

**UNIVERSITA' CATTOLICA DEL SACRO CUORE  
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**Dottorato di ricerca in Psicologia  
ciclo XXXIII  
S.S.D: M-PSI/05**

**COMMUNICATIVE (INTER)ACTIONS AND IDENTITY IN  
MIXED REALITY ENVIRONMENTS: A  
METHODOLOGICAL PROPOSAL**

**Tesi di Dottorato di: Ilaria Vergine  
Matricola: 4713611**

**Anno Accademico 2019 / 2020**



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## Table of Contents

Introduction.....	3
1 A Methodological Proposal to Study Interactions and Identity in Interactions Inside Mixed Reality Environments .....	9
1.1 Thematic Literature Review .....	9
1.1.1 New Technological Environments.....	10
1.1.2 Technology and Communication.....	15
1.1.3 Technology and Social Psychology of Communication.....	17
1.1.4 Communication.....	20
1.2 From the Literature Gap to the Methodological Proposal .....	26
1.2.1 Research Questions.....	28
1.2.2 Work Structure.....	28
2 Disciplinary and Lexical Premises .....	31
2.1 Disciplinary Premises .....	31
2.1.1 Complexity Theory .....	31
2.1.2 From Complexity to the Overcoming of Disciplinarity.....	34
2.1.3 Reflections on Overcoming Disciplinarity in This Work.....	39
2.2 Lexical Premises .....	41
2.2.1 General Considerations.....	41
2.2.2 Use of Specific Methodological Lexicon .....	42
2.2.3 Use of the Word “Comprehending”.....	42
3 The Corpus.....	44
3.1 The Investigated Communicative (Inter)actions: Setting, Data Production and Tools.....	44
3.1.1 What MHL is and how it Works.....	50

3.2	Corpus Characteristics and Sample Characteristics.....	54
3.2.1	Videotaping Communicative (Inter)actions: Discussing This Decision 59	
3.3	Participant Recruitment and Data Storage.....	62
3.4	Ethics .....	63
3.5	Limits of the Corpus and Future Improvements .....	64
4	Introducing Discourse Analysis and Multimodality .....	69
4.1	Discourse Analysis .....	69
4.2	Defining the Term “Discourse” .....	69
4.3	Introducing Discourse Analysis.....	72
4.4	Introducing Multimodality.....	74
4.4.1	Defining Multimodality .....	75
4.4.2	Understanding the History of Multimodality.....	78
4.4.3	Understanding how Multimodality Field is Structured .....	80
4.4.4	Understanding how to Start a Study in the Field of Multimodality...	82
4.5	Conclusions.....	83
5	Defining MIA: Roots, Theoretical Framework, and Phases and Steps .....	85
5.1	Defining MIA and its Roots.....	85
5.2	MIA Theoretical Framework and Analytical Tools .....	88
5.2.1	Multimodal (Inter)action Analysis.....	91
5.2.2	An Essential Assumption: Mediation .....	91
5.2.3	(Inter)action .....	93
5.2.4	(Inter)actional Attention .....	93
5.2.5	Mode .....	95
5.2.6	Lower–Level Mediated Actions .....	98

5.2.7	Multimodal Transcription Conventions.....	100
5.2.8	Higher–Level Mediated Actions.....	101
5.2.9	Frozen Mediated Actions.....	102
5.2.10	Modal Aggregate .....	102
5.2.11	Modal Density.....	104
5.2.12	Modal Configuration.....	105
5.2.13	Modal Density Foreground–Background Continuum of Attention/Awareness.....	107
5.2.14	Semantic/Pragmatic Means.....	110
5.2.15	Scales of Action .....	113
5.2.16	Site of Engagement.....	115
5.2.17	Time Cycles and (Inter)action Rhythms.....	116
5.3	MIA Phases and Steps .....	118
5.3.1	Phase I: Data Collection .....	118
5.3.2	Phase II: Delineating the Data .....	119
5.3.3	Phase III: Selecting Data Pieces for Micro Analysis.....	119
5.3.4	Phase IV: Transcribing Data Using Multimodal Transcription Conventions .....	120
5.3.5	Phase V: Using Analytical Tools.....	120
5.4	Conclusions.....	121
6	An Example of a Study With MIA in MR.....	122
6.1	Introduction.....	122
6.2	Method.....	124
6.3	Findings .....	128
6.3.1	The Higher–Level Mediated Actions .....	129

