by Robins, Fein, Barton, and Green in 2001. The M-CHAT was developed as an extension of the Checklist for Autism in Toddlers (CHAT) that was developed by Baron-Cohen, Allen, & Gillberg in 1992. The CHAT aims to detect autism in children at 18 months. It includes two sections: the first one consists of parents' reports related to the child's current behavior and skills, the second section consists of the interaction of the clinician with the child and clinical observation of the child. There are 9 questions in the first section, and 5 questions in the second section. The questionnaire is answered in a 'yes' or 'no' format by parents and clinicians. The questions in the CHAT are related to ten areas of development. Six of these areas are related to the early signs of autism and the other four areas are related to

developmental areas that are reported as normal in autistic children. The CHAT focuses on two major early indicators of autism which are prodeclarative pointing and pretend play (Baron-Cohen, Allen, & Gillberg, 1992) (Appendix B).

Similar to the CHAT, the M-CHAT is a screening tool which aims to detect autism/PDD at a very young age. One difference between the CHAT and the M-CHAT is the maximum screening age. The maximum screening age for the M-CHAT is 24 months whereas for the CHAT it is 18 months of age. Secondly, although the CHAT includes both parents' and clinicians' evaluations, the M-CHAT relies only on parents' reports of their children's current skills and behaviors. The M-CHAT includes 23 questions. Its first nine items were directly taken from the CHAT. The other 14 items were generated by the authors in order to 'broaden the checklist symptoms to identify a greater range of Pervasive Developmental Disorders and to compensate for the elimination of the home health visitors observations' (Robins, Fein, Barton, & Green, 2001, p.134). Some of the questions are related to early signs of autism and other questions are related to developmental areas that are reported as normal in autistic children (Robins et al., 2001). The questionnaire is answered in a 'yes' or 'no' format.

Two groups of children and their families participated in the original study of the M-CHAT (Robins et al., 2001). The first group was a nonselected group of well-baby checkup applicants. The second group was the high-risk group children who were directed through early intervention services (Table 2).

Table 2: Demographic Information for the Initial Study of the M-CHAT

Time 1	Total Number	Male	Female	Unknown Sex
Non-selected Group (ages in months) (18 – 25)	1122	570	531	21
High-risk Group (ages in months) (18 – 30)	171	123	46	2

Based on their M-CHAT scores, children who were found at risk for autism were evaluated developmentally. The following measures were administered for the developmental evaluation of the children: The Vineland Adaptive Behavior Scales, the Bayley Scales of Infant Development; Second Edition, the Communication and Symbolic Behavior Scale, the Childhood Autism Rating Scale and semi-structured interview based on the DSM-IV criteria for Autistic Disorder. As a result of these evaluations, 39 children were diagnosed as having an autistic spectrum disorder and 19 children were diagnosed as having developmental delays (either language delay or mental retardation), but not a disorder on the PDD spectrum (Robins et al., 2001).

Cronbach's alpha coefficient was calculated in order to measure the reliability of the M-CHAT. The reliability of the 23 questions of the M-CHAT was found to be high ($\alpha = .85$). Chi-square analysis revealed that all items were significantly different between the children diagnosed as autistic compared to other participants, except for item 1 ('Does your child enjoy being swung, bounced on your knee?') and item 16 ('Does your child walk?') (Appendix A). Standardized canonical discriminant function coefficients were applied for each item. (The 23rd item of the M-CHAT was added later during the application of the study. The item was given to a small sample of parents. Therefore, in this statistical analysis the 23rd item was excluded.). Questions 7, 14, 2, 9, 15, 13 (Appendix A) were found to be the best items in

terms of differentiating between autistic and nonautistic children. These six items are the critical items of the M-CHAT.

Discriminant function analysis (DFA) results correctly classified 33 of 38 children with autism or pervasive developmental disorders and misclassiffied 8 of the 1,196 nonautistic children. Results of discriminant function analysis indicated that the M-CHAT is a successful scale in terms of detecting children (Robins et al., 2001).

Since the follow-up of all participants was not complete, absolute sensitivity and specifity were not determined. Robins and colleagues indicated that discriminant function analysis gives some clues about sensitivity, specificity and predictive power (Robins et al., 2001). Based on the DFA classification, the M-CHAT has a sensitivity of .87, specificity of .99, positive predictive power (PPP) of .80 and negative predictive power (NPP) of .99 (Robins et al., 2001).

A part of the follow-up study was done by Deborah Fein (April 2005, personal communication). A portion of the sample that was screened in the initial study (Time 1) and had a diagnosis of autism were re-screened (Time 2) after nearly two years. A new high-risk group was added in this follow-up study. During the application of the initial screening, the M-CHAT was also administered to the siblings of the children with early indicators with autism. Some of the caregivers of children with ASD filled out the M-CHAT for the sibling of the child with ASD when the child was brought to the evaluation during the initial research. Therefore, new a high-risk group was generated for this study. The age range for the Time 2 children was 42 months to 54 months (see Table 3).

Table 3: Demographic Information for the Follow-up Study of the M-CHAT

Time 2	Unselected Sample (n=735)	High-risk Sample (n=160)	Sibling Sample (n=5)	Site Unknown Sample (n=40)	Total (n=940)
Male	379	116	3	32	530
Female	350	42	2	8	402
Sex Unknown	6	2	0	0	8
Average Age (in months)	61.5	56.96	41.93	61.03	57.94

The internal reliability was found to be adequate for the overall 23 items and the six critical items (α = .87 and α = .85, respectively). The concurrent validity of the M-CHAT was also studied in this follow-up study. The sensitivity of the M-CHAT was found as .99, specificity was found as .94, PPP was found as .42, NPP was found as .99.

The criteria of the M-CHAT for detecting suspicion of autism are; to fail two of the six critical items or any three of the 23 items. In other words, when a child fails two of the six critical items or any three of the 23 items, the child is considered to have failed the M-CHAT. For this study the same criteria were adopted.

For the current study, a professional translator and a psychology student fluent in both languages translated the M-CHAT from English to Turkish. Back translation was done by another professional translator. All translations were compared to ensure equivalence and minor adaptations were done on the statements.

Ankara Developmental Screening Inventory (Ankara Gelişim Envanteri-AGTE)

The AGTE was developed by Savaşır, Sezgin and Erol in 1998. The scale aims to define the development of children both in general and in specific areas. The AGTE consists of 4 subtests which are cognitive-linguistic (dil-bilişsel), gross motor (kaba motor), fine motor

(ince motor) and social ability-self care (sosyal beceri-özbakım). Besides aiming to measure the development of the child in these four major areas, the AGTE involves measurement of the general development level of the child. The AGTE is composed of 154 items.

The sample used to develop norms included children from low and middle SES families. The age range of the children was between 0 and 6. Families of 420 boys and 440 girls participated in the original study of the AGTE.

Cronbach Alpha Coeffients were high for ages between 0 and 3 (see Table 4).

