CLINICAL SIGNIFICANCE OF TEST ITEM REFUSALS AMONG YOUNG CHILDREN

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Abstract

The aim of the present study was to describe the incidence of refusal to perform a task at neuropsychological assessment at 3.5 years of age, investigate its correlates assessed both concurrently and at earlier ages, and track its stability by analysis of refusals at a younger age. Refusals were analyzed in respect to the children's neuropsychological profile, overall cognitive level, linquistic skills, and behavioral characteristics. The participants were 124 children whose development has been followed from birth in the Jyväskylä Longitudinal Study of Dyslexia (JLD). The present analyses used both concurrent data (neuropsychological test data and parental ratings), and cognitive and linguistic data collected earlier in toddlerhood (ages 2.5, and 3.0). In line with the literature non-cooperative test-taking was found to be relatively common at a standardized assessment at this young age, and there was continuity in refusals from one age to another. A tendency for test refusals was related to compromised scores on the neuropsychological profile and prior linguistic skills. Incidence of refusals varied across the administered subtests in a predictable fashion so that missing data due to refusal was more common in tasks requiring verbal production. No group level differences emerged between children at risk for dyslexia and the children without familial risk for dyslexia. The study draws attention to the clinically significant phenomenon of refusals among young children and points out its relevance when drawing conclusions on children's developmental skills and prognosis. The possibility that a refusal reflects the child's poor underlying skills and a strategy for avoiding imminent failure in the task rather than non-compliance in the sense of oppositional behavior, should always be carefully deliberated in making interpretations of tests scores of young children.

Key words: test-taking behavior, refusal, neuropsychological assessment, children

Tiivistelmä

Tutkimuksen tarkoitus oli kuvata 3 ½ - vuotiaiden lasten tutkimustilanteessa esille tulevaa vastustusta saattaa annetut tehtävät loppuun, selvittää vastustukseen liittyviä taustatekijöitä ja sen jatkuvuutta kehityksellisestä arvioinnista toiseen. Tutkimuksessa selvitettiin kieltäytymisen yhteyttä lapsen neuropsykologiseen profiiliin, yleiseen kehitykselliseen tasoon, kielellisiin kykyihin sekä vanhempien raportoimiin käyttäytymispiirteisiin. Tutkimukseen osallistui 124 lasta, joiden kehitystä on seurattu syntymästä alkaen Lapsen kielen kehitys ja dysleksiariski - pitkittäistutkimuksessa Jyväskylässä. Pitkittäistutkimus mahdollisti lasten kehityksen seuraamisen kolmessa ikävaiheessa (2 ½ v., 3 v. ja 3 ½ v.), joiden aikana kerättiin tietoa lapsen yleisestä tiedollisesta ja taidollisesta sekä kielellisestä kehityksestä, neuropsykologisesta profiilista sekä käyttäytymispiirteistä. Aiempien tutkimusten tapaan todettiin pienten lasten kieltäytymistaipumuksen olevan varsin yleistä vakioidussa tutkimustilanteessa. Kieltäytymisessä havaittiin jatkuvuutta tutkimusvaiheesta toiseen ja sen todettiin olevan yhteydessä neuropsykologiseen profiiliin ja kielellisten kykyjen tasoon. Kieltäytyminen oli yleisintä kielellistä tuottamista edellyttävissä tehtävissä. Dysleksiariskin omaavilla lapsilla ei esiintynyt muita lapsia useammin vastustavaa käyttäytymistä tutkimustilanteissa. Kieltäytyminen saattaa varsinaisen yhteistyöhaluttomuuden sijasta toimia strategiana, jonka avulla lapsi pyrkii välttämään vaikeaksi kokemaansa tehtävää ja ennakoimaansa epäonnistumista. Tutkimustilanteessa ilmenevä vastustuskäyttäytyminen on kliinisesti merkittävä ilmiö, joka tulisi huomioida tehtäessä päätelmiä lasten kehitystasosta ja ennusteesta.

