Language development in children with psychiatric impairment.
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1 Language disorders and psychiatric disorders

Claudia Blankenstijn and Annette Scheper

1.1 Introduction
In recent years there has been an increase in awareness that language disorders and psychiatric disorders frequently co-occur. In numerous studies it is assumed that these two areas of development are closely linked: language disordered children have a significantly increased risk of developing a psychiatric disorder, and conversely, children being treated for psychiatric disorders have a high prevalence of language disorders. Why this is the case and how these links should be interpreted, is still subject of research and debate. In this thesis we will study in depth the linguistic properties of the language produced by children with a psychiatric disorder. We will consider the structural properties of morphology/syntax and semantics/pragmatics of the children’s language production. Thereafter we will explore the issue of the relationship between a specific linguistic profile and specific type of psychiatric disorder. An unresolved issue is whether psychiatric disorders are the cause or consequence of the language disorder, or whether they have both developed as a result of common third risk factors (see 2.2; 2.3.1) and are interrelated and comorbid from the beginning.

Although it is not the topic of this research to investigate the causal relationship between problems in language and social-cognition, this is an area that naturally needs to be discussed before preceding to the linguistic analysis. It is certainly plausible that the two areas of development mutually influence one another. From a psycholinguistic point of view, language is presumed to play a central role in social-cognitive development. Communicative language use is not only one of the most important tools to form social relationships with peers and caretakers, but also provides children with the most powerful means of causal thinking. They develop reasoning skills that enable them to differentiate emotional, behavioural and conceptual domains, gain mastery of these skills and refine them (Hassibi and Brewer, 1980; Bishop, 2002). Although not all language disordered children develop social-cognitive disorders, often referred to as psychiatric disorders (Van Leeuwen, Vieijra and Kappers, 1988; Prizant, Audet, Burke, Hummel, Maher and Theodore, 1990), it has been found that serious developmental language impairment can have a profound negative impact on social-cognitive development (Tallal, Dukette and Curtiss, 1989).

Language disorders might increase the risk for the development of psychiatric disorders or vice versa, resulting in a comorbidity. In this chapter, we will describe the possible complex relationship of this comorbidity and provide background information, such as working definitions of language and psychiatric disorder (1.2). Next, we will review the most important developmental literature concerning the co-occurrence of language and psychiatric disorders in different disordered populations
And finally, we will make some concluding remarks about this comorbidity in individuals (1.4).

1.2 The classification of language and psychiatric disorder

As is typical when different disciplines address similar research questions, studies of language and psychiatrically impaired populations not only use different theoretical frameworks and criteria for description of subject samples, but also different measures of the language and psychiatric disorder (Donahue, Hartas and Cole, 1999). We will show that co-occurrence rates depend on how language and psychiatric abilities are measured and described: the more precise the language and psychiatric assessment tools, the higher the co-occurrence rates. In some older studies, for example, children were solely diagnosed as being language disordered with respect to their cognitive functioning, namely if the verbal IQ was 15 to 20 IQ-points lower than the performal IQ. This procedure proved to be a rather poor indicator for the existence of language disorders (Cohen, Davine and Meloche-Kelly, 1989). Later, when linguistic abilities were tested, initially the areas of phonology, morphology, syntax and semantics (vocabulary) were investigated (Cantwell and Baker, 1987; Beitchman, Brownlie, Inglis, Wild, Mathews, Schachter, Kroll, Martin, Ferguson and Lancée, 1994; Beitchman, Wilson, Brownlie, Walters, Inglis and Lancée, 1996b) but no pragmatics. The research mentioned above used primarily standardized tests, probably resulting in lower co-occurrence rates than procedures that also included spontaneous language analysis. If more detailed assessment tools to analyse language abilities are used, such as (standardised) spontaneous language analysis, higher co-occurrence rates can be found (e.g. Ran and Smits, 1990).

Psychologists and psychiatrists are continually improving the tools to assess psychiatric disorders. The DSM-IV-TR (American Psychiatric Association, 2000) is a widely used diagnostic and statistical manual of mental disorders. Additionally, parental or teacher's checklists, parental interviews and child observations can be used to motivate the psychiatric diagnosis (Lavigne, Gibbons, Kaufer-Christoffel, Arend, Rosenbaum, Binns, Dawnsnon, Sobel and Isaacs, 1996). In general, precise assessment procedures have a positive influence on the reliability of observed co-occurrence rates. However, psychiatric diagnosis often includes a language problem as part of the evidence for a psychiatric disorder, thus confounding the two (Grinnell, Scott-Hartnet and Glasier, 1983). In an attempt to differentiate both disorders, we will present some working definitions before we review the research results with respect to the co-occurrence of language and psychiatric impairment (see 1.3).

In this study, we use the terms disorder and impairment predominantly to describe a severely abnormal pattern of language and/or social-cognitive abilities in children causing distress or disadvantage to the individual and his environment. The term problem or difficulty is used when a less severe disorder or the existence of a possible disorder is inferred but has not yet been tested or diagnosed. Terms such as deficit, distortion, disturbance, disability, abnormality, anomaly and atypicality are
Language disorders and psychiatric disorders

also frequently used in the literature to describe abnormal functioning (e.g. Cantwell and Baker, 1987), but will only occasionally be used in this text. It is important to remember that a disorder is not a stable collection of symptoms, but that a child can be disordered at different ages with quite different symptoms. Symptoms that identify the disorder are not static and change over time (Verhulst and Verheij, 2000; Rutter and Taylor, 2002). For efficiency, language impairment or language impaired children will be referred to as LI and LI-children, whereas psychiatric disorders and psychiatric disordered children will be termed PI and PI-children. The group of children with a language impairment (LI) and psychiatric impairment (PI) are further referred to as LIPI-children.

