REPORT DOCUMENTATION PAGE

AFRL-SR-BL-TR-01-

0621

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	29 Nov 01	Final Report, 15 Feb 98 to 29 Nov 00

4. TITLE AND SUBTITLE	5. FUNDING NUMBERS
FOUNDATIONS OF STIMULUS-RESPONSE/STIMULUS-STIMULUS COMPATIBILITY	61102F 2313/BV

6. AUTHOR(S)

Dr Sylvan Kornblum

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)	8. PERFORMING ORGANIZATION REPORT NUMBER
Mental Health Research Institute The University of Michigan 205 Zina Pitcher Place Ann Arbor, MI 48109-0720	

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSORING/MONITORING AGENCY REPORT NUMBER
AFOSR/NL 801 N. Randolph Street Suite 732 Arlington, VA 22203-1977	F49620-98-1-0301

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION AVAILABILITY STATEMENT

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED

12b. DISTRIBUTION CODE

AIR FORCE OFFICE OF SCIENTIFIC RESEARCH (AFOSR)
NOTICE OF TRANSMITTAL DTIC. THIS TECHNICAL REPORT
HAS BEEN REVIEWED AND IS APPROVED FOR PUBLIC RELEASE
LAW AFR 190-12. DISTRIBUTION IS UNLIMITED.

13. ABSTRACT *(Maximum 200 words)*

The two principal accomplishments during this period have been the successful extension of the dimensional overlap model to sequential effects, and the completion of Greg Stevens' dissertation. The sequential effects on which we have been focusing are the speed ups and slow downs of RT with repetitions and non-repetitions, respectively, of stimuli and/or responses in choice RT tasks – the so-called repetition effect. Of particular importance for the dimensional overlap model is the finding that the repetition effect interacts with S-R compatibility. We have now shown that the DO model can account for this interaction, as well as for the repetition effects of irrelevant stimuli, by postulating that the information requirements on repeated trials are less than on non repeated trials.

20011220 101

14. SUBJECT TERMS	15. NUMBER OF PAGES
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	

FINAL PROGRESS REPORT
OCTOBER 1, 1999 – SEPTEMBER 30, 2000

FOUNDATIONS OF STIMULUS-RESPONSE/
STIMULUS-STIMULUS COMPATIBILITY

SYLVAN KORNBLUM – P.I.

Mental Health Research Institute
The University of Michigan
205 Zina Pitcher Place
Ann Arbor, MI 48109-0720
Phone: 734-763-1101
FAX: 734-647-4130
E-Mail: Kornblum@umich.edu

3 & 4 SUMMARY

This was the final year of the grant.

The two principal accomplishments during this period have been the successful extension of the dimensional overlap model to sequential effects, and the completion of Greg Stevens' dissertation. The sequential effects on which we have been focusing are the speed ups and slow downs of RT with repetitions and non-repetitions, respectively, of stimuli and/or responses in choice RT tasks - the so-called repetition effect. Of particular importance for the dimensional overlap model is the finding that the repetition effect interacts with S-R compatibility. We have now shown that the DO model can account for this interaction, as well as for the repetition effects of irrelevant stimuli, by postulating that the information requirements on repeated trials are less than on non repeated trials. We call this the "Information Reduction Hypothesis". Basically, when the relevant stimuli overlap, the repetition effects are accounted for by a reduction in either the stimulus and/or the response thresholds. When the irrelevant stimuli overlap, the repetition effects are accounted for by a reduction in the time needed to distinguish between relevant and irrelevant stimuli. Thus, depending on whether the relevant or irrelevant stimulus dimension has DO, one or the other of two parameters in the DO model is modified, contingent on the occurrence of a repetition. Simulations, based on this implementation of the hypothesis in the DO model, fit the experimental results well (Kornblum & Stevens, in press). In his dissertation Stevens shows that the S-S consistency effect in flanker tasks actually consists of two effects: one on the response stage, the other on the stimulus stage (Stevens 2000). In a further development of the DO model we have also shown that irrelevant response dimensions have a profound effect on performance depending on which aspect of the task they overlap with (Stevens & Kornblum, 2000). This is being pursued further by Stevens who started a post-doc with John Hummel at UCLA this fall.

5. PERSONNEL SUPPORTED

Principal Investigator
  Sylvan Kornblum – 40%

Graduate Student
  Gregory Stevens – supported in part by a DoD Predoctoral Fellowship and a
            Rackham Predoctoral Fellowship.

Staff
  Anthony Whipple, software/computer engineer – 100%
  James Morgenstern, programmer – 5%

Others
  Hourly assistants – approximately 30 hours per week.

6 & 7. PUBLICATIONS

1. Shiu, L-P, and Kornblum, S. (1999). Stimulus-Response compatibility effects in go/no-go tasks: A dimensional overlap account. *Perception and Psychophysics,* 61, 1613-1623.

2   Stevens, G. T. (2000). The locus of Eriksen, Simon, and Stroop effects: New data and a comparison of models. A PhD dissertation submitted at the University of Michigan, Ann Arbor, MI.

In press

1. Kornblum, S. & Stevens, G.T. Intertrial sequential effects of dimensional overlap: Findings and issues. The Association Lecture. In, *Attention & Performance XIX: Common Mechanisms in Perception and Action,* W. Prinz & B. Hommel, (eds). Oxford University Press.

Presentations

1. Kornblum, S. (2000). S-R and S-S compatibility and Dimensional Overlap.
    AFOSR Forum on Human Attentional Processes, 25-26 May, 2000, Fairborn OH.

2. Stevens, G.T. & Kornblum, S. (2000). Goals and dimensional overlap: The effects of irrelevant response dimensions. *A poster presented at the XIXth. International Symposium on Attention & Performance.* Kloster Irsee, Germany, July 16-22, 2000

[3. Kornblum, S. *(2001).* The Dimensional Overlap model of S-R and S-S compatibility. Invited Plenary Lecture - Third International Conference on Cognitive Science, August 27-31, Beijing, China.]

In preparation

1. Stevens, G. T. & Kornblum, S. The locus of consistency effects in Eriksen and Stroop-like tasks.

2. Kornblum, S. & Stevens, G. T. Representation and processing in Hedge & Marsh tasks.