Avainsanat: testikäyttäytyminen, kieltäytyminen, lasten neuropsykologinen arviointi

Esipuhe

Haluan esittää kiitokseni kaikille niille, jotka ovat mahdollistaneet tämän tutkimuksen valmistumisen. Kannustavasta ja kärsivällisestä ohjauksesta kiitän lämpimästi ohjausryhmääni, johon kuuluivat dosentti Timo Ahonen, PsT Tuija Aro sekä PhD Anna-Maija Poikkeus. Suuri kiitos kuuluu myös kaikille "Lapsen kielen kehitys ja geneettinen dysleksiariski"- pitkittäistutkimuksen parissa työskennelleille entisille työtovereilleni. Ilman heidän kanssaan tehtyä yhteistyötä tämän tutkimuksen toteuttaminen olisi ollut mahdotonta. Dosentti Marit Korkmania kiitän tekstin rakentavasta kommentoinnista. Asko Tolvanen on ollut korvaamaton tuki tilastollisia analyysejä koskevissa ongelmatilanteissa ja Lauri Viljanto on ratkonut useita aineiston keruuseen liittyneitä käytännön pulmia. Kiitokset myös Haukkalan Lastenpsykiatrisen hoitolaitoksen kannatusyhdistykselle, jonka myöntämä apuraha edisti merkittävällä tavalla työni valmistumista.

Introduction

Reluctance to cooperate during standardized psychological assessment is an aspect of test-taking behavior that is well known to those working with young children suspected of having developmental disorders. The term refusal refers to a child's tendency to decline to try or complete test items. Refusal during testing jeopardizes the reliability of the assessment, and may prevent the calculation of test scores or developmental indices because of missing data. Clinical decision making regarding the child's developmental status, thus, is hampered. The clinician can not simply overlook the child's unwillingness to attempt certain tasks since it is possible that it reflects the child's deficiencies in skills tapped in the task.

Surprisingly few studies have addressed the question of non-cooperative behavior during standardized assessment, and reports throwing light on this issue date back to the late 1970's and early 1980's (Bishop & Butterworth, 1979; Ounstedt, Cockburn, & Moar, 1983). Ounstedt and colleagues (1983) studied the developmental achievement of 203 children at 4 and 7 years with a test battery covering gross motor, fine motor and visuomotor skills as well as tests of expressive language and comprehension. Of the 4-year-olds 18% did not cooperate fully, and for these children developmental standard scores could not be calculated. Highest refusal rates were found in the domain of gross motor development. In those domains in which the non-cooperative children did achieve a score, they had lower scores than other children, and this tendency continued up to the age of 7 years. Similarly, using a sample of 169 four-year-old children from normal population Bishop and Butterworth (1979) reported that 18% of children were unable to complete some or all of the Wechsler Preschool and Primary Scale of Intelligence subtests (WPPSI; Wechsler, 1963) due to non-cooperative behavior. They also found that children who had refused to cooperate at the age of 4 years had lower test scores at the follow-up at 8 years than the other children.

Further evidence for the links between test-taking behaviors and test scores has been reported by Roth, Eisenberg and Sell (1984). They concluded that there is a close, although not a simple relationship between test-taking behaviors and mental test scores; test-taking behavior influenced the test scores of high risk infants (prematurely born children) but less strongly the scores of children with no such risk. The association between non-cooperative test-taking behavior and low test scores may,

thus, be relevant especially when interpreting test scores for children with developmental risks.

The studies mentioned above unfortunately provide little information on the processes or mechanisms behind non-cooperative test taking behavior. On one hand refusals can be seen to reflect a child's cognitive capacities, especially level of self-control. The ability to voluntarily execute control over one's own behavior even in the absence of external monitors is believed to develop gradually during the first three years of life along with the growth of higher order cognitive (Vaughn, Kopp, & Krakow, 1984). Language particularly is a strong predictor of individual differences in self-control during early childhood (Vaughn et al., 1984).

In clinical practice, children's refusal to cooperate is often attributed to the child's behavioral characteristics. Abkarian, King, and Krappes (1987) described a case of a three-year-old boy who was referred to speech-language assessment but was reluctant to cooperate, and no basal could be established in tests assessing communicative skills. The father characterized the boy as shy and apprehensive, and the diagnostic team noted strong separation anxiety. The boy was unresponsive to both verbal and nonverbal prompts by the clinicians and was very fidgety. Case reports such as this seem to provide support to the view of an association between child's stable behavioral traits characteristics and test-taking behavior. Some empirical evidence also suggests that test taking behaviors of high risk infants are related to their temperamental characteristics (Roth et al., 1984). Such a connection, however, seems to be much weaker for children with no developmental risks (Frankel & Bates, 1990; Roth et al., 1984).

The present study describes the incidence of refusals at standardized neuropsychological assessment in early childhood, analyses the correlates and stability of such behavior, and addresses the question whether refusal to complete tasks can be considered a sign of developmental risk. More specifically, our *first aim* was to investigate whether children with frequent refusals differ from cooperative children on their neuropsychological abilities at 3.5 years of age, and to determine whether there are differences in refusal rates by the assessed domains (e.g., language, attention/executive functions, memory and learning), or by the demands that the tasks place on the child (verbal vs. nonverbal subtests; recognition vs. active output).