As a working definition of language disorder, we adopt the view that children must show comprehension and/or production impairments or deviant development in any or all of the subdomains in which language traditionally is divided: phonology, morphology, syntax, semantics and pragmatics. In these areas, many children with expressive language disorders have difficulties in receptive skills as well (APA, 2000:58-64). In normally developing English speaking children, 3% to 7% of all children are at risk to develop language impairment (LI) (Griffith and Ripich, 1999; Cantwell and Baker, 1991; Stevenson, 1984). In Dutch-speaking children, the rates are comparable: in 2.5% of all normally developing children at age 2;6 (De Koning, De Ridder, Van Agt, Van der Stege, Korfage, Polder, 2002) and in 5%-10% of older normally developing children a language disorder/delay is observed (Reep-van den Bergh, De Koning, De Ridder-Sluiter, Van der Lem and Van der Maas, 1998). The symptoms of the language disorder within and between subdomains, its manifestations and severity, and the effect on the child's overall functioning can change over time (Bloom and Lahey, 1978; Bishop, 1997).

In this thesis, language disorders are restricted to deficits in spoken language and do not include speech, although problems such as slow speech rate, intonational flatness and fluency disorders also might co-occur with certain psychiatric disorders, such as anxiety disorders (Kotsopoulos and Mellor, 1986). Although phonological disorders were evident in some of the 120 P-children in this study, we will not describe these in detail for reasons of time. Disorders of phonology, such as articulation difficulties (e.g. Fikkert, 1994; Beers, 1995), when they occur on their own, have in previous research been shown to have no or few psychiatric consequences (Baker and Cantwell, 1987ab; Howlin and Rutter, 1987; Beitchman et al., 1989a; 1996a, 1996b; APA, 2000:65-66; Toppelberg and Shapiro, 2000). However, since we know that phonological disorders can cause difficulties in the area of morphology/syntax and semantics/pragmatics, further investigations on this point are needed in the future. The other four language subdomains were grouped into morphology/syntax (MS) on the one hand and semantics/pragmatics (SP) on the other.
Many LI-labels have been proposed that cover a specific combination of LI-symptoms that also are related to certain more or less specific diagnostic groups, such as PI-children (Table 1.1).

### Table 1.1 LI terminology in order to classify different diagnostic groups

<table>
<thead>
<tr>
<th>Author</th>
<th>Label</th>
<th>Area of LI</th>
<th>Diagnostic group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Van der Lely (1993, 2002)</td>
<td>Grammatical SLI (G-SLI)</td>
<td>MS</td>
<td>- N-children</td>
</tr>
</tbody>
</table>

* PHI-children: physically impaired children (neurologic, senso-motoric, sensoric, and somatic impairments)
** PIPHI-children: psychiatrically and physically impaired children
From Table 1.1 we see that there are three main-streams in thinking about LI. First, there is the group of researchers that label LI-children in the most general terms (LD; LI; DLD) and include most diagnostic groups. Second, there are researchers, predominantly linguists that under the influence of Chomsky (1981) mainly have explored the morphosyntactic characteristics of LI. In Specific Language Impaired children (SLI-children) the emphasis has been on disorders in morphology and syntax (e.g.Rice, 1996; Leonard, 1998; De Jong, 1999). Specific Language Impairment (SLI) is the prevailing term in coexistence with Developmental Language Disorder (DLD) as used in DSM-IV-TR (APA, 2000) and ICD-10 (WHO, 1992). Van der Lely (e.g. 1993; 1994) also claims that a group of SLI-children exists who only have an impairment in grammar, called Grammatical SLI (G-SLI).

Third, there are researchers that mainly explore the semantic/pragmatic characteristics of LI under the heading of (Semantic-)Pragmatic Syndrome or Disorder. Semantic-pragmatic disorders have predominantly been observed in children with additional psychiatric disorders, especially disorders on the autistic spectrum (Bishop, 1997). However, in English (Cantwell and Baker, 1991; Beitchman et al., 1996b; Cohen, Menna et al., 1998) and Dutch psychiatrically disordered populations (Kolthoff, 1989; Ran and Smits, 1990; Polišenká, 2003) some children had exclusively semantic disorders. Our research best fits into the first main-stream, since we keep an open mind about the type of LI that PI-children may have.

In neuropathology, morphological/syntactic disorders seem to be more linked to left and semantic/pragmatic disorders to right hemisphere neurological dysfunctions (Shield, Varley, Broks and Simpson, 1996). In this research, we will group the domains in a similar way. Models of spontaneous language analysis with respect to morphology/syntax and semantics/pragmatics were primarily used to classify language disorders in these areas (see Chapter 3). We are aware of the fact that the language domains can be ordered in relation to each other in different ways. One such model takes morphology/syntax as the core encircled by semantics, seen as the interface of language and social-cognition. This is in turn interrelated and encircled by pragmatics at the interface of language and social-cognitive behaviour (e.g. Dik, 1989; Tager-Flusberg, 1992). Other models are presented in Chapter 2.

