Re ea ch Re o

h h h e C e e e e : A E t e e e

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ABSTRACT

An e en - ela ed po en ial (ERP) e pe imen a cond c ed o e plo e he diffe ence be een Chine e- peaking d le ic child en and no mal chool child en in o hog aphic and phonological p oce ing d ing Chine e en ence eading. Pa icipan e e i all p e en ed i h en ence , o d-b - o d and e e a ked o j dge he he he en ence e e eman icall accep able. The c cial manip la ion a on he en ence-final o- cha ac e compo nd o d , hich e e ei he co ec o inco ec . Fo he inco ec compo nd , he econd cha ac e of he ba e o d e e eplaced b homophonic o o hog aphicall imila cha ac e . I a fo nd ha , fo he no mal con ol , he o hog aphic and phonological mi ma che elici ed mo e nega i e ERP e pon e , ela i e o he ba eline, o e a ela i el long ime co e (incl ding he ime indo fo P200 and N400) a he cen al–po e io calp egion . In con a , he d le ic child en in gene al ho ed no diffe ence be een e pe imen al condi ion fo P200 and N400, al ho gh he mo e de ailed ime co e anal e did e eal ome eak effec fo he N400 componen

B e ni , 2005b; Molfe e e al., 2006; Sch l e-K ne e al., 2004; Ta lo and Keenan, 1990, 1999; Wimme e al., 2002). Wi h ome e cep ion (ee belo), fe die ha e in e iga ed he he d le ic child en ha e defici in p oce ing a io kind of ling i ic info ma ion of he pcoming o d and in eg a ing hem in o p io en en ial con e and ho he e defici o ld manife in he e en - ela ed b ain po en ial . The main p po e of hi ERP e ea ch i o e amine he ne al make of o hog aphic and phonological p oce ing defici in eading Chine e en ence . Befo e e make an in od c ion o he Chine e i ing em and he e pe imen al de ign of hi d , e fi p e en a b ief e ie of he ea lie die on o hog aphic and phonological p oce ing and e cal o428i.13.8.7(a6(li)26643.6.4(aT)0(h)24398p402820T)0(h)23.4(d)22.5(e)25.4(ng)2ela 1 2.
023-203;e)TJ-22.3362-1.4369TDHol(omb)24391(e)0(24323 g af.,.24327.5 e 85;al)2389.1Me l(e)432357(n(d)-2424B e ni , --24293-205b;d)23894(M ll(e-Sha)59.8

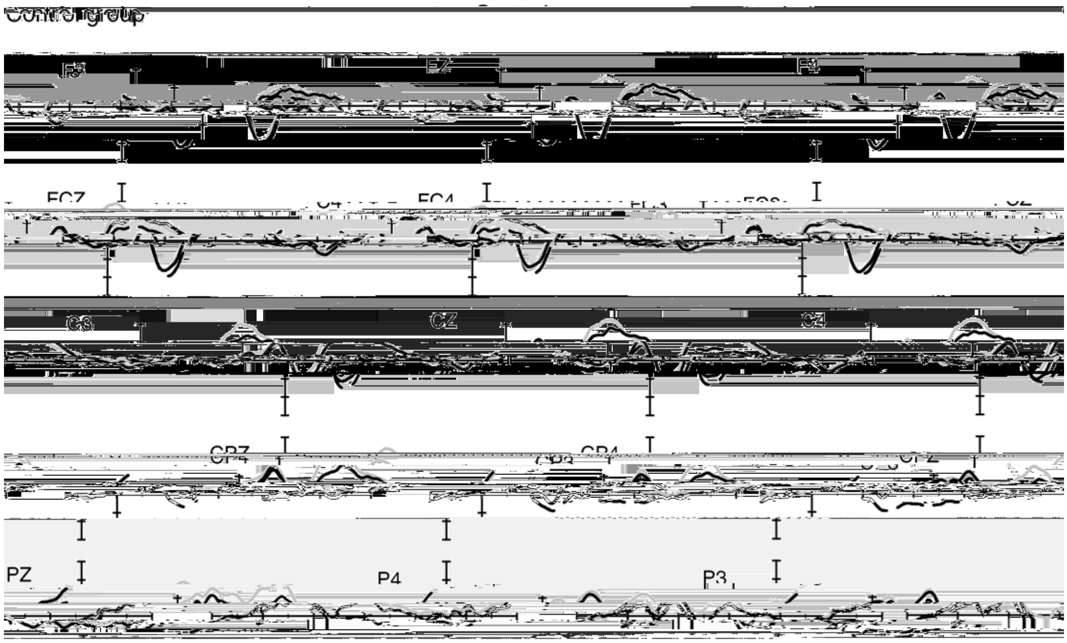
o hog aphic kill and in apid naming. A he ne oph iolog-
ical le el, Meng e al. (2005) ho ed ha Chine e d le-
ic child en ha e malle mi ma ch nega i i ie (MMN)
han no mal con ol o a di o im li de ia ing in ini ial
con onan o o el f om he anda d llable and o im li
de ia ing in empo al info ma ion.

