



UNIVERSITÀ  
CATTOLICA  
del Sacro Cuore

Dottorato di ricerca in Psicologia

Ciclo XXX

S.S.D: M-PSI/04

TWIN PREGNANCY

AND THE BUILDING OF MOTHER-TWIN RELATIONSHIP

Coordinatore: Chiar.mo Prof. Camillo Regalia

Tesi di dottorato di:

Eleonora MASCHERONI

Matricola: 4411560

Anno Accademico: 2016/2017

## **Abstract**

Twin pregnancies account approximately for 3% of all live births. The experience of expecting and parenting twins is undeniably different from that of a singleton pregnancy and parenthood. Twin births are associated with several medical, health care, socio-emotional, psychological and developmental consequences for families. The overall aim of the present work is to add knowledge concerning the unique aspects of expecting and parenting twins. I would like to examine the way the mothers-to-be perceive and live their pregnancy as well as how mothers experience parenting twins and interact with their babies in the early post-partum period. To better investigate the unique experience of expecting and parenting twins, results were compared with the existing literature and different research design were used.

It was evaluated the validity and the psychometric properties of the Italian version of the Baby Care Questionnaire (Winstanley & Gattis, 2013) in a sample of 222 Italian expectant and current parents during the last trimester of pregnancy or with an infants aged between 0 and 18 months. Cognitive interviews demonstrated a good content validity of the questionnaire. Structure and Attunement showed good internal consistency. Parenting principles are related to caregiving practices. Structure is negatively related both to bed-sharing and to feeding durations, while Attunement was positively related to bed-sharing. This measure could be gain to a better understanding of non-optimal caregiving environments during infancy as in the case parents of twin.

It was examined prenatal attachment during twin and singleton pregnancy and it was investigated if the unique experience of expecting twin may adversely affect prenatal attachment. Also those biopsychosocial predictors of maternal prenatal attachment in interaction with the type of pregnancy that woman experienced (twin vs singleton pregnancy) were analysed. The study included a sample of 39 pregnant women, 18 women

experiencing twin and 21 women experiencing singleton. Results indicated that level of prenatal attachment was lower in women expecting twins. The perception of support by the family as well as Attunement predicted higher level of prenatal attachment. Perceived social support by friends and Structure buffered the relationship between type of pregnancy and prenatal attachment.

It was explored the impact of twin birth on mother-child interaction. Eleven mother of monochorionic twin were enrolled. Each mother of a twin was matched to a singleton mother considering the gestational age at birth of their babies, to eliminate the effect of prematurity, and the infant's gender. During a three-month visit visits face-to-face interactions between mother and their infant were videotaped. Mother interactive behaviours were coded by the Global Rating Scales (Murray, et al., 1996a, 1996b). The quality of maternal sensitive behaviour during the interactions were poorer in mothers of twins. Mothers of twins were also more remote and showed higher level of signs of depression than mothers of singleton during the interactions.

This thesis established that mothers of twins have unique needs and have to face unique challenges. Mothers of twins seems to be less psychological adjusted to their pregnancy in terms of lower level of prenatal attachment. Also the building of a close and positive relationship between the mothers and their babies could be more difficult in the case of twins.

# Table of Contents

<b>Chapter 1</b>	<b>General Introduction</b>	<b>12</b>
1.1	Overview of the thesis	13
1.2	Methodological issue	15
	1.2.1 Participants and procedures	15
	1.2.2 Measure	17
1.3	Contributions of this thesis	18
<b>Chapter 2</b>	<b>Twin pregnancy and twin birth</b>	<b>20</b>
2.1	Chapter overview	20
2.2	Epidemiology of twin birth	20
2.3	Medical issue associated to twin pregnancy and twin birth	22
	2.3.1 Twin pregnancy: fertilization, intrauterine growth and associated foetal risk factors	22
	2.3.2 Twin childbirth and perinatal risk factors	25
	2.3.3 Additional risk factors associated to Assisted Reproductive Technologies	27
2.4	Psychological issue associated with twin pregnancy and twin birth	29
	2.4.1 Parents' mood states and stress associated to twin pregnancy	29
	2.4.2 Twin pregnancy and prenatal attachment	31
	2.4.3 Psychological challenges associated to twins childbirth	32
2.5	Conclusions	34