As a working definition, children who are to be classified as having a psychiatric disorder must show impairments or deviant development in social-cognition, especially in emotional/behavioural development. In order to diagnose psychiatric disorders, usually the DSM-IV-TR (APA, 2000) is used by psychiatrists, as opposed to the diagnosis of psychological disorders solely based on psychological testing. Aside from the term psychiatric disorders, some prefer 'emotional' behavioural disorders' (EBD) or only behavioural disorders (BD), used in the American-English literature to denote all types of psychopathology in children, such as emotional and emotional-behavioural disorders (ED/EBD).
Emotional and behavioural abilities that develop over time are usually called – when taken together – children's social development. Within social development different aspects can be accentuated. Some researchers highlight the development of emotions, thoughts, feelings and wishes etc. within a child, called the 'development of personality'.

Others see emotional development as a reciprocal system acquired in interaction, preferring the term 'emotional-social development'. If emotional/social development is assumed to be embedded in cognitive development, underlying mental representations of social interaction being necessary, then the term 'social-cognitive development' is to be preferred as the term for the general developmental area in which a childhood psychiatric disorder must be placed. This term will be used in this text, although the ideas scholars have about these different but overlapping major developmental areas leave the boundaries unclear.

A psychiatric disorder is equivalent to a social-cognitive disorder with a psychopathological basis. Furthermore, the psychiatric disorder, having characteristics that might change over time, has to be sufficiently severe and prolonged to the extent that it causes the child to be at some level of risk in one or more domains of life functions. The psychiatric disorder might cause significant distress or interfere with a child’s ability to study or to relate to family and friends, making the child and/or the people in his environment feel unhappy about the child’s functioning (Morrison and Anders, 1999).

It has been observed that 10% to 26% of normally developing English speaking children are at risk to develop a psychiatric disorder (Morrison and Anders, 1999; Lavigne et al., 1996). Lower rates are found for Dutch-speaking children: 7% of all children between 0;0 to 18;0 year develop a severe psychiatric disorder (De Koning et al., 2002).

There are a number of ways to categorise psychiatric disorders, although the different types of psychiatric disorders are generally diagnosed according to the ICD-10 (WHO, 1992) or the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) (APA, 2000). Both classification systems set out criteria for the diagnosis of different types of psychiatric disorder based on observations of symptoms in a child. The DSM-III-R and DSM-IV-TR is a multiaxial system that has been updated for over more than a hundred years. According to the DSM-III-R (APA, 1987) used during our investigation, it was possible to diagnose a psychiatric disorder on Axis I, such as Anxiety disorder, and other additional developmental disorders on Axis II, such as language disorders, or personality disorders. Physical disorders and other conditions, such as malnutrition, can be mentioned on Axis III. The severity of psychosocial stressors, such as child abuse or neglect, can be assessed on Axis IV. It is known that a multiaxial classification system such as the DSM provides a richer conceptualisation and higher reliability among diagnostic raters, because every axis must be coded, even if the coding is of ‘no abnormality’ (Rutter and Taylor, 2002). A global assessment of the child’s functioning at home and in school can be given on Axis V, containing information about the severity of
Psychiatric disorders (Axis I) can be divided further into disorders having either an emotional or a behavioural basis (Griffith and Ripich, 2002:21). This division is adopted as the two global dimensions of psychopathology, often referred to as internalizing and externalizing psychiatric disorders (Mesman and Koot, 2002). Emotional disorders are seen as internalizing disorders, characterised by depressive, anxious, inhibited or withdrawn behaviour, resulting in a diminished interest and pleasure in activities (Rogers-Adkinson, 1999; Verhulst and Verheij, 2000), such as in Depressive Disorders (DSM-IV-TR, APA, 2000:369-381) and Anxiety Disorders (DSM-IV-TR, APA, 2000:121; 429-484). Behavioural disorders are characterised by externalizing abnormal behaviour, such as aggressive, antisocial, hyperactive and impulsive behaviour (Gresham, MacMillan and Bocian, 1996) as is observed in children with Attention Deficit Hyperactivity Disorder (ADHD) (DSM-IV-TR, APA, 2000:85-93) or Conduct, Oppositional and Disruptive Disorders (DSM-IV-TR, APA, 2000:93-103).

Externalizing disorders are frequently perceived as disruptive, whereas internalizing disorders do not directly have such an effect. Diagnoses of behavioural/externalizing disorders and emotional/internalizing disorders are not necessarily mutually exclusive. For example, both types are to be found in the group of PI-children with PDD-NOS (DSM-IV-TR, APA, 2000:69-70) and of 'diagnostic orphans', PI-children who clearly have one or more severe emotional/behavioural psychiatric symptoms of the DSM-IV-TR, but do not meet the diagnostic criteria to be classified as a specific type. These children perceive the classification 'no diagnosis' (DSM-IV-TR, APA, 2000:743).

Dividing larger psychiatric populations into children with externalizing or internalizing disorders seems to be practically useful and also well motivated. Each group needs different assessment and treatment procedures (Verhulst and Verheij, 2000). Empirical data suggest that externalizing disorders are more common among boys and have an earlier onset time than internalizing disorders, which are more often found in girls (Cantwell and Baker, 1987; Morrison and Anders, 1999).

1.3 Co-occurrence rates of language and psychiatric disorders in development

A large number of children is found to have both language and emotional/behavioural disorders, although the co-occurrence rates in both populations show a huge variation across studies, namely from 37% to 89%. Children with language disorders have been found to have a high prevalence (37% to 89%) of diagnosable psychiatric disorders. Research in child psychiatry has demonstrated a high prevalence (46% to 59%) of language disorders. A high co-occurrence of language and psychiatric disorders is also found in pre-adolescents, students and adults (Donahue et al., 1999) and is especially associated with delinquency (Chess, 1944; Camp, Zimet, Van Doornick and Dahlern, 1977; Belenchia and Crowe, 1983; Warr-Leeper, Wright and Mack, 1994; Teichner, Golden, Crum, Azrin, Donahue and Van Hasselt, 2000). Here, we only include
literature on children younger than twelve years, since we are interested in the period in which the symptoms of both disorders become manifest for the first time (Cantwell and Baker, 1991). Furthermore, we only include those studies that are explicit about sample size, mean age, referral and assessment procedures and use appropriate selection criteria (explained below). If reports are based on subgroups out of the same total population, only the most recent publication is presented in the tables.

