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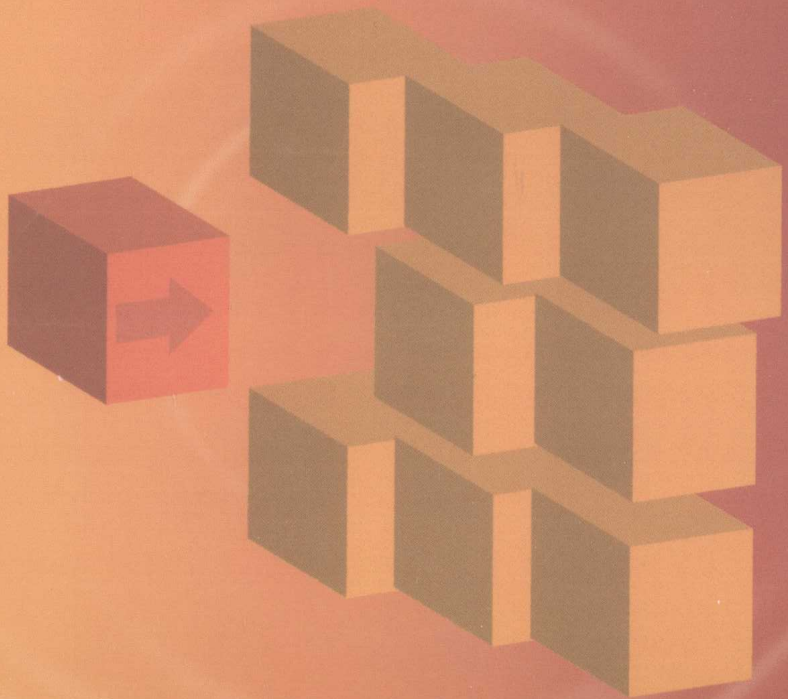
Input and Output in the Construction of Procedural Knowledge: Evidence from Instructed EFL Learners' Performance

顾琦一 著



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内容摘要

本研究旨在探索教学环境下成人外语学习过程中，输入与输出对语言能力发展的作用。研究者着重从理论视角对外语习得进行探讨，运用安德森（Anderson）（1983，2000，2004）的思维适应性控制理论（Adaptive Control of Thought），把第二语言能力发展界定为程序性知识逐步建构的过程。程序性知识是第二语言学习者解决各类语言任务的知识。程序性知识的建构由知识表征和知识提取的发展共同促成，通过不断实践（practice）来实现。陈述性知识在程序性知识建构过程中虽然起到了积极作用，但是并不能转换成为程序性知识。

第二语言程序性知识的建构通过输入、输出两类语言实践来成就。输入在语言习得中不可或缺，输入和输出在二语习得过程中不可分割，因此本研究建立了将输入与输出结合起来进行考察的理论和研究框架。

本研究通过控制对比实验考察了输入和“输入＋输出”语言实践在第二语言程序性知识建构过程中的作用。实验选取英语关系从句为目标语言项，对成人外语学习者分别进行了输入和“输入＋输出”两种语言实践的实验处理。研究者对被试者在前测、后测和跟踪后测中，实施理解、表达和语法判断三类计时语言运用任务中的表现，进行组间比较和组内比较，发现被试者在陈述性知识发展基本稳定的情况下，“输入＋输出”组的程序性知识发展明显优于输入组。实验结果表明：输入与输出语言实践的结合在输入和输出都有限的外语环境下的二语习得过程中必不可少。

本研究在理论和方法上有以下贡献。理论上，首先，本研究立足对二语习得的宏观认识，把输入和输出视为二语习得中的两个加工过程，主张这两个加工过程在二语习得过程中缺一不可，提出并验证了输入加工和输出加工的结合是促成外语环境下第二语言程序性知识的必要条件，因而在以往同类研究的基础上有所突破。其次，本研究对颇具影响的思维适应性控制理论中的一个重要论点进行了质疑，以神经生物学领域的最新科研成果论证了陈述性知识不能转化成程序性知识，语言实践是促成二语发展的必要条件。第三，本研究论证了知识表征和知识提取共同促成语言能力的发展，对 VanPatten 的输入加工模式（input processing model）提出了质疑。方法上，本研究在以往同类研究的基础上亦有所发展。在实验设计上控制了输入组和输入加输出组语言实践性质和语言实践量的平衡。在探测语言能力发展上采用了准确率和加工时间两项行为指标，通过时间压力促使被试者在各项计时任务中更多地依赖程序性知识，并通过结合两项指标更为准确地捕捉了第二语言能力的发展。

关键词：输入　输出　程序性知识建构

Abstract

This study investigates the role of input and output in instructed adults' learning of English as a foreign language (EFL). Much of the research effort gets into the development of theoretical thinking. Following Anderson's (1983, 2000, 2004) theory of Adaptive Control of Thought (ACT), this study defines the development of second language (L2) competence as a construction process of procedural knowledge. Procedural knowledge involves L2 learners' knowledge of how to perform various tasks. Procedural knowledge is constructed as a conflation of the development of representation and retrieval through practice. Declarative knowledge, though beneficial in the construction of procedural knowledge, does not convert to procedural knowledge.