6.3.2	The Used Modes .....	130
6.3.3	Analysis of the Most Common Higher–Level Mediated Action .....	130
6.4	Discussion .....	144
6.5	Conclusions .....	147
7	A Methodological Proposal for Studying Communicative (Inter)action in MR 148	
7.1	Defining AC and its Roots .....	149
7.2	AC Theoretical Framework and Analytical Tools .....	155
7.2.1	An Essential Assumption: Dialogism .....	157
7.2.2	(Communicative) Interaction .....	159
7.2.3	Sequence .....	161
7.2.4	Exchange .....	163
7.2.5	Intervention .....	165
7.2.6	Speech Act .....	165
7.2.7	Turn Taking .....	176
7.2.8	Success and Satisfaction of Speech Act .....	178
7.2.9	Inferences .....	180
7.2.10	Indirect Speech Acts and Implicature .....	184
7.3	AC Phases .....	187
7.4	Conclusions on AC .....	188
7.5	The Methodological Proposal Presentation .....	189
7.5.1	Limits of MIA and AC .....	189
7.5.2	Beyond MIA and AC .....	194
7.5.3	Rationale of the Methodological Proposal .....	197



7.5.4	Compatibility of MIA and AC to Study Communicative (Inter)actions in MR	202
7.6	Conclusions.....	206
8	An Example of the Methodological Proposal for Studying Communicative (Inter)action in MR .....	208
8.1	Analysing Completing the Intervention Macro–Exchange .....	208
8.1.1	Method .....	208
8.1.2	Findings .....	210
8.2	Discussion: MIA and AC Together .....	213
8.3	Conclusions.....	218
9	A Theoretical Model Proposal to Study Identity in Communicative (Inter)action in MR .....	219
9.1	MIA and Identity .....	220
9.1.1	An Essential Assumption: Each (Inter)action is Identity–Telling...221	
9.1.2	Identity .....	223
9.1.3	Lower–Level Mediated Action.....	224
9.1.4	Higher–Level Mediated Action .....	225
9.1.5	Frozen Mediated Action .....	226
9.1.6	Modal Configuration and Modal Aggregates .....	227
9.1.7	Horizontal Identity Production .....	229
9.1.8	Vertical Identity Production.....	236
9.1.9	Site of Engagement.....	241
9.1.10	Scales of Action.....	242
9.1.11	A Summary of MIA Framework .....	244
9.1.12	Additional Concepts to Original MIA Framework.....	247
9.2	Conclusions on MIA and Identity.....	258

9.3	Utterance Intersubjectivity Model .....	259
9.3.1	Essential Assumptions: Situatedness, Positioning, Plurality, and Fluidity.....	260
9.3.2	Identity .....	262
9.3.3	Self.....	264
9.3.4	Subject .....	265
9.3.5	Subjectivity .....	266
9.3.6	Cyberspace and Cyberplace.....	267
9.3.7	Utterance Intersubjectivity.....	270
9.4	Conclusions on Utterance Intersubjectivity Model .....	273
9.5	The Theoretical Model Proposal Presentation.....	273
9.5.1	Limits of MIA Framework Level on Multimodal Identity and Utterance Intersubjectivity Model .....	274
9.5.2	Beyond MIA Framework Level on Multimodal Identity and Utterance Intersubjectivity Model.....	277
9.5.3	Rationale of the Theoretical Model Proposal .....	279
9.5.4	Compatibility of MIA Framework Level on Multimodal Identity and Utterance Intersubjectivity Model to Study Identity in Communicative (Inter)actions in MR.....	282
9.5.5	A Derived Theoretical Model Proposal to Study Identity in Communicative (Inter)action in MR.....	285
9.6	Conclusions.....	297
10	An Example of Theoretical Model Proposal Application to Study Identity in (Inter)action in MR .....	298
10.1	Analysis of Identity in Completing the Intervention Example .....	298
10.2	Conclusions.....	311