Symptoms of language disorder have frequently been used as criteria for diagnosing psychiatric disorder, for example, one of the diagnostic criteria for ADHD is 'often interrupts others/often blurs out answers before questions have been completed' (DSM-IV-TR, APA, 2000; see also Rogers-Adkinson, 1999:53). The language disorder is, however, never sufficient for such a diagnosis, although for some classifications, such as autism, it is a necessary condition. Statistics on the co-occurrence of language disorders and psychiatric disorders must reflect this confounding relationship by specifying whether children, in which both are necessary for a specific diagnosis, are included in the figures. However, in the past this has often not been done.

Prior to 1975, the comorbidity of both disorders was only studied in single cases or small groups. Language disordered children were often described as either shy, timid and over-anxious or tense, hostile and aggressive (Spock and Huschka, 1938; Karlin, 1954; Barbara, 1960; Schlangler, 1962). These children showed failures of individuation, such as distorted social perceptions, school phobias, and poor peer relations (Cantwell and Baker, 1977). These early studies will not be considered here.

Among the most famous landmark studies are the epidemiological studies of Beitchman and colleagues (Toronto, Canada; 1982-2003), the studies by Cantwell and Baker focussing on the prevalence of psychiatric disorders in language impaired children (Los Angeles; USA; 1977-1991), and the studies by Cohen and colleagues on the prevalence of language disorders in psychiatrically impaired children (Toronto, Canada; 1985-2003). These different types of studies have been carried out since the early eighties, including some follow-up studies. The last two types of study will be discussed in the most detail, since the existence of possible language disorders is tested thoroughly.

1.3.1 Epidemiological studies

In epidemiological studies children are selected at random from the total population of children and diagnosed as being language and/or psychiatrically disordered. These studies explore developmental abilities in large populations, including children attending kindergarten or main stream schools. However, the different designs that have been chosen make it quite difficult to compare the results of these studies.

One of the earlier studies is that of Stevenson and Richman (1978) (Table 1.2). They explored the co-occurrence of language and psychiatric disorders in 705 three-year-olds in an aselect population in England. The following results are reported based on first screening: 84% (n=595) were not disordered, 13% (n=88) were psychiatrically disordered, whereas only 3% (n=22) were language disordered. The low prevalence
of language disorders in the total population is probably caused by the method of testing, as the diagnosis was only based on scores of a general expressive language test. After more detailed testing only 2% (n=13) of all 88 PI-children suffered from both language and psychiatric disorder. When calculated over all 22 language disordered children, out of this group 59% (n=13) also had a behavioural disorder (PI). The existence of a psychiatric disorder was only established by means of parental checklists and interviews about behavioural development. The results should be interpreted with caution, since the diagnosis of both disorders is based on procedures that are not detailed enough.

Beitchman, Peterson and Clegg (1988) assessed language and psychiatric disorders in 1655 five-year-old Kindergarten children in Canada; 50% of the LI-children (n=142) proved to suffer also from psychiatric disorder, primarily related to attention deficits. Unfortunately, they do not report the percentage of children with only a PI. In these two epidemiological studies, the approximate co-occurrence rates for psychiatric disorder in LI-children vary from 50% to 60%. Children in which both disorders co-occurred were observed to have more severe language-processing problems as well as greater delays in language skills than language impaired peers without psychiatric impairment.

**Table 1.2**  The co-occurrence of language impairment (LI) and psychiatric impairment (PI) in epidemiological studies

<table>
<thead>
<tr>
<th>Authors</th>
<th>Sample</th>
<th>Mean Age</th>
<th>Population</th>
<th>Assessment LI</th>
<th>Assessment PI</th>
<th>% PI in LI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stevenson and Richman (1978)</td>
<td>705 English-speaking</td>
<td>3:0</td>
<td>Aselect expressive language test</td>
<td>checklist parents interview parents</td>
<td>59% PI in 22 LI-children</td>
<td></td>
</tr>
</tbody>
</table>

**1.3.2 The comorbidity of psychiatric disorders in language impaired children**

Unlike epidemiological studies, other comorbidity studies have begun by selecting a population of LI-children, recruiting children from (private) language clinics. Psychiatric disorders are not uncommon in children referred to language services, although some children's psychiatric impairments remain unsuspected until detailed...
testing is done. Only the best-known and most appropriately designed developmental studies on this issue will be presented (see Table 1.3).

From Table 1.3, it is clear that research differs in sample size, age groups and assessment procedures, making results difficult to compare. Sometimes results with respect to co-occurrence rates are disputable, since selection criteria were not appropriately defined. For example, Paul, Cohen and Caparulo (1983), who reported that 61% of 28 LI-children showed psychiatric disorders, included children that could not be IQ-tested or frequently had seizures; 50% of these children were severely language impaired since they had little to no useful language.

The first classic investigations assessed psychiatric disorders in 600 children who had been referred to speech and hearing clinics (Baker and Cantwell, 1987a, 1987b; Cantwell and Baker, 1987). Mostly, a speech and hearing clinic is specialized in the assessment and treatment of children with language disorders, including phonological (articulation) and hearing difficulties.

