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Twins *in utero* react individually to the silent communication of their mother



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Introduction

At this time no one can deny anymore the ability of the fetus to respond to external physical stimuli. We have previously demonstrated that (Figure 1) :

- 1) Fetuses respond to vocal stimulation
- 2) The reaction is stronger if the stimulus comes from their mother
- 3) And even more important, if the speech is addressed to them
- 4) And / or has an emotional content
- 5) Neonates and fetuses respond in the same way whether mothers address them vocally or "silently" (see graphs opposite).

Purpose of this study:
 We tested the individual response of twins *in utero* to a silent communication specifically addressed to each one.

Methods

Participants:
 Eighty seven (87) women participated in the study. They were tested between 28 and 39 weeks of amenorrhea with 59% between 36 and 38 weeks.

A total of 349 tests comprise the study. Each twin counted as one test. Some mother-twin subjects were tested several time in order to check the consistency of each twin's reaction.

This work was carried out during the years 2001 to 2009 at Robert Debré University Hospital in Paris (France), after the approval of the hospital's ethical committee. Study personnel explained the project verbally to each participant, who was then given time to review the written consent. The study protocol was conduct after participant signed the consent form.

Protocol:
 The tests were divided into 6 periods of 5 minutes each (figure 2).

In the **experimental group**, mothers were instructed to read a text in silence (period 1, 3, 4, 6) and to communicate silently (without speaking aloud) with one twin (period 2) and subsequently with the other twin (period 5).

In the **control group**, mothers were reading a text in silence during 30 minutes.

Measures during the test:
 -Heart rate of the mother and that of each fetus recorded on a Hewlett-packard tocograph
 -Maternal uterin tonus and number of contractions

Outcomes :
 Were counted the number of twins whose heart rate was modified during periods 2 and 5 in the experimental group and in the control group.

Results & Discussion

In 33% of the tests, there is a change in the fetal heart rate of the targeted twin towards which the mother's attention is directed (silent communication).

This suggests that the fetus at the end of gestation already perceives that the attention of his mother is addressed to him (in previous experiments, the proportion of fetuses responding to a vocal stimulation was equivalent).

In some cases, the answer was not the one expected:

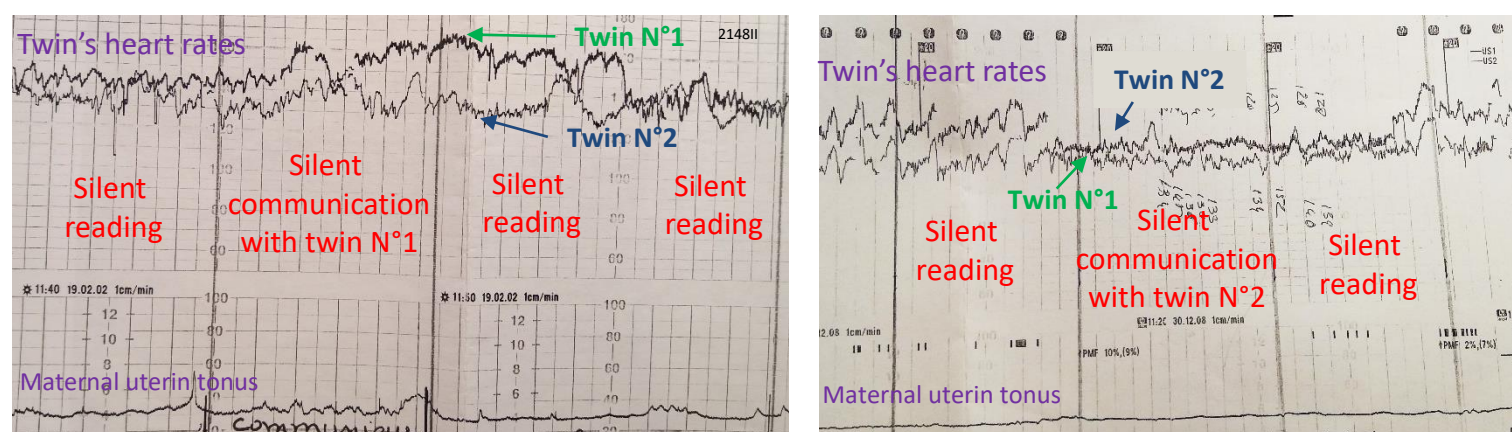
In 16% of the tests, the heart rate of both twins changed, the reaction of the targeted twin might have stimulated the non-targeted twin to react.

In 9% of the tests, a change in the heart rate of the non-targeted twin occurred, which probably reflects a random reaction of the fetus.

In 41% of the tests, the heart rates of both twins did not change. Either the mother's communication failed or the fetus was not receptive at this time.

The experimental data differ significantly from those obtained in the control data.

Thus, this study demonstrates that silent communication with one twin changes the fetus's heart rate significantly when compared to the non-targeted twin as well as when compared with controls.



Conclusion

The significant parallel pattern of fetal heart rate responses to spoken and silent communication by the mothers is remarkable. These new findings raise fundamental questions about the nature of a stimulus and about the development of these finely-tuned responses in the fetus.

Further longitudinal studies of the mother-twin pairs should characterize mother-fetus interactions and the different modalities of the silent communication in early life.

