Journal of Autism and Developmental Disorders, Vol. 31, No. 2, 2001

Reply to Charman *et al.*'s Commentary on the Modified Checklist for Autism in Toddlers

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We appreciate the thoughtful and important points raised by Charman *et al.* (2001) in their commentary on our paper, and would like to provide a few responses about these points.

With regard to clinic versus population samples, we agree that it is most important to examine item and total scale characteristics separately for unscreened samples as well as for children referred for early intervention but not yet evaluated or diagnosed. We are continuing to recruit many more children from pediatric practices and expect to have a sufficient sample to analyze these groups separately. It seems unlikely that specific predictive items will turn out to be quite different for the two populations, since there is so much agreement between items found predictive on the CHAT, the M-CHAT, and in such studies as Lord's (1995), but this is an empirical question to be answered by future screening studies.

With regard to scale characteristics for the CHAT 9 items, we were indeed interested in the classificatory power of the 9 items as a set, since one screening criterion would be a certain number of failed items on the total scale; the discriminant analysis should generally give higher weights to the items that individually discriminate the two groups. In the M-CHAT 22, we had the CHAT "filler" items plus an additional one (Does your child walk?) and were interested in the classificatory power of these items as a total set. The question concerning the classificatory power of the CHAT's two major risk factors, pretend play and protodeclarative pointing, was a very interesting one. Although Charman *et al.* are certainly right in suggesting that two questions alone would not be expected to provide a reliable screen, we did investigate the performance of these two items alone (Items 5 and 7) in our database, as they suggested. Results indicate the frequencies shown in Table I.

Thus, the two items work about as well as could be expected for any set of two items. Failing both items detects 18 of the 39 children with autism, or 46% sensitivity (this number would be expected to drop when missed children are found on later follow-up).

The question of whether to use a parent report only or a parent report along with health professional observation is extremely important. Parent report has the advantages of the extensive knowledge parents have of their children, their observation of their children in multiple settings, and the fact that parental concerns are often found to be justified (Glascoe, MacLean, & Stone, 1991). On the other hand, parental inexperience, cultural expectations or attitudes about reporting problems, and emotional bias (such as denial or overconcern) can distort reporting. The U.S. health care system lacks the home health visitor system enjoyed in the U.K. A health professional's observation would therefore have to be done in the pediatrician's office. This observation would have the advantage of a large base for normative comparison and a more objective attitude (although clinical impression formation in detecting developmental disorders has been found to be far from objective; Glascoe & Dworkin, 1993).

On the other hand, pediatricians have been found to underdetect very significantly both cognitive and emotional/behavioral disorders in young children (Glascoe & Dworkin, 1993; Rapin, 1996); no doubt,

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0162-3257/01/0400-0149$19.50/0

Table I. Performance on Items 5 and 7 Alone

Items failed	No follow-up	Phone follow-up	Evaluated nonautistic	Evaluated autistic
0	1,124	51	9	5
1	15	18	8	16
2	0	5	2	18

factors that contribute to this underdetection include failure to use standardized tests and the reliance on clinical impression only, the restricted sample of behavior obtained, and the atypical behavior of children in a doctor's office. False positives (overreporting of atypical behavior) by parents are of less concern to us than false negatives, because the structured telephone follow-up eliminates most of the false positives. Missed children, however, are a major concern, and the extent of this on the M-CHAT will not be known until our own follow-up study is complete. One safeguard that did identify three children with autism was our request to early intervention providers and pediatricians to flag children about whom they were concerned for telephone contact and possible evaluation. We agree that expression of parental concern alone is sufficient indication for referral for developmental evaluation or careful review of the checklist by pediatrician, nurse, or EI provider. In fact, the ideal screening process would probably be to have the screening instrument administered by the health professional to the parent while observing the child. Until pediatric practice changes, however, parent report *or* red flagging by concerned health providers will probably be the best procedure for maximum sensitivity.

With regard to item selection, we did expect that early social communication and especially joint attention items would be most predictive, but included repetitive and sensory behaviors to test their discriminating power. Several of these were dropped when we went from the 30-item to the 23-item checklist and the remaining ones are not among the most discriminating items. We agree, therefore, that these behaviors may not appear in very young children, and perhaps should not be required for diagnosis of autism or PDDNOS at this age. We also agree that different items would be expected to identify children at different ages, and that therefore a screening instrument should be specific to a fairly narrow age band.

With regard to population coverage, all participating pediatricians are requested to administer the checklist to every child at the 24-month visit. To our knowledge, few if any parents have refused to fill out the checklist and the number of families not included is based on office staffing on the day of visit and other random factors, but the percentage of eligible children on whom we have checklists is not yet known.

The optimal age of screening is indeed a difficult question. Screening at 18 months has the advantage of being perhaps the earliest reasonable age for large-scale autism screening and providing the earliest opportunity for intervention, and we did begin our study as an 18-month screening. We moved the screening to the current 24 months for two main reasons: the increased willingness of pediatricians to screen and raise developmental concerns about 24-month-olds, and the problem of regression between 18 and 24 months. The fact that almost one third of Baird *et al.*'s (2000) false negatives were missed because of regression after 18 months indicates that screening at 24 months may increase sensitivity significantly. The point raised by Charman *et al.* about children on the spectrum who would be missed at 24 months because of development of new skills is a very interesting one. This is perhaps more applicable to developmental acquisitions such as language, which proved a weak discriminator, than to joint attention and social communication items such as responding to name, interest in other children, and protodeclarative pointing, which may reflect affiliative motivation and remain problematic in autism at later ages.

We particularly appreciate Charman *et al.*'s final point, that using screening instruments such as the CHAT and M-CHAT can raise the awareness of adults working with young children and sensitize them to early warning signs. Effectively increasing such awareness may be as important for early detection as implementing a standardized screening.

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