Baker and Cantwell have reported about different subgroups of approximately 100, 200 or 300 children out of this large group (n=600), varying in age from 2;0 - 16;0 years (mean age 5;6 years) (e.g. Cantwell and Baker, 1985). The enormous variability in the children's age influences the prevalence of specific types of psychiatric disorders, since some might be more prevalent in older age groups (Cantwell and Baker, 1987; Rutter and Taylor, 2002).

<table>
<thead>
<tr>
<th>Authors</th>
<th>Sample</th>
<th>Mean Age</th>
<th>Population</th>
<th>Assessment LI</th>
<th>Assessment PI</th>
<th>% PI in LI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amarosa et al. (1986)</td>
<td>24</td>
<td>4;5 - 8;0</td>
<td>Speech/ Hearing Clinic</td>
<td>phonology/ language test IQ test</td>
<td>neurological assessment ICD-10</td>
<td>37% PI in LI-children</td>
</tr>
<tr>
<td>Cantwell and Baker (1987)</td>
<td>600</td>
<td>5;6</td>
<td>Speech/ Hearing Clinic</td>
<td>auditory test language test (rec./expr.) language analysis IQ test</td>
<td>checklist teachers checklist parents interview parents interview child DSM-III</td>
<td>73% PI in LI-children</td>
</tr>
<tr>
<td>Baker and Cantwell (1987a,b)</td>
<td>80</td>
<td>4;3</td>
<td>Speech/ Hearing Clinic</td>
<td>auditory test language test: phonology morphosyntax semantics pragmatics</td>
<td>checklist parents (CBCL)</td>
<td>89% PI in LI-children</td>
</tr>
<tr>
<td>Tallal, Dukette and Curtiss (1989)</td>
<td>80</td>
<td>4;3</td>
<td>Speech/ Hearing Clinic</td>
<td>auditory test language test: phonology morphosyntax semantics pragmatics</td>
<td>checklist parents (CBCL)</td>
<td>89% PI in LI-children</td>
</tr>
</tbody>
</table>
In their studies, language disorders are thoroughly analysed. Different tests were 
used to establish auditory, articulatory, and receptive/expressive language abilities. 
Sometimes even an analysis of spontaneous language was part of the language 
assessment procedure (Cantwell, Baker and Rutter, 1978; Mattison, Cantwell and 
Baker, 1980). They established three subgroups in their LI-population: (1) children 
with exclusively speech disorders, (2) children with exclusively language disorders 
and (3) children with both speech- and language disorders. They also used the most 
refined diagnostic psychiatric instruments available. In the most complete study 
including the largest population, it is reported that more than 50% of all 600 LI-
children were diagnosed as having a psychiatric disorder: 31% of the speech 
disordered children (n=203), 73% of the language disordered (n=45) and 58% of the 
speech/language disordered children (n=352) proved to have an additional 
psychiatric disorder (Baker and Cantwell, 1987). The highest co-occurrence rates 
were observed in the exclusively language disordered subgroup. The most 
frequently observed psychiatric disorders in LI-children were Attention Deficit 
Disorder, oppositional Disorder and Anxiety Disorder (Cantwell and Baker, 1980; 

The major weakness of these studies is that they included language disordered 
autistic children. Although this group was small, their inclusion might have 
increased the reported co-occurrence rates, since the language disorder is a 
necessary condition for such a psychiatric diagnosis. Cantwell and Baker should 
have excluded these autistic children in advance. Another point of criticism is that 
they included mentally retarded children. For example, in Baker and Cantwell 
(1987), mental retardation (IQ measure below 70) was observed in 6% of all 
children. Their inclusion also might have increased the reported co-occurrence rates. 
Low IQ rates can reflect information processing disorders possibly based on 
underlying neurodevelopmental immaturity that might cause both LI and PI in 
individual children (Beitchman et al., 1996b) (see 2.2 and 2.3.1). However, the 
major strength of these studies is that they collected one of the largest samples and 
used the most refined diagnostic language and psychiatric instruments available at 
the time, treating both disorders as being of equal importance.

Other studies have shown a design more or less comparable to Baker and Cantwell’s, 
but applied stricter criteria for subject samples. Amarosa, Von Benda and Wagner 
(1986) found that 37% of language impaired, but not cognitively impaired children 
(n=24) had additional psychiatric disorders, characterized by hyperactivity and 
attention deficits. Although Tallal, Dukette and Curtiss (1989) carefully selected 
their population, they were less careful in diagnosing the psychiatric disorder, since 
diagnoses were solely based on parental rating scales. They reported that 89% of all 
80 LI-children selected from schools/clinics were judged by their parents as having 
psychiatric problems, especially attention deficits.

In sum, the results from the different developmental studies confirm that LI-children 
have a relatively high prevalence (37% to 89%) of psychiatric disorder. It is 
important to note that the language disorders were especially related to attention 
deficits in these studies. This was also found in the epidemiological study of
Beitchman and colleagues. They postulated that neurodevelopmental immaturity may be the common underlying antecedent of both linguistic and psychiatric impairment, especially in children with AD(H)D (Beitchman et al., 1994, 1996a, 1996b). This view will be discussed in more detail in Chapter 2.

1.3.3 The comorbidity of language disorders in psychiatrically impaired children

Some comorbidity studies select a population of PI-children, recruiting children from psychiatric clinics or those referred for psychiatric services to mental health centers. Again, the comorbidity rates reported in these different studies are highly variable, ranging from 46% to 86%. Before the most appropriately designed developmental studies of this type will be presented (Table 1.4), we will briefly explain why other studies are not included.