In o de o in e iga e he ne oph iological ma ke of
he po en ial defici in p oce ing o hog aphic and phono-
logical info ma ion in en ence eading, e eco ded ERP
hen Chine e- peaking d le ic child en and he ma ched
no mal con ol e e p e en ed, o d-b - o d, i h en-
ence ha ended i h he c i ical o-cha ac e compo nd
o d . The c cial manip la ion a on he econd cha ac e
of he e compo nd (ee Table 1), ch ha he co ec
cha ac e e e eplaced b cha ac e hich e e o ho-
g aphicall imila o, b phonologicall diffe en f om he
ba e cha ac e (in he o hog aphic condi ion), o b cha -
ac e hich e e homophonic o, b o hog aphicall
diffe en f om he ba e cha ac e (in he homophonic
condi ion). Thi manip la ion e l ed in en ence ending
i h compo nd non o d . Al ho gh he inco ec inp
cha ac e b hem el e o ld be able o acce he
co e ponding mo phemic ep e en a ion in he le icon
(Zho and Ma len-Wil on, 2000a; Zho e al., 1999), he
combina ion of he fi , co ec cha ac e and he econd,
inco ec cha ac e in he homophonic and o hog aphic
condi ion co ld no ac i a e ongl he eman ic ep e en-
a ion of he ba e o d in he le icon and hi o ld e l in
diffic l ie in in eg a ing he c en inp i h he p io
en en ial con e . Mo eo e , beca e he ba e o d , he
mo pheme co e ponding o he inp cha ac e and he
mo pheme co e ponding o he eplaced c i ical cha ac e
in he ba e o d e e all no n (ee he Me hod ec ion), he
mo phological p oce e in ol ed in p oce ing he com-
po nd non o d in he homophonic and o hog aphic condi-
ion ho ld be imila and an diffe en ial ERP effec
be een he condi ion co ld onl be a ib ed o he impac
of o hog aphic and phonological mi ma che be een he
inp cha ac e and he ba e o d pon eman ic p oce e .
Gi en he p e io die conce ning he p oce ing of
eman icall incong en o d in We e n lang age o
c ip fo d le ic o lang age-impai ed indi id al (e.g.,
Heleni e al., 1999; Ne ille e al., 1993; Robichon e al., 2002;
Sabi ch e al., 2006) and gi en he finding in Li e al. (2003)
and Valde -So a e al. (1993) fo Chine e o hog aphic and
phonological p oce ing in indi id all p e en ed o d , e
p edic ed ha , fo bo h he d le ic and he no mal pa ici-
pan , he N400 componen fo he c i ical im li ho ld be
mo e nega i e-going fo he o hog aphic and homophonic
condi ion han fo he ba eline condi ion. Impo an l ,
depending on he he he o hog aphic o phonological
info ma ion i ed p edominan l o con ain acce o
le ical eman ic (Zho and Ma len-Wil on, 1999, 2000b), he
o hog aphic o phonological mi ma ch be een he inp
o d and he ba e o d co ld elici diffe en ial N400 effec
be een he e pe imen al condi ion fo he o g o p of
pa icipan . The e co ld al o be diffe ence in he P200
componen be een he condi ion and be een he pa ici-
pan g o p .