11	Discussion and Conclusions .....	313
11.1	Contributions to Scientific Knowledge.....	313
11.1.1	Contributions Regarding the First Research Question .....	313
11.1.2	Contributions Regarding the Second Research Question .....	315
11.1.3	Contributions Regarding the Third Research Question.....	317
11.1.4	Final Considerations .....	319
11.2	Limits .....	324
11.3	Fields of Application .....	324
11.4	Suggestions for Future Research .....	325
	Bibliography .....	327
	Appendices.....	352
	20. s18-11.25-c3 .....	371
	Glossary .....	384

## List of Figures

Figure 1 <i>Reality–Virtuality (RV) Continuum</i> .....	10
Figure 2 <i>Reality–Virtuality (RV) Continuum Modified</i> .....	13
Figure 3 <i>Setting: Laboratory Map</i> .....	44
Figure 4 <i>Visual Summary of the Setting With Persons (in Capital Letters) and Tools Involved</i> .....	47
Figure 5 <i>Examples of Selected Holograms in the Animals Category</i> .....	49
Figure 6 <i>The Selected Location: The Island</i> .....	49
Figure 7 <i>Participants Involved in Task Resolution</i> .....	50
Figure 8 <i>Microsoft HoloLens Photograph</i> .....	51
Figure 9 <i>Bloom Gesture</i> .....	52
Figure 10 <i>Air Tap Gesture</i> .....	53
Figure 11 <i>Tap and Hold Gesture</i> .....	53
Figure 12 <i>Multimodal (Inter)action Analysis Roots</i> .....	87
Figure 13 <i>Example of Image in a Transcript and Abbreviations Used for Social Actors</i> .....	90
Figure 14 <i>Observable Manifestation of Attention in a Multimodal Manner</i> .....	94
Figure 15 <i>Example of HL’s Lower–Level Mediated Action of the Mode of Walking</i> .....	99
Figure 16 <i>Examples of Participant’s Higher–Level Mediated Actions in Taking Part in an Experiment Session</i> .....	101
Figure 17 <i>HL’s Modal Aggregate in the Higher–Level Mediated Action Exploring the PMR</i> .....	103
Figure 18 <i>PC’s Modal Configuration in the Higher–Level Mediated Action of Writing Down the Story</i> .....	106
Figure 19 <i>PC’s Modal Density Foreground–Background Continuum of Attention/Awareness</i> .....	109
Figure 20 <i>PC’s Semantic/Pragmatic Means Example</i> .....	112
Figure 21 <i>HL’s Scales of Action Example: Taking Part to an Experiment</i> .....	114
Figure 22 <i>Site of Engagement of John (Inter)acting with Giuseppe to Create the Story</i> .....	116

Figure 23 <i>Multimodal Transcript of Completing the Intervention (from 00:17:24:00 to 00:17:37:06)</i> .....	131
Figure 24 <i>HL and PC's Modal Density Foreground–Background Continuums of Attention/Awareness</i> .....	137
Figure 25 <i>HL's Modal Configurations of his Higher–Level Mediated Actions</i> ..	139
Figure 26 <i>PC's Modal Configurations of her Higher–Level Mediated Actions</i> ..	140
Figure 27 <i>HL and PC's Modal Density Foreground–Background Continuums of Attention/Awareness at a Larger Scale of Action</i> .....	142
Figure 28 <i>Analysis of Conversation Roots</i> .....	152
Figure 29 <i>Mind Map of the Comparison of Multimodal (Inter)action Analysis and Analysis of Conversations Roots</i> .....	204
Figure 30 <i>HL's Lower–Level Mediated Action Related to Identity</i> .....	224
Figure 31 <i>Examples of Participant's Higher–Level Mediated Actions in Taking Part in an Experiment Session Related to an Identity Element</i> .....	226
Figure 32 <i>PC is Writing Down the Story</i> .....	228
Figure 33 <i>HL's Modal Density to Produce Participant Identity with Participant</i> .....	231
Figure 34 <i>PC's Modal Density Foreground–Background Continuum of Attention/Awareness and Identity Elements</i> .....	233
Figure 35 <i>PC's Semantic/Pragmatic Means Example and Identity Elements</i> .....	235
Figure 36 <i>HL's Scales of Action Example and Identity Elements</i> .....	243
Figure 37 <i>HL and PC Realise Exploring the Cyberplace</i> .....	250
Figure 38 <i>HL's Modal Density Foreground–Background Continuum of Attention/Awareness to Determine Tiers of Material Intersubjectivity</i> .....	251
Figure 39 <i>PC's Modal Density Foreground–Background Continuum of Attention/Awareness to Determine Tiers of Material Intersubjectivity</i> .....	252
Figure 40 <i>HL's Modal Configuration of Exploring the Pure Mixed Reality and Tiers of Material Intersubjectivity</i> .....	253
Figure 41 <i>PC's Modal Configuration of Exploring the Mixed Reality and Tiers of Material Intersubjectivity</i> .....	255
Figure 42 <i>Emergency Exit Sign</i> .....	270

