

# 精神分裂症患者在听觉掩蔽环境下的言语识别\*

吴超 吴玺宏 李量

(中国科学院心理研究所, 北京 100871)

## 摘要

关键词 : ; ; ; ; ; ;  
分类号 B845

( )  
,  
,  
( Horan et al., 2008; Skelley, Goldberg,  
Egan, Weinberger, & Gold, 2008; Barnett et al.,  
2010)  
(Allen, Griss, Folley, Hawkins, & Pearson, 2009;  
Barnett et al., 2010) (Giakoumaki,  
Roussos, Pallis, & Bitsios, 2011; Ivleva et al., 2012),  
,  
,  
(Gottesman & Gould, 2003; Barnett et al.,  
2010)

## 1 精神分裂症的感觉门控缺失

, (Hoffman  
et al., 2007),  
,  
(  
Gottesman & Gould, 2003; Light & Braff, 2003)  
,  
,  
(Lee, Chung, Yang, Kim, & Suh, 2004; Ross  
et al., 2007)  
(fMRI)  
(PET-CT) ( Gottesman & Gould, 2003;  
Kumari et al., 2010)

: 2013-01-09  
\* (31170985)  
(2009CB320901; 2011CB707805)

: , E-mail: liangli@pku.edu.cn

## 2 精神分裂症与听觉掩蔽

### 2.1 听觉加工干扰：能量掩蔽和信息掩蔽

2009年JET EMC228(MC /F2 9 Tf1 0 0 1 395.59 63DC BT4)BDC B

(Li, Daneman, Qi, & Schneider, 2004; Shinn-Cunningham, 2008; Shinn-Cunningham & Wang, 2008)

( )

(Freyman, Helfer, McCall, & Clifton, 1999; Freyman, Balakrishnan, & Helfer, 2001, 2004; Li et al., 2004; Yang et al., 2007; Wu, & Cao et al., 2012; Wu, & Li et al., 2012)

(Shinn-Cunningham, 2008)

1) 2)  
(Best, Gallun, Carlile, & Shinn-Cunningham, 2007; Shinn-Cunningham, 2008)

(Freyman, Balakrishnan, & Helfer, 2001, 2004; Li et al., 2004; Yang et al., 2007; Wu, & Cao et al., 2012; Wu, & Li et al., 2012)

(Brungart, Simpson, Ericson, & Scott, 2001; Freyman, Balakrishnan, & Helfer, 2004; Li et al., 2004; Kidd, Arbogast, Mason, & Gallun, 2005; Wu et al., 2005; Wu, & Li et al., 2012)

(Force, Venables, & Sponheim, 2008),  
 (Kasai et al., 2003);  
 (Källstrand et al., 2002);  
 ( )  
 ) (Hoffman, Rapaport, Mazure,  
 & Quinlan, 1999; Lee et al., 2004) ,  
 ,  
 ,  
 (Wu, & Cao et al.,  
 2012) ,  
 (Mickey & Dalack, 2005),  
 ,  
 (Carroll, Boggs, O'Donnell, Shekhar,  
 & Hetrick, 2008; Wood et al., 2008)  
 Källstrand (2002) 12  
 8 12  
 ,  
 ,  
 ( )  
 , ( )  
 ) ( )  
 )  
 ,  
 (Kuperberg & Heckers, 2000; Kallstrand et al., 2002;  
 Rosenkranz, Moore, & Grace, 2003)

-8 , 1998) / (Okugawa, Sedvall, & Agartz, 2002; Federspiel et al., 2006; DeLisi, 2008; Friedman et al., 2008; Gasparotti et al., 2009)

18% ( ) 21% ( 39),

24 ) 24% ( Ross 2007 , (PANSS)

① ,

Ross ; ②Ross 4) Wu (2012)

( ) , ( ) ,

), Ross , ( ) (Tombaugh, 2006),

(Freyman et al., 1999; Li et al., 2004; Wu et al., 2005; Rakerd, Aaronson, & Hartmann, 2006) , (Ohrmann et al., 2007; Forbes, Carrick, McIntosh, & Lawrie, 2009; Pantelis et al., 2009; Zanello, Curtis, Badan B â & Merlo, 2009),

(Wu et al., 2012), Ross , Wu 2012

2) Wu (2012) , ,

5) Wu (2012) ,

3) Wu (2012) , ) ( =

;

1) , ( Øie, Rund, Sundet, & Bryhn,

### 3 未来的研究展望

1)

(Myslobodsky, Goldberg, Johnson, Hicks, & Weinberger, 1992; Schonauer, Achtergarde, & Reker, 1998; de Gelder, Vroomen, Annen, Masthof, & Hodiament, 2003; Ross et al., 2007; Szycik et al., 2009),

2)

3)

### 参考文献

徐李娟, 黄莹, 吴玺宏, 吴艳红, 李量. 鸡尾酒会环境中的知觉线索的去掩蔽作用. *心理科学进展*, 17(2), 261-267.