Table 4: Cronbach Alpha Coeffients for Ages between 0 and 3

Age Groups (in months)	Total Item	Cognitive Linguistic	Gross Motor	Fine Motor	Social Ability-Self-care
0 – 12 months	.98	.93	.92	.91	.92
13 – 44 months	.97	.95	.80	.80	.85
45-72 months	.88	.84	.64	.19	.37

However, Cronbach Alpha Coeffients for gross motor and social ability-self care subtests were low for the ages between 3 and 6. It was asserted that since the development of a child in gross motor ability and social ability-self care is nearly complete by the age of 3, the number of items for these subtests were also low for children older than 3 years. Therefore, the Cronbach Alpha Cofficients decreased (Savaşır et al., 1998). Test-retest reliability for 0-12, 13- 44, 45-72 months are r = .99, r = .98 and r = .88, respectively. These results revealed that the AGTE has a high test-retest reliability (Savaşır et al., 1998).

Validity of the scale was studied in terms of general development. The higher the age, the higher the score that the child gets from the test.

Diagnostic and Statistical Manual of Mental Disorder –IV , Text Version (DSM-IV-TR)

The criteria for autism in the DSM-IV were also checked in this study. DSM-IV was used in some of the screening and autism rating studies in the literature including the follow up study of the M-CHAT (Stone et al., 1999; Nordin, Gillberg, & Nyden, 1998).

In view of the fact that two experimenters administered the questionnaires in this study, the clarification of the DSM-IV criteria for autism was made in order to eliminate possible disparities caused by individual differences of asking questions and difficulty for parents to understand some statements. In order to define clear and objective criteria, a preliminary study was conducted. A clinical psychologist who is an expert on autism and two clinical psychology graduate students from Boğaziçi University including the author of this paper defined more clarified criteria mostly based on sampling and rephrasing the deficiencies stated in the DSM-IV criteria. These recently defined samples and rephrases were introduced to another expert for evaluation, who is a child psychiatrist with extensive expertise on children with autism. A questionnaire that consists of statements that can be answered in a "applicable" "not applicable" format was generated. This final version of the DSM-IV statements obtained in the preliminary study was used in the main study (Appendix C).

In the DSM-IV, criteria for autism are defined in three main areas which are qualitative impairment in social interactions, qualitative impairment in communication and restricted, repetitive and stereotypic behaviors, interests and activities. The first main area, which is qualitative impairment in social interactions, includes five deficiencies. Each of the second and the third areas include four deficiencies. Totally, there are thirteen deficiencies in

the DSM-IV autism criteria to check. In order to classify a child as autistic, total six deficiencies need to be detected at the end of the interview with the primary caregivers. Two of these six deficiencies have to be included in the first main group, which is qualitative impairment in social interactions. In addition to that, at least one of these six deficiencies has to be included in the each two main group. If any six deficiency is detected regardless of which group the deficiency is included, the child is diagnosed as PDD. When less than any six deficiencies is detected, a diagnoses of PDD or autism is not given. The clinician makes this assesment as a result of an interview with the caregivers. During the data analysis of this study, discrimination between diagnosis of autism and PDD was not considered. Since the M-CHAT is a screening instrument, the major aim of the M-CHAT is to detect children who has autistic features. Therefore, a differential diagnosis between autism and PDD is not necessary for the purpose of this study. Moreover, in the literature, a differential diagnostic criteria of the M-CHAT between autism and PDD was not studied yet.

Procedure

A total of 80 sessions including the administration of the DSM-IV, Ankara Developmental Screening Inventory, the M-CHAT, and the CHAT questionnaires, and the application section of the CHAT were administred by two researchers. Fourty sessions were conducted by the researcher of this study while the other fourty were conducted by another graduate student who studied the validity of the CHAT (Tetik-Kabil, 2005). Both researchers had received extensive training with autistic children prior to these administrations.

Informed consents were collected from all participating families. In each session, the AGTE was administered first, the DSM-IV and the M-CHAT followed the administration of the AGTE, and the CHAT was administered as the final instrument. The M-CHAT was filled out by the mothers unless they requested that the researcher read the questions. The researcher

also read the statements of the final version of the DSM-IV that was obtained in the preliminary study, and the questions of the AGTE to the mothers. The whole assessment took approximately one hour.

RESULTS

Descriptive Information about Parents

Descriptive information related to the parents of the children, which are mother's age, father' age, mother's education and father's education, for each four group is presented in Table 5. Nine mothers failed to fill out the item on parental education. Therefore, Table 5 includes information about 66 parents' education levels.

Table 5: <u>Demographic Characteristics of the Parents of Four Groups of Children</u>

		Normally Developing Children	Children with Down Syndrome	Children with the Early Indicators of Autism	Children with Diagnosis of Autism
Mean for Mothers' Age (in years)		28	33	33	31
Mean for Fathers' Age (in years)		35	34	37	39
Education Level of Mothers	Primary School	6	12	4	4
	Secondary School	3	2	0	1
	High School	5	5	4	5
	University	1	0	8	6
Education Level of Fathers	Primary School	2	8	2	4
	Secondary School	5	2	3	2
	High School	7	5	5	1
	University	1	4	6	9

Since children with normal development were not randomly selected, group comparisons in terms of parental education are not meaningful. However, when the autistic group (children with early indicators of autism and with the diagnosis of autism) is examined, it is seen that most of the mothers of these children have high school or university education.

These numbers imply that the higher the education level of the mother, the better she can assess her child's development. A slightly different interpretation would be that mothers with higher education levels are more likely to consult to a professional earlier than those with lower education levels.

Question 1. Does the M-CHAT discriminate children with autistic signs (children with suspicion of autism and children with the diagnosis of autism) from those with no autistic signs (children with normal development and children with Down syndrome)?

The present study aimed to establish the validity of the M-CHAT by examining its accuracy in discriminating children with autistic signs from children with no autistic signs. For this reason, the sample was grouped into two: the children with autism (the children with the early indicators of autism and the children with the diagnosis of autism) and the children without autism (normally developing children and the children with Down syndrome). In order to compare the two groups based on their M-CHAT results a 2x2 chi-square analysis was computed. Since the numbers in cells are rather small, the Fisher's Exact Test was run. Results revealed a significant difference between these two groups in terms of their M-CHAT scores [$\chi^2(1)= 21.72$, p<.001]. Frequencies are presented in Table 6.

Table 6: Frequency Distributions of the M-CHAT Results for Children with Autism and Children without Autism

	Results of the M-CHAT	
	Children without Suspicion of ASD	Children with Suspicion of ASD
Children without ASD (n=35)	17	18
Children with ASD (n= 40)	1	39
Total	18	57

As presented in Table 6, out of 75 cases, the M-CHAT was able to screen 56 cases

(75 %) successfully. Except for one case, errors tended to occur as false positives. That is,

in the children without autism group the M-CHAT indicated suspicion of autism for 18

children. These results indicate that the M-CHAT discriminates children with autistic signs

from those with no autistic signs. Its errors are observed as false positives.

To examine the distributions of the false positives and one false negative of the M-

CHAT Table 7 is presented.

Table 7: Frequency Distributions of the M-CHAT Results for Four Groups of Children

	Results of the M-CHAT	
	Children without Suspicion of ASD	Children with Suspicion of ASD
Normally developing children	11	4
Children with Down Syndrome	6	14
Children with early indicators of ASD	1	19
Children with ASD		20
Total	18	57

Frequencies presented in Table 7 reveal that on the M-CHAT the highest rate of false positives was observed in the children with Down syndrome group (14 cases out of 18). It is also clarified that one false negative of the M-CHAT was a child with early indicators of autism.