<b>Chapter 3</b>	<b>Parenting twins</b>	<b>36</b>
<b>3.1</b>	<b>Chapter overview</b>	<b>36</b>
<b>3.2</b>	<b>Caring twins in the postpartum period</b>	<b>36</b>
	3.2.1 A systematic review of the literature on sleeping and feeding practice	38
	3.2.2 Sleeping	44
	3.2.3 Feeding	46
	3.2.4 Discussion	48
	3.2.5 Limitations and future directions	49
	3.2.6 Conclusions	50
<b>3.3</b>	<b>The building of mother-twin relationship and early mother-twin interaction</b>	<b>50</b>
	3.3.1 Risks and challenges for mother-twin relationship	52
	3.3.2 Mother-twin interactions	54
<b>3.4</b>	<b>General discussion</b>	<b>56</b>
<b>Chapter 4</b>	<b>The Baby Care Questionnaire: adaptation and evaluation of psychometric properties in an Italian parents' sample</b>	<b>59</b>
<b>4.1</b>	<b>Chapter overview</b>	<b>59</b>
<b>4.2</b>	<b>Introduction</b>	<b>60</b>
	4.2.2 Parenting principles in parents of twins	60
	4.2.2 The Baby Care Questionnaire	62
<b>4.3</b>	<b>Aims</b>	<b>63</b>
<b>4.4</b>	<b>Method</b>	<b>64</b>
	4.4.1 Participants	64
	4.4.2 Procedures	65

4.4.3	Measures	66
4.4.4	Data Analysis	68
<b>4.5</b>	<b>Results</b>	<b>69</b>
4.5.1	Cognitive Interviews	69
4.5.2	Item selection	69
4.5.3	Reliability and Intercorrelation of the BCQ	70
4.5.4	Descriptive statistics of the BCQ	70
4.5.5	Perceived control over caregiving failure and parenting principles	71
4.5.6	Effect of parenting principles on parenting practices and infant crying	72
<b>4.6</b>	<b>Discussion</b>	<b>74</b>
4.6.1	Implications	76
4.6.2	Limitations and future directions	77
<b>Chapter 5</b>	<b>Prenatal attachment in twin and single pregnancy: An examination of moderation effects of biopsychosocial factors</b>	<b>79</b>
<b>5.1</b>	<b>Chapter overview</b>	<b>79</b>
<b>5.2</b>	<b>Introduction</b>	<b>79</b>
5.2.1	Prenatal attachment	79
5.2.2	Prenatal attachment in twin pregnancy	82
<b>5.3</b>	<b>Aims</b>	<b>84</b>
<b>5.4</b>	<b>Method</b>	<b>87</b>
5.4.1	Participants	87
5.4.2	Procedures	90

	5.4.3 Measures	91
	5.4.4 Data Analysis	94
<b>5.5</b>	<b>Results</b>	<b>96</b>
	5.5.1 Descriptive statistics	96
	5.5.2 Effect of twin pregnancy and other biopsychosocial variables on prenatal attachment	97
<b>5.6</b>	<b>Discussion</b>	<b>107</b>
	5.6.1 Implications	111
	5.6.2 Limitations and future directions	112
<b>Chapter 6</b>	<b>Monochorionic twins and the early mother-infant relationship: an observational exploratory study on mother-infant interaction in the early post-partum period</b>	<b>114</b>
<b>6.1</b>	<b>Chapter overview</b>	<b>114</b>
<b>6.2</b>	<b>Introduction</b>	<b>114</b>
	6.2.1 Potential and additional risks in monochorionic twin pregnancy	114
	6.2.2 The impact of premature birth on early mother-infant interaction	116
	6.2.3 Twin birth as risk factor for early mother-infant interaction	118
	6.2.4 Monochorionicity as an additional risk factor for early mother-twin interaction	122
<b>6.3</b>	<b>Aims</b>	<b>123</b>
<b>6.4</b>	<b>Method</b>	<b>123</b>
	6.4.1 Participants	123