- Allen, A. J., Griss, M. E., Folley, B. S., Hawkins, K. A., & Pearlson, G. D. (2009). Endophenotypes in schizophrenia: A selective review. *Schizophrenia Research*, 109(1-3), 24-37.
- Barnett, J. H., Robbins, T. W., Leeson, V. C., Sahakian, B. J., Joyce, E. M., & Blackwell, A. D. (2010). Assessing cognitive function in clinical trials of schizophrenia. *Neuroscience & Biobehavioral Reviews*, 34(8), 1161-1177.
- Best, V., Gallun, F. J., Carlile, S., & Shinn-Cunningham, B. G. (2007). Binaural interference and auditory grouping. *The Journal of the Acoustical Society of America*, 121(2), 1070-1076.
- Best, V., Ozmeral, E., Gallun, F. J., Sen, K., & Shinn-Cunningham, B. G. (2005). Spatial unmasking of birdsong in human listeners: Energetic and informational factors. *The Journal of the Acoustical Society of America*, 118(6), 3766-3773.
- Bregman, A. S. (1994). *Auditory scene analysis: The perceptual organization of sound*. New York: MIT Press.
- Brungart, D. S., Simpson, B. D., Ericson, M. A., & Scott, K. R. (2001). Informational and energetic masking effects in the perception of multiple simultaneous talkers. *The Journal of the Acoustical Society of America*, 110(5), 2527-2538.
- Carroll, C. A., Boggs, J., O'Donnell, B. F., Shekhar, A., & Hetrick, W. P. (2008). Temporal processing dysfunction in schizophrenia. *Brain and Cognition*, 67(2), 150-161.
- de Gelder, B., Vroomen, J., Annen, L., Masthof, E., & Hodiament, P. (2003). Audio-visual integration in schizophrenia. *Schizophrenia Research*, 59(2-3), 211-218.
- DeLisi, L. E. (2008). The concept of progressive brain change in schizophrenia: Implications for understanding schizophrenia. *Schizophrenia Bulletin*, 34(2), 312-321.
- Federspiel, A., Bégé S., Kiefer, C., Schroth, G., Strik, W. K., & Dierks, T. (2006). Alterations of white matter connectivity in first episode schizophrenia. *Neurobiology of Disease*, 22(3), 702-709.
- Forbes, N. F., Carrick, L. A., McIntosh, A. M., & Lawrie, S. M. (2009). Working memory in schizophrenia: A meta-analysis. *Psychological Medicine*, 39(6), 889-905.
- Force, R. B., Venables, N. C., & Sponheim, S. R. (2008). An auditory processing abnormality specific to liability for schizophrenia. *Schizophrenia Research*, 103(1-3), 298-310.
- Freyman, R. L., Balakrishnan, U., & Helfer, K. S. (2001). Spatial release from informational masking in speech recognition. *The Journal of the Acoustical Society of America*, 109(5), 2112-2122.
- Freyman, R. L., Balakrishnan, U., & Helfer, K. S. (2004). Effect of number of masking talkers and auditory priming on informational masking in speech recognition. *The Journal of the Acoustical Society of America*, 115(5), 2246-2256.

