Available online at www.sciencedirect.com
SCIENCE DIRECT
Progress in Neuro-Psychopharmacology & Biological Psychiatry 29 (2005) 535–542
Progress In Neuro-Psychopharmacology & Biological Psychiatry
www.elsevier.com/locate/pnpbp

Schizophrenia and second language acquisition

Yuly Bersudsky[a,*], Jonathan Fine[b], Igor Gorjaltsan[a], Osnat Chen[b], Joel Walters[b]

[a]*Ministry of Health Mental Health Center, Faculty of Health Sciences, Ben Gurion University of the Negev, Beersheva, Israel*
[b]*Department of English, Bar-Ilan University, Ramat Gan, Israel*

Accepted 28 January 2005
Available online 9 March 2005

Abstract

Language acquisition involves brain processes that can be affected by lesions or dysfunctions in several brain systems and second language acquisition may depend on different brain substrates than first language acquisition in childhood. A total of 16 Russian immigrants to Israel, 8 diagnosed schizophrenics and 8 healthy immigrants, were compared. The primary data for this study were collected via sociolinguistic interviews. The two groups use language and learn language in very much the same way. Only exophoric reference and blocking revealed meaningful differences between the schizophrenics and healthy counterparts. This does not mean of course that schizophrenia does not induce language abnormalities. Our study focuses on those aspects of language that are typically difficult to acquire in second language acquisition. Despite the cognitive compromises in schizophrenia and the manifest atypicalities in language of speakers with schizophrenia, the process of acquiring a second language seems relatively unaffected by schizophrenia.

Keywords: Cognitive deterioration; Schizophrenia; Second language acquisition

1. Introduction

Schizophrenia was classically thought to influence associations and affect without causing cognitive deterioration (Kraepelin, 1971). More recently, cognitive deterioration has become a central feature of schizophrenia research, and cognitive function seems to correlate better with outcome than delusions, hallucinations or affective disturbance. Cognitive deterioration in schizophrenia has been described to encompass executive functions (Fucetola et al., 2000; Perry et al., 2001; Taylor, 1996), working memory (Park et al., 2003; Perlstein et al., 2003) and other aspects (Elvevag et al., 2003; Goldstein et al., 1998; Wexler et al., 1998). While the cognitive impairment in schizophrenia is distinct from that of Alzheimer's, several medications may improve both schizophrenic and Alzheimer's symptoms (Friedman et al., 1999, 2002; Levin and Rezvani, 2000; Stryjer et al., 2003).

Language is clearly affected in schizophrenia, since disorganised speech including derailment, topic shifting and incoherence and the negative symptoms of blocking, poverty of speech, poverty of content, and flattening of affect all characterize schizophrenia (American Psychiatric Association, 1994). The question is whether the underlying substrates responsible for schizophrenia also block the learning of a second language. This issue can be examined by comparing second language acquisition among speakers with schizophrenia and healthy bilingual immigrants.

The large immigration to Israel of Russian-speakers from the former Soviet Union (FSU) in the 1990s brought with it many individuals diagnosed with schizophrenia before arrival in Israel. A central feature of the acculturation process in Israel, as in any country of immigration, is language acquisition. Language acquisition involves brain processes that can be affected by lesions or dysfunctions in several brain systems. In addition to executive function and working memory as indicated above, recent investigations

Abbreviations: FSU, Former Soviet Union; SR, reference to speech roles (e.g., "I", "we", "you"); NSR, reference to non-speech role entities in the environment (e.g., *that* table); t/t ratio, type–token ratio.

* Corresponding author. Beer-Sheba Mental Health Center, PO Box 4600, Beer-Sheba, Israel. Tel.: +972 8 640 1602; fax: +972 8 640 1621.
E-mail address: yuly1960@zahav.net.il (Y. Bersudsky).

