



Universiteit
Leiden
The Netherlands

On the dynamic interplay between perception and action - a connectionist perspective

Haazebroek, P.

Citation

Haazebroek, P. (2013, December 11). *On the dynamic interplay between perception and action - a connectionist perspective*. Retrieved from <https://hdl.handle.net/1887/22849>

Version: Corrected Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/22849>

Note: To cite this publication please use the final published version (if applicable).

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/22849> holds various files of this Leiden University dissertation

Author: Haazebroek, Pascal

Title: On the dynamic interplay between perception and action : a connectionist perspective

Issue Date: 2013-12-11

On the dynamic interplay between perception and action

A connectionist perspective

by
Pascal Haazebroek

On the dynamic interplay between perception and action - A connectionist perspective
Copyright Pascal Haazebroek, 2013

Printed by Iskamp Drukkers B.V. Enschede

Layout: Pascal Haazebroek

ISBN: 978-94-6191-984-7

More information: <http://pascal.haazebroek.nl/hitec>

On the dynamic interplay between perception and action

A connectionist perspective

Proefschrift

ter verkrijging van
de graad van Doctor aan de Universiteit Leiden,
op gezag van de Rector Magnificus Prof. Mr. C.J.J.M. Stolk,
volgens besluit van het College voor Promoties
te verdedigen op woensdag 11 december 2013
klokke 10.00 uur

Door
Pascal Haazebroek
geboren te 's-Gravenhage

in 1980

Promotiecommissie

Promotor

Prof. Dr. B. Hommel (Universiteit Leiden)

Overige leden

Prof. Dr. J.M.J. Murre (Universiteit van Amsterdam)

Prof. Dr. S. Nieuwenhuis (Universiteit Leiden)

Dr. G. Wolters (Universiteit Leiden)

Table of Contents

Chapter 1 Introduction	11
Traditional views of human information processing	12
Artificial Intelligence and Robotics	13
Information processing in the brain	14
Direct interaction between perception and action	16
Representing perception and action using common codes	16
HiTEC connectionist model	18
Outline of the thesis	18
Publications	19
Chapter 2 HiTEC Connectionist Model	23
Cortical layering	24
Connectionist approach	25
HiTEC architecture	26
Basic model behavior	28
Ideomotor learning	29
Task internalization	29
Computational implementation	30
Simulating behavioral studies	33
Model dynamics	34
Discussion	36
Chapter 3 Action Control	41
Simulation 1: Action-effect learning	43
Simulation 2: Action planning	46
Discussion	48
Chapter 4 Automaticity	57
Simulation 3: Simon effect	58
Simulation 4: Stroop effect	61
Discussion	63
Chapter 5 Task Context	71
Simulation 5: Inverting the Simon effect	74
Empirical study: Feature weighting	76
Simulation 6: Feature weighting	82
Discussion	91

Chapter 6 General Discussion	99
Research questions revisited	100
Key characteristics of HiTEC	103
Extending HiTEC	107
References	111
Appendix	125
Samenvatting	129
Acknowledgements	137
Curriculum Vitae	141