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Secondly, we analysed whether subgroups of children characterized by different rates of refusals differ in their earlier language and cognitive skills (overall expressive and comprehensive language at 2.5 years, and cognitive level at 3.0 years), and whether high refusal rate is more common among children at risk for dyslexia than among children without familial risk for dyslexia. *Thirdly*, we investigated the assumption concerning associations between tendency for test refusal and behavioral characteristics (e.g., anxiety, inattention, aggression) by analysing whether the subgroups manifesting different levels of refusal differ in parental ratings of child behavior. Our *fourth* goal focused on the continuity of non-cooperation; the follow-up design provided the rare opportunity to analyse whether children with frequent refusals have a history of such behavior manifested at structured assessments also at an earlier age.

Method

Participants

124 children (70 boys and 54 girls) whose development has been followed from birth attended a neuropsychological assessment at the age of 3.5-year. The children and their families participate in the Jyväskylä Longitudinal Study of Dyslexia, (JLD; Lyytinen, 1997). The aim of this prospective study is to identify early precursors of dyslexia following two groups of children from birth up to school age. The participants comprise altogether 110 children with at least one dyslexic parent and familial background of reading or spelling difficulties, and a matched control group of 93 children.

The subjects of the present study were children who had attended the 3.5-year neuropsychological assessment by August 1998, and for whom parental ratings completed around the child's 4th birthday were also available. Half of the children of this subsample (n = 63) have familial history of developmental dyslexia (= at risk group), and the other half (n = 61) are from families without such background (= control group).

Design

Refusal to complete tasks at 3.5 years of age was analyzed with respect to the children's concurrent neuropsychological profile and behavioral traits, and their prior cognitive development (3.0 years) and language skills (2.5 years). Total number of participants for the statistical analyses ranged from 92 to 124 participants due to missing data.

Variables

The Developmental Neuropsychological Assessment (NEPSY; Korkman, Kirk, & Kemp, 1997, 1998). Neuropsychological assessment was undertaken at the age of 3.5 years in a laboratory setting. The NEPSY is a comprehensive instrument designed to assess neuropsychological development in pre-school and school-aged children. It involves five functional domains: Attention/Executive Functions, Language, Sensorimotor Functions, Visuospatial Processing, and Memory and Learning. The selection of subtests for the purposes of this study was based on the standardization version of the NEPSY since the final version was not yet published at the beginning of this study. At 3.5 years 14 subtests were administered.

For the purposes of this study the children were classified into three test-taking groups according to the number of subtest refusals they had at the 3.5-year assessment. Test-taking on each subtest was classified into 11 categories (see Table 1). Classification took place immediately after the assessment by the examiner, and it was confirmed from videotapes before data analyses. For the purposes of this study the 11 categories were suppressed into the following three categories: 1) Test completed; 2) Test not completed due to child's refusal (test-taking categories belonging to the new category 2 are marked with an asterisk in Table 1); and 3) Test not completed but due to other reasons than refusals (e.g., omitted subtests). Refusal was defined as non-cooperative behavior by the child that prevented the continuation of a subtest so that the testing had to be dropped before the discontinue rule was met (e.g. the child responded to the first three items of a subtest but refused to try next items even when encouraged to continue).

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Children who did not refuse any subtests formed the *Highly cooperative group* (n =53, 43%). The children with one or two subtest refusals formed *the Cooperative group* (n = 51, 41%). Using the cut-off criteria of one standard deviation, children with three or more refused subtests were included in the *Non-cooperative group* (n = 20, 16%). There were 14 boys and 6 girls in the non-cooperative group, and 11 of the children belonged to the control group, and 9 to the at risk group.

TABLE 1 Classification of test-taking behaviour.

