

## University of Groningen

### The impact of individual differences on network relations

Muñoz Herrera, Manuel

**IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.**

*Document Version*

Publisher's PDF, also known as Version of record

*Publication date:*

2015

[Link to publication in University of Groningen/UMCG research database](#)

*Citation for published version (APA):*

Muñoz Herrera, M. (2015). *The impact of individual differences on network relations*. [S.n.].

**Copyright**

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

**Take-down policy**

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

*Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.*

# **The Impact of Individual Differences on Network Relations**

Social Exclusion and Inequality in Productive  
Exchange and Coordination Games

Manuel Muñoz-Herrera

© **Manuel Muñoz-Herrera**

<http://www.manumunozh.com>

ISBN (print):

978-90-367-7476-5

ISBN (digital):

978-90-367-7475-8

Printed by:

Ipskamp Drukkers, Enschede

Cover Design:

Manuel Muñoz-Herrera



university of  
 groningen

# The Impact of Individual Differences on Network Relations

PhD Thesis

to obtain the degree of PhD at the  
University of Groningen  
on the authority of the  
Rector Magnificus Prof. E. Sterken  
and in accordance with  
the decision by the College of Deans.

This thesis will be defended in public on

5<sup>th</sup> February 2015 at 11:00 hours

by

**Manuel Muñoz-Herrera**  
born on 10 March 1981  
in Bucaramanga, Colombia

**Promoters:**

Prof. dr. R. P. M. Wittek  
Prof. dr. A. Flache

**Co-promoter:**

Dr. J. Dijkstra

**Assessment committee:**

Prof. dr. T. B. A. Snijders  
Prof. dr. V. W. Buskens  
Prof. dr. A. M. Riedl

# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Introduction . . . . .	1
1.2	Framework . . . . .	3
1.2.1	Productive exchange vs coordination settings . . . . .	4
1.2.2	Assumptions . . . . .	5
1.2.3	Productive exchange networks . . . . .	6
1.2.4	Coordination games on networks . . . . .	9
1.2.5	Coordination problems vs coordination games . . . . .	11
1.3	Approach . . . . .	12
1.3.1	Overview of the four studies . . . . .	14
<b>2</b>	<b>How specialization can breed social exclusion: A model of strategic interaction between specialists and generalists in knowledge-intensive productive exchange</b>	<b>17</b>
2.1	Introduction . . . . .	17
2.2	Framework . . . . .	21
2.2.1	Exchange and network emergence . . . . .	21
2.3	The model . . . . .	24
2.3.1	Types of expertise . . . . .	24
2.3.2	Strategic link formation . . . . .	26
2.4	Equilibrium . . . . .	29
2.4.1	Strategies . . . . .	29
2.4.2	Nash equilibrium . . . . .	30
2.4.3	Dyadic interactions: The 2-person game . . . . .	32
2.4.4	Connectivity in the n-person network . . . . .	35
2.5	Pairwise stable Nash equilibria . . . . .	38
2.6	Discussion . . . . .	42
<b>3</b>	<b>The coordination of exchange relations: Equilibrium and reciprocity in network formation</b>	<b>47</b>
3.1	Introduction . . . . .	47

3.2	Framework . . . . .	49
3.2.1	Exchange networks and exchange games . . . . .	51
3.2.2	Individual rationality: Nash equilibrium . . . . .	54
3.2.3	Dyadic rationality: The core . . . . .	56
3.2.4	Empty cores: Reciprocity . . . . .	58
3.3	The experiment . . . . .	59
3.3.1	Experimental game . . . . .	59
3.3.2	Experimental treatments . . . . .	61
3.3.3	Experimental design and procedures . . . . .	68
3.4	Results . . . . .	69
3.4.1	Analytical strategy . . . . .	69
3.4.2	Description of strategies used . . . . .	70
3.4.3	Equilibrium: H1 and H2 . . . . .	71
3.4.4	Reciprocity: H3 . . . . .	72
3.4.5	Stability . . . . .	75
3.5	Discussion . . . . .	76
<b>4</b>	<b>Heterogeneous network games: Conflicting preferences</b>	<b>81</b>
4.1	Introduction . . . . .	81
4.2	Framework . . . . .	83
4.2.1	Individual preferences . . . . .	83
4.2.2	Network games . . . . .	85
4.3	The model . . . . .	87
4.3.1	The 2-person game: Strategic complements and substitutes . . . . .	89
4.4	Equilibrium: Complete information . . . . .	91
4.4.1	Strategies . . . . .	91
4.4.2	Nash equilibrium . . . . .	91
4.5	Equilibrium: Incomplete information . . . . .	94
4.6	Discussion . . . . .	99
<b>5</b>	<b>Conflict and segregation in networks: An experiment on the interplay between individual preferences and social influence</b>	<b>101</b>
5.1	Introduction . . . . .	101
5.2	Framework . . . . .	103
5.2.1	Identities and social influence . . . . .	103
5.3	The model . . . . .	107
5.4	Equilibrium . . . . .	108
5.4.1	Network categorization . . . . .	109
5.4.2	Nash equilibrium . . . . .	109
5.4.3	Subgame perfect Nash equilibrium . . . . .	110
5.4.4	Equilibrium selection . . . . .	111
5.5	The experiment . . . . .	118
5.5.1	Experimental game . . . . .	118
5.5.2	Experimental design and treatments . . . . .	120

---

5.5.3	Experimental procedures, data and methods . . . . .	122
5.6	Results . . . . .	123
5.7	Discussion . . . . .	126
<b>6</b>	<b>Conclusions</b>	<b>131</b>
6.1	Summary of the findings . . . . .	131
6.1.1	Results on productive exchange networks . . . . .	132
6.1.2	Results on coordination games on networks . . . . .	134
6.2	A general comment on the findings and on further research . . . . .	136
6.2.1	Theoretical extension: Behavioral rules . . . . .	138
6.2.2	Empirical extension: Communication . . . . .	139
6.2.3	Concluding remarks . . . . .	141
<b>A</b>	<b>Mathematical Proofs Chapter 2</b>	<b>143</b>
A.1	Proof Proposition 1: Best responses in $\Gamma$ . . . . .	143
A.2	Proof Lemma 1: Optimal allocations in a dyad . . . . .	144
A.3	Proof Lemma 2: Optimal connectivity in equilibrium . . . . .	147
A.4	Proof Proposition 2: Pairwise stable Nash equilibria . . . . .	148
<b>B</b>	<b>Instructions Experiment Chapter 3</b>	<b>151</b>
<b>C</b>	<b>Instructions Experiment Chapter 5</b>	<b>157</b>
	<b>Samenvatting - Summary in Dutch</b>	<b>161</b>
	<b>Bibliography</b>	<b>165</b>
	<b>Acknowledgments</b>	<b>175</b>
	<b>Curriculum Vitae</b>	<b>187</b>