	6.4.2 Procedures	125
	6.4.3 Measures	126
	6.4.4 Data Analysis	130
<b>6.5</b>	<b>Results</b>	<b>130</b>
	6.5.1 Comparison between mother's behaviour during the interaction with each twin	130
	6.5.2 Comparison between mothers of MC twin and mothers of singleton	132
<b>5.6</b>	<b>Discussion</b>	<b>133</b>
	6.6.1 Implications	137
	6.6.2 Limitations and future directions	138
<b>Chapter 7</b>	<b>General discussion</b>	<b>140</b>
<b>7.1</b>	<b>Chapter overview</b>	<b>140</b>
<b>7.2</b>	<b>Review of main findings and future directions</b>	<b>140</b>
	7.2.1 The pregnancy	140
	7.2.2 Parenting	144
	7.2.3 Mother-child interaction	147
<b>7.3</b>	<b>How can we better support parents of twins in dealing with the unique experience of expecting and parenting twins?</b>	<b>151</b>
<b>7.4</b>	<b>Conclusions</b>	<b>154</b>
	<b>References</b>	<b>156</b>
<b>Appendix 1</b>	<b>The Baby Care Questionnaire – Italian</b>	<b>187</b>
<b>Appendix 2</b>	<b>The Parent Attribution Test</b>	<b>191</b>
<b>Appendix 3</b>	<b>Demographic and medical information of mothers during pregnancy</b>	<b>192</b>



<b>Appendix 4</b>	<b>The Prenatal Attachment Inventory</b>	<b>194</b>
<b>Appendix 5</b>	<b>The Profile of Mood States</b>	<b>196</b>
<b>Appendix 6</b>	<b>The Multidimensional Scale of Perceived Social Support</b>	<b>197</b>
<b>Appendix 7</b>	<b>The Wijma Delivery Expectancy Questionnaire</b>	<b>198</b>

# **Chapter 1.**

## **General introduction**

Twins fascinated humankind through human evolution (Linney, 1980; Holditch-Davis, Roberts & Sandelowski, 1999). In ancient times parents of twins were considered either as worthy of special privileges or as deserving of punishment for incest or adultery (Linney, 1980). Although in a different way, this attraction continues today because of a significant increase of twin pregnancies over the last four decades in all of Western countries (Hoekstra et al., 2008; Pison & d'Addato, 2006) especially due to the rise of maternal mean age at childbearing as well as to the increase use of medically Assisted Reproductive Technologies.

Currently, twin pregnancies account approximately for 3% of all live births (Long & Ferriman, 2016). This extraordinary growth in twinning rates is an important public health issue since twin pregnancies are generally associated with increased risk for both children and the mothers. Twin babies are more fragile, have lower birth weight and born preterm more often than singleton babies. Many of the risks to the mother are also risks to the unborn babies, since they can lead to premature labour, complications, or in the worst cases, foetal death. Other complications for the mother are gestational diabetes, hypertension, preeclampsia and acute polyhydramnios. All these factors are generally associated with several health problems in the short and long period (Delobel-Ayoub et al., 2009; Johnson and Schoeni, 2011; Larroque et al., 2004).

Moreover, twin births can have negative effects on parents as well. In fact, although it is possible to identify similarities in pregnancy and parenthood for twin and singleton births, the experience of expecting and parenting twins is undeniably different (Leonard & Denton, 2006). Parents' reactions to pregnancy and consequently to parenthood may be influenced by the unique aspects of twin births. Many parents are ambivalent if not surprised

they will become parents of more than one baby, even if the pregnancy resulted from infertility treatment (Gromada, 1999). The responses to a multiple pregnancy and parenthood by families may be associated with shock, ambivalence, higher levels of anxiety, distress and higher risk of depression in the post-partum period (Leonard & Denton, 2006; Choi, Bishai, and Minkovitz 2009). On the other hand, parents of twin also report feeling proud, enthusiastic and fulfilled (Leonard & Denton, 2006).

Since twin pregnancies are increasing and because this type of pregnancies is associated with unique characteristics and challenges it will be important to increase our knowledge about parents' reactions to twin pregnancy and parenthood. Researchers and health care practitioners that have to deal with this type of pregnancies need to better understand the special needs of parents of twins. A focus on the unique experience of expecting and parenting twins will be necessary and particularly important since the demand for information about how to deal with twin pregnancy and how to take care of twins will continue to increase (Bowers, 1998).

## **1.1 Overview of the thesis**

Starting from this considerations, the overall aim of the present work is to add knowledge concerning the unique aspects of expecting and parenting twins. I would like to examine the way the mothers-to-be perceive and live their pregnancy as well as how mothers experience parenting twins and interact with their babies in the early post-partum period. Specific aims for the present work include:

- (a) To give a comprehensive framework about parents' experience of expecting twins and about the nature of the medical and psychological risk associated to this type of pregnancy;

- (b) To better investigate questions concerning the unique challenges associated to parenting twins;
- (c) To investigate mothers' psychological adjustment during twin pregnancies;
- (d) To explore how mothers interact with their twins.

