An Approach to Differentiating Bilingualism and Language Impairment

Sharon Armon-Lotem and Joel Walters

INTRODUCTION

Bilingualism presents a weighty challenge to clinical assessment in general and to the analysis of language impairment and neurological disorders in particular. A wide range of linguistic and social phenomena converge in the bilingual person in ways that are often difficult to differentiate. Simply analyzing and comparing the two languages of a bilingual may be insufficient for determining impairment or identifying disorder (although this alone would be a major improvement of much current practice that generally addresses only a single language, often, the second language). From a research perspective, clinical disorders offer numerous challenges to the study of bilingualism, in particular: what it means theoretically to know a language, the notion of completeness in linguistic knowledge, and the relationship between a language user’s two languages. From a practitioner’s point of view, theory and method in bilingualism can help inform clinical decisions that may make a large difference in people’s lives.

This chapter on bilingualism and neurolinguistic disorders centers on whether diagnosis is necessary in both languages or whether it is sufficient to look at a single language. The two populations we choose to look at here, children with language impairment (LI) and adults with schizophrenia, share the fact that impairment is manifested in both languages. A further question arises as to whether bilingualism exacerbates the linguistic manifestation of the impairment; that is, whether it makes linguistic performance worse or makes it harder to diagnose, and so forth. The two populations potentially differ in several ways: (1) age (children vs. adults); (2) the nature of the impairment (for LI children more grammatically indicated/diffuse across linguistic domains), for schizophrenia more focused on lexical/pragmatic phenomena; and (3) different manifestation due to typological differences versus similar manifestation (schizophrenia). It will be argued that it may be sufficient to diagnose and treat a single language in adult schizophrenics,
but it is crucial to look at both languages in the case of developmental language impairment such as SLI.

**TWO SETS OF QUESTIONS FOR THE STUDY OF BILINGUALISM AND LANGUAGE IMPAIRMENT**

At the outset we contrast two perspectives: bilinguals with language impairments or language impaired individuals who happen to be bilingual. The researcher in bilingualism is drawn to the former; the clinician–educator naturally gravitates to the latter. We are motivated here to integrate these two perspectives in an attempt toward dialogue between researchers and clinicians.

One set of questions relates to social aspects of bilingualism, in particular to social identity and attitudes. Again we ask: Are we talking about bilinguals with language disorders or language impaired individuals who happen to be bilingual? These alternative formulations of the question bring us to the heart of the difference/deviance debate. In the study of bilingualism, especially subtractive bilingualism in children (Lambert, 1990) but also the relative prestige of a bilingual’s two languages, the relevant constructs include ethnolinguistic vitality, language status, and attitudes toward the second language and its speakers (e.g., Allard & Landry, 1994). In the area of language-related learning disabilities, intentions and goals are critical notions for proper assessment, along with affective factors, such as self-esteem and self-confidence.

In bilingual acquisition, Pearson (2007) reviews a variety of studies (e.g., De Houwer, 2003; Pearson, Fernandez, Lewedag, & Oller, 1997) in search of social factors to explain why approximately 25% of bilingual children from bilingual environments do NOT acquire the home/minority language. The factors examined include: input, language status, access to literacy, immigrant status, and community support. She concludes that “quantity of input has the greatest effect on whether a minority language will be learned,” but that both status and attitudes also make a difference. In showing the importance of language status; that is, the difference between minority and majority languages, Pearson presents the intuitive observation: “if one does not speak a language well, one will not use it. If one reports using a language often, we can infer the person has some skill in that language.” But then she goes on to show that this adage may not be true for the majority language, citing Hakuta and D’Andrea (1992) who showed language attitudes to be a better predictor of language use than proficiency in Mexican-American teenagers. Finally, in the context of community support for the minority language and the economic benefits of ethnolinguistic enclaves, Pearson states that “It is crucial to have contact with monolingual speakers of the minority language,” but goes on to report that “the effect of language of instruction at school could more than counterbalance the effect of less Spanish in the home.” She argues strongly for either simultaneous bilingualism or early second language acquisition both as a means to maintaining the minority language and for its presumed cognitive, social, and affective benefits (Bialystok, 2001; Bialystok & Senman, 2004; Cummins, 1976; Pearson, 2008).
Questions on social aspects of bilingualism and language impairment include:

a. How are both bilingualism and language impairment expressed in a speaker's social identity?

b. How do positive attitudes to a bilingual’s native and/or second language and its speakers contribute to achievement in L2 (additive bilingualism)? How do negative attitudes to L1 and its speakers and positive attitudes to L2 and its speakers contribute to or impede achievement in L2 (subtractive bilingualism)?

c. What are some of the goals and beliefs of bilinguals with language disorders about their bilingualism and language disabilities, and how are those goals and beliefs expressed in their perceptions of self, in the way they conceive of language and communication, and in their language behavior. In particular, how do the intentions and speech acts of bilingual language disordered individuals reflect their social identities, attitudes, goals, and beliefs?

A second set of questions is an attempt to disentangle bilingualism and language impairment (LI) by identifying the relative contribution of each to language performance. In doing so, we hope to shed light on theoretical issues in bilingualism and neurolinguistics as well as on clinical practice, asking:

a. How can linguistic indicators of LI be identified in both languages in SLI/schizophrenia? More specifically, to what extent are the manifestations of LI similar/different across the two languages?

b. How can the manifestations of LI and typically developed (TD) bilingualism be differentiated given the fact that some of the same linguistic markers are characteristic of both bilingualism and LI?

The motivation for these questions is both practical and methodological. Practically, we are interested in knowing what to recommend to teachers, and clinicians regarding educational planning and programming for children or family members regarding supportive frameworks for adult schizophrenics. A second motivation comes from our research bias favoring individual analysis, personal design, and case studies and rejecting approaches that rely on large samples, group means, and comparisons of monolinguals and bilinguals. We do not expect that answers to these questions will be easy to attain, certainly not as easy as the “monolingual” solution, recommending that the child be spoken to in one language only at home or at school.

To address these questions, we ideally need demographic and ethnographic information about language use, language choice, language preferences, and language attitudes in the home, neighborhood, and school environments in both languages, sampling a range of topics, with a variety of listeners/interlocutors. We need to combine this information with a variety of language tasks, conducted in
both languages, including spontaneous speech and focused probes of a range of morphosyntactic, lexical, and pragmatic stimuli, tasks, and response measures. Within this mass of data, we pay special attention to bilingual phenomena such as codeswitching, interference, and fluency and how they interact with pragmatic phenomena such as certainty and confidence, insecurity and defensiveness.