Category
Testing was completed
1. Subtest completed
2. Subtest completed but reliability rating of the data is poor (child unmotivated, inattentive, or exhausted)
Test administration was interrupted before discontinue rule was fulfilled
3. Child refused to continue with the subtest (oppositional attitude) *
4. Subtest was interrupted due to child's off task behaviour (e.g., hyperactive, impulsive or hyperkinetic behaviour) *
5. Subtest was interrupted due to child's lack of motivation or attention*
Test administration was given up after initial attempts
6. Child refused to try any of the test items (oppositional attitude) *
7. Testing had to be given up due to off task behaviour (e.g., hyperactive, impulsive or hyperkinetic behaviour) *
8. Testing had to be given up because child did not attend to the test (child unmotivated, inattentive, exhausted) *
Test was not administered
9. Subtest was omitted due to child's hyperactive, impulsive or hyperkinetic behaviour in other subtests
10. Subtest was omitted due to child's lack of motivation or attention in the testing situation
11. Subtest was omitted due to lack of time or technical problems

* Test-taking behaviour classes included in the "Test not completed due to child's refusal" category

The Bayley Scales of Infant Development (BSID; Bayley, 1993) The BSID were administered in the laboratory setting at 3.0 years.The BSID provides a Mental Development Index (MDI), and a Psychomotor Development Index (PDI). The test provides also a Language Facet score (BSID Language sum) which at 3.0 years comprises 14 items tapping the child's verbal comprehension and expressive language skills. For the purposes of the present study motor and mental item refusal rates were also calculated.

The Reynell Developmental Language Scales (RDLS; Reynell & Huntley, 1987) The RDLS were administered to the children in their homes at the age of 2.5 years. The RDLS provides separate measures of Verbal Comprehension and Expressive Language. The Expressive Language score is based on the following three subscales: Structure, Vocabulary, and Contents. In our analyses both the composite scores (raw score sums) and the subscale scores were employed.

The Behavior Assessment System for Children (BASC; Reynolds & Kamphaus, 1992) The BASC Parent Rating Scale for preschoolers (131 items) was completed by the mother of the child at the age of four years. At this age range the BASC involves the following ten subscales: Adaptability, Aggression, Anxiety, Attention Problems, Atypicality, Depression, Hyperactivity, Social Skills, Somatization, Withdrawal. In addition, scores can be summarized into three composites: Externalizing Problems, Internalizing Problems, and Adaptive Skills. In the present study, the subscale and composite scores were (raw score sums) used to analyze whether rate of refusal in the neuropsychological assessment is associated with the child's behavioral characteristics.

Data analysis

One-way analysis of variance (ANOVA) was used to analyze differences between the test-taking groups in the neuropsychological profile, overall cognitive level, linguistic skills, behavioral characteristics, and the BSID refusal rates. Scheffé's Multiple Range Test was used in post hoc analyses. Subtest refusal frequencies were analyzed using the nonparametric Friedman test.

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Results

Refusal by the subtests, developmental domains, and modality and type of output in the
tasks

The mean of refused subtests across all 14 NEPSY subtests was 1.3 (SD = 1.7). The
number of refused subtests per child ranged from 0 to 9. Frequencies of refusals by
subtests were analyzed using the Friedman test. Analyses revealed significant
differences between the subtests, Chi-Square (13) = 114.8, p = .000. In six out of 14
subtests more than 10% of the children refused to complete the subtest (Table 2.). The
percentage of refusals was highest in the Sentence repetition subtest (29.8%, 37
children), and it was lowest in the Visuo-motor precision subtest in which there were
no refusals at all.

TABLE 2 The percentages of refusals by subtests.

NEPSY subtests by domain at 42 months assessment	Percentage and number of children not completing a subtest due to refusal	
Attention/Executive Functions		
Visual Attention	5.7 %	(n = 7)
Language		
Body Part Naming	5.7 %	(n = 7)
Phonological Processing	2.4 %	(n = 3)
Comprehension of Instructions	3.2 %	(n = 4)
Repetition on Nonsense Words	12.9 %	(n = 16)
Sensorimotor Functions		
Visuomotor Precision	0 %	(n = 0)
Finger Discrimination	21.0 %	(n = 26)
Visuospatial Functions		
Design Copying	4.8. %	(n = 6)
Block Construction	13.7 %	(n = 17)
Recognition of Pictures	2.4. %	(n = 3)
Memory and Learning		
Narrative Memory	9.7 %	(n = 12)
Sentence Repetition	29.8 %	(n = 37)
Memory for Faces	12.2 %	(n = 15)

Significant differences emerged in average refusal rates between the five
NEPSY domains Attention, Language, Sensorimotor functions, Visuospatial
processing, and Memory and Learning, Chi-Square (3) = 34.8, p =.000. Post hoc

testing (Scheffe's Multiple Range Test) indicated that the domain of Memory and Learning had more refusals than all the other domains (p-values ranging from .000 to .012). The other four domains did not differ in the number of refusals.