I will address these aims through the next chapters of the present work. The next two chapters of the thesis will review the main literature on the unique experience on expecting and parenting twins, while the following three chapters of this work will focus on three separate studies. It is important to point out that these studies were undertaken to extend our knowledge of the impact of twin pregnancy and twin births on mothers' experience. Chapter 2 will provide a review of the studies that document the epidemiology of twin birth and the causes of the increase in twinning rate in recent years. Moreover, in this chapter it will be analysed research focusing on both medical and psychological aspects associated with twin pregnancy and childbirth. Chapter 3 will try to give a comprehensive frame of the issues regarding the exclusive challenges associated to the early experience of parenting twins. It was present a systematic review of the literature on the experience of caring for twins, exploring sleeping and feeding practice used by parents with twin babies. Moreover, this chapter will focus on how parents build the early parent-child relationship with their twins. The study presented in Chapter 4 will introduce and report the psychometric properties in a sample of Italian parents of a recent measure of parenting principles and practices during infancy: The Baby Care Questionnaire (BCQ; Winstanley & Gattis, 2013). Thus, the goal of Chapter 3 and 4 will be to investigate questions concerning the unique challenges associated to parenting twins, understanding how the conditions following twin birth may have altered early caregiving. The study described in Chapter 5 will investigate the impact of a twin pregnancy on prenatal attachment. In particular, this study will investigate if the unique experience of expecting twin may adversely affect prenatal attachment during the last

trimester of pregnancy, and which biopsychosocial factors predict maternal prenatal attachment in interaction with the type of pregnancy that woman experienced (twin vs singleton pregnancy). Therefore, the goal of this chapter will be to more fully understand mothers' psychological adjustment during twin pregnancies. The study provided in Chapter 6 will aim to explore the impact of twin birth on mother-child interaction. In particular, this chapter presents data on how mothers of monochorionic twins interact with their infants in the early post-partum period during face-to-face interaction. Chapter 7 brings together findings and discusses future work.

## **1.2 Methodological issue**

### **1.2.1 Participants and procedures**

To better investigate the unique experience of expecting and parenting twins it was used different mothers' samples recruited at different time points.

As regard the first study, "The Baby Care Questionnaire: adaptation and evaluation of psychometric properties in an Italian parents' sample", participants were recruited between January 2015 and October 2016. Parents were recruited through emails, mailing lists and online postings on parenting websites. Participants were eligible if they were expecting a baby or had at least one child under 18 months old. During the data collection stage, 334 parents completed The Baby Care Questionnaire and the Parent Attribution Test (Bugental & Shennum, 1984; Italian version by Benedetto and Camera, 2011), to test convergent validity. All study procedures were approved by the Catholic University research ethics committee, which required informed consent from the parents of each participant. For further information, see Chapter 4.

The second study, "Prenatal attachment in twin and single pregnancy: An examination of moderation effects of biopsychosocial factors" is an exploratory prospective

study. Participants were recruited between June 2016 to June 2017. Participants of the study were 39 pregnant women, 18 women (46.2%) experiencing a twin pregnancy, recruited at ASST Papa Giovanni XXIII (Bergamo, Italy), and 21 women (53.8%) experiencing a singleton pregnancy, recruited at ASST Bergamo Est (Bergamo, Italy). During the last trimester of pregnancy, pregnant women were asked to complete a questionnaire that investigated: socio-demographic and medical information, prenatal attachment, negative mood states, perceived social support, fear of childbirth and parenting principles. All study procedures were approved by the Catholic University research ethics committee, which required informed consent from the parents of each participant. For further information about demographic and medical characteristic of the sample see Chapter 5.

Finally, the third study, "Monochorionic twins and the early mother-infant relationship: an observational exploratory study on mother-infant interaction in the early post-partum period", is an observational cross-sectional exploratory study. Participants had been recruited from a larger observational longitudinal case-control study that aimed to investigate the role played by mothers and fathers on the neuropsychological developmental outcome of healthy preterm infants from birth until preschool age, during the period from March 2013 to June 2017, at Vittore Buzzi Children's Hospital (ASST Fatebenefratelli Sacco, Milan, Italy). Mothers included in the present study were 11 mothers of monochorionic twins and 11 mothers of a single baby, matched per infant's gestational age at birth and gender, and mother's age, parity and educational level. Mother-child interaction were videotaped during a home visit scheduled at three-month infant's corrected age for prematurity. After that, maternal behaviour during the interactions were assessed and rated using the Global Rating Scales (GRS; Murray, et al., 1996a, 1996b). All study procedures were reviewed and approved by the Vittore Buzzi Children's Hospital Ethics Committee (Milan, Italy). For further information about demographic and medical characteristic of the

sample see Chapter 6.