**REPRESENTATION AND PROCESSING IN BILINGUALISM: A SELECTIVE REVIEW**

Two theoretical constructs inform this work: representation and processing. Representation of syntactic and lexical structure may be incomplete or different for both bilingual and LI children, but are assumed to be unimpaired in schizophrenia. Processing of linguistic information, however, may differ for both groups. LI in children has been considered a result of impaired representations and/or impaired processing in terms of duration, rate, and salience, showing up as difficulties in temporal integration, word-finding, morphosyntactic substitution, syntactic permutation errors and in tasks with heavy memory demands. Schizophrenic language processing difficulties have been reported primarily in the lexical and pragmatic domains as wordsalad, an overabundance of lexical rather than anaphoric cohesion, and prevalence of exophoric reference. Developing bilinguals may show evidence of linguistic representations that differ from those of monolinguals, and may also experience difficulties in processing related to their lexical knowledge or reduced exposure to each language. Adult second language learners, however, are assumed to transfer linguistic representations from L1, especially with regard to morphology and syntax; lexical knowledge and declarative memory are said to be more involved in adult language learning than grammatical knowledge and procedural memory (Ullman & Pierpont, 2005).

Linguistic representations and processing of linguistic structures in the literature on bilingualism, especially from the laboratories of Green and Kroll, are the foundational constructs of Walters’s (2005) sociopragmatic-psycholinguistic model of bilingualism. The review in this section begins with the work of Kroll and Green and then presents a brief outline of the structural and processing components of Walters’s SPPL model, concluding with three issues deemed most relevant to the study of bilingualism: typological differences, codeswitching, and code interference.

**FOCUS ON BILINGUAL LEXICAL REPRESENTATION**

Lexical representation has been widely investigated in bilingualism, in particular to address the question of shared versus separate representational systems. Kroll’s model of bilingual lexical production (Kroll & De Groot, 1997; Kroll & Tokowicz, 2005) contains different levels of representation for concepts, lemmas, and phonology. Language specific information is claimed to be available at the conceptual level in the form of language cues (cf. language tags) and at the lemma level, where language information is “distinct for words in each of the bilingual’s
languages” (p. 539). The phonological level consists of features shared between the two languages, activating representations from both languages. This model argues for an integrated set of lemmas to account for comprehension processes in word recognition.

Kroll and Tokowicz (2005) criticize some models of bilingualism for not distinguishing “among different levels of representation,” maintaining that bilingualism does not need to be represented in the same way at each level. Their review analyzes studies of a wide range of linguistic domains (e.g., orthography, phonology, lexical semantics). Bilingual stimuli in these studies include cognates, translation equivalents, interlingual homographs, orthographic neighbors, semantically related words, concrete and abstract nouns and tasks such as word recognition, priming, lexical decision, Stroop-type picture–word production, translation, word association, and semantic ratings. In contrast to morphology and syntax, where typological differences (see Section 2.5) may argue for more separate systems (Emmorey, Borinstein, Thompson, & Gollan, 2008; Meisel, 2004; Paradis & Genesee, 1997; Pyers & Emmorey, 2008), Kroll and Tokowicz (2005) amass a broad range of support on behalf of the notion that the “lexicon is integrated across languages, and that lexical access is parallel and nonselective” (p. 534).

**BILINGUAL PROCESSING MODELS: KROLL AND GREEN**

In terms of processing, the most prevalent constructs in bilingual research are storage and retrieval/access, activation/inhibition, and control. Of the two most influential models, Kroll’s model focuses on lexical processing and Green’s is more broadly scoped. The specifically bilingual aspects of these models are highlighted here.

In Kroll’s Conceptual Features Model (Kroll & De Groot, 1997) interference is determined by similarity in features across languages and by similarity in within-language and cross-language mappings from meaning to form, with more similarity reflecting less interference. Codeswitching in recognition and lexical decision tasks (Grainger & Beauvillain, 1987; Li, 1996) is explained in terms of activation of both languages. Cross-language priming effects (e.g., Grainger & Dijkstra, 1992) are claimed to come from activation of both lemmas and lexical features, while studies that showed no evidence for cross-language priming were apparently due to activation of the lemma only. Data on codeswitching at all linguistic levels from phonotactics to discourse (e.g., Clyne, 2003; Walters, 2005) provide strong evidence for this account.

**GREEN’S MODEL OF INHIBITORY CONTROL**

Green (1998, 2000) poses the main question in bilingual processing as a problem of control under conditions of multitasking, comparing bilingual production to a Stroop task. Phrased differently: How do bilinguals avoid speaking in L1 when they want to speak in L2? Green’s (1993) model proposes to account for a broad
range of bilingual data, including involuntary speech errors, interference, and fluent codeswitching and for findings in picture naming tasks.

The core structural constructs in the model are lemmas and language tags. The model involves two processes, *activation* of the lemma and *retrieval* of the lexeme, with *control* specified as one of three states of activation. The processing notions in control include competition, selection, and inhibition as well as schemas and goals. The multilevel nature of control is explained as follows: “first, one level of control involves language task schemas that compete to control output; second, the locus of word selection is the lemma level … and selection involves the use of language tags; third, control at the lemma level is inhibitory and reactive.” Two conditions are involved in control: explicit intentions and language tags on both word meanings (lemmas) and word forms (lexemes). Green discusses how this works for steady-state production in a second language and for codeswitching, arguing: In L2 production, activation of both lemmas and lexemes in L2 is increased, while L1 lexemes are suppressed when phonological information is retrieved. In codeswitching, there is competition at the stage of phonological assembly, and the lexeme that “reach[es] threshold first” is the one produced.

In Green’s model, an executive processor, the Supervisory Attentional System (SAS) activates language task schemas (e.g., for translation and word naming), which compete to control output. These schemas exercise control by activating and inhibiting language tags at the lemma level via functional control circuits. The “functional control circuits” regulate activation and inhibition to handle competition between language task schemas. Green illustrates this process with an example of a bilingual aphasic who was able to translate into a language he could not speak spontaneously. The functional control circuit for this phenomenon is called a translation schema (L1 → L2), which increases activation of a word production schema (for L2) and suppresses L1. Codeswitching “costs” in studies of numeral naming (Meuter & Allport, 1999) are also explained in terms of inhibitory control. He cites experimental research on translation, codeswitching, Stroop effects, and cross-language competitive priming as further evidence for his model.