Question 2: Do the children who fail the M-CHAT also fail the CHAT?

To answer this question, the sample was again studied as two groups: children with autism (the children with early indicators of autism and the children with the diagnosis of autism) and children without autism (normally developing children and the children with Down syndrome). To compare these two groups on their CHAT and M-CHAT scores, a chi-square analysis, using the Fisher's Exact Test, was computed. Results indicated that there was no significant difference between the M-CHAT and CHAT scores for children without autism [$\chi^2(1)= 1.91$, p>.05] and for children with autism [$\chi^2(1)= 4.84$, p>.05]. Frequencies are presented in Table 8.

Table 8: Frequency Distributions of the M-CHAT and the CHAT Results for

Children with and without Autism

			Results of the M-CHAT		
			No Suspicion of ASD	Suspicion of ASD	Total
Children without ASD	**Results of the CHAT**	No Suspicion of ASD	16	14	30
		Suspicion of ASD	1	4	5
	Total		17	18	35
Children with ASD	**Results of the CHAT**	No Suspicion	1	6	7
		Suspicion of ASD		33	33
	Total		1	39	40

Frequencies on Table 8 show that in the children without autism group the two instruments agreed on 20 cases out of 35. The disagreement between the two instruments largely stemmed from the false positives of the M-CHAT. In this group, the M-CHAT falsely indicated suspicion of autism for 18 children. Four of these 18 children were screened as having suspicion of autism by the CHAT also.

In the children with autism group, the M-CHAT and the CHAT agreed on more cases (34 out of 40). Their disagreements in this group (6 cases) reflect the false negatives of the CHAT. In other words, among children with autism, the M-CHAT was more successful than the CHAT in detecting the signs of autism. These frequencies indicate that the rate of agreement between the CHAT and the M-CHAT was higher in the children with autism group (85 %) than in the children without autism group (57%).

Table 9 presents more detailed information about the distribution of these frequencies by classifying children into four groups: normally developing children, children with Down syndrome, children with early indicators of autism and children with autism.

Table 9: Frequency Distributions of the CHAT and the M-CHAT Results for Four Groups of Children

GROUP			Results of the CHAT		
			No Suspicion of ASD	Suspicion of ASD	Total
Normally developing children	**Result of M-CHAT**	No Suspicion	11		11
		Suspicion of ASD	3	1	4
	Total		14	1	15
Children with down syndrome	**Result of M-CHAT**	No Suspicion	5	1	6
		Suspicion of ASD	11	3	14
	Total		16	4	20
Children with early indicators of ASD	**Result of M-CHAT**	No Suspicion	1		1
		Suspicion of ASD	5	14	19
	Total		6	14	20
Children with ASD	**Result of M-CHAT**	Suspicion of ASD	1	19	20
	Total		1	19	20

Among normally developing children, out of 15 cases, the M-CHAT was able to screen 11 children successfully. In this group, the M-CHAT falsely indicated suspicion of autism for 4 children. One of these 4 children was also detected by the CHAT as having suspicion of autism. For this group of children, agreement between the CHAT and the M-CHAT was achieved for 12 cases (80%).

Among children with Down syndrome, out of 20 cases, the M-CHAT was able to screen only 6 children successfully. In this group, the M-CHAT detected suspicion of autism in 14 children. Frequencies presented on Table 9 reveal that majority of the M-CHAT's false positives were included in the children with Down syndrome group (14 cases out of 18). The remaining 4 false positives of the M-CHAT were included in the normally developing children group. Among children with Down syndrome, agreement between the CHAT and the M-CHAT was achieved for 8 cases (40%).

Among the children with early indicators of autism, out of 20 cases, the M-CHAT was able to screen 19 children successfully. As it was presented in Table 8, among children with autism, both the CHAT and the M-CHAT failed to detect suspicion of autism for 1 child who had indicators of autism. Table 9 clarifies that this single case was included in the children with early indicators of autism group. For this group of children, overall agreement between the CHAT and the M-CHAT was achieved for 15 cases (75%).

Among children with autism group, out of 20 cases, the M-CHAT was able to screen all 20 children successfully. The agreement between the CHAT and the M-CHAT was achieved for 19 cases (95%). One child reflects the false negative of the CHAT.

These results indicate that the highest rate of disagreement between the two instruments is observed in the children with Down syndrome group. In the assessment of children with the diagnosis of autism, the rate of agreement between the M-CHAT and the CHAT is almost perfect.

Question 3: Do the children who fail the M-CHAT also fail the DSM-IV Autistic Disorder criteria?

For this question, the sample was again studied as two groups: the children with autism (the children with the early indicators of autism and the children with the diagnosis of autism) and the children without autism (normally developing children and the children with Down syndrome). Frequencies are presented in Table 10.

Table 10: Frequency Distributions of the DSM-IV and the M-CHAT Results for Children with Autism and without Autism

GROUP			DSM-IV Results		
			No PDD or Autism	PDD or Autism	Total
Children without ASD	**Result of the** M- CHAT	No Suspicion of ASD	17		17
		Suspicion of ASD	18		18
	Total		35		35
Children with ASD	**Result of the M-CHAT**	No Suspicion of ASD		1	1
		Suspicion of ASD		39	39
	Total			40	40

As presented in Table 10, among childen without autism, out of 35 cases, the M-CHAT was able to screen 17 children successfully. However, in this group, the M-CHAT detected suspicion of autism for 18 children. The DSM-IV criteria classified all children in this group successfully. The rate of agreement between the two devices was only 49% for this group. As was previously noted, frequencies on Table 10 indicate that the M-CHAT's errors occur as false positives. It tends to detect signs of autism in children without autism.

In the children with autism group, out of 40 cases, the M-CHAT screened 39 children successfully. For only one case, the DSM-IV indicated autism and the M-CHAT failed to detect suspicion of autism. The rate of agreement between the two devices reached to 98%.

Table 11 presents more detailed information about the distribution of these frequencies by classifying children into four groups: normally developing children, children with Down syndrome, children with early indicators of autism and children with autism.

Table 11: Frequency Distributions of the DSM-IV and the M-CHAT Results for Four Groups

GROUP			Results of the DSM-IV		
			No PDD or Autism	PDD or Autism	Total
Normally developing children	**Result of the M-CHAT**	No Suspicion of ASD	11		11
		Suspicion of ASD	4		4
	Total		15		15
Children with Down syndrome	**Result of the M-CHAT**	No Suspicion of ASD	6		6
		Suspicion of ASD	14		14
	Total		20		20
Children with early indicators of ASD	**Result of M-CHAT**	No Suspicion of ASD		1	1
		Suspicion of ASD		19	19
	Total			20	20
Children with ASD	**Result of M-CHAT**	No Suspicion of ASD			
		Suspicion of ASD		20	20
	Total			20	20

Frequencies on Table 11 show that among normally developing children, out of 15 cases, the M-CHAT was able to screen 11 children successfully. Out of these 15 children, the M-CHAT detected suspicion of autism for 4 normally developing children. Overall agreement between the DSM-IV and the M-CHAT results was for 11 cases (73%). The DSM-IV did not indicate autism in this group of children.