We have excluded, for example, one well-known study of Chess and Rosenberg (1974) who found language disorders in 24% of all 563 PI-children (age 2;0 to 16;0 years) with predominantly Attention Deficit Disorders. Half of these LIPI-children showed some form of mental retardation, causing a higher percentage of both LI and PI (see 2.2 and 2.3.1). Multilingual children were also included in this study, which may have negatively influenced the assessment of language skills, resulting in a higher percentage of LI. Although on the basis of subject sampling high co-occurrence rate were expected, Chess and Rosenberg (1974) reported an extremely low co-occurrence rate. This may be due to the fact that children with exclusively articulatory disabilities were classified as LI. Articulation disorders co-occur less frequently with psychiatric disorders than morphological/syntactic and semantic/pragmatic language disorders (Baker and Cantwell, 1987; Love and Thompson, 1988; see 2.2.1). Two other studies had to be excluded from detailed description for comparable reasons. Gualtieri, Koriath, Van Bourgondien and Saleeby (1983) who reported language disorders in 77% of 26 PI-children (mean age 9;4) also wrongly included mentally retarded children, as the mean IQ of the LIPI-children was below 80. Love and Thompson (1988) found language disorders in 59% of 116 PI-children (mean age 5;0) with predominantly Attention Deficit Disorder. This study was also not representative, because they included many bilingual and multilingual children.
Table 1.4  
The co-occurrence of language impairment (LI) in children with psychiatric impairment (PI-children) from previous research

<table>
<thead>
<tr>
<th>Authors</th>
<th>Sample</th>
<th>Age range</th>
<th>Population</th>
<th>Assessment LI</th>
<th>Assessment PI</th>
<th>% LI in PI-children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Van Leeuwen, Viejira and Kappers (1988)</td>
<td>71</td>
<td>4.0-13.0</td>
<td>Pedological Institute</td>
<td>auditory test language test (TvK): rec./expr language judgement IQ test</td>
<td>psychiatric research</td>
<td>60% LI in PI-children</td>
</tr>
<tr>
<td>Kohlhoff (1989)</td>
<td>6</td>
<td>5.10-7.11</td>
<td>Child Psychiatry Clinic</td>
<td>language test (TvK): rec./expr language analysis (STAP) IQ test</td>
<td>interview parents interview child DSM-III-R</td>
<td>86% LI in PI-children</td>
</tr>
<tr>
<td>Ran and Smits, (1990)</td>
<td>16</td>
<td>5.10-8.9</td>
<td>Child Psychiatry Clinic</td>
<td>language test (TvK): rec./expr language analysis (STAP) IQ test</td>
<td>interview parents interview child DSM-III-R</td>
<td>75% LI in PI-children</td>
</tr>
<tr>
<td>Cohen, Davine, et al. (1992)</td>
<td>399</td>
<td>4.0-12.0</td>
<td>Child Psychiatry Clinic</td>
<td>speech test language test: phonology semantics syntax IQ test</td>
<td>checklist parents</td>
<td>52% LI in PI-children</td>
</tr>
</tbody>
</table>
The Dutch studies and English studies of Cohen and colleagues (Table 1.4) were all based on better research designs, as autistic, mentally retarded and multilingual children were excluded. The Dutch study of Van Leeuwen et al. (1988) reported language disorders in 60% of 71 PI-children. The criteria used to define LI and PI were, however, not clearly specified. Language disorders were more precisely diagnosed in two small Dutch studies (Kolthoff, 1989; Ran and Smits, 1990), which served as pilot studies for this current research. They both used a language test (Taaltest voor Kinderen (TvK); Van Bon and Hoekstra, 1982) and analysed conversational abilities, according to a spontaneous language analysis procedure (STAP) (Van den Dungen and Verbeek, 1994, 1999) (see 3.4).

On the basis of psychiatric parental/child interviews and psychological testing, children were diagnosed according to the DSM-III-R (see 3.2.2). These studies were the first to present more specific information about the type of language disorders observed in PI-children. This detailed language analysis might account for the high co-occurrence rates reported in both studies: the more precisely symptoms of a language disorder are defined, the more children with language disorders are detected, resulting in higher co-occurrence rates. Kolthoff (1989) found one PI-child with LI exclusively in the area of morphology/syntax, another PI-child with LI exclusively in the area of semantics, while three PI-children with LI were diagnosed as semantic/pragmatic disordered. Ran and Smits (1990) observed more or less the same distribution of the different types of language disorders. These studies base their results on very small subject samples, so that these high co-occurrence rates are not generalizable.

In the English study of Cohen and colleagues (1989) 46% of the 37 PI-children suffered from LI. In a later study of Cohen and colleagues (Cohen, Davine, Horodezky, Lipsett and Isaacson, 1993), they observed language disorders in 52% of the 399 PI-children (age 4;0 to 12;0 years). The latest study reports language disorders in 63% of all 380 PI-children (age 7;0 to 14;0 years) (Cohen, Barwick, Horodezky, Vallance and Im, 1998; Cohen, Menna, Vallance, Barwick, Im and Horodezky, 1998).

Over time, the reported co-occurrence rates have increased, since the LI-diagnosis is no longer solely based on receptive/expressive language tests as in the earliest study, but also on spontaneous conversational and narrative analyses in both morphological/syntactic and semantic/pragmatic areas. New to their design was that they divided the children that suffered from both language and psychiatric disorder into two groups: group 1 LIPI-children that have obvious language disorders before they were first seen for language assessment and group 2 LIPI-children in which the language disorder was detected only after thorough language testing.