Our work differs in several ways. First, our interest in codeswitching and code interference is more restricted. We focus on morphosyntactic rules and typological differences across languages in language impairment in children and in lexical as well as pragmatic issues in schizophrenia. The SPPL model presented below takes a more dynamic view of bilingual representation in terms of where L1 and L2 information is specified in the model and offers a different perspective on processing.

**REPRESENTATION OF SOCIOPRAGMATIC AND PSYCHOLINGUISTIC STRUCTURE**

The Sociopragmatic Psycholinguistic (SPPL) model of bilingualism contains seven structural/information sources and a set of processing mechanisms to describe how information flows between these components during bilingual
An Approach to Differentiating Bilingualism and Language Impairment

speech (Figure 23.1). Two modules (depicted vertically at the sides of the model) indicate that L1 and L2 language choice and affective information are available at every stage of language production. Interaction of the language choice module with the other information components provides an account for codeswitching, code interference, and fluency. The upper components of the model characterize sociopragmatic information, and the lower components represent psycholinguistic information. The sociopragmatic-psycholinguistic partition distinguishes impairment, which is more communicative, for example, in schizophrenia, from language disorders such as specific language impairment (SLI).

The language choice module is responsible for making L1 and L2 information available to the bilingual speaker: (1) for expressing one’s social identity; (2) in the choice of where to speak and in preferences for interlocutors and genres; (3) in conceiving intentions; (4) in retrieving and formulating concepts and words; and finally (5) in articulating an utterance. The language choice module selects, regulates, and retrieves information from these components and integrates them with the speaker’s linguistic choices. This module has been used to account for a distinction between sociopрагmatically and psycholinguistically motivated codeswitching in healthy bilingual adults (Altman, Schrauf, & Walters, under review) and in sequential bilingual children (Raichlin & Walters, 2005).

The affective module has an analogous framework for distinguishing sociopрагmatically motivated discourse markers and those which are used to convey

FIGURE 23.1. A sociopragmatic-psycholinguistic (SPPL) model of bilingualism.
fluency and other discourse formulation functions. It characterizes differences between more affectively motivated slips of the tongue (of the Freudian type) and more phonetically and phonologically based tip-of-the-tongue phenomena. It is currently the source of research attempting to distinguish social from linguistic indicators of schizophrenia.

Five internal components represent information sources and stages in language production, moving from expression of social identity to articulatory output.

**Social identity** information, the lead component, shows that bilingualism is grounded in the social world of the speaker. Social identity is constructed when the bilingual makes new friends, switches jobs, and integrates language choices regarding accent, names, and greetings with these elements of social life. Social identity information is relevant to both language impairment in children and adult schizophrenia, in part due to social ostracizing and in part due to identities grounded in communication difficulties.

The **contextual/genre component** specifies setting, participants, topic and genre information in conversational interaction. It addresses the classical sociolinguistic question of “who speaks that language to whom, where, and about which topic” (Fishman, 1965). It accounts for bilingual code alternation between immigrant parents and their native-born children. The genre subcomponent distinguishes scripted language, for example, in doctor-patient exchanges, from spontaneous conversation. For both language impairment and schizophrenia, this component accounts for language choices, with preferences for “safe” listeners, topics, and perhaps more scripted language than spontaneous conversation.

The central component of the model is responsible for identifying **speaker intentions** and their bilingual features. It is informed by speech act theory and research on discourse markers (e.g., *well*, *like*, *ya’ know*), greetings, and lexical choice, and bridges the upper sociopragmatic sources of information with lower psycholinguistic sources. A speaker’s intention (to request, promise, deceive, or blame) is peppered with bilingual information, from subtle indicators of the speaker’s identity latent in discourse markers or the prosodic shape of the utterance to lexical preferences influenced by psycholinguistic factors such as interference, lexical gaps, and word frequency.

The **formulator**, locus of most psycholinguistic research on bilingual processing, gets at the heart of lexical representation, or how words are stored in the mind. Monolingual models of lexical processing posit a universal, dictionary-like lemma containing syntactic and semantic information that maps into a morphophonological lexeme. In contrast, lexical formulation in the SPPL Model contains pragmatic information as well as structural features from both languages. Representations are highly variable, both within and across speakers. In addition to lexical information, the formulator specifies discourse patterns to handle relevance, cohesion, and sequencing of information. This discourse component is where schizophrenics have been shown to be impaired in their first language (Fine, 2006) and are assumed to be impaired in their second language as well.

The SPPL approach to formulation accounts for variability and incompleteness in a bilingual’s knowledge. All bilinguals (and even monolinguals) experience
lexical near-misses, which the listener perceives as malapropisms. The model attempts to characterize this variability by incorporating pragmatic and discourse information in the formulator and by making bilingual information available from the language choice module.

Finally, the bilingual articulator, accounts for the fact that bilinguals, even those without a trace of an accent, show evidence (sometimes only via precise acoustical measurements) of a merged system of sounds. The Spanish-English bilingual produces neither the sounds of Spanish nor the sounds of English (Caramazza, Yeni-Komshian, Zurif, & Carbone, 1973; Obler 1982). The SPPL Model and its bilingual articulator attempt to characterize this uniqueness as well as variability within and across speakers.

PROCESSING IN SPPL

Four general cognitive processing mechanisms are found in the SPPL framework: imitation, variation, integration, and control. Their generality enables an account of both sociopragmatic and psycholinguistic information. These mechanisms are supported by a set of basic processes, including: attention, discrimination, recognition, identification/recall, classification-sorting, and categorization. Imitation and variation, grounded conceptually in linguistics, are elaborated on here. Integration and control draw from Anderson’s (1996) Functional Theory of Cognition and Powers’s (1973, 1978) Perceptual Control Theory, respectively, and are beyond the scope of this chapter (but see Walters, 2005).

Imitation drives both sociopragmatic and psycholinguistic information. Language production begins with an innate representation that is defined by a set of structural features; that is, phonemes, morphemes, syntactic, and semantic structures. These features are selected, copied, and adapted, in order to express social, psychological, and linguistic preferences. Among the basic level processes that support this mechanism, recognition and recall are most prominent.

By way of example, the selection of names and use of greetings are among the most salient ways to project social identity. If schizophrenics are impaired in the social domain, their impairment could be manifested in the imitation mechanism. In contrast, language impaired children may show use of lexical imitation, for example, use of social routines or a fixed verb stem, as a strategy to compensate for limitations in morphosyntactic processing.