A qualitative reclassification of the subtests was conducted by crosstabulation of the modality (verbal vs. nonverbal) and type of output (recognition vs. active output) that the tasks demanded. The subtests were, thus, classified into four categories: 1) Verbal subtests requiring verbal output; 2) Verbal subtests based on recognition; 3) Non-verbal subtests requiring own production, and 4) Non-verbal subtest based on recognition. Calculation of mean percentages for these groups revealed that refusals were highest for Verbal subtests requiring verbal output, and lowest for Verbal subtests based on recognition, Chi-Square (3) = 40.919, p =.000 (see Table 3.). Post hoc testing revealed that Verbal subtests requiring verbal output differed from all other types of subtests in the number of refusals (p-values ranging from .000 to .006).

TABLE 3 Qualitative classification of subtests and mean percentages of refusals by category.

Category	Tests included	Mean percentages of refusals (Range)	
Verbal subtests requiring verbal output	Body Part Naming Repetition on Nonsense Words Narrative Memory Sentence Repetition	14.5 %	(5.7 – 29.8 %)
Verbal subtests based on recognition	Phonological Processing Comprehension of Instructions	2.9 %	(2.4 – 3.2 %)
Non-verbal subtests requiring own production	Block Construction Visuomotor Precision Design Copy	6.2 %	(0 – 13.7 %)
Non-verbal subtest based on recogntion	Visual Attention Finger Discrimination Recognition of Pictures Memory for Faces	10.3 %	(2.4 – 21.0 %)

<u>Neuropsychological profiles of the test-taking groups</u>

In order to compare the Highly Cooperative, Cooperative and Non-cooperative groups on performance in the neuropsychological tests, mean of z-scores were calculated for all completed subtests (only subtests in which the child fully cooperated were included in the mean z-score). ANOVA revealed significant differences between the groups in the mean z-scores (F (2, 121) = 6.16, p = .003). Post hoc testing (Scheffé's Multiple Range Test, p = .004) indicated differences between the Highly cooperative and Non-cooperative groups in the direction that the mean of z-scores was significantly higher for the Highly cooperative group.

   Comparisons of the z-scores for individual subtests using ANOVA (see Figure 1) revealed significant differences between the groups in three subtests; Block Construction (F (2, 85) = 3.58, p = .03), Visual Closure (F (2, 111) = 8.49, p = .000), and Narrative Memory (F (2, 103) = 3.88, p = .02). A similar trend, although not a statistically significant different, in the same direction was found in Comprehension of Instructions (F (2, 108) = 2.80, p = .066) and Phonological Processing (F (2, 109) = 2.96, p = .056). Scheffé's Multiple Range Test indicated that the Highly Cooperative group outperformed the Non-cooperative group in the Block Construction (p = .04), and both the Highly Cooperative and the Non-cooperative groups outperformed the Cooperative group in the Visual Closure subtest (p = .004 and, p = .005 respectively). No differences were found between the three groups in the Narrative Memory subtest.

FIGURE 1 Neuropsychological profiles of the test-taking subgroups.
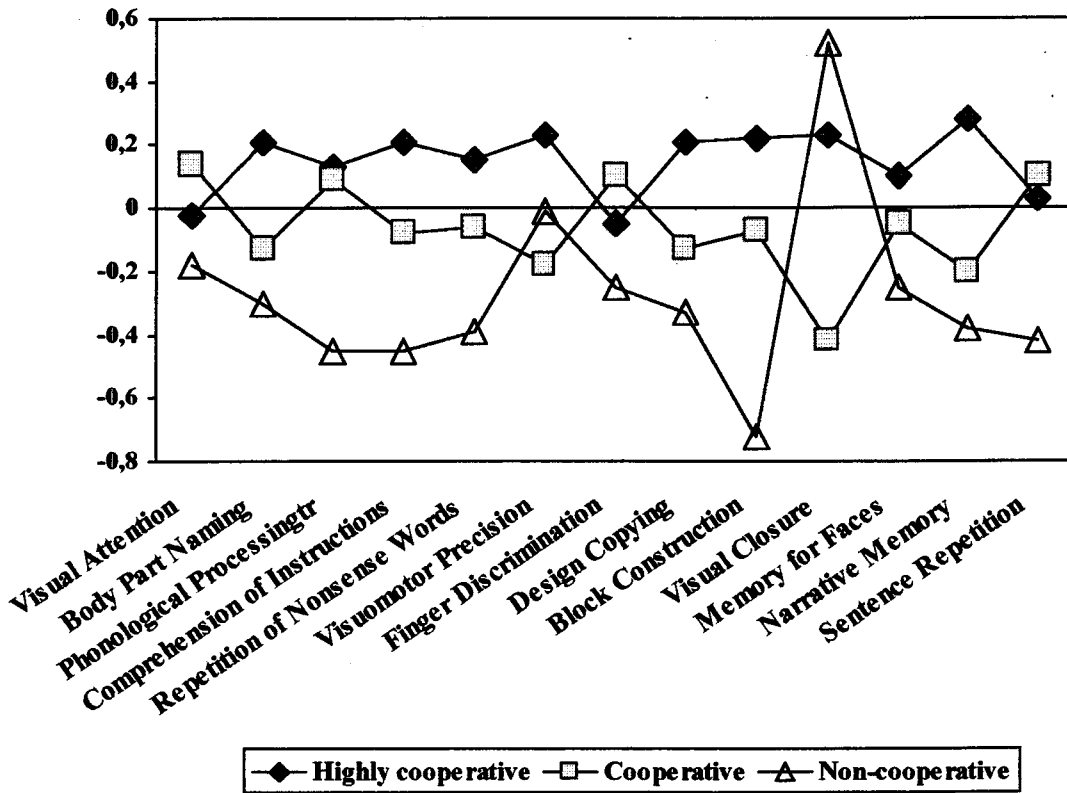
Comparison of prior language and cognitive skills and analysis of risk status in the test-taking groups