In all of these studies mentioned above, Cohen and colleagues observed that half of the LIPI-children had previously identified language disorders (group 1) and half had unsuspected language impairments (group 2). Group 1 LIPI-children were initially thought to have more severe problems in formulating grammatically correct sentences, whereas group 2 LIPI-children had more semantic-pragmatic disorders (Cohen et al., 1993; Cohen, Menna et al., 1998; Cohen, Barwick et al., 1998). Initially, the unsuspected language impairments (group 2) were predominantly
Language disorders and psychiatric disorders

observed in children with ADHD. It was thought that the language impairments in these children had been overlooked for such a long period because the symptoms of the psychiatric disorder overshadowed the language difficulties (Cohen et al., 1989). As their research developed, they have argued that unsuspected language impairments, mainly semantic-pragmatic disorders, were in general more difficult to detect than morphological/syntactic disorders, because semantic/pragmatic disorders easily (but wrongly) were confused by adults with symptoms of a psychiatric disorder, such as inattentiveness or noncompliance (Howlin and Rutter, 1987; Cohen et al., 1993). They conclude that semantic-pragmatic disorders are often overlooked in the period before assessment by parents, teachers and clinicians.

Recently, Cohen and colleagues have observed that the language impairments in the area of morphology/syntax and semantics/pragmatics in children with ADHD do not differ from the language impairments observed in children with other psychiatric disorders, such as Oppositional Conduct Disorder or Overanxious Disorder (Cohen, Vallance, Barwick, Im, Menna, Horodezky and Isaacson, 2000). Cohen and colleagues have found no support for the hypothesis that specific psychiatric disorders are associated with specific morphological/syntactic or semantic/pragmatic disorders, nor with respect to the severity of language disorder (Cohen et al., 1993; Cohen, Menna et al., 1998; Cohen, Barwick et al., 1998; Cohen et al., 2000) nor with respect to receptive as opposed to expressive language disabilities. These results are comparable to earlier findings reported by others (Beitchman, 1985; Beitchman and Young, 1997).

The major strength of the Cohen studies is that they have used the most refined diagnostic language instruments available. However, as the psychiatric diagnosis was mainly established on the basis of (parental) checklists or reports about behaviour development, this has reduced the likelihood of obtaining information on internalizing disorders, such as Depression, which typically comes from children's self-reports, as the researchers themselves admit (Cohen et al., 2000).

In sum, the results from the different developmental studies confirm that PI-children have a relatively high co-occurrence (46% to 86%) of language disorder. This is more or less comparable to the co-occurrence of psychiatric disorder (37% to 89%) found in LI-children. The variation is mainly due to differences in subject selection and accuracy of assessment procedures. We conclude that a clear correlation between specific type of language disorder and specific type of psychiatric disorder has not yet been found. For example, no specific language disability profile can be associated with ADHD as opposed to what has been claimed and still is claimed, for example, in the DSM-IV-TR (APA, 2000). It is clear that research that disentangles symptoms of language impairment from symptoms of psychiatric impairment is still needed.
1.3.4 Co-occurrence rates at follow-up
The studies discussed above have focussed on assessment at one point in time. However, the comorbidity of LI and PI can change over time in the same individual as described in follow-up studies. Although some children do not improve, despite any form of professional help, other children improve their language and/or social-cognitive skills over time, as a result of therapy. One disorder disappears, causing a decrease in co-occurrence rates.

In practice some older LI- or PI-children are wrongly diagnosed as having a learning disorder instead of being diagnosed as LI or PI. Learning disorders are mostly reflected by poor academic achievements in the area of reading, spelling and mathematics (Beitchman et al., 1994; Cantwell and Baker, 1991; Cohen, Menna et al., 1998; Griffith and Ripich, 1999; Tomblin, Zhang, Buckwalter and Catts, 2000; APA, 2000:49-56).

This wrong diagnosis might be another reason for observing lower co-occurrence rates at follow-up, as this reduces the chance to identify LIPI-children. Consequently, the identification of a clear causal relationship between LI and PI in time is not possible. In the future, learning disorders should be separated from language and/or psychiatric disorders in order to get better subject samples necessary for observing more reliable co-occurrence rates over time (Baker and Cantwell, 1982b, 1987a; Prizant et al., 1990; Cantwell and Baker, 1991; Whitehurst and Fischel, 1994).

Despite this difficulty in diagnosing LI or PI in school-aged children, some researchers were able to select appropriate subject samples. In one follow-up study it is reported that only 26% of all five-year-old PI-children developed LI at twelve years of age (Beitchman et al., 1996a, 1996b). Most research in this area shows that a substantial part (33% to 73%) of all LI-children develop additional psychiatric disorders (PI) over time. The causal relationship between LI and PI in general was first observed by Sheridan (1973) and Sheridan and Peckham (1975). Associations between early language disorders and later antisocial behavioural disorders have also been found (for an overview see Donahue, Hartas and Cole, 1999:80-85). They found that the chance that seven-year-old LI-children develop psychiatric disorders at age eleven is three to four times higher than in seven-year-old non-language disordered children. Fundudis, Kolvin and Garside (1980) found that 77% of 133 three-year-old LI-children developed a psychiatric disorder at age seven. Stevenson, Richman and Graham (1985) observed that 38% of 256 three-year-old LI-children developed additional psychiatric impairments at age eight. In a longitudinal study Silva and colleagues (Silva, Justin, McGee and Williams, 1984; Silva, Williams and McGee, 1987) documented that three-year-old LI-children had more parent and teacher-reported externalizing psychiatric disorders at age nine and eleven. In later reports of the Beitchman follow-up study, PI-children with early language impairment at age five were found to have significantly higher rates of Anxiety Disorder at age nineteen compared to non-language-impaired PI-children Beitchman, Wilson, Johnson, Atkinson, Young, Adlaf, Escobar and Douglas, 2001).