Figure 43 <i>Intersubjectivity Model in Mixed Reality Environments</i> .....	286
Figure 44 <i>Intersubjectivity Model in Mixed Reality Environments: Dialogue Plane</i> .....	293
Figure 45 <i>Intersubjectivity Model in Mixed Reality Environments With Dialogue Plane: Adjustments</i> .....	296
Figure 46 <i>Completing the Intervention Data Piece: Intersubjectivity Model</i> .....	299
Figure 47 <i>HL and PC's Modal Density Foreground–Background Continuums of Attention/Awareness and Produced Identity Elements/Subjectivities</i> .....	302
Figure 48 <i>HL's Modal Configuration of Completing the Intervention and Tiers of Material Intersubjectivity</i> .....	307
Figure 49 <i>PC's Modal Configuration of Completing the Intervention and Tiers of Material Intersubjectivity</i> .....	308

## List of Tables

Table 1 <i>Set 1 (N = 16) and Set 2 (N = 16) of Used Holograms</i> .....	48
Table 2 <i>Videotaped Dyadic Communicative (Inter)actions: Schedule, Participant's Gender, and Assigned Tool</i> .....	55
Table 3 <i>Duration of Each Videotaped Dyadic Communicative (Inter)actions</i> .....	56
Table 4 <i>Videotaped Dyadic Communicative (Inter)actions: Participants' Sample Composition</i> .....	58
Table 5 <i>Videotaped Dyadic Communicative (Inter)actions: Participants' Age Distribution</i> .....	58
Table 6 <i>Key Question for Understanding Multimodality Role in Scientific Studies</i> .....	83
Table 7 <i>Number of Selected Data Pieces for Each (Inter)action</i> .....	127
Table 8 <i>Frequency of Bundles of Higher-Level Mediated Actions in the Subcorpus of Collaborative Data Pieces</i> .....	129
Table 9 <i>Summary of Multimodal (Inter)action Analysis Framework</i> .....	245

## Abstract

### *English Version*

Advances in digital-based technologies have allowed subjects to interact in environments other than physical ones causing changes in communication modalities.

Microsoft HoloLens (MHL) introduced the possibility of experiencing a new digital environment: pure mixed reality. This work consists of a methodological proposal to study synchronous communication and the making of identity in it when MHL is used. To respect the phenomenon's ontological complexity, I combined two perspectives in this work: multimodality and social psychology of cyberplaces. The adoption of these perspectives reduced the phenomenon in a research object called communicative (inter)action. To study it, I elaborated a methodological proposal that combines two qualitative methods: multimodal (inter)action analysis (MIA; from multimodality) and analysis of conversations (AC; from social psychology of cyberplaces). To examine the making of identity in communicative (inter)action, I enriched the methodological proposal with a theoretical model proposal. The theoretical model proposal is a model that I called intersubjectivity model derived from: MIA framework on multimodal identity from multimodality and utterance intersubjectivity model from social psychology of cyberplaces. The entire work line of argument was supported by analysis examples using a corpus of 16 videotaped dyadic communicative (inter)actions. Each dyad had one subject using MHL and another using a pc that interacted to perform a collaborative task in a mixed reality environment.