Two of the Reynell Developmental Language Scales -scores at 2.5 years of age, Verbal Comprehension and Vocabulary (a subscale of the Expressive Language scale) indicated group differences between the test-taking subgroups in ANOVA, $F (2, 120)$ = 6.87, p = .001), and $F (2, 120) = 4.95$, p = .009), respectively. Post hoc testing (Scheffé's Multiple Range Test) revealed that verbal comprehension of the Non-cooperative group was compromised compared to both the Highly cooperative (p = .002) and the Cooperative (p = .006) groups. Vocabulary scores of children in the Non-cooperative group were lower compared to those of children in the Highly cooperative group (p = .012).

Comparison of the three test-taking groups on the BSID-II cognitive and psychomotor indices at 3.0 years of age revealed no differences in the overall MDI or the PDI. However, the Non-cooperative group had significantly lower Language Sum than the Cooperative group, ANOVA (F (2, 89) = 4.74, p < .05), Scheffé's Multiple Range Test p < .05.

Children with and without risk for dyslexia were equally distributed in the test-taking groups. Thus, children at risk for familial dyslexia were no more likely be non-cooperative at neuropsychological assessment than children in the control group. Also, within the Non-cooperative group children with and without familial dyslexia risk did not differ from each other in either behavioral characterists or in language skills.

Behavioral characteristics of children in the test-taking groups

One significant difference emerged in the ANOVAs comparing the test-taking groups on maternal ratings of behavioral characteristics (F (2, 106) = 3.94, p = .03). Post hoc analyses (Scheffé's Multiple Range Test) indicated that children in the Non-cooperative group had higher scores on the aggression subscale than the Cooperative children (p < .04). Analyses of the BASC composite scores revealed no statistically significant differences between the the three groups, however, there was a trend (p = .062), towards higher extent of externalizing behavior (sum of items on the Hyperactivity, Aggression, and Conduct Problem Scales) for the Non-cooperative children.

Continuity of refusals

One way ANOVA revealed significant differences between the Highly cooperative, Cooperative, and Non-Cooperative groups in the number of refusals in the Bayley Scales of Infant Development assessment at the age of three for both cognitive (F (2, 89) = 6.7, p = .002) and motor items (F (2, 89) = 6.9, p = .002). Post-hoc analyses (Scheffé's Multiple Range Test) revealed that Highly cooperative children had fewer refusals than the Non-cooperative children both on the BSID cognitive (p = .003) and motor (p = .007) items (see Table 4.), fewer refusals on the motor items than the

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Cooperative children (p = .02). The Cooperative children had fewer refusals than the Non-cooperative children on cognitive items (p = .02). Thus, children who refused many of the NEPSY subtests at 3.5 years of age had a history of refusals at the preceding developmental assessment six months earlier.

TABLE 4 Comparisons of the number of refusals on BSID assessment between the Highly cooperative, Cooperative and Non-cooperative children in NEPSY.

