Empirical Studies in Machine Psychology

Robert Johansson

LIU LINKÖPING UNIVERSITY

Division of Human Centered Systems
Department of Computer and Information Science (IDA)
Linköping University, SE-581 83 Linköping, Sweden

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Abstract

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Preface

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Acknowledgements

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Contents

CHAPTER 1

Introduction

1.1 Motivation

1.2 Research questions

1.3 Summary of contributions

1.4 List of publications

This thesis is partly based on what has been covered in the following published papers.

1. Robert Johansson. "Arbitrarily applicable relational responding". In: *International Conference on Artificial General Intelligence*. Springer, 2019, pp. 101-110.

2. Robert Johansson. "Arbitrarily applicable relational responding in NARS". In: *OpenNARS Workshop at the International Conference on Artificial General Intelligence*. 2019.

3. Robert Johansson. "Scientific progress in AGI from the perspective of contemporary behavioral psychology". In: *OpenNARS Workshop at the International Conference on Artificial General Intelligence*. 2020.

4. Patrick Hammer, Peter Isaev, Tony Lofthouse, and Robert Johansson. "ONA for autonomous ROS-based robots". In: *International Conference on Artificial General Intelligence*. Springer, 2022, pp. 231-242.

5. Robert Johansson, Tony Lofthouse, and Patrick Hammer. "Generalized identity matching in NARS". In: *International Conference on Artificial General Intelligence.* Springer, 2022, pp. 243-249.

6. Robert Johansson. "Conditional discriminations with NARS". *NARS Workshop at the International Conference on Artificial General Intelligence.* 2023.

7. Robert Johansson, and Tony Lofthouse. "Stimulus equivalence in NARS". In: *International Conference on Artificial General Intelligence.* Springer, 2023.

Background and Preliminaries

The research topic of Artificial Intelligence (AI) is not well defined, and the goals of the field, its unit of analysis etc is up for debate. This was evident in a 2018 survey of the definition of AI, where a very diverse set of definitions was uncovered [1].

2.1 Learning Psychology

2.2 NARS

2.3 OpenNARS for Applications

Conditional discriminations

3.1 Introduction

3.1.1 Section Two

Some text with a `monospaced` insert.

```
<A1 --> [sample]>. :|: // comment
<B1 --> [left]>. :|:
<B2 --> [right]>. :|:
G! :|:
```

Listing 3.1. Hello world program.

3.2 Method

3.3 Results

The results from the four phases are illustrated in Figure 3.1.
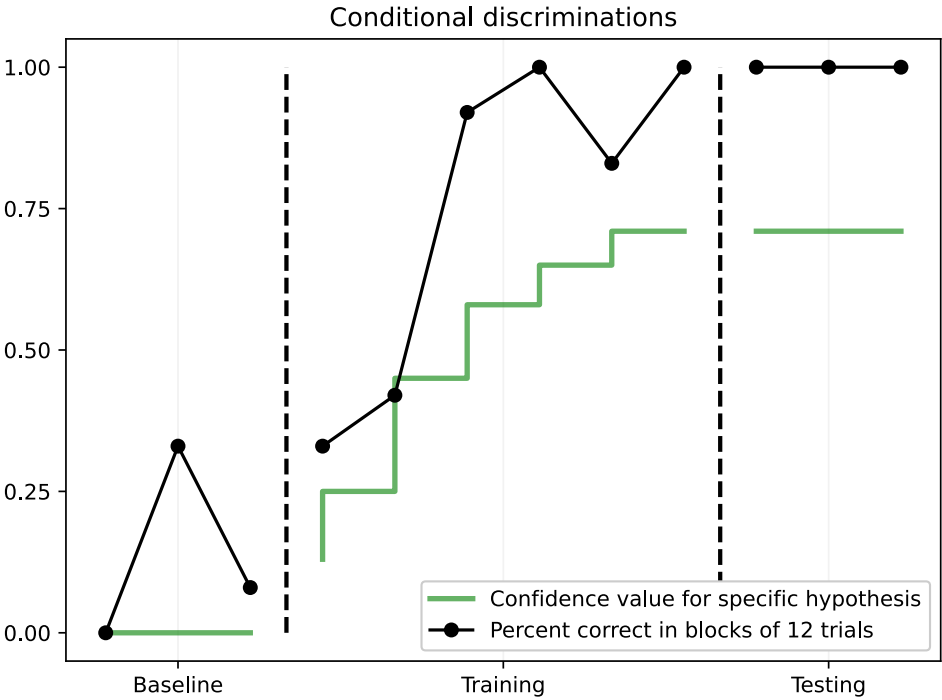
3.4 Discussion

Figure 3.1. Learning conditional discriminations in the matching-to-sample task. Dots illustrate the percent of correct in blocks of 12 trials. The solid line shows the NARS confidence value for specific hypotheses.