This work provides an inter-disciplinary proposal to study communicative (inter)action and the making of identity in it inside mixed reality when MHL is used and covers three of Doise's levels of explanation of social psychology.

### *Italian Version*

L'avanzamento delle tecnologie digitali ha permesso ai soggetti di interagire in ambienti diversi da quelli fisici causando cambiamenti nelle modalità di comunicazione.



Il dispositivo Microsoft HoloLens (MHL) ha introdotto la possibilità di sperimentare un nuovo ambiente chiamato *pure mixed reality*. Questo lavoro consiste in una proposta metodologica per studiare la comunicazione sincrona e il farsi dell'identità in essa quando viene utilizzato MHL. Per rispettare la complessità ontologica del fenomeno, ho combinato due prospettive: *multimodality* e *social psychology of cyberplaces*. L'adozione di queste prospettive ha permesso di ritagliare all'interno del fenomeno studiato un oggetto di ricerca definibile come (inter)azione comunicativa. Per studiarlo, ho elaborato una proposta metodologica che combina due metodi qualitativi: *multimodal (inter)action analysis* (MIA; dalla *multimodality*) e *analysis of conversations* (AC; *social psychology of cyberplaces*). Per esaminare il farsi dell'identità nell'(inter)azione comunicativa, ho arricchito la proposta metodologica con l'*intersubjectivity model*, una proposta di modello teorico derivato da: *MIA identity framework* dalla *multimodality* e modello dell'intersoggettività enunciativa dalla *social psychology of cyberplaces*. L'intera linea argomentativa del lavoro è stata supportata da esempi di analisi utilizzando un corpus di 16 (inter)azioni comunicative diadiche videoregistrate. Ogni diade era composta da un soggetto che utilizzava MHL e uno che utilizzava un pc. Interagivano insieme per eseguire un'attività in un ambiente di *mixed reality*. Questo lavoro fornisce una proposta inter-disciplinare per studiare l'(inter)azione comunicativa e il farsi dell'identità in ambienti di *mixed reality* con l'utilizzo di MHL. La proposta si articola su tre dei livelli di spiegazione della realtà sociale tematizzati da Doise.

*Keywords:* mixed reality, pure mixed reality, discourse, conversation, discourse analysis, analysis of conversations (AC), multimodal (inter)action analysis (MIA)

## Introduction

Analysis of discourse is like riding a bicycle compared to conducting experiments or analysing survey data which resemble baking cakes from a recipe. (Potter & Wetherell, 1987, p. 168)

This doctoral thesis starts from a concrete problem: advances in digital-based technologies have opened the possibility for subjects to interact in environments other than physical ones (R. H. Jones et al., 2015; Kress & Leeuwen, 2001; R. Scollon & LeVine, 2004; Sindoni, 2013). This new possibility results in changes in the use of communication modalities or modes (e.g., gestures) and in how they intertwine in subjects' communication.

Galimberti et al. (2010), R. H. Jones et al. (2015), and Sindoni (2013) argued for the necessity of theoretical and methodological innovations in studying communication in these new technological environments.

The launch of the Microsoft HoloLens device opened to the possibility of experiencing a new digital environment: pure mixed reality (Flavián et al., 2019). Consequently, this work consists of a methodological proposal for the study of subjects' communication and identity when a pure mixed reality device is used. I added to the study of communication also that of identity because studying technologies and communication implies that identity elements emerge in the phenomenon of interest. According to two scholars relevant for this work, all actions communicate something and are identity-telling (Norris, 2005, 2007, 2011), so also the action that happen in digital environments, and the digital environments that accompany them are a "laboratorio dell'identità [identity laboratory]" (Galimberti, 2011, p.85). Instead, I used the expression "when a pure mixed reality device is used" due to the following reason: Microsoft HoloLens is more likely to be used in organisational contexts together with other devices, such as the pc, because of its high cost and technological functions. When Microsoft HoloLens is used together with other devices, it is more proper to use the expression "mixed reality" instead of "pure mixed reality" (Galimberti et al., 2019). This the reason why I inserted in the title the former expression instead of the second one.