Variable	Highly Cooperative Group (N = 45)		Cooperative Group (N = 32)		Non-cooperative Group (N = 15)	
	M	SD	M	SD	M	SD
BSID mental items refused at 36 months	1.1 *	1.8	1.4 **	1.4	3.2	3.2
BSID motor items refused at 36 months	1.1 ***	1.7	2.5	2.7	3.2	2.1

* Indicates a significant (p<.01) difference between the Highly Cooperative and Non-cooperative groups,** Indicates a significant (p<.05) difference between the Cooperative and Non-cooperative groups, *** Indicates a significant difference between the Highly Cooperative and Cooperative groups (p<.05) and the Highly Cooperative and Non-cooperative groups (p<.01)

Discussion

The results of this study indicated that occasional refusals are rather common in standardized assessments of young children, and they often seem to be the child's normal reaction to tasks that are beyond their capacity or comprehension. A strong tendency for non-coperative test taking, on the other hand, was found to be associated with lowered scores on neuropsychological assessment. Children with a high number of test refusals (Non-cooperative group) had lower scores also on developmental and/or language tests than children with only a few (Cooperative group) or no test refusals (Highly cooperative group) both concurrently and at younger ages. This evidence allows the conclusion that there are differences in the cognitive abilities of non-cooperative children compared to those children that are fully cooperative even in the domains in which the children are able or willing to complete the tasks.

A more detailed analysis of the neuropsychological test profiles revealed that children in the non-cooperative group had more problems than children in the highly cooperative group in visuospatial processing. A tendency for language related problems was supported by the lower overall language and comprehension in the non-cooperative group at 3.0 and 2.5 years. These results are in line with those by Ounsted et al. (1983) which indicated lowered developmental scores in the areas of language, comprehension, and visuomotor processing for non-cooperative children. The clinical implication of this finding is that especially children with language related developmental disorders are prone to non-cooperative -test-taking which may prevent the clinician from obtaining a valid and reliable test profile.

This study also addressed the question of whether behavioral characteristics of the children are associated with variation in the refusal rate at neuropsychological assessment. The results gave only little support for this kind of a link. The parents of the non-cooperative and cooperative children rated their children in the same way with one exception; non-cooperative children were rated as more aggressive compared to highly cooperative children. Some of the statements included in the aggression scale seem to fit well the behavior exhibited by the non-cooperative children at assessments sessions; "Argues when denied own way", "Talks back to parents", "Orders others around" and "Argues with parents". This finding raises the question whether the

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parents of non-cooperative children face non-compliant behavior also at home, and may not be very surprised to learn that their child is unmotivated in an assessment session with a strange adult. Parents can yield important information in beforehand to the clinician, and this knowledge could be utilized to plan the assessment session so that it is as motivating as possible for the child who easily gets frustrated.

Previous studies have suggested that there is continuity in the test performance of children with frequent non-cooperation (Bishop & Butterworth, 1979; Ounsted et al., 1983), but the question whether non-cooperative behavior as such continues from one age or assessment to another has not been addressed. Our findings indicated a statistically significant tendency for children with frequent non-cooperative behavior to have high refusal rates also at assessments at other ages. There may, thus, be a group of children who demonstrate refusals with a high probability regardless of the situational factors of the assessment session (e.g., the test instruments used). Our results, which are in line with those by Ounsted et al., suggest that for these children refusal to cooperate may indicate a child's inability to perform a task.

Our analyses indicated that familial dyslexia risk was not associated with the rate of test refusal. Children at risk for dyslexia refused subtests as often as the children in the control group. Language skills and behavioral characteristics of children with high refusals were also unrelated to the dyslexia risk. This finding should though be taken only as preliminary, since the groups being analyzed were small. Our results contradict Roth et al.'s (1984) study that underlined the role of developmental risk in the relation of test-taking, temperament, and test scores. This difference may, however, be related to the type of risk being analyzed in the studies. In the study by Roth et. al developmental risk represented a clear-cut medical diagnosis (prematurirty) but in our own study developmental risk is defined indirectly based on genetic risk. The final analyses regarding the pontential associations between dyslexia and non-cooperative test taking need to be postponed to the time when the children in the follow-up study have reached a stage in their reading acquisition at which their reading status can be determined.

The results of this study gave support for the notion that refusals may reflect young children's general low interest to certain types of tasks. Qualitative classification of the subtests revealed that children rarely refused subtests requiring no verbal output (Comprehension, Segmentation) whereas language subtest requiring production of speech (Nonword Repetition, Sentence Repetition, Narrative memory, Body Part Naming) had most often missing data due to refusal.One common feature of the Nonword Repetition, Sentence Repetition, and Narrative memory subtests, in addition to speech production, is the lack of test materials that would help the child to maintain interest in the task for a longer time. This holds true also for the Finger Discrimination task that had one of the highest refusal rates. The finding that subtests requiring speech production were most vulnerable to refusals underlies the value of parental reports in assessing productive language of young children. There is evidence that parents are reliable and valid reporters of their child's language development (Lyytinen, 1999), and parents may thus yield important complementary information in cases were formal testing gives only limited information on child's abilities.