Some researchers, for example Cantwell and Baker (1.3.2) and Beitchman and colleagues (1.3.1) extended their original design following up same populations.
Baker and Cantwell (1987a) reported that 16% of all 300 five-year-old LI-children developed psychiatric impairments at age nine, such as ADHD and Anxiety Disorder. Beitchman and colleagues reported that 33% of the 215 five-year-old LI-children developed an additional psychiatric disorder at twelve years (Beitchman et al., 1996a, 1996b); these were mainly externalizing psychiatric impairments (Table 1.5).

Some researchers explain this increase in comorbidity rates over time by assuming that psychiatric disorder already existed but remained undetected. They argue that at follow-up the language disturbance might be experienced as less severe, due to the adult’s improved coping behaviour, i.e. responding more sensitively to the language disordered child. The previously undetected symptoms of a psychiatric disorder become therefore suddenly highlighted (Bishop and Edmundson, 1987; Beitchman et al., 1996a, 1996b). It is assumed that symptoms of psychiatric impairment existed but were not identified. However, this does not explain their co-existence. Researchers still need to explain how the language impairments in LI-children (without psychiatric disorder) at time 1 might cause additional psychiatric impairments at time 2 (LI → PI), diagnosed at follow up (time 2) as LIPI-children. The lack of understanding of the child's specific types of language problems can cause

**Table 1.5  Follow-up studies: proportion of language impaired children (LI-children) that developed a psychiatric impairment (PI) at time 2 (follow-up) from previous research**

<table>
<thead>
<tr>
<th>Authors</th>
<th>Sample</th>
<th>Mean Age</th>
<th>Population</th>
<th>Assessment LI</th>
<th>Assessment PI</th>
<th>% LI-children developed PI at time 2 (follow-up)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cantwell and Baker (1987a)</td>
<td>300 English-speaking</td>
<td>time 1 5; 6 time 2 9; 1</td>
<td>Speech/ Hearing Clinic</td>
<td>auditive test language test: (rec./expr.) language analysis IQ test t2</td>
<td>checklist teachers checklist parents interview parents linguistics test DSM-III</td>
<td>16% LI-children developed PI</td>
</tr>
<tr>
<td>Cantwell, Baker, Rutter and Mawhood (1989)</td>
<td>14 English-speaking</td>
<td>time 1 8; 0 time 2 11; 0</td>
<td>Speech/ Hearing Clinic</td>
<td>auditive test language test (rec./expr.) language analysis IQ test t2</td>
<td>interview parents</td>
<td>9% LI-children developed PI</td>
</tr>
<tr>
<td>Beitchman et al. (1996)</td>
<td>215 English-speaking</td>
<td>time 1 5; 0 time 2 12;5 time 3 19;5</td>
<td>Main school</td>
<td>language test: phonology semantics syntax</td>
<td>checklist teachers checklist parents interview parents child checklist DSM-III-R</td>
<td>33% LI-children developed PI</td>
</tr>
</tbody>
</table>
difficulties for the child in that communication will be disrupted, causing frustra­
tions and then psychiatric problems (Cohen et al., 1989). How linguistic and social­
cognitive theories might contribute to the explanation of this specific causal relationship between LI and PI will be discussed in more detail in Chapter 2. Alternative causal relationships will also be described.

1.4 General conclusions and additional remarks
After reviewing the developmental literature, we see that differences in diagnostic standards and the nature of sampling contributed to the variation in co-occurrence rates (33% - 89%), although most results indicate a clear co-occurrence of LI and PI:

- PI was found in 50% - 59% of all LI-children (Epidemiological studies)
- PI was found in 37% - 89% of all LI-children (Speech/Hearing Clinic)
- LI was observed in 46% - 86% of all PI-children (Child Psychiatry Clinic)
- PI was observed in 33% - 73% of all LI-children (Follow-up studies)

Thus, despite all differences in research design, we can conclude that psychiatric disorders are as common in populations of language disordered children as, conversely, language disorders are in populations of psychiatric disordered children. We showed that when language abilities are only globally measured, co-occurrence rates are approximately 50%, whereas more detailed testing result in co-occurrence rates even higher than 80%. We also showed that language disordered children are at risk for developing a psychiatric disorder that is approximately 4.5 times higher than that of non-language impaired children. The severity of the language impairment might even increase this risk (Beitchman et al., 1989b, 1990). LIPI-children, in which both disorders co-occur, were observed to have more severe language-processing problems as well as greater delays in language skills than language impaired peers without psychiatric impairment (Baker and Cantwell, 1987). In these children, life-functioning in school and at home is often severely disturbed over a longer period of time (Baker and Cantwell, 1982; Beitchman et al., 1996).

Thus, symptoms of a language disorder must be thoroughly assessed and separated from symptoms of a psychiatric disorder, especially where the LI-symptoms are a necessary condition of diagnosing the psychiatric disorder. We also explained why LI and PI should be disentangled from learning disorders. This thesis will empirically address the comorbidity issue by attempting to give detailed descriptions of the language problems of PI-children. In the developmental literature about the comorbidity of language and psychiatric disorders relatively little attention has been paid to the matter of causality. In Chapter 2 we will discuss and explain the co-occurrence of language and psychiatric disorder from different theoretical perspectives.