Among children with Down syndrome, out of 20 cases, the M-CHAT was able to screen 6 cases successfully. In this group, the M-CHAT detected suspicion of autism for 14 children with Down syndrome. As was presented in Table 8, the M-CHAT gave false positives for 18 children without autism. Frequencies presented in Table 11 explain that the majority of these 18 cases were from the children with Down syndrome group (14 cases out of 18) and the remaining 4 were from the normally developing children group. The results of these two instruments overlapped for only 6 cases (30%). The DSM-IV did not indicate autism for children with Down syndrome.

Among children with early indicators of autism, out of 20 cases, the M-CHAT screened 19 children successfully. As Table 8 indicated, for one case, the DSM-IV indicated autism while the M-CHAT did not detect suspicion of autism. Table 11 clarified that this single case was a child with early indicators of autism. The raw data of this single case was examined. On the DSM-IV, this child failed the items related to qualitative impairment in communication and restricted, repetitive and stereotypic behaviors, interests and activities. He did not fail any items related to qualitative impairment in social interactions.   On the M-CHAT, the same child failed only item 8, which is 'Does your child play with small toys (i.e., cars or blocks) without putting them into his/her mouth, without dropping it or plays properly without tossing it around in his/her hands? '. The results of the M-CHAT and of the DSM-IV overlapped for 19 cases in this group (95%).

Among children with autism, out of 20 cases, the M-CHAT screened all 20 children successfully. The results of the DSM-IV and the M-CHAT overlapped for all cases.

4. a) Does the M-CHAT differentiate children with developmental delays from normally developing children?

To answer this question, M-CHAT results were compared with the AGTE general development scores. Based on their AGTE scores, 15 normally developing children, two children with Down syndrome and one child with early indicators of autism were included in the children without developmental delay group. Although these three children (two children from the Down syndrome group, one child from the children with early indicators of autism group) were expected to exhibit developmental delays, their AGTE scores did not indicate so. This might seem unusual at first sight but it was found that two children from the Down syndrome group were involved in special education for a long time. The other child with early indicators of autism was 16 months old. Since the child's age is very young, it is likely that a significant gap between the child's development and the child's peers' development is not observed yet. Therefore, these three children were included in the children without developmental delay group. To compare these two groups, a 2x2 chi-square analysis, using Fisher's Exact Test, was computed. Results revealed a significant difference [$\chi^2(1)= 17.88$, p<.001] between these two groups in terms of their M-CHAT results. Frequencies are presented in Table 12.

Table 12: Frequency Distributions of the AGTE and the M-CHAT Results

		Results of the M-CHAT		
		No Suspicion of ASD	Suspicion of ASD	Total
Results of the AGTE	No Developmental Delay	11	7	18
	Developmental Delay	7	50	57
	Total	18	57	75

As presented in Table 12, among children without developmental delay, out of 18 cases, results of the M-CHAT and the AGTE overlapped for 11 cases. The M-CHAT detected suspicion of autism in 7 cases, while the AGTE did not detect any developmental delay. In the children with developmental delay group, out of 57 cases, the M-CHAT indicated suspicion of autism in 50 cases. In this group, for 7 cases, the M-CHAT did not detect suspicion of autism while the AGTE detected developmental delay. Overall agreement between the AGTE scores and the M-CHAT results occurred for 61 cases, that is in 81% of the sample. These results indicate that the M-CHAT differentiates children with developmental delays from normally developing children.

b) In the developmentally delayed group, do the M-CHAT results differ for children with autism from children with Down syndrome?

Table 13 presents more detailed information about the distributions of these frequencies by classifying children into four groups: normally developing children, children with Down syndrome, children with early indicators of autism and children with autism.

TABLE 13: Frequency Distributions of the AGTE and the M-CHAT Results for Four Groups of Children

GROUP			Results of the AGTE		
			No Developmental Delay	Developmental Delay	Total
Typically developed children	**Results of M-CHAT**	No Suspicion of ASD	11		11
		Suspicion of ASD	4		4
	Total		15		15
Children with Down syndrome	**Results of M-CHAT**	No Suspicion of ASD		6	6
		Suspicion of ASD	2	12	14
	Total		2	18	20
Children with early signs of ASD	**Results of M-CHAT**	No Suspicion of ASD		1	1
		Suspicion of ASD	1	18	19
	Total		1	19	20
Children with ASD	**Results of M-CHAT**	No Suspicion of ASD			
		Suspicion of ASD		20	20
	Total			20	20

For normally developing children, out of 15 cases, results of the M-CHAT and AGTE overlapped for 11 children (73%). For the remaining 4 cases, the AGTE did not indicate developmental delay but the M-CHAT detected suspicion of autism.

In the children with Down syndrome group, out of 20 cases, the results of the two instruments overlapped for 12 children (60%). However, for 6 children, the M-CHAT did not detect suspicion of autism while the AGTE indicated developmental delay. As it was previously stated, for two children in the Down syndrome group, the AGTE scores did not

indicate developmental delay. The M-CHAT, on the other hand, placed these children in the suspicion of autism group. When the M-CHAT results of these two children are examined, it is discovered that they failed the M-CHAT based on the "any three items of the overall 23 items" criterion. They did not fail the "two of the six critical items" criterion.

For children with the early indicators of autism, out of 20 cases, results of the M-CHAT and the AGTE overlapped for 18 cases (90%). For one child, the AGTE indicated developmental delay but the M-CHAT did not detect suspicion of autism. As noted previously, for one child from this group the AGTE scores did not reveal developmental delay. However, the M-CHAT detected suspicion of autism for this child. By further investigation of the M-CHAT scores of this child, it is discovered that the child failed the M-CHAT because he failed the "two of the six critical items" criterion, not the "any three of the overall 23 items" criterion.

For children with the diagnosis of autism, the M-CHAT detected suspicion of autism and the AGTE indicated developmental delay for all 20 children, reflecting a perfect rate of agreement.

5. How do the two M-CHAT criteria (to fail two of the six critical items or any three of the overall 23 items) differ for children with and without autism?

Table 14 presents the distributions of children who failed the "any three of the 23 items" criterion and those who failed the "two of the six critical items" criterion of the M-CHAT.

TABLE 14: Frequency Distributions on the two M-CHAT Criteria

	M-CHAT Criteria		
	3 of overall 23 items	2 of the six critical items	Total
Children without ASD	13	6	19
Children with ASD	6	33	39
Total	19	39	58

As Table 14 presents, in the children without autism group, the majority of those who failed the M-CHAT (13 out of 19) failed any three of the 23 items. In the children with autism group, on the other hand, the majority of children (33 out of 39) failed the M-CHAT because they failed two of the six critical items. Table 15 displays these frequencies for four groups of children.

Table 15: Frequency Distributions of the Four Groups on the two M-CHAT Criteria

	M-CHAT Criteria		
	3 of overall 23 items	2 of the six critical items	Total
Normally developing children	4	0	4
Children with down syndrome	8	6	14
Children with early indicators of ASD	4	15	19
Children with ASD	2	18	20
Total	18	39	57

Table 15 clarifies that, in the without autism group, 4 children out of 13, who failed any three of the 23 items are normally developing children. None of these children failed the critical items of the M-CHAT. These findings reveal that the rate of failing the "any three of the 23 items" criterion of the M-CHAT is quite high even among normally developing children. The critical items, on the other hand, discriminate these children from autistic children.