Imitation is also vital in generating intentions. A speech act selected to encode an intention is assumed to involve social identity, contextual, and genre information. It is conceived here as having been copied from a mental inventory of available intentions and integrated with an appropriate propositional content. In bilingual processing, copies of L1 speech act forms are sometimes combined with L2 propositional content (or vice versa) to yield utterances with code interference. When the Israeli speaker of English responds “Not right” in order to express mild disagreement, imitation is at work in replicating the speech act and the propositional content from each of the bilingual speaker’s languages. Intentions are not expected to be impaired in either schizophrenia or SLI, but the expression of
intentions in terms of speech act form and its link to propositional content should present different kinds of problems for each population.

In the formulator, imitation is the processing mechanism that takes the abstract information in a concept and lemma and copies or maps it onto morphophonological information to yield the lexeme. In bilingual lexical processing, information can be said to be copied from different linguistic levels and integrated to yield transfer errors; that is, forms with code interference as well as codeswitching. For example, Hebrew does not lexicalize the difference between process and result like English does in the distinction between “study” and “learn.” Thus, native Hebrew speakers of English typically use the word “learn” in a context that requires use of the word “study” (e.g., “I am learning English at school.”) In terms of the imitation mechanism, the speaker has selected the syntactic and semantic information from the Hebrew lemma “lmd” (to learn) and copied it onto the English lexeme, resulting in the word “learn.” Studies of codeswitching might ignore this phenomenon, since on the surface only a single language appears in the example above. In the present context, codeswitching and code interference show evidence of the same underlying imitation process.

Variation. The approach to variation taken here builds on notions of diversity or richness of linguistic forms, strategies, and patterns from sociolinguistics, adding a psycholinguistic perspective on variation as a mechanism in language use. The claim is: richer variation will allow a speaker to generate more language, more varied language and in more contexts. When the bilingual speaker produces codeswitching or code interference, a variant is produced. The mechanism by which choices are made is variation—variation in presentation of self, in deciding who to interact with, in selecting a topic, in selecting a speech act, in accessing a lexical representation. The variation mechanism allows the speaker to select from a range of linguistic options and manipulate them to fit his/her social identity and specific intentions. The variation mechanism is grounded in the basic processes of discrimination and classification.

In both schizophrenia and SLI, processing demands in other domains (e.g., lexical selection in schizophrenics, temporal integration in SLI) may lead to impairment in the variation mechanism, which in turn may have similar or different manifestations in the two phenomena.

**REPRESENTATION AND TYPOLOGICAL DIFFERENCES**

Insight into abstract linguistic representations can be attained by taking advantage of contrasting typological differences between a bilingual’s two languages, particularly in the areas of morphology and syntax. For example, English is morphologically “sparse” and requires an overt sentence subject, whereas Russian, Hebrew, and Spanish are relatively rich in their inflectional morphologies. Russian has a rich morphological case system; English, Hebrew, and Spanish do not. All four languages have prepositions, some which are governed by verbs (and obligatory) and others used to introduce adverbial prepositional
phrases, such as locatives, temporals, and instrumentals. Syntactically, English, Russian, Hebrew, and Spanish are all SVO languages, but show different degrees of freedom in word order, with English and Spanish less flexible than Russian and Hebrew. Russian, Hebrew, and Spanish all allow null subjects, but English does not. The use of null subjects in Hebrew is more limited than its use in Spanish. On the borders of syntax, semantics, and pragmatics, English and Spanish have both definite and indefinite articles, Hebrew has only a definite article, and Russian has neither, but marks definiteness by demonstratives and changes in word order.

These typological differences lead to code interference in bilinguals. For example, Russian speakers’ omission of definite articles in English and Hebrew suggests that a slot for this morpheme is missing in their underlying representation. Inappropriate insertion of definite articles in these languages may show that a speaker has acquired a representation for grammatical definiteness, but may not yet have acquired all of the semantic and pragmatic constraints on their use, as found in monolingual acquisition (Avram, 2007).

Typological differences have also been found in the clinical markers for SLI. In English, widespread use of root infinitives is a clinical marker for SLI (Rice & Wexler, 1996), whereas in Hebrew, SLI children show weakness in some aspects of the inflectional system, but this is not a diagnostic for SLI. A combination of inflectional and derivational factors seems to offer a better tool (Dromi, Leonard, Adam, & Zadunaisky-Ehrlich, 1999; Ravid, Levie, & Avivi-Ben-Zvi, 2001). In a Hebrew-English bilingual child, use of root infinitives in English and difficulties with Hebrew verb morphology could be the result of code interference between very different systems rather than indicators of language impairment, as is reported for learners of English with different first languages (Paradis, 2007).

The interface of bilingualism and language impairment requires that we distinguish processing from representation, and more specifically, differentiate crosslinguistic influence from clinical markers of SLI. Typological variation can lead to different manifestations of (impaired) linguistic representation and can be differentiated from bilingual representation by the quantity and type of errors the bilingual child produces. In general, impaired representation is expected to yield omissions, while bilingual representation is expected to yield substitutions due to shared storage. In contrast, bilingual schizophrenics should present a relatively intact morphosyntactic system in their native language and the same kind of code interference as nonimpaired bilinguals in their second language.

**CODESWITCHING AND CODE INTERFERENCE**

Codeswitching is motivated by sociopragmatic and psycholinguistic factors. These motivations can be distinguished in terms of intentionality and directionality. For example, a Russian immigrant to the United States might codeswitch into English to show how much she understood about her new job but would codeswitch back to Russian to describe a particular kind of existential frustration because English doesn’t have a term with Soviet flavor. Similarly, an Argentinean-born ivy-league
professor who feigns a nonnative accent in English in order to project her minority identity in faculty meetings, might converse in accentless, idiomatic English with her native English-speaking graduate students. Sociopragmatic codeswitching is goal-driven and motivated by identity as well as external, contextual factors. Structural-psycholinguistic codeswitching stems from individual linguistic and mental factors, in particular difficulties in finding words and lack of structural equivalence across languages, when the bilingual is confronted with word finding and fluency issues. In processing terms, codeswitching is characterized as involving the mechanisms of imitation and variation.

In early bilingual acquisition, codeswitching occurs across speakers and intrasententially. Despite 50 years of scientific research on codeswitching, folk wisdom says that it causes confusion and leads to problems in school. But, as Zentella (1997) states so strongly, the pediatrician, school official, or other “professional” makes this kind of assessment based on very limited data. The child is usually assessed in the majority language. The diversity of patterns of bilingualism and socialization in the home, in the neighborhood, and in the schoolyard are often ignored (but see Bedore & Peña, 2008).