Our findings emphasize the relevance of taking the qualitative aspects of test-taking into account when drawing conclusions about the child's developmental status and nature of skill deficiencies. Developmental problems do not always manifest themselves as clear-cut defects in abilities but rather as subtle qualitatively different behaviors that may lead to problems with learning (Krakow & Kopp, 1983).Single episodes of refusals are common among young children, but when they are more persistent they should not be overlooked. According to our findings refusals can be linked to lowered developmental scores, and may, thus, be an indication of developmental risk. Individual test scores need to be interpreted against information obtained on the child's overall assessment profile, information on test taking and formation of rapport on previous assessments, and information provided by parents on the child's skills and behavioral traits (e.g., shyness, reluctance to changes in test type, achievement motivation, threshold for giving up, high demands set for oneself or anxiety caused by failures).

It is always a challenge for the clinician to find ways to motivate the child to demonstrate his or her best achievement. One way to aid this is by asking parents to report on the child's previous history of test-taking, and utlilize this information in the

planning of assessements. As the child may find one instrument more interesting than the other, it is ideal if the clinician has alternative instruments for tapping the same skill area at hand. Questionnaires filled by the parents are also a valuable source of information when formal testing is incomplete; unfortunately only few exist for clinical purposes. Informal assessments such as testing of limits, and applying principles of dynamic assessment are other ways to complete the holes in data; a session of free play with toys and books, for instance, is a good addition to the assessment of a non-cooperative child.

References

Abkarian, G.G., King P., & Krappes, T.L. (1987). Enhancing interaction in a difficult-
to-test child: The PPVT-TV technique. Journal of Learning Disabilities, 20 (5),
268-269.

Bayley, N. (1993). Bayley Scales of Infant Development-II. Second edition. Manual.
San Antonio: The Psychological Corporation.

Bishop, D. & Butterworth, G.E. (1979). A longitudinal study using the WPPSI and
WISC-R with an english sample. British Journal of Educational Psychology, 49,
156-168.

Frankel, K.A. & Bates, J.E. (1990). Mother-toddler problem solving: Antecedents in
attachment, home behavior, and temperament. Child Development, 61, 810-819.

Korkman, M., Kirk, U. & Kemp, S. (1997) NEPSY. Lasten neuropsykologinen
tutkimus. Käsikirja. Helsinki: Psykologien kustannus.

Korkman, M., Kirk, U., & Kemp, S. (1998). NEPSY. A developmental
neuropsychological assessment. Manual. San Antonio: The Psychological
Corporation.

Krakow, J.B. & Kopp, C.B. (1983). The effects on developmental delay on sustained
attention in young children. Child Development, 54, 1143-1155.

Lyytinen, H. (1997). In search of the precursors of dyslexia: a prospective study of
children at risk for reading problems. In C. Hulme and M. Snowling (Eds.),
Dyslexia: biology, cognition and intervention (pp. 97-107). London: Whur
Publishers.

Lyytinen, P. (1999). Varhaisen kommunikaation ja kielen kehityksen arviointimenetelmä.
Jyväskylän yliopiston Lapsitutkimuskeskus ja NMI:
Yliopistopaino.

Ounstedt, M., Cockburn, J., & Moar V.A. (1983) Developmental assessment at four
years: are there differences between children who do, or do not, cooperate?
Archives of Disease in Childhood, 58, 286-289.

Reynell, J.K. & Huntley, M. (1987). Reynell Developmental Language Scales. Manual.
(2nd ed.). Windsor, UK: NFER-Nelson.

Reynolds. C.R. & Kamphaus, R.W. (1992). Behavior Assessment System for
    Children, BASC. Manual. Circle Pines: AGS.

Roth, K., Eisenberg, N., & Sell E.R. (1984). The relation of preterm and full-term
    infants temperament to test-taking behaviors and developmental status. Infant
    Behavior and Development, 7, 495-505.

Vaughn, B.E., Kopp, C.B., & Krakow, J.B. (1984). The emergence and consolidation of
    self-control from eighteen to thirty months of age: normative trends and
    individual differences. Child Development, 55, 990-1004.

Wechsler, D. (1963). Wechsler Preschool and Primary Scale of Intelligence. New York:
    Psychological Corporation.