CHAPTER 4

Generalized Identity Matching

4.1 Introduction

4.2 Method

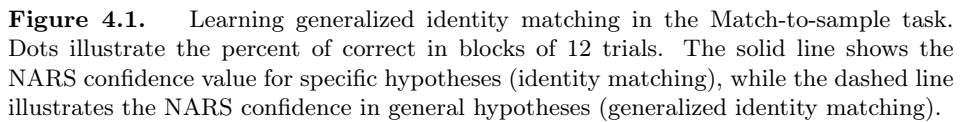**4.3 Results**

4.4 Discussion

Figure 4.1. Learning generalized identity matching in the Match-to-sample task. Dots illustrate the percent of correct in blocks of 12 trials. The solid line shows the NARS confidence value for specific hypotheses (identity matching), while the dashed line illustrates the NARS confidence in general hypotheses (generalized identity matching).

CHAPTER 5

Symmetry

5.1 Introduction

5.2 Method

5.3 Results

5.4 Discussion

Symmetry

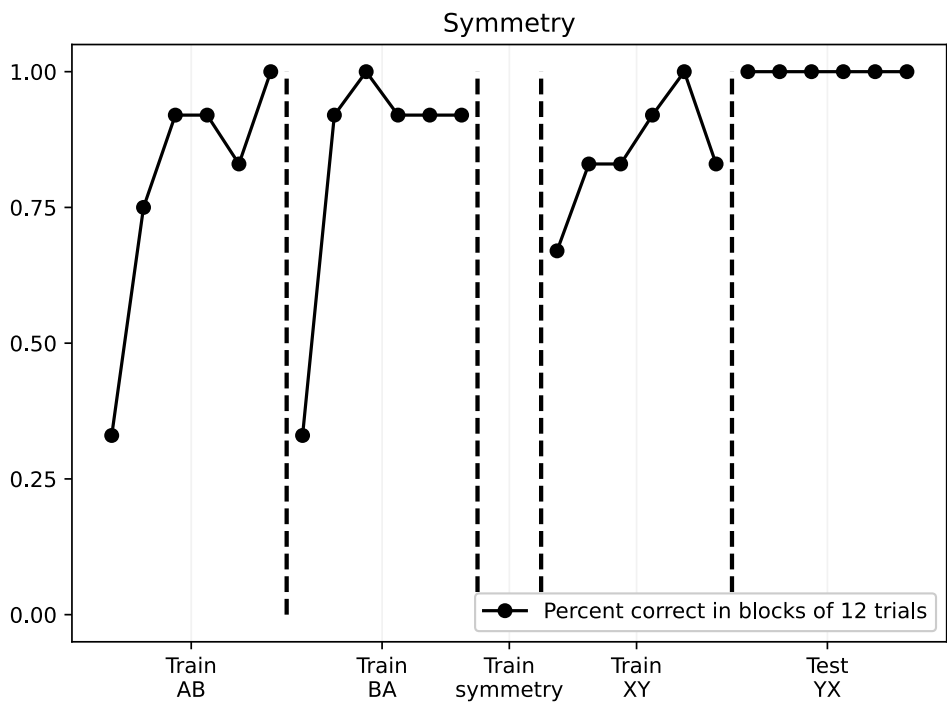**Figure 5.1.** Learning symmetry in the Match-to-sample task. Dots illustrate the percent of correct in blocks of 12 trials.

Stimulus Equivalence

6.1   Introduction

6.2   Method

6.3   Results

6.4   Discussion

CHAPTER 7

Conclusions and Future Work

7.1   Conclusions

7.2   Future Work

Bibliography

[1] Dagmar Monett and Colin WP Lewis. "Getting clarity by defining artificial intelligence—a survey". In: *Philosophy and theory of artificial intelligence 2017.* Springer. 2018, pp. 212–214.