Structural properties of codeswitching (e.g., where it occurs syntactically) alone cannot say unequivocally whether a bilingual’s two languages are represented in like fashion or whether they are differentiated. Neither can structural and distributional features of codeswitching in the environment, for example, how much and where family members codeswitch, directionality from L1→L2 or L2→L1, tell the whole story about questions of representation. However, coupled with information about identity, context, genre, and intention, this structural information can offer a wider picture of the role of codeswitching in bilingualism, and as claimed here, as a diagnostic of language impairment. We have found directionality and psycholinguistic motivations for codeswitching to be excellent indicators of language dominance in both schizophrenics and SLI children.

Code interference is closely related to codeswitching. Three constructs are relevant here: completeness, fluency, and automaticity. Completeness is grounded in the structural or representational aspects of language. The products of one or both languages in bilinguals are incomplete because their linguistic representations are incomplete. In the lexical domain, bilingual lemmas, perhaps more so than their monolingual counterparts, are not full-scale OED (Oxford English Dictionary) entries. Rather, they are potentially “incomplete”—phonologically, syntactically, semantically, and pragmatically.

Fluency and automaticity are processes, reflections of incompleteness. Fluency is linguistically defined; automaticity cuts across perceptual and cognitive domains. Along these lines, dysfluency results when:

- information from the two languages has not been accurately or appropriately copied from memory (due to deficiencies in storage, search, or retrieval),
- there is underuse, overuse, inappropriate use of the imitation and/or variation mechanisms,
• imitation and variation are out of balance; that is, when the control mechanism indicates disturbances (e.g., unstable relations between intentions and perceptions).

Dysfluency manifests itself as hesitations, pauses, false starts, repetitions, and use of discourse markers as space fillers and lexical inventions. Two additional bilingual phenomena related to code interference and fluency are size of lexicon and rate of speech. Bilinguals’ vocabulary size, both children and adults, is marked by lexical gaps and size limitations, which lead to word-finding difficulties. Vocabulary size is a structural issue, and rate of speech is a processing phenomenon. Both contribute to fluency.

**RESEARCH ON BILINGUAL SLI AND SCHIZOPHRENIA**

Our research on bilingualism and language impairment in SLI and schizophrenia is marked by its wide range of linguistic indicators, including morphosyntactic features of verbs and prepositions, lexis, pragmatics, and social factors. Due to space limitations, we focus on verbal morphosyntax, prepositions, and narrative abilities in SLI and clinical as well as linguistic indicators in schizophrenia.

**VERBAL MORPHOSYNTAX**

For SLI, the bilingual children were all successive bilinguals, immigrant children with at least 2 years of exposure to the L2 in Hebrew-speaking preschool programs. All children were screened again, at time of study, for both languages using standardized instruments where available, for example, CELF 2 Preschool for English (Wiig, Secord, & Semel, 2004), and Goralnik for Hebrew (Goralnik, 1995). The cutoff point for atypical development was set at one SD below norm for the CELF and 1.5 SD below norm for the Goralnik. This screening distinguished between children who showed typical development in both languages (TD), atypical development in both languages (A-TD), and typical development in one language (English: E-TD; Hebrew: H-TD).

In one paper (Armon-Lotem, Adam, & Walters, 2008), we examined the use of verbal inflections by 15 English–Hebrew preschool bilinguals, ages 4–7: six typically developing (TD) bilinguals from regular preschools and nine language impaired bilinguals placed in “language preschools” following standardized SLP assessments. Using a case studies approach and multiple tasks (sentence completion, sentence imitation, and productions/enactment), we found similar errors for all bilinguals, with a significance difference in quantity across the different groups. In English, both TD bilinguals and E-TD bilinguals tended to use root infinitives in up to 20% of the relevant contexts. By contrast, A-TD bilinguals showed the same kind of errors in 50%–60% of the relevant contexts, like monolingual children with SLI. In Hebrew, the TD bilinguals used the wrong person inflection in 16% of the contexts, which targeted verbs inflected for 1st and 2nd person. A-TD bilinguals substituted 1st and 2nd person forms like TD bilinguals,
but did so in 50%–60% of the relevant contexts. By contrast, E-TD children opted for the bare form, omitting person morphology altogether in 50%–60% of the relevant contexts.

These findings raise the question as to whether quantitative differences are enough to diagnose language impairment in bilinguals. Is the high ratio of root infinitives indicative of SLI in the A-TD bilinguals? Does this mean that the E-TD group is not SLI? Is the high ratio of person substitution indicative of SLI in the A-TD group? Are the omissions of person morphology in Hebrew indicative of SLI in the E-TD group?

We propose that since the E-TD bilinguals perform like TD children in their L1, they are not SLI by definition, but rather slow second language learners, who have not mastered the inflectional system of their L2. More specifically, their errors reflect a strategy that is unlike Hebrew typical and impaired acquisition. The E-TD bilinguals had difficulties with the uninterpretable person features that are not available in their L1. These features are sensitive to critical period (White, 2003), and so the E-TD bilinguals show an error pattern that reflects the acquisition of L2 after the critical period. For the A-TD children, though tense-marking may not be a qualitative clinical indicator of SLI in bilingual populations, the quantity of errors, when manifested in both languages, is a potential indicator. That is, quantitative and qualitative differences when found in both languages can be indicative of SLI, while a qualitative difference only in the second language is not.

**Prepositions**

Twelve children with language impairment (LI) who attended special “language preschools” after being diagnosed as language impaired by a speech clinician and seven TD who attended regular preschools were tested. Children’s ages ranged from 4.0–7.4, and they all came from the same bilingual neighborhood and same (middle-high) SES. Seven children were A-TD while four were E-TD, and the 12th child was H-TD. Our case study approach made it possible to start profiling the different groups.

Data were analyzed for quantity of errors, according to the following categories:

- Substitution with code interference: The baby laughed *on* the clown.
- Substitution with no code interference: The baby laughed *to* the clown.
- Omission with code interference: The elephant pulled *(down)* the zebra’s pants.
- Omission with no code interference: The baby laughed *(at)* the clown

Findings showed better performance on spontaneous speech than imitation and that the children in the language preschools had more errors in English than in Hebrew, reflecting higher proficiency in Hebrew, and a tendency toward more code interference in English. Both TD and LI children had errors in prepositions due to code interference, but LI children also showed substitutions of prepositions.
that could not be explained by code interference. This was true for both languages, with verb governed prepositions being more problematic than locatives and temporals in English. There were very few omission errors, which were mostly restricted to the ATD group.