Children with Down syndrome are likely to fail both criteria, although the majority fail the "any three of the 23 items" criterion of the M-CHAT.

The rates of failing the two different criteria do not show distinct differences between the children with early indicators of autism group and the children with the diagnosis of autism group. The majority of children in both groups fail the critical items. However, minor differences between these two groups suggest that detecting the critical signs of autism is more difficult under three years of age.

DISCUSSION

The main purpose of the present study was to validate the M-CHAT on a sample of Turkish children. One major finding of the study was that the M-CHAT significantly discriminated autistic children from nonautistic children. However, its rate of detecting autistic signs in nonautistic children was also quite high (24% of the entire sample). The highest rate of these false positives was observed in children with Down syndrome.

The present study indicated low rates of false negatives. Out of 40 autistic children only one child was missed by the M-CHAT. This was a 16 months old child who had not yet received the diagnosis of autism. It can be argued that because he was very young, a significant gap between his and his peers' development was not apparent yet. It is also known that some children with mild autistic signs regress after 18 months (Baird et al., 2000).

The original and follow-up studies of the M-CHAT have indicated relatively high rates of false positives and low rates of false negatives as well (Robins et al., 2001; Deborah Fein, March, 2005, personal communication). In the original study of the M-CHAT, the number of non-ASD children misclassified as ASD was reported as 8 out of 1,196 (Robins et al., 2001). Five of these misclassified children received diagnoses other than ASD. In the follow-up study, two separate discriminant function analyses (DFA) were performed to determine the M-CHAT's ability to classify children as ASD or as non-ASD. In the first DFA, the rate of false positives was reported as 53 out of 3,791, yielding an overall classification accuracy of 98.3%. In the second DFA, 35 of the 37 children with ASD were correctly classified, and 19 of the 903 non-ASD children were misclassified, yielding an overall classification accuracy of 97.7 %. Of these 19 false positives, five children who were initially diagnosed with delays in

the initial study were found to be typically developing at the follow-up (Deborah Fein, April, 2005, personal communication).

When the initial and follow-up studies, and the present research are taken together, results indicate that the M-CHAT has a high accuracy in terms of classifying children as autistic or nonautistic. Its likelihood of misclassifying nonautistic children as autistic is higher than missing autistic children. Obviously, it seems more acceptable for a screening device to err on the side of commission than taking the risk to miss children in need for an early intervention. As Robins et al. (2001) emphasized, overreporting is of less concern to clinicians than underreporting. Falsely detected children, on the other hand, once brought to the attention of a professional, are held subject to a more comprehensive evaluation. In most cases, this evaluation results in identifying developmental disorders other than ASD. Lord's study (1995) emphasized that some children, who exhibited behavioral patterns similar to children with autism between the ages of 2 and 3, turned out to have global developmental delay or other developmental disorders (cited in Trillingsgaard et al., 2005).

In the early years of life, distinguishing children with ASD from children with other developmental disorders is a difficult task. Behavioral patterns of children with different impairments may resemble each other and discriminating one group from another may require an expert evaluation. Based on the results from parent interviews, Trillingsaard et al. (2005) indicated that young children diagnosed with ASD could not easily be differentiated from young children with other developmental disorders in the first two years of life. They asserted that since nearly 75 % of the autistic children have also mental retardation, it can be difficult to determine 'the extent to which deviations reported by parents are specific to autism or whether they are related to the associated mental retardation' (2005, p. 66). Vatter (1998) stated that diagnosis of autism in children with Down syndrome is more difficult than in children without Down syndrome and added that a professional needs to pay special attention

to some DSM-IV items. For this purpose, the researcher determined which DSM-IV items are common or uncommon in children with Down syndrome. Results of this investigation revealed that some qualitative impairments in social interaction (ie., lack of spontaneous seeking to share enjoyment, interests, or achievements with other people, lack of social or emotional reciprocity) can sometimes be observed in children with Down syndrome. In addition to that, some qualitative impairments in communication (ie., marked impairment in the ability to initiate or sustain a conversation with others, and stereotyped and repetitive use of language or idiosyncratic language) are also common in children with Down syndrome.

In light of these information, DSM-IV scores of children with Down syndrome who failed the M-CHAT were investigated in the present study. This investigation revealed paralel information to what Vatter (1998) stated. It was discovered that 28 % of these children failed the DSM-IV items which are related to qualitative impairments in social interaction and communication. Remaining 72 % of children with Down syndrome failed the DSM-IV items which are related to qualitative impairments in communication only.

Although an extensive overlap between Down syndrome and autism is not reported in the literature, as a result of their common deficiencies, these two groups of children may exhibit similar behavioral patterns. Therefore, it is not surprising that the present study indicated its highest rate of false positives in the children with Down syndrome group. As was discussed previously, Robins et al. study (2001) noted its false positives in their clinical samples as well. These results indicate that assessment targetted to identifying specific developmental deficiencies in young children is a complicated task. When the developmental deficiency is severe, as in the case of Down syndrome, the likelihood of getting high rates of false positives increases even further.

In the present study, parallel findings were obtained when the M-CHAT was compared with the AGTE. Based on their AGTE scores, children were regrouped as those

with developmental delays (children with autism and children with Down syndrome) and those with normal development. Results indicated a high rate of agreement between the two devices for the delayed group. In four normally developing children, however, the M-CHAT signalled autism. These children were accurately classified as manifesting "no developmental delay" by the AGTE. The original study of the M-CHAT reported developmental delays in children who received diagnoses on the autism spectrum on all measures used in the developmental evaluation except for the Vineland Adaptive Behavior Scales Motor Domain (Robins et al., 2001). Since both of these two groups (children with autism and children with Down syndrome) exhibit developmental delays, these findings are in line with general expectations. Despite a small percentige of false positives observed among normally developing children, the M-CHAT differentiates children with developmental delays from children with normal development. The most important reason behind its detecting autistic signs in normally developing children lies in the screening criteria of the instrument. One of the two criteria of the M-CHAT is to fail any three of the 23 items. These items are not treated as critical items signaling autism. However, this lowered threshold of the instrument enables clinicians to detect as many children in need of further evaluation as possible.

When the two groups of children; those with Down syndrome and those with autism, were compared to each other based on their M-CHAT and AGTE scores, the degree of agreement between the two instruments was very high for the autistic group. However, a striking finding was observed in the children with Down syndrome group. The M-CHAT classified two children, for whom the AGTE indicated no delay, as autistic. These children passed the critical items, but failed the "any three of the 23 items" criterion. This finding gave further evidence for the clinical utility of the "any three of the 23 items" criterion which apparently increases the sensitivity of the instrument in terms of detecting developmental delays in children.

The M-CHAT results were also compared with the DSM-IV Autistic Disorder criteria. This comparison indicated an almost perfect agreement between the two measures for autistic children. For nonautistic children, the disagreements stemmed from the false positives of the M-CHAT. The DSM-IV criteria classified all children successfully. In the DSM-IV, criteria for autism are defined in three main areas which are qualitative impairment in social interactions, qualitative impairment in communication and restricted, repetitive and stereotypic behaviors, interests and activities (DSM-IV, 1994). In each of these areas, DSM-IV looks for specific indicators of autism. In other words, it covers a broad spectrum of problem areas and makes a focused assessment in each area. The M-CHAT, on the other hand, was not designed to focus on specific indicators of autism. Robins et al. asserted that 14 items, those that are different from the CHAT, were generated in order to 'broaden the checklist symptoms to identify a greater range of Pervasive Developmental Disorders and to compensate for the elimination of the home health visitors observations' (2001, p.134). This broadened nature of the M-CHAT results in high rates of false positives, especially when children with other developmental problems are evaluated. In other words, it lacks sensitivity to discriminate autistic children from children with developmental delays other than autism. However, these results should be evaluated in light of the fact that the M-CHAT is designed as a screening instrument, not as a diagnostic measure like the DSM-IV.