### 1.2.2 Measure

The multi-methods approach used in the present work enabled us to better investigate the unique experience of expecting and parenting twins. It was also possible to compare results with the existing literature as well as extend our understanding by including different type of measure and research designs. The present work included self-reports, observations, and reviews of medical records. These measures covered different domains, as well as collecting demographical and medical information (see Table 1.1).

Table 1.1

*Overview of the different measures employed in the present work*

Measures	
Study 1	(a) Cognitive interview (b) Self-report measures: <i>Baby Care Questionnaire</i> (BCQ; Winstanley & Gattis, 2012) <ul style="list-style-type: none"><li>- <i>Parent Attribution Test</i> (PAT; Bugental &amp; Shennum, 1984; Benedetto &amp; Camera, 2011)</li></ul>
Study 2	(a) Review of medical records (b) Self-report measures: <ul style="list-style-type: none"><li>- <i>Prenatal Attachment Inventory</i> (PAI; Muller, 1993; Della Vedova, Dabrassi &amp; Imbasciati, 2008)</li><li>- <i>Profile of Mood States</i> (POMS; McNair, Lorr &amp; Droppleman, 1971; Farnè, Sebellico, Gnugnoli &amp; Corallo, 1991)</li><li>- <i>Multidimensional Scale of Perceived Social Support</i> (MSPSS; Zimet et al., 1988; Prezza, Principato 2002)</li><li>- <i>Wijma Delivery Expectancy Questionnaire</i> (WDEQ; Wijma, Wijma &amp; Zar, 1998; Fenaroli &amp; Saita 2013)</li></ul> <i>Baby Care Questionnaire</i> (BCQ; Winstanley & Gattis, 2012)
Study 3	(a) observation and videotaping of mother-child interaction coded by <i>Global Rating Scales</i> (GRS; Murray, et al., 1996a, 1996b)

### **1.3 Contributions of this thesis**

The present thesis is a multi-site, collaborative study made up of researchers based at the *CRIdee*, Department of Psychology, Catholic University of Milan and the School of Psychology, Cardiff University, and clinicians at the ASST Papa Giovanni XXIII (Bergamo, Italy), ASST Bergamo Est (Bergamo, Italy) and Vittore Buzzi Children's Hospital (ASST Fatebenefratelli Sacco, Milan, Italy).

I was therefore highly involved in the initial design and set up of the studies included in the present work.

As regard the first study, "The Baby Care Questionnaire: adaptation and evaluation of psychometric properties in an Italian parents' sample" (see Chapter 4), my specific (independent) responsibilities were: data collection; management and reduction of data; and training as intern at School of Psychology, Cardiff University to set up the database for the analyses. I shared responsibility for the translation of the BCQ with professor Gattis' PhD student at School of Psychology, Cardiff university.

As regard the second study, "Prenatal attachment in twin and single pregnancy: An examination of moderation effects of biopsychosocial factors" (see Chapter 5), my specific (independent) responsibilities were: to design the antenatal data point, specifically selecting all the measures for the data collection; data collection of the clinical sample during the last trimester of pregnancy; and management and reduction of data collected. I trained a Masters' degree student at Catholic University and shared with her the responsibility for recruitment of the sample. This student is responsible for the recruiting and data collection for the control sample.

As regard the third study, "Monochorionic twins and the early mother-infant relationship: an observational exploratory study on mother-infant interaction in the early post-partum period" (see Chapter 6), my specific (independent) responsibilities were:



management and reduction of data collected at 3 months; video coding after the training “Reliability for the use of the Global ratings scales for mother-infant interactions at two and four” made at Liverpool University (Professor: Laura Bozicevic). The secondary coding was made by Prof.ssa Chiara Ionio (who achieved the reliability at Scuola di Specializzazione in Psicologia Clinica dell'Università di Firenze). The data collection was mainly made by the medical staff of the Buzzi Children's Hospital and by Masters' degree students at Catholic University (ASST Fatebenefratelli Sacco, Milan, Italy).