Follow-up work on prepositions with 50 children shows about half of the children are dominant in one language, scoring within norms for only one of their languages. These children are not discussed here, since they are assumed either to have not yet acquired L2 or show evidence of L1 language loss. This left us with more homogeneous groups of 15 children with Language Impairment (LI) who were ATD (six male, nine female) and 11 Typically Developing (TD) children (three male, eight female).

Findings showed evidence of code interference for both typically developing and language impaired bilingual children, as manifested by substitution errors. Different performance on obligatory (verb-governed) and free prepositions (locatives and temporals) distinguished LI and TD bilinguals, with LI children performing better on free than obligatory prepositions and TD children showing no difference on these two forms. Moreover, LI children’s omissions were not traceable to code interference. In addition, language specific effects emerged in English, with obligatory prepositions posing greater difficulty than the Hebrew prepositions in this category. Finally, sentence length influenced the proportion of bilingual errors but not LI errors. The findings contribute to the discussion of ways to generate bilingual language samples that are comparable across languages despite structural differences and further suggest a possible new indicator for SLI among bilingual children.

- Only LI children omitted prepositions where there was no code interference.
- Both TD and LI children show unsystematic substitutions that are not due to code interference, with a quantitative difference between the two groups.
- Utterance length had a different influence on the two types of prepositions and errors.

**Narrative and Discourse Abilities**

Narrative and discourse abilities are elicited with multiple stimulus materials, including response to picture books, retelling of stories presented orally and via interactive role playing. In storytelling the child is first given a picture book to look through on his/her own and then asked to tell a narrative, following the pictures.

Mlodinov (2007) investigated the narratives of 11 Russian–Hebrew speaking bilingual children, ages 6–6.9 with 1–3.5 years of exposure to L2, five of them diagnosed with language problems, and six TDs. Two narratives were elicited from each child, one in each language, using the same six black and white pictures depicting a story of “A fox and a crow” in both languages. She found that the LI children used more code-switching and made more morphosyntactic errors than the TD children.
A crosslinguistic difference was found between the two languages, with better performance in L2/Hebrew, as indicated by the use of more connectors per proposition, and a smaller percentage of morphosyntactic errors than the Russian narratives. Moreover, TD children told longer narratives in Hebrew, and in both languages their narratives were more fluent and included more temporal markers and fewer “unclear” referents than the narratives of the LI children. Hebrew narratives also included less codeswitching and a lower percentage of unclear references than the Russian ones. On the other hand, the Russian narratives included more propositions and were more fluent than the Hebrew narratives.

**Schizophrenia in Two Languages**

Our approach to the relation between schizophrenia and bilingualism parallels the work in bilingual SLI. We want to identify linguistic indicators that may be unique to schizophrenia, which are not influenced by second language use. We examine clinical indicators (blocking, topic shift) and a range of linguistic markers (exophoric reference, lexical repetition, incomplete syntax, unclear reference) of schizophrenia and two bilingual discourse phenomena (codeswitching, discourse markers) in order to begin disentangling bilingualism and schizophrenia.

Recently, cognitive dysfunction has been found to correlate better with schizophrenic phenomena than traditional diagnostic criteria such as delusions, hallucinations, and flat affect (Park, Puschel, Sauter, Rentsch, & Hell, 2003; Perry et al., 2001). Cognitively schizophrenia includes executive functions and working memory. Linguistically, the illness is defined and diagnosed by disorganized speech and thought, for example, topic switching, alogia, derailment, incoherence, blocking, poverty of content of speech, thought-disorder, loose associations, incoherence, and word salad. Avolition and affective disturbance are also expressed to some extent in language, leading to social dysfunction. While current thinking in research and clinical practice labels schizophrenia a cognitive disorder, all aspects of the illness involve language behavior (Fine, 2006). Current research offers a number of explanatory proposals that shed light on the role of language in schizophrenia, among them diminished lateralization (Liddle, White, & Francis, 2007) attention and sequencing difficulties (Docherty, 2005), and impaired ability to build up context verbally and nonverbally.

In one study (Bersudsky, Fine, Gorjaltsan, Chen, & Walters, 2005) eight diagnosed bilingual schizophrenics were matched with healthy bilinguals for age, gender and educational level, and spontaneous speech data were collected via sociolinguistic interviews and transcribed for analysis. One clinical measure and four linguistic measures that have shown differences between schizophrenics and different control groups (Caplan, Guthrie, Tang, Komo, & Asarnow, 2000; Goren, Fine, Manaim, & Apter, 1995; Rochester & Martin, 1979) were applied to the data.

The clinical measure, blocking (sudden inability to participate in the interview due to word or thought retrieval difficulties) successfully distinguished the two populations, only the schizophrenics showing evidence of blocking. Of the linguistic measures, incomplete syntax, lexical repetition, and unclear reference
revealed virtually no differences between schizophrenics and healthy second language learners. One other measure, exophoric reference (to the physical context of the interaction), did appear more in the transcripts of the patient group, but this may have been an artifact of the interview procedure. Thus, based on clinical diagnosis (PANNS) and linguistic measures showing differences between clinical and typical populations, we concluded that our eight schizophrenics were very similar to other immigrant language learners. Next, approaching the data from a second language/bilingual perspective, we looked at three additional indicators from the areas of morphosyntax, lexis, and pragmatics/discourse.

**Morphosyntax**

Structures based on typological similarities and differences between Russian and Hebrew were examined. Gender agreement for nouns and adjectives, preposition use and verb tense morphology showed appropriate use in both schizophrenics and healthy immigrants. At the other end of the difficulty scale, the definite article does not exist in Russian and thus poses major difficulties due to its presence as a prefix on Hebrew nouns. It is also a highly frequent form in Hebrew. Appropriate use of definite articles in Hebrew, then, is a good indicator of the extent to which Russian native speakers have acquired Hebrew. In the present study, contexts in which the definite article was obligatory were counted and proportion of appropriate obligatory use was calculated. On the whole, schizophrenics afforded themselves fewer opportunities to use definite articles, and their error patterns (both omissions and substitutions) were very similar to those of the controls. For schizophrenics appropriate use of definite articles ranged from 13%–82% of obligatory uses of the article (M = 58.9%); for healthy immigrants appropriate use ranged from 47%–90% (M = 72.6). Individual analyses revealed that four healthy immigrants performed better than the schizophrenics, but four other schizophrenics performed equal to or better than the controls.