- Freyman, R. L., Helfer, K. S., McCall, D. D., & Clifton, R. K. (1999). The role of perceived spatial separation in the unmasking of speech. *The Journal of the Acoustical Society of America*, *106*(6), 3578–3588.
- Friedman, J., Tang, C., Carpenter, D., Buchsbaum, M., Davis, K. L. (2008). Diffusion tensor imaging findings in first-episode and chronic schizophrenia patients. *American Journal of Psychiatry*, *165*(8), 1024–1032.
- Gasparotti, R., Valsecchi, P., Carletti, F., Galluzzo, A., Liserre, R., Cesana, B., & Sacchetti, E. (2009). Reduced fractional anisotropy of corpus callosum in first-contact, antipsychotic drug-naïve patients with schizophrenia. *Schizophrenia Research*, *108*(1-3), 41–48.
- Giakoumaki, S. G., Roussos, P., Pallis, E. G., & Bitsios, P. (2011). Sustained attention and working memory deficits follow a familial pattern in schizophrenia. *Archives of Clinical Neuropsychology*, *26*(7), 687–695.
- Gottesman, I. I., & Gould, T. D. (2003). The endophenotype concept in psychiatry: Etymology and strategic intentions. *American Journal of Psychiatry*, *160*(4), 636–645.
- Hazlett, E. A., Buchsbaum, M. S., Haznedar, M. M., Siever, L. J. (2008). Cortical gray and white matter volume in unmedicated schizotypal and schizophrenia patients. *Schizophrenia Research*, *101*(1-3), 111–123.
- Hazlett, E. A., Buchsbaum, M. S., Zhang, J., Newmark, R. E., Siever, L. J. (2008). Frontal-striatal-thalamic mediodorsal nucleus dysfunction in schizophrenia-spectrum patients during sensorimotor gating. *Neuroimage*, *42*(3), 1164–1177.
- Hoffman, R. E., Hampson, M., Wu, K., Anderson, A. W., Krystal, J. H. (2007). Probing the pathophysiology of auditory/verbal hallucinations by combining functional magnetic resonance imaging and transcranial magnetic stimulation. *Cerebral Cortex*, *17*(11), 2733–2743.
- Hoffman, R. E., Rapaport, J., Mazure, C. M., & Quinlan, D. M. (1999). Selective speech perception alterations in schizophrenia. *American Journal of Psychiatry*, *156*(3), 393–399.
- Horan, W. P., Braff, D. L., Nuechterlein, K. H., Sugar, C. A., Cadenhead, K. S., Calkins, M. E., Green, M. F. (2008). Verbal working memory impairments in individuals with schizophrenia and their first-degree relatives: Findings from the Consortium on the Genetics of Schizophrenia. *Schizophrenia Research*, *103*(1-3), 218–228.
- Ivleva, E. I., Morris, D. W., Osuji, J., Moates, A. F., Tamminga, C. A. (2012). Cognitive endophenotypes of psychosis within dimension and diagnosis. *Psychiatry Research*, *196*(1), 38–44.
- Källstrand, J., Montañery, P., Niélan, S., & Olsson, O. (2002). Auditory masking experiments in schizophrenia. *Psychiatry Research*, *113*(1-2), 115–125.
- Kasai, K., Yamada, H., Kamio, S., Nakagome, K., Iwanami, Kato, N. (2003). Neuromagnetic correlates of impaired automatic categorical perception of speech sounds in schizophrenia. *Schizophrenia Research*, *59*(2-3), 159–172.
- Kidd, G., Jr., Arbogast, T. L., Mason, C. R., & Gallun, F. J. (2005). The advantage of knowing where to listen. *The Journal of the Acoustical Society of America*, *118*(6), 3804–3815.
- Kumari, V., Fannon, D., Pfyfchem D. H., Raveendran, V., Kuipers, E. (2010). Functional MRI of verbal self-monitoring in schizophrenia: Performance and illness-specific effects. *Schizophrenia Bulletin*, *36*(4), 740–755.
- Kuperberg, G., & Heckers, S. (2000). Schizophrenia and cognitive function. *Current Opinion in Neurobiology*, *10*(2), 205–210.
- Lee, S. H., Chung, Y. C., Yang, J. C., Kim, Y. K., & Suh, K. Y. (2004). Abnormal speech perception in schizophrenia with auditory hallucinations. *Acta Neuropsychiatrica*, *16*(3), 154–159.
- Li, L., Daneman, M., Qi, J. G., & Schneider, B. A. (2004). Does the information content of an irrelevant source differentially affect spoken word recognition in younger and older adults? *Journal of Experimental Psychology: Human Perception and Performance*, *30*(6), 1077–1091.
- Light, G. A., & Braff, D. L. (2003). Sensory gating deficits in schizophrenia: Can we see the difference? *Biological Psychiatry*, *53*(10), 380–389.
- nicotine use, and [ch9\(i\)-38\(z\)-31\(o\)-21\(,\)-36\(u\)-39\(s\)-3\(e\)-31\(l\)-23\(c\)-15\(h\)-39823](#)