L2 procedural knowledge is accomplished through input-based practice and output-based practice. As input is necessary, and input and output are inseparable in L2 learning, the present study investigates the role of input and output as two integrated types of practice which contribute collaborately to the construction of target-like procedural knowledge.

An experiment was conducted to investigate the role of input practice and input-plus-output practice in the construction process of target-like procedural knowledge through a controlled comparison study. The experiment involved two treatment conditions on English relativization with adult EFL learners as subjects. The input-based

condition was composed of input-based comprehension tasks, while the input-plus-output condition was composed of reconstruction tasks. The researcher conducted between-groups and within-group comparisons on the subjects' timed performance in comprehension, production and grammaticality judgment tasks in the pretest, the immediate posttest and the follow-up posttest. The results suggested that when the subjects had achieved stable mastery of declarative knowledge, the input-plus-output group outperformed the input group. The results showed that the integration of input and output is necessary in the instructed EFL context where both input and output are limited.

The present study contributes to the subject in the following senses. Theoretically, first, input and output are taken as two types of processing in the overall process of Second Language Acquisition (SLA). Both of the two are seen as integral to the L2 development. It holds an integrative position on input and output, and thus, departs from the previous approach to input and output which features a separation and dichotomy of the two. Second, based on the recent neurobiological findings, an important argument of Anderson's ACT theory, namely, *conversion* from declarative knowledge to procedural knowledge, is rejected. It is proposed that practice is essential to the L2 development. At the core of the framework is *learning by doing* (Anderson, 1983), and thus, competence and performance are inseparable. Third, it is argued that representation and retrieval conflate in the development of language competence. VanPatten's rather influential input processing model is challenged. Methodologically, unlike earlier similar studies, the empirical work makes a point of keeping balance in the nature and amount of practice for the input

practice and the input-plus-output practice. Furthermore, two behavioral indicators, namely, accuracy rate and processing time, are employed in tapping L2 knowledge development. It is because of time constraint that our subjects tend to rely more on their procedural knowledge.

Key Words: input output procedualization

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Abbreviations

Abbreviation	Term
ACT	Adaptive Control of Thought
ANOVA	analysis of variance
AR	accuracy rate
CG	control group
COH	Comprehensible Output Hypothesis
CR	consciousness raising
DO	direct object
EFL	English as a foreign language
EG	experimental group
ES	effect size
ESL	English as a second language
fMRI	functional magnetic resonance imaging
GEN	genitive
GJT	grammaticality judgment test
IG	input group
IO	indirect object
IOG	input-plus-output group
IP	input processing
L1	first language
L2	second language
LAD	Language Acquisition Device
LAP	language acquisition process

MANOVA	multivariate analysis of variance
MOI	meaning-based output instruction
msec	milliseconds
NP	noun phrase
NPAH	Noun Phrase Accessibility Hierarchy
OCOMP	object of comparison
OO	direct object relative clauses embedded in the object matrix position
OOCOPM	object of comparison relative clause embedded in the object matrix position
OOPREP	object of preposition relative clauses embedded in the object matrix position
OPREP	object of preposition
OS	subject relative clauses embedded in the object matrix position
PCSCT	picture-cued sentence completion task
PCSIT	picture-cued sentence interpretation task
PDH	Perceptual Difficulty Hypothesis
PFH	Parallel Function Hypothesis
PI	processing instruction
PT	processing time
RC	relative clause
RT	reaction times
SCT	sentence combination task
SDH	Structural Distance Hypothesis
SDO	direct object relative clause embedded in subject matrix position

SIA	structured input activities
SIT	sentence interpretation task
SLA	second language acquisition
SO	direct object relative clauses embedded in the subject matrix position
SOCOPM	object of comparison relative clause embedded in the subject matrix position
SOHH	SO Hierarchy Hypothesis
SOPREP	object of preposition relative clauses embedded in the subject matrix position
SS	subject relative clauses embedded in the subject matrix position
SU	subject
TI	traditional instruction
UG	Universal Grammar

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