Figure 1. Previous results
 Reactions before, during and after maternal stimulus

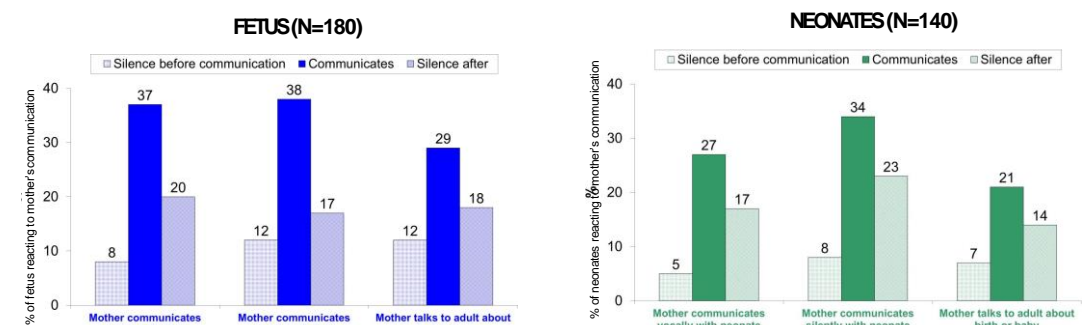


Figure 2: Protocol timing

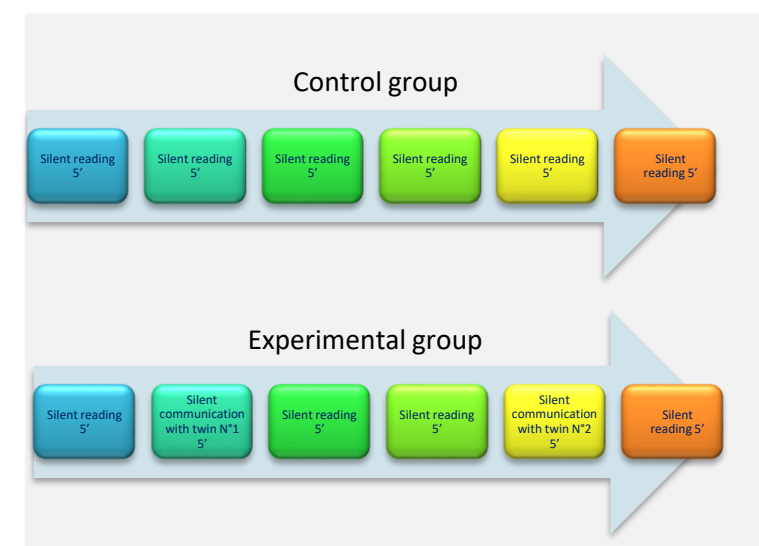
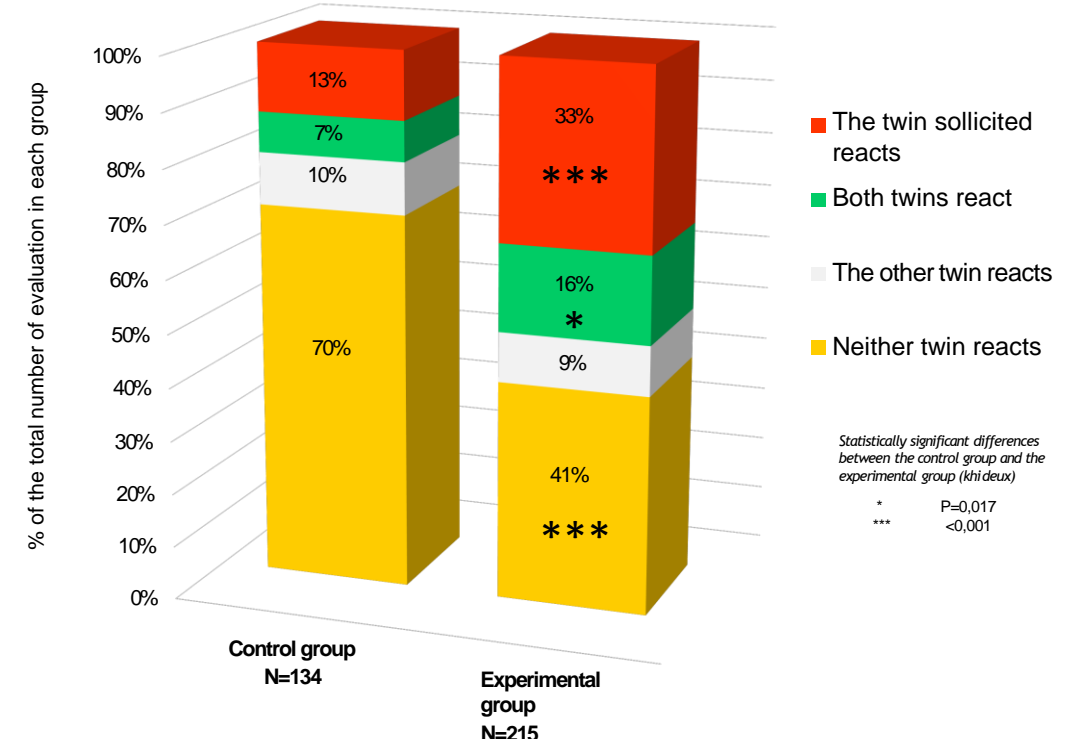


Figure 3: Changes in fetal heart rate during silent communication



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