0278-5846/$ - see front matter © 2005 Elsevier Inc. All rights reserved.
doi:10.1016/j.pnpbp.2005.01.004

suggest the following affected neurological processes: developmentally reduced synaptic connectivity (McGlashan and Hoffman, 2000), abnormal automatic spreading activation of semantic networks as measured by the N400 event-related potential (Mathalon et al., 2002), mismatched negativity generated in the primary and secondary auditory cortex and the frontal lobe, measured again by an event-related potential (Salisbury et al., 2002), and perceptual closure indexed by closure negativity ERP generated in the visual association cortex (Doniger et al., 2002). However, second language acquisition may depend on different brain substrates than first language acquisition. Ullman's (2001) declarative/procedural model maintains that first language acquisition is grammar-based and relies more on procedural memory, which is grounded in frontal lobe and basal ganglia areas of the left hemisphere, while second language acquisition depends more on lexical/declarative processes which have been localized in cortical regions of the left temporal lobe. Thus second language acquisition by immigrants to Israel suffering from schizophrenia may provide unique information as to whether schizophrenic cognitive impairment affects those brain areas necessary for second language acquisition. We hypothesized that individuals from the FSU with schizophrenia would show abnormalities of Hebrew language use compared to non-schizophrenic individuals from FSU matched for appropriate variables. Three areas of linguistic knowledge were examined in order to examine this capacity: syntactic ability, as reflected in gender marking, determiners, and prepositions; lexical knowledge, and pragmatics. As detailed in the data analysis section, linguistic and clinical measures that distinguish schizophrenics from non-schizophrenics were chosen as well as syntactic, lexical and pragmatic measures relevant for assessing second language learning. The linguistic measures were selected to show a range of contrast between Russian and Hebrew structures. The syntactic and lexical measures are those typically reported to cause difficulty for second language learners even at advanced stages of second language acquisition literature (Walters, 2005).

2. Methods

2.1. Participants

A total of 16 Russian immigrants to Israel, 8 diagnosed schizophrenics and 8 healthy immigrants, were compared. The patients were selected from the outpatient clinic of the Beer Sheba Mental Heath Center. Data from healthy immigrants came from the cross-sectional component of a project on second language acquisition among Russian immigrants to Israel. Participants from both schizophrenic and healthy groups were chosen according to the following criteria: home-language Russian only; high level of proficiency in Hebrew, their second language; age on arrival in the target country between 30 and 40 years old; length of residence at the time of initial data collection at least 5 years; professionally trained; urban origin. Over a period of 6 months, the patients who best matched the individuals in the healthy immigrant group and could speak Hebrew for 15 min were selected for the study. Informed consent was obtained from all patients. Equal numbers men and women were engaged for the study. Diagnosis was DSM IV (American Psychiatric Association, 1994) chronic schizophrenia. All patients were stable on neuroleptic medication (one on risperidone, one on perphenazine, one on clozapine and five on olanzapine).

Subjects were matched for (1) length of residence in Israel, (2) age (at the time of immigration), (3) education, and (4) sex. Length of residence (exposure to Hebrew) ranged from 6 to 11 years for schizophrenics and from 8 to

Table 1
Matched pairs of subjects (background information)

		Subject identification	Sex/age	Years in Israel	Years of education	Profession
1	Patient	BA	M/33	11	15	Engineer
	Control	VL/14	M46	12	15	Engineer
2	Patient	PA	F/47	11	15	Biology teacher
	Control	PA/15	F/49	13	15	Chemical researcher
3	Patient	BO	M/40	6	13	Electronic technician
	Control	RO/28	M/41	8	15	Mechanical engineer
4	Patient	RA	F/36	11	15	Doctor
	Control	ZH/13	F/34	12	18	Doctor
5	Patient	RI	F/40	9	15	English teacher
	Control	MA/02	F/49	12	17	English teacher
6	Patient	VL	M/32	6	15	Engineer
	Control	AL/06	M/35	12	15	Math teacher
7	Patient	VA	M/33	11	12	None
	Control	SA/26	M/53	10	15	Physicist
8	Patient	PV	F/52	9	15	Engineer
	Control	RZ/12	F/49	13	15	Chemical engineer