Because of the phenomenon's ontological complexity (Sindoni, 2013; Trognon, 2003), in this work I combined two perspectives based on the conducted literature review (see Chapter 1): multimodality (e.g., Jewitt et al., 2016) and social psychology of cyberplaces (Brivio et al., 2010; Galimberti, 2011). Having adopted these two perspectives, I use the expression "communicative (inter)action" instead of "communication" to refer to the research object. Consequently, I combined two qualitative methods of discourse analysis to study the research object: multimodal (inter)action analysis (Norris, 2004a, 2011, 2019, 2020) and analysis of conversations (e.g., Galimberti, 1992b; Mazzoleni & Galimberti, 2013) respectively introduced for multimodality and social psychology of cyberplaces. I demonstrated the compatibility of multimodal (inter)action analysis and analysis of conversations, and the advantage of using them to study communicative (inter)action in mixed reality when Microsoft HoloLens is used. To examine identity in communicative (inter)action, I integrated two models: identity theory within the multimodal (inter)action framework (Norris, 2011, 2020) from multimodality and the utterance intersubjectivity model (Galimberti, 2011; Galimberti et al., 2010, 2012) from social psychology of cyberplaces. I combined both these models into a new identity model: "intersubjectivity model". The intersubjectivity model can be practically applied to data through multimodal (inter)action analysis and analysis of conversations. The methodological proposal was supported by analysis examples using a corpus of 16 videotaped dyadic communicative (inter)actions. In each session, one subject used Microsoft HoloLens, the other subject used a pc, and they interacted to perform a common task in a mixed reality environment.

So, this work aims at answering the three following research questions:

1. How can different modalities or modes intertwine to produce (inter)action in mixed reality where a pure mixed reality device is used?
2. Which can be a methodological proposal to describe and comprehend communicative (inter)action in mixed reality where pure mixed reality device is used, considering the complexity of this kind of communicative

(inter)action from multimodality perspective and social psychology of cyberplaces perspective?

3. Which can be a theoretical model proposal to study identity in communicative (inter)action in mixed reality, where pure mixed reality device is used from multimodality perspective and social psychology of cyberplaces perspective?

To answer these three research questions, I wrote 11 chapters that I briefly described below.

In Chapter 1, I provided the theoretical background to frame this work and to provide the rationale behind it. In particular, it includes a thematic literature review that allows to outline: (a) the concepts (mixed reality and pure mixed reality, and communication) at the base of this thesis, (b) the found literature gap that led to the formulation of the three research questions, (c) the three research questions, and (d) the work structure.

In Chapter 2, I defined the disciplinary premises of this work and the lexical choices that I adopted. In addition, I clarified that I positioned this work in complexity theory (e.g., Morin, 1990).

In Chapter 3, I illustrated the corpus of data used in this work: (a) how it was produced, (b) its characteristics and participants' sample characteristics, (c) participants' recruitment, (d) data storage, (e) ethical aspects, (f) corpus limits, and (g) possible future improvements to the corpus for future studies.

In Chapter 4, I delineated the methodological basis necessary to understand the methodological proposal elaborated in the next chapters. In particular, I defined discourse analysis and multimodality (e.g., Jewitt et al., 2016).

In Chapter 5, I presented multimodal (inter)action analysis (Norris, 2004a, 2011, 2019, 2020) which is a method from multimodality (e.g., Jewitt et al., 2016). I defined it and its roots, I outlined its theoretical framework from which the analytical tools derive, and I listed multimodal (inter)action analysis phases and steps.

In Chapter 6, I communicated a study that I conducted on the corpus with multimodal (inter)action analysis. This chapter concludes the first part of this work related to the first research question.

In Chapter 7, firstly, I presented analysis of conversations (e.g., Galimberti, 1992b; Mazzoleni & Galimberti, 2013): its definition and roots, its theoretical framework from which the analytical tools derives, and its phases. After that, I introduced the methodological proposal to study communicative (inter)action in mixed reality when a pure mixed reality device is used.

In Chapter 8, I showed an applicative example (i.e., an expansion of the one analysed in Chapter 6) of the methodological proposal articulated in Chapter 7. This chapter gives the possibility to verify the validity of the methodological proposal in an empirical way and to enlighten how to practically use it. This chapter concludes the second part of this work related to the second research question.