This study also compared the results of the M-CHAT with those of the CHAT. The two instruments agreed on 72% of the sample. The rate of agreement between the two was higher for the autistic sample (85%) than for the nonautistic sample (57%). In the autistic sample, their disagreements reflected the false negatives of the CHAT. In the nonautistic sample, on the other hand, disagreements reflected the false positives of the M-CHAT. A closer look at the data revealed that the false negatives of the M-CHAT was lower than the CHAT because it screened children based on two different criteria. Two of the six children

who passed the CHAT but failed the M-CHAT were detected as a result of the "any three of the 23 items" criterion. The remaining four children failed the critical items of the M-CHAT. This finding once more indicates that screening children with more conservative measures increases the sensitivity of a screening instrument. And, the M-CHAT is firm example for this.

In the next step, these six children's responses to each M-CHAT item was examined. This examination revealed that highest frequencies were observed for item 7 ('Does your child, when an object attracts her/his attention, point to that object to show that she/he is interested in it?') and item 6 ('Does your child ever use her/his index finger to point or want something?'). The first item relates to protodeclarative pointing, while the second relates to imperative pointing. Only two of these six children failed both item 7 and item 6. Item 7 has already been identified as a critical item of the M-CHAT, however, item 6 has not. If item 6 was treated as a critical item, the M-CHAT would have detected five of these six children. In other words, inclusion of item 6 to the critical items list would have further increased the sensitivity of the M-CHAT.

Several authors have emphasized that lack of pointing is a significant signifier for autism. Homevideotapes of infants who received a later diagnosis of autism revealed deficits in 9 to 12 month olds in the area of pointing and showing objects (Adrien et al., 1993; Baranek, 1999; Osterling & Dawson, 1994, cited in Trillingsgaard, 2005). The results of the present study corroborate these views and highlight the importance of assessing imperative pointing in the detection of autism in early childhood.

In the final step, the present study explored how the two M-CHAT criteria differed for autistic versus nonautistic children. Results indicated that the majority of autistic children failed the critical items of the M-CHAT. The majority of nonautistic children, on the other hand, failed any three of the 23 items. Among normally developing children, no child failed

the critical items. These findings pointed to the discriminative power of the critical items between autistic versus nonautistic children. The "any three of the 23 items" criterion, on the other hand, allowed to detect developmental deficiencies other than ASD.

In their follow-up study, Robins et al. (2005) indicated group differences in terms of both the total and critical item scores. High-risk groups, on average, failed more according to both criteria than low-risk groups.

The overall results of the study suggest that the M-CHAT is a promising screening device for the detection of autistic signs in young children. However, it is also likely to misclassify nonautistic children as autistic. As discussed in the literature (Robins et al., 2001; Trillingsgaard et al., 2005), when these falsely detected children are evaluated further, the chance of detecting developmetal delays other than autism/PPD is also high. Therefore, this downside of the M-CHAT can be regarded as an asset if the major purpose of screening is described as 'to detect many children at high-risk as early as possible'. False detection of autistic signs is preferable than missing children at risk.

Contributions and Limitations of the Present Study

The present study compared different groups of children based on their M-CHAT performances. This comparison was accomplished by including a clinical sample (children with autism and Down syndrome) and a group of normally developing children. This design brought advantages as well as limitations to the study.

To discuss these advantages and limitations, the sample characteristics of this study need to be restated. The two autistic groups included already screened children. One group was consisted of children under three years old. The other group was above three years old. Both groups were selected from a sample of children who had not received any education

prior to this research. By doing so, the effects of special education experience were eliminated. The other clinical group of the study included children with Down syndrome. Such a design enabled to make comparisons between: autistic children and nonautistic children, autistic children under and above three years of age, autistic children and children with Down syndrome, children with and without developmental delay. This design limited the sample size of the study. However, it provided the opportunity to evaluate each child comprehensively utilizing four different measures. In addition, each child's performance on the administered instruments was examined closely.

There is an argument in the literature that the M-CHAT was originally designed to be used for unselected populations. Therefore, it needs to be tested in a general population. A validity study including an unselected population requires screening a large number of children. On the other hand, a large sample size restricts the extent of evaluation.

One major limitation of the study was that the predictive power of the M-CHAT was not examined. Due to time restrictions, a follow-up study could not be carried out. A research that includes the re-administration of the M-CHAT to this previously screened population will bridge this gap.

One final point needs to be taken into consideration while discussing the results of this research. The M-CHAT is a screening instrument which totally relies on mothers' resports. The education levels of the mothers of autistic children was relatively high in this sample. This might have contributed to the success of the M-CHAT in the autistic group. This result points to a need to investigate whether this success can be replicated when mothers with lower education levels are served as informants for the M-CHAT. Questions remain to be answered include several other parental factors. For example, Robins et al. (2001) raised concerns about parental inexperience and emotional bias (such as denial or overconcern). These concerns highlight the necessity of combining parental reports with a trained clinician's observations.

Their combination will probably produce the ideal procedure to achieve maximum sensitivity in the detection of autism. It will also address the difficulty of discriminating autistic signs from other developmental disorders.

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DEĞİŞTİRİLMİŞ ERKEN ÇOCUKLUK DÖNEMİ OTİZM TARAMA ÖLÇEĞİ

Lütfen aşağıdaki formu çocuğunuzun genelde nasıl olduğunu göz önünde bulundurarak doldurunuz. Lütfen her soruyu cevaplamaya çalışın. Eğer belirli bir davranışı nadiren yapıyorsa (Yani söz konusu hareketi bir veya iki kere yaptığını gördüyseniz), çocuğunuz o davranışı yapmıyormuş gibi cevaplayın.

1) Çocuğunuz kucakta sallanmaktan ya da dizinizde hoplatılmaktan hoşlanır mı?
Evet/Hayır

2) Çocuğunuz başka çocuklarla ilgilenir mi?
Evet/Hayır

3) Çocuğunuz bir şeylerin üzerine tırmanmayı mesela merdiven çıkmayı sever mi?
Evet/Hayır

4) Çocuğunuz "Ce-e" ya da saklambaç oynamaktan hoşlanır mı?
Evet/Hayır

5) Çocuğunuz sembolik oyunlar (Örneğin, oyuncak araba/bebekle oynarken sanki arabayı sürerek bir yerden başka bir yere götürüyormuş gibi/ bebeğini uyutuyormuş gibi) oynar mı?
Evet/Hayır

6) Çocuğunuz bir şey istemek için hiç işaret parmağını kullanır mı?
Evet/Hayır

7) Çocuğunuz bir şeyle ilgilendiğini göstermek için hiç işaret parmağını kullanır mı?
Evet/Hayır

8) Çocuğunuz küçük oyuncaklarla (Araba ya da küpler gibi.) onları ağzına almadan, kurcalamadan ya da düşürmeden düzgün bir şekilde oynayabilir mi?
Evet/Hayır

9) Çocuğunuz size bir şey göstermek için nesneleri alıp size getirir mi?
Evet/Hayır

10) Çocuğunuz gözünüze bir iki saniyeden fazla bakar mı?
Evet/Hayır

11) Çocuğunuzun sese karşı aşırı hassasiyeti var mı? (Örneğin, kulaklarını tıkar mı?)
Evet/Hayır

12) Çocuğunuz sizin yüzünüze ya da gülümsemenize karşılık gülümser mi?
Evet/Hayır

13) Çocuğunuz sizi taklit eder mi? (Örneğin, siz bir yüz ifadesi takınsanız bunu taklit eder mi?)