- McGorry, P. D. (2009). Attentional set-shifting ability in first-episode and established schizophrenia: Relationship to working memory. *Schizophrenia Research, 112*(1-3), 104-113.
- Parwani, A., Duncan, E. J., Bartlett, E., Madonick, S. H., Rotrosen, J. P. (2000). Impaired prepulse inhibition of acoustic startle in schizophrenia. *Biological Psychiatry, 47*(7), 662-669.
- Rakerd, B., Aaronson, N. L., & Hartmann, W. M. (2006). Release from speech-on-speech masking by adding a delayed masker at a different location. *The Journal of the Acoustical Society of America, 119*(3), 1597-1605.
- Rojas, D. C., Camou, S., & Carlson, J. (2003). Psychoacoustic evidence of impaired frequency, duration and intensity discrimination in schizophrenia. *Schizophrenia Research, 60*(1), 181.
- Rosenkranz, J. A., Moore, H., & Grace, A. A. (2003). The prefrontal cortex regulates lateral amygdala neuronal plasticity and responses to previously conditioned stimuli. *The Journal of Neuroscience, 23*(35), 11054-11064.
- Ross, L. A., Saint-Amour, D., Leavitt, V. M., Molholm, S., Javitt, D. C., & Foxe, J. J. (2007). Impaired multisensory processing in schizophrenia: Deficits in the visual enhancement of speech comprehension under noisy environmental conditions. *Schizophrenia Research, 97*(1-3), 173-183.
- Schonauer, K., Achtergarde, D., & Reker, T. (1998). Lipreading in prelingually deaf and hearing patients with schizophrenia. *The Journal of Nervous and Mental Disease, 186*(4), 247-249.
- Shinn-Cunningham, B. G. (2008). Object-based auditory and visual attention. *Trends in Cognitive Sciences, 12*(5), 182-186.
- Shinn-Cunningham, B. G., & Wang, D. (2008). Influences of auditory object formation on phonemic restoration. *The Journal of the Acoustical Society of America, 123*(1), 295-301.
- Skellley, S. L., Goldberg, T. E., Egan, M. F., Weinberger, D. R., & Gold, J. M. (2008). Verbal and visual memory: Characterizing the clinical and intermediate phenotype in schizophrenia. *Schizophrenia Research, 105*(1-3), 78-85.
- Szycik, G. R., Münte, T. F., Dillo, W., Mohammadi, B., Samii, A., Emrich, H. M., & Dietrich, D. E. (2009). Audiovisual integration of speech is disturbed in schizophrenia: An fMRI study. *Schizophrenia Research, 110*(1-3), 111-118.
- Tombaugh, T. N. (2006). A comprehensive review of the paced auditory serial addition test (PASAT). *Archives of Clinical Neuropsychology, 21*(1), 53-76.
- Wood, S. J., Pantelis, C., Velakoulis, D., Yücel, M., Fornito, A., & McGorry, P. D. (2008). Progressive changes in the development toward schizophrenia: Studies in subjects at increased symptomatic risk. *Schizophrenia Bulletin, 34*(2), 322-329.
- Wu, C., Cao, S. Y., Zhou, F. C., Wang, C. Y., Wu, X. H., & Li, L. (2012). Masking of speech in people with first-episode schizophrenia and people with chronic schizophrenia. *Schizophrenia Research, 134*(1), 33-41.
- Wu, M., Li, H., Gao, Y., Lei, M., Teng, X., Wu, X., & Li, L. (2012). Adding irrelevant information to the content prime reduces the prime-induced unmasking effect on speech recognition. *Hearing Research, 283*(1-2), 136-143.
- Wu, X. H., Wang, C., Chen, J., Qu, H. W., Li, W. R., Wu, Y. H., Li, L. (2005). The effect of perceived spatial separation on informational masking of Chinese speech. *Hearing Research, 199*(1-2), 1-10.
- Yang, Z. G., Chen, J., Huang, Q., Wu, X. H., Wu, Y. H., Schneider, B. A., & Li, L. (2007). The effect of voice cuing on releasing Chinese speech from informational masking. *Speech Communication, 49*(12), 892-904.
- Zanello, A., Curtis, L., Badan Bâ M., & Merlo, M. C. G. (2009). Working memory impairments in first-episode psychosis and chronic schizophrenia. *Psychiatry Research, 165*(1-2), 10-18.

## Speech Recognition in Schizophrenic under Masking Conditions

WU Chao; WU Xihong; LI Liang

(Department of Psychology, Speech and Hearing Research Center, McGovern Institute for Brain Research, Key Laboratory on Machine Perception (Ministry of Education), Peking University, Beijing 100871, China)

**Abstract:** Some cognitive deficits are specifically trait-related to schizophrenia and are important for early detection, diagnosis, and treatment of this mental disorder. This article reviews the literature on deficits of schizophrenic patients in auditory masking tasks, auditory attention, and auditory working memory, and particularly put the emphasis on the vulnerability of speech recognition to masking stimuli, especially informational masking stimuli. This article will facilitate both the understanding of the etiology of schizophrenia and the exploration of new methods for early diagnosis and treatment of this mental disorder.

**Key words:** schizophrenia; speech recognition; energetic masking; informational masking; working memory; first-episode schizophrenics; chronic schizophrenics