In Chapter 9, I tackled the study of identity in communicative (inter)action. I described multimodal (inter)action analysis identity framework (Norris, 2011, 2020) from multimodality (e.g., Jewitt et al., 2016) and the utterance intersubjectivity model (Galimberti, 2011; Galimberti et al., 2010, 2012) from social psychology of cyberplaces (Brivio et al., 2010; Galimberti, 2011). After these two models, I presented the new intersubjectivity model to study identity in communicative (inter)action in mixed reality when a pure mixed reality device is used. I also illustrated how to apply it to data using multimodal (inter)action analysis from multimodality and analysis of conversations from social psychology of cyberplaces (i.e., the methodological proposal).

In Chapter 10, I showed an example (i.e., an expansion of the one analysed in Chapters 6 and 8) of the application of the theoretical model articulated in Chapter 9 on identity in communicative (inter)action. This chapter gives, as Chapter 8, the possibility to verify the validity of the theoretical proposal in an empirical way and to clarify how to use it practically. This chapter concludes the third part of this work related to the third research question.

In Chapter 11, I underlined the conclusion of this work derived from the answers given to the three research questions.

I enriched Chapters 5, 7, and 9 with examples of analysis conducted on extracts from the corpus used in this work. I chose these examples for their elementary and apparent naivety to illustrate in a simple way each concept introduced respectively for multimodal (inter)action analysis (Norris, 2004a, 2011, 2019, 2020) in Chapter 5, analysis of conversations (e.g., Galimberti, 1992b; Mazzoleni & Galimberti, 2013) in Chapter 7, and multimodal (inter)action analysis identity framework (Norris, 2011, 2020) and utterance intersubjectivity model (Galimberti, 2011; Galimberti et al., 2010, 2012) in Chapter 9.

How can this work be read? The reader can adopt four reading paths. The first consists in reading the entire work following the order of the chapters. The second can be aimed at grasping the theoretical and methodological aspects of the proposal contained in this work through the reading of Chapters 1, 2, 3, 4, 5, 7, 9, and 11. The third can be aimed at grasping how a study that uses the methodological proposal of this work can be developed through reading of Chapters 3, 6, 8, and 10. The fourth can be aimed at understanding how one of the three research questions is answered by reading the first part (see Chapters 1–6) or the second (see Chapters 7 and 8) or the third (see Chapters 9 and 10). The first, second, and third parts are, however, organised according to an increasing order of complexity. Therefore, the reader, before deciding to read only the second or third part of this work, will have to evaluate whether or not he/she has the necessary knowledge to understand the content.

This doctoral thesis is written in compliance with the APA style 7<sup>th</sup> (American Psychological Association, 2020). In accordance with the *Publication Manual of the American Psychological Association*, I made some minor changes to the style because this is a thesis work and not a paper (American Psychological Association, 2020, p. 10). For example, I adopted the following adaptations: (a) seven keywords instead of five, (b) justified text, (c) use of expressions like “in the next section” or “in the previous section”, (d) British spelling instead of American, and (e) position of footnote callouts not always after a punctuation mark. Additionally, I used abbreviation for terms and expressions that were used many times in the present work. To facilitate the reading of the work, I inserted a glossary that collects all the

abbreviations used in this work (see Glossary at the end of the entire work). In compliance with the same style, I tried to improve the accessibility and the inclusivity of this document. This means that I attempted to use ICT tools to guarantee to more people the possibility to read the thesis. Communicating research is a phase of the research process, so I tried to be as ethical as I could also in this phase. For instance, I used Microsoft Office Word Styles that enables to listen to the work content through the Read Aloud function. Consistent with the positioning within the complexity theory (e.g., Morin, 1990), multimodality (e.g., Jewitt et al., 2016), and the interactive nature of the research object, I tried to by-pass the linearity of the reporting of a project through the written mode of verbal language by inserting cross-references. This means that, whenever in the text I refer to another part of the text itself (e.g., see Section 1.1), the reader, by clicking on the indicated number, will be automatically redirected to the section, figure or table associated with that number.