Evet/Hayır

14) Çocuğunuza adıyla seslendiğinizde tepki verir mi?

Evet/Hayır

15) Odanın diğer ucundaki bir oyuncağı parmağınızla gösterseniz çocuğunuz o oyuncağa bakar mı?

Evet/Hayır

16) Çocuğunuz yürüyor mu?

Evet/Hayır

17) Çocuğunuz sizin baktığınız bir şeye bakar mı?

Evet/Hayır

18) Çocuğunuz yüzünün yakınında sıra dışı parmak hareketleri yapar mı?

Evet/Hayır

19) Çocuğunuz sizin dikkatinizi yaptığı işe çekmeye çalışır mı?

Evet/Hayır

20) Çocuğunuzun sağır olup olmadığını merak ettiğiniz oldu mu?

Evet/Hayır

21) Çocuğunuz insanların ne dediğini anlayabiliyor mu?

Evet/Hayır

22) Çocuğunuz bazen boşluğa gözünü dikip bakar mı ya da amaçsızca etrafta dolaşır mı?

Evet/Hayır

23) Çocuğunuz alışık olmadığı bir şeyle karşılaştığında tepkinizi ölçmek için yüzünüze bakar mı?

Evet/Hayır

ERKEN ÇOCUKLUK DÖNEMİ OTİZM TARAMA ÖLÇEĞİ

BÖLÜM A: ANNE – BABAYA SORUNUZ:

1- Çocuğunuz kucakta sallanmaktan ya da dizinizde hoplatılmaktan hoşlanır mı?

EVET/HAYIR

2- Çocuğunuz diğer çocuklarla ilgilenir mi?*

EVET/HAYIR

3- Çocuğunuz merdiven vb. nesnelere tırmanmaktan hoşlanır mı?

EVET/HAYIR

4- Çocuğunuz "Ce-e" ya da saklambaç oynamaktan hoşlanır mı?

EVET/HAYIR

5- Çocuğunuz sembolik oyunlar (örneğin, oyuncak araba/bebekle oynarken sanki arabayı sürerek bir yerden başka bir yere götürüyormuş gibi/bebeğini uyutuyormuş gibi) oynar mı?

EVET/HAYIR

6- Çocuğunuz bir şey İSTEMEK için hiç işaret parmağını kullanır mı?

EVET/HAYIR

7- Çocuğunuz bir şeyle İLGİLENDİĞİNİ göstermek için hiç işaret parmağını kullanır mı?

EVET/HAYIR

8- Çocuğunuz küçük oyuncaklarla (arabalar ya da küpler gibi) onları ağzına almadan, kurcalamadan ya da düşürmeden düzgün bir şekilde oynayabilir mi?

EVET/HAYIR

9- Çocuğunuz bir şey GÖSTERMEK için size herhangi bir nesne getirir mi?

EVET/HAYIR

BÖLÜM B: GÖZLEYİNİZ

i- Görüşmeniz sırasında çocuk sizinle göz kontağı kurdu mu?

EVET/HAYIR

ii- Çocuğun dikkatini kendinize çekin, ardından odanın diğer köşesindeki ilginç bir nesneyi gösterin ve "Aaa bak! Bir …… (oyuncağın adı) var." deyin. Çocuğun yüzüne bakın. Çocuk işaret ettiğiniz şeyi görmek için odanın diğer tarafına bakıyor mu?**

EVET/HAYIR

iii- Çocuğun dikkatini kendinize çekin, ona bir oyuncak araba/bebek vererek "Arabayı sürer misin/bebeği uyutur musun?" deyin. Çocuk arabayı sürüyormuş/bebeği uyutuyormuş gibi sembolik davranışta bulunuyor mu?** *

EVET/HAYIR

iv- Çocuğa "Işık nerede?" ya da "Bana ışığı göster." deyiniz. Çocuk işaret parmağıyla ışığı GÖSTERİYOR mu?****

EVET/HAYIR

iv- Çocuk küplerle kule yapabiliyor mu? (Eğer yapabiliyorsa kaç küple?)
(Küplerin sayısı:…)

EVET/HAYIR

* Ebeveyne "ilgilenmek" sözcüğünü, bulunduğu ortamdaki çocukları gözüyle takip etme, çocuklara doğru yönelme, onların yanına gitme isteği gösterme olarak izah edebilirsiniz.

**Bu sorunun cevabını EVET işaretleyebilmek için çocuğun elinize değil, işaret ettiğiniz nesneye baktığından emin olunuz.

*** Başka bir oyunla da sembolik davranışı gözlemlerseniz bu sorunun cevabını EVET işaretleyiniz. Bazı çocukların arabalara karşı özel bir ilgisi olabilir. Arabaları yan yana dizme gibi yineleyici davranışlarda da bulunabilirler. Bu yineleyici davranışlar sembolik davranışlardan farklıdır. Belirli amaçları yoktur. Sembolik davranışların yerine yineleyici davranışların gözlendiği durumlarda HAYIR işaretlenmelidir.

****Çocuk "ışık" sözcüğünü anlayamazsa, onun ulaşamayacağı başka bir nesneyi göstererek örneğin "Ayı nerede?" gibi sorularla bunu tekrar ediniz. Bu soruda EVETi işaretleyebilmeniz için çocuğun nesneye işaret ettiği sırada yüzünüze bakmış olması gerekmektedir.".

DSM-IV OTİSTİK BOZUKLUK KRİTERLERİ

Kalın olarak yazılmış sorular ve maddeler orjinale ilave olarak genişletilmiş kısımları işaret etmektedir.

A) En az ikisi (1)'inci maddeden ve birer tanesi (2) ve (3)'üncü maddelerden olmak üzere (1), (2) ve (3)'üncü maddedlerden toplam altı (ya da daha fazla) maddenin bulunması:

1) Aşağıdakilerden en az ikisinin varlığı ile kendini gösteren toplumsal etkileşimde nitel bozulma:

☐   a] Toplumsal etkileşim sağlamak için yapılan el-kol hareketleri, alınan vücut konumu, takınılan yüz ifadesi, göz göze gelme gibi sözel olmayan bir çok davranışta belirgin bir bozulmanın olması.

Çocuğunuz toplumsal etkileşimi sağlamak için el-kol hareketlerinde, göz göze gelme davranışında, farklı vücut konumlarında bulunur mu? Farklı yüz ifadeleri takınır mı?