**Lexis**

Type-token ratios, measures of lexical diversity were calculated for both an overall estimate of diversity and for diversity of content words. In Hebrew, a morphologically rich language, prepositions, pronouns, and determiners appear both as prefixes and suffixes attached to nouns and verbs as well as independent function words. The data for schizophrenics and healthy L2 learners differed very little, the data showing very similar mean lexical diversity (0.36 vs. 0.39, respectively) and range (0.12 vs. 0.19).

**Pragmatics/Discourse**

Four markers were selected to cover a range of discourse and pragmatic functions (*az* “so,” *ze* “this,” *em* “um,” *eh* “uh”). Only one group difference emerged, schizophrenics producing almost twice as many fluency markers (*eh*) as healthy immigrants. Moreover, a very large proportion of these forms came during blocking, the clinical indicator of schizophrenia. The picture that emerges, then, from
these discourse and pragmatic data continues to show that immigrant schizophrenics use language very much like their healthy counterparts.

For the bilingual measure examined (codeswitching), there were again no differences between schizophrenics and healthy language learners, and only six participants (three in each group) codeswitched at all. The very limited use of codeswitching during the interviews attests to the fact that even schizophrenics were well aware of the social norms of the interview situation (despite the fact that they knew the interviewer to be bilingual in Russian and Hebrew). Finally, both groups presented the same range of language learner phenomena, including interference/translation strategies, use of routine phrases, and self-monitoring.

A second study was aimed to avoid the inherent variability in comparing small numbers of patients with healthy subjects and take advantage of bilingualism as an opportunity to implement a within-subject design.

From a pool of 60 patients diagnosed clinically (PANNS evaluation), 12 (10 males and 2 females) ranging in age from 25–59 (M = 33.8), who met the following criteria were identified: (1) clear signs of thought disorder in their schizophrenic diagnosis; (2) homogeneity in terms of age, age at the time of immigration, length of residence in Israel; and (3) age at the onset/diagnosis of illness. These patients participated in two sessions, one in their preferred language (Russian) and the other in Hebrew/L2, with a bilingual interviewer.

A range of clinical and linguistic indicators of schizophrenia and two bilingual discourse phenomena were examined. These included: blocking, topic shifting, exophoric reference, lexical repetition, unclear reference, and incomplete syntax. Exophoric reference (percentage of phoric nominal groups) was the only indicator to show within-subject cross-linguistic differences, and even then only four of the patients accounted for the higher level of exophora in Hebrew. The bilingual discourse measures on the other hand, revealed three times as much codeswitching from Russian to Hebrew and six times as many discourse markers in Russian than in Hebrew. The codeswitching is indicative of greater salience of Hebrew in the hospital environment where the study was conducted as well as higher frequency of Hebrew lexis, especially for nouns, where most CS occurs. The finding for DMs belies the fact that patients preferred Russian and the experimenter who conducted both Russian and Hebrew interview sessions reported better Russian than Hebrew. It may, however, hint at an impairment in social skills grounded in language. More detailed analyses are needed to clarify this speculation.

To conclude, the disorder in schizophrenia cuts across the two languages. This finding is important for assessment. The characteristics of language that lead to the diagnosis of schizophrenia are roughly equal in both languages of these fairly adept bilingual speakers, even though they learned their second language as adults. However, there were patients (different for each of the indicators) who showed more markers of schizophrenia in L2. One possible explanation for this additive effect of bilingualism and schizophrenia is that short-term memory and monitoring of language output may be under particular stress with the double burden of schizophrenia and communicating in a second language. On the other
hand, (1) the more low level task of processing syntax was similar in the two languages, and (2) fluency markers and the social awareness of interacting in a conversation were even elevated in the second language; speakers used their second language to achieve fluency by code-switching, and they used discourse markers in their first language to create rapport with the interviewer in the first language that was in fact the minority language in the culture. Docherty et al. (2006) point out that schizophrenia language problems are not unitary but rather there are many ways that the speech may be unclear (see Fine, 2006, for extensive detail). Thus the discovery of a subgroup of speakers who show relatively greater difficulty in the second language is not surprising. These speakers have relatively greater difficulty in using a second language in the context of the cognitive and social difficulties underlying the schizophrenia.

RESEARCH AND ASSESSMENT STRATEGY

The methodological approach we use is based on large amounts of data, collected with a variety of tasks and procedures from relatively small numbers of subjects from bilingual backgrounds, matched with typically developing bilinguals for age and language for children and for education and occupation for adults. In order to deal with the heterogeneity of bilingualism and neurolinguistic disorders, we conduct within-subject, cross-language case studies of a range of linguistic phenomena. Data analyses proceed in stages, focusing first on the individual subject, with comparisons across languages, linguistic markers, and tasks; next on comparisons of bilingual impaired subjects matched linguistically and chronologically with unimpaired bilingual subjects, and finally on group comparisons, across languages, linguistic features, and tasks.

Three general principles guide this approach. One essential requirement is to assess and collect data in both languages. This practice follows the principle that language impairment in children and psychiatric disorders in adults should be manifested in both languages of a bilingual. Second, since a bilingual is more than a sum of her two languages, assessing one language can be highly misleading, especially if the assessment is done in the less dominant language. Thus, the individual is the primary unit of analysis, and group data are examined only after labor-intensive analyses of individual cases (see Guendouzi, 2003, on the importance of individual analysis). A third principle is that assessment measures should not be literal translations of words and structures; rather they need to be developed and constructed by taking into account the typological differences and similarities manifested in the two languages.

Beyond these general guidelines, methodological choices in studies of bilingual language acquisition and use involve several sampling decisions. These choices include:

1. the specific linguistic structures to investigate,
2. the tasks and response measures needed to elicit those structures,
3. which bilingual speakers to choose to examine.
The question of which linguistic structures to examine poses a problem of whether to aim for depth or breadth. Linguistic studies tend to aim for depth in their quest for answers to focused research questions (e.g., Genesee, 2001, for bilingualism; Rice & Wexler, 1996, for SLI), while clinical, psychoeducational studies and standardized measures of language seek breadth (e.g., Stuart-Smith & Martin, 1999) and tend to use standardized measures. Tasks and response measures are crucial to creative research and offer the most potential for breakthroughs in treatment of communication disorders (cf. melodic intonation therapy in aphasia). Once relevant structures and functions in the two languages have been selected, tasks and response measures can be derived from the theoretical constructs. Nevertheless, the problem of comparing impaired bilinguals and “typically developing bilinguals,” still remains, the problem that introduces the largest source of variance to the study. The unpredictability in these sources of variance and the inherent confounding in designing studies that can keep track of all of them favor a “bilingual” approach based on large amounts of data, gathered in both languages, from relatively small numbers of bilinguals, each individual offering a relatively self-contained basis for analysis and interpretation. In the terminology of design and statistics, each subject in effect serves as his or her own control. Thus, bilingualism offers a unique opportunity to avoid the pitfalls of group comparisons and between-subject designs that are inevitably victims of the kind of heterogeneity discussed above with regard to defining bilingualism. The remainder of this section outlines the choices we make in terms of: identification of participants, selection of stimuli, tasks and procedures, and data analyses.