2. e t

2.1. Behavioral data

Fo eac ion ime (RT) and e o a e (ee Table 2) in he
eman ic accep abili j dgmen a k, 2 (d le ic . no -
mal) 3 (o hog aphic . homophonic . ba eline) ANOVA
e e cond c ed. Fo RT , he main effec of pa icipan g o p
a ignifican ,



F . 1 – C

he d le ic child en had highe e o a e han he no mal con ol in he o hog aphic (p<0.01) and he homophonic (p<0.01) condi ion , b no in he ba eline condi ion. Mo eo e , hile he e o a e did no diffe be een he h ee e pe imen al condi ion fo he no mal con ol (p>0.1), he e o a e in he o hog aphic and homophonic condi ion e e ignifican l highe han in he ba eline condi ion (p<0.05) fo he d le ic child en. The e finding

ba eline condi ion (–0.39 μV). The main effec of an e io / po e io loca ion a ignifican , F

homophonic condi ion, hich had he o hog aphic mi ma ch. Thi di ocia ion gge ha , compa a i el , he d le ic child en had le e e e defici in phonological p oce ing han in o hog aphic p oce ing. Mo eo e , in a la e ime indo of 531–676 m , he homophonic condi ion a ac all le nega i e-going han he o hog aphic condi ion fo he d le ic child en, gge ing ha he phonological info ma ion conce ning he ba e cha ac e p o ided b he inp cha ac e in he homophonic condi ion helped he d le ic child en o acce he eman ic of he ba e o d and hence o ed ce he magni de of he nega i i in he la e ime indo .

The p e en finding of eak nega i e effec (e.g., N400) fo he homophonic and o hog aphic condi ion fo he d le ic g o p han fo he con ol g o p appea o be incon i en i h p e io die on d le ic in alphabe ic c ip . U ing h me j dgmen a k , a n mbe of die (e.g., Acke man e al., 1994; Lo ich e al., 1997; McPhe on e al., 1996, 1998) ob e ed stronger N400 componen fo he d le ic han fo he con ol (b ee Lo ich e al., 2003). Ho e e , he appa en incon i - enc a likel o be ca ed b he e pe imen al a k hich ap in o diffe en le el of le ical p oce ing. On he o he hand, in en ence comp ehen ion, Robichon e al. (2002) fo nd ha he eman icall incong en o d elici ed la ge N400 com- ponen and a la ge N400 effec fo d le ic han fo he con ol (al o Ne ille e al., 1993 fo lang age-impai ed child en; b ee Heleni e al., 1999), gge ing ha d le ic eade ha e diffic l ie in in eg a ing o d meaning in o en ence ep e en a ion. Gi en he cha ac15.e7(a)0(-o)29e0;(f)0(f8-584(ic3a h)19.6(of2(i)0(4(b)13.9( )-288.3( )15.1(h)0(e)-275.7(e)0( )25.4(p)0(e)240)0(i)23.8

t- e o e amine he po ible gende diffe ence in Ra en, eading fl enc and ocab la e and fo nd no diffe ence be een he d le ic gi l and he d le ic bo ($p>0.1$) o be een he no mal con ol gi l and he con ol bo ($p>0.1$).

4.2. Stimuli

4.2.1. Stimuli and design

The e pe imen had h ee condi ion : he o hog aphic

can hi. The linked bila e al ma oid e ed a efe ence poin and he AF elec ode on he cap e ed a g o nd. Elec ode impedance a kep belo 5 kΩ. The EEG a amplified (band pa 0.05–