- ○ **Çocuk göz temasında, göz kontağında bulunur mu?**
- ○ **İnsanlarla iletişimde jest ve mimiklerini kullanır mı? Mesela; yüz ifadesinden şaşırdığı, üzüldüğü veya sevindiği anlaşılır mı?**
- ○ **Bir şeyi duyamadığında eğilip duymaya çalışır mı?**
- ○ **Sizin elinizden bir şey almak için uzanır mı?**
- ○ **Bir yerden ayrılırken elini "bye bye" demek için sallar mı, "baş baş" yapar mı?**
- ○ **"Hayır" anlamında başını sağa sola sallar mı ya da omuz silker mi?**

☐   b) Yaşıtlarıyla gelişimsel düzeyine uygun ilişkiler geliştirememe.
Yaşıtlarıyla gelişimsel düzeyine uygun ilişkiler geliştirebilir mi? Mesela;

- ○ **12-13 aylık→ Arkadaşlarının yaptığı oyuncak bebeğe sarılma, oyuncak bebeği sevme gibi basit hareketleri taklit eder.**

- **2 yaş→ Diğer çocuklara sempati gösterir.**

- **2+1/2 yaş→ Diğer çocukların araba, bebek ya da Legolarıyla oynar.**

- **3 yaş→ Diğer çocukları yönlendirir. Yönergeler verir. Onlarla evcilik gibi hayali oyunlar oynar.**

- **3+1/2 yaş→ en az seviyedeki çatışma ve destekle, diğer çocuklarla yardımlaşarak oynar.**

- **4 yaş→ Kendinden küçükleri korur.**

- **4+1/2 yaş→ Kutu, kart ya da tahta oyunlarında basit oyun kurallarını takip eder.**

- **5 yaş→ Çocuklar arasında lider konumuna bürünür.**

☐ c) Diğer İnsanlarla eğlenme, ilgilerini ya da başarılarını kendiliğinden paylaşma arayışı içinde olmama (Örn: İlgilendiği nesneleri göstermeme, getirmeme ya da belirtmeme).

Diğer insanlarla ilgilenir mi? Beğendiği, ilgilendiği, sevdiği, onu mutlu eden bir şeyi veya başarılarını kendiliğinden başkalarıyla paylaşır, onlara anlatır mı? Mesela;

- **Çocuk ilgisini çeken bir şey olduğunda onu işaretle gösterir mi ya da etrafındakilerin de dikkatini ilgilendiği şey üzerine çekmeye çalışır mı?**

- **Yeni bir oyuncağı olduğunda bunu etrafındaki yetişkin ya da çocuklara gösterir mi?**

☐ d) Toplumsal ya da duygusal karşılıklar vermeme

1) **Toplumda yaşanan iyi, kötü, üzücü, sevindirici olayları anlayarak uygun davranışta bulunur mu? Ne yapar?**
   - **Evet**
   - **Hayır**

2) **Karşısındaki kişinin duygularını ve hareketlerini anlayarak uygun şekilde davranır mı? Mesela;**

- Birisinin üzgün olduğunda sessizleşerek o kişinin üzüntüsünü paylaşır mı ya da yanağını okşayarak, öperek o kişiyi teselli etmeye çalışır mı?

- Annesinin çok kızgın olduğunu fark ettiğinde, jestlerle veya sessizleşerek kendini affettirmeye çalışır mı?

- Yaralandığında "Uf olmuş" denince anlar mı? "Gel öpelim, geçsin" deyince yaralı bölgesini uzatır mı? Başkası yaralandığında aynı tepkileri gösterir mi?

2) Aşağıdakilerden en az birinin varlığı ile kendini gösteren iletişimde nitel bozulma:

☐ **a) Konuşulan dilin gelişiminde gecikme olması ya da hiç gelişmemiş olması (El, kol, ya da yüz hareketleri gibi diğer iletişim yollarıyla bunun yerini tutma girişimi eşlik etmemektedir.)**

Konuşma problemi ya da gecikmesi var mı?

- 2 aylık→ ah, eh, uh gibi sesler çıkarır.

- 6 aylık→ Agulama görülür.

- 7-8 aylık→ da, ba, ga, ka, ma; ma-ma, da-da, an-ne, ba-ba sesleri çıkarır.

- 12 aylık→ anne, mama, baba der.

- 15 aylık→ anne, mama veya babanın yanında 2 kelime daha söyler.

- 18 aylık→ nesne isimleri olarak 5 ya da daha fazla kelime kullanır. En az 10 kelimesi vardır.

- 24 aylık→ En az 50 kelime anlar ve kullanır.

- 36 aylık→ 100 kelime anlar ve kullanır.

❑ **b) Konuşması yeterli olan kişilerde, başkalarıyla söyleşiyi başlatma ya da sürdürmede belirgin bir bozukluğun olması.**

Çocuğun konuşması yeterli ise, başkalarıyla söyleşiyi başlatma ya da sürdürmede belirgin bozukluk var mı?

- ⭘ **Çocuk başkalarıyla sohbet etmek ya da konuşmak için bir girişimde bulunuyor mu?**

- ⭘ **Başkası tarafından başlatılmış bir sohbete devam etme çabası gösteriyor mu? Yoksa arkasını dönerek ya da başka şeylerle uğraşarak umursamaz davranıp ilgisiz mi kalıyor?**

❑ c) Basmakalıp ya da yineleyici ya da özel bir dil kullanma

Sürekli başkalarının söylediklerini veya TV ve reklamlardan duyduklarını tekrar ediyor mu?

- ▪ **Evet**
- ▪ **Hayır**

❑ d) Gelişim düzeyine uygun çeşitli, imgesel ya da toplumsal taklitlere dayalı oyunları kendiliğinden oynayamama

İmgesel ya da toplumsal taklitlere dayalı oyunları gelişim düzeyine uygun olarak kendiliğinden oynayabiliyor mu? Mesela;

- ⭘ **4 aylık→ Yüzüne gülümsenildiğinde gülümser.**

- ⭘ **8 aylık→ "Ce-e" oyunu oynar**

- ⭘ **9 aylık→ "tel sarar" oynar. "bye-bye" demek için el sallar.**

- ⭘ **12 aylık→ Bebeğine sarılma, sevme gibi basit taklitler yapar.**

- ⭘ **14 aylık→ Öpücük verir.**

- ⭘ **15 aylık→ Gülümseme, ses çıkarma ve jestleri karşılıklı yapar.**

- ⭘ **18 aylık→ Basit sembolik oyunları oynar (Oyuncak bebeği beslemek gibi)**

○ **3 yaş→ Sembolik oyunlarda öğretmen, anne, pilot vs. rolleri bürünür.**

3) Aşağıdakilerden en az birinin varlığı ile kendini gösteren davranış, ilgi ve etkinliklerde sınırlı, basmakalıp ve yineleyici örüntülerin olması:

❑ **a) İlgilenme düzeyi ya da üzerinde odaklanma açısından olağandışı, bir ya da birden fazla basmakalıp ve sınırlı ilgi örüntüsü çerçevesinde kapanıp kalma**

Normalden fazla ilgilendiği, sürekli yapmaktan hoşlandığı, müdahale edilince aşırı tepki gösterdiği sınırlı ilgi alanları var mı? Mesela;

○ **Arabalar**

○ **Gazoz kapakları**

○ **Pullar**

○ **Gazete küpürü toplama gibi.**