**Subject Selection**

For the study of bilingual SLI, we focus on children ages 4–7 with bilingual backgrounds in English-Hebrew and Russian-Hebrew, conducting cross-linguistic, intrasubject comparisons on a case by case basis. Within-subject comparisons reduce the impact of the sociocultural differences. We choose children from similar SES and from L2 (Hebrew-speaking) preschools with a majority of native speakers of the target language. We select subjects from among LI children rather than from among bilinguals, since LI children represent a clinically referred population, whereas bilinguals are not, and there is less consensus about defining criteria for bilinguals. Given the heterogeneity in the bilingual population, we have limited our work to early successive bilinguals, where the child is exposed to one language at home and another in preschool prior to the age of three; that is, early L2 acquirers. We include only early bilinguals who are able to carry on a conversation in both languages and whose two languages are balanced for a range of linguistic measures (e.g., MLU), excluding late bilinguals who began acquiring L2 after the age of three. Finally, all participants are cognitively, emotionally, and neurologically unimpaired but show primary language disorder, being at least 1–1.5 SD (depending on the specifics of the standardized measure and conventional practice in using it) behind typically developing bilinguals for both languages. In addition to placement in special “language preschools,” all subjects
are tested on standardized measures in both languages where available. Where a standardized measure does not exist (e.g., Russian), we have developed two screening measures: an age appropriate sentence imitation task and a nonword repetition task, designed in both languages to reflect the contrastive structures of the two languages.

For schizophrenia, we identify patients from a hospital environment, choosing subjects from a larger outpatient pool who have been evaluated with standardized instruments (PANNS) and clinical interviews, focusing on language-based indicators: disorganized speech, derailment, or alogia. Language proficiency in both languages is evaluated by bilingual research assistants in three domains: lexis, grammar, and fluency.

**Stimulus Selection Based on Contrast Across Languages**

Typological differences and similarities serve as the theoretical basis for development of stimuli. Target structures include those which are similar in both languages and those which are contrastive, allowing investigation of transfer as well as code interference. For example, in the area of verbal morphosyntax we targeted present and past tense morphemes in English, tense, number, gender, and conjugation (pattern) morphology in Hebrew, tense and aspect in Russian. For prepositions, we distinguish “obligatory” prepositions lexically or grammatically selected by the verb from “free” prepositions that introduce adverbial (locative/temporal) preposition phrases with parallel and contrastive stimuli across language pairs.

Due to the exploratory nature of research on schizophrenic language and findings of largely intact grammatical systems in the second language, our research has relied primarily on naturalistic data collection, including sociolinguistic interviews and narrative recall. Planned studies will investigate lexical and pragmatic deficits along the same lines described here for bilingual SLI children.

**Tasks and Procedures**

Each subject is tested with a wide range of tasks. In addition to the studies presented in Section 3, we have used:

1. Guided play with a uniform set of toys in two settings: kitchen and playground; the former represents the home environment and is expected to elicit more spontaneous speech in the home language and the latter represents the school environment and is expected to elicit more spontaneous speech in the school language.

2. Sentence imitation and sentence completion targeting crosslinguistic interference in verbal morphosyntax, prepositions, case marking, and definiteness as well as a wide range of higher syntactic structures that involve changes in word order.
3. Narrative elicitation based on familiar and unfamiliar stories, with and without picture stimuli; and bilingual retelling, where the subject retells narratives presented in different languages to three listeners, one who speaks only the native language, one who speaks only L2, and one who is bilingual.

5. A pragmatic-discourse task involving role playing, for example, a doctor–patient situation. In this task the context is constrained by the role relationship, allowing examination of pragmatic choices and sociolinguistic appropriateness.


This range of tasks serves as the basis for bilingual profiles, allowing comparison across languages and examination of task effects both within and across languages.

**DATA ANALYSES: FROM INDIVIDUAL PROFILES TO GROUP PATTERNS**

Data analyses include some measures that cut across tasks (e.g., omission and substitution errors) and others that are unique to certain tasks (e.g., story grammar categories for narratives, discourse markers for spontaneous speech). With the individual subject as the primary unit of analysis, comparisons across languages, linguistic markers, and tasks are conducted only when we are sure we have homogeneous groups of subjects, be they typically developing or impaired.

**Cross-Language Measures**

In order to prepare linguistic data for analyses, we first identify all the obligatory contexts for a particular structure. For verbal morphology and prepositions, these are the contexts in which a particular verb form is expected to appear. For prepositions, the procedure is the same. For narrative structure, obligatory contexts are not as clear-cut, notwithstanding findings from story grammar research. Thus, we opt to transcribe the narratives, pair the subject’s utterances with the picture or oral stimuli and then identify the narrative categories. Beyond each separate linguistic domain, we also examine performance across domains, for example, lexical abilities in spontaneous speech, role playing and narrative; verbal inflections and prepositions in these tasks as well as in story completion, sentence imitation and other tasks that specifically target these structures; social identity indicators such as names, pronouns, and discourse markers in actual language use as well as in reported language use.

Error analyses are particularly useful. We have looked at: (1) the quantity of errors; (2) comparisons of omissions and substitutions; (3) qualitative assessment of errors that can be traced to code interference; and (4) errors that are unique and cannot be traced to either of the child’s languages.

Additional cross-language measures comparing individual performance for each individual include: (1) proficiency as indicated by standardized language tests, MLU/MPU, verb-based utterances (%V/U), subjective ratings of lexis,
An Approach to Differentiating Bilingualism and Language Impairment

grammars, and fluency, pragmatic variation, nonword repetition designed to capture typological contrasts in morphophonology; (2) structure of the lexicon (e.g., content/function word distributions) and lexical diversity; and (3) fluency measures (e.g., discourse markers, pauses, repetitions).

Measures of Bilingualism

Measures include: (i) codeswitching (analyses based on frequency, grammatical category, directionality, and motivations) in narrative, retelling, and role-playing tasks; and (ii) background information including age, gender, birth order, length, and amount of exposure to L1 and L2.

REFERENCES


