

# Parental Beliefs About the Motor Development of Dutch Infants Born Very Preterm: A Cohort Study

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**Purpose:** To explore the influence of preterm birth on parental beliefs about gross motor development and parents' supportive role in infants' motor development.

**Methods:** Prospective cohort study: Parents of infants born very preterm (VPT) (gestation  $\leq 32$  weeks, birth weight  $< 1500$  g, without perinatal complications) and parents of healthy infants born full-term (FT) completed the Parental Beliefs on Motor Development questionnaire.

**Results:** Questionnaires from 37 parents of infants born VPT, aged 3.5 to 7.5 months (corrected), and 110 parents of infants born FT, aged 3.5 months, were analyzed. Parents of infants born VPT believed stimulating motor development to be more important than parents of infants born FT ( $F = 5.22$ ;  $P = .024$ ;  $\eta_p^2 = 0.035$ ). Most parents of infants born VPT (82.4%) and FT (85.2%) acknowledged their role in supporting motor development. More parents of infants born VPT (41.2% vs 12.0%) believed they should follow their infant's natural developmental pace.

**Conclusion:** Knowledge of parental beliefs and parents' supporting role in motor development is relevant for tailoring pediatric physiotherapists' interventions with families. (*Pediatr Phys Ther* 2024;36:95–103)

**Key words:** infant, motor development, parental belief, preterm

## INTRODUCTION

Preterm birth is a stressful event for parents,<sup>1</sup> with uncertainties about future developmental problems, including gross motor problems.<sup>2-5</sup> Development, in particular motor development, is more rapid in the first years of life than at any other age.<sup>6</sup> Infant motor development emerges in the interaction between factors within the infant and the environment.<sup>7</sup> The environment during the first 2 years is usually the infant's home, where the infant is completely dependent on their caregivers, mainly parents, who therefore play an important role in their development.<sup>8</sup> Parental practices affect infant motor devel-

opment by creating opportunities for the infant to develop and to explore the world.<sup>9,10</sup>

According to the developmental niche, a theoretical framework describing the sociocultural construction of development, different subsystems influence infant motor development.<sup>11</sup> These subsystems are (1) the physical and social setting of the infant, (2) parental beliefs about development and parenting, and (3) daily customs and practices on child-rearing. These 3 subsystems interact with each other and with the developing child. Although research has already shown the influence of culture on gross motor development,<sup>12-14</sup> little is known about the relationship between parental beliefs and motor development among parents of infants born very preterm (VPT) (VPT parents) compared with parents of infants born full-term (FT) (FT parents).

Parental beliefs are the reflection of ideas, thoughts, knowledge, and values that parents hold about children's development and socialization, parenting, and family life.<sup>15,16</sup> Beliefs can be conscious but are often unconscious. Also, beliefs have different origins and are formed through past experiences and/or information from trusted sources.<sup>17</sup> Thus, it is plausible that parents confronted with preterm birth develop different beliefs in comparison with those of FT parents. The stressful event of preterm birth and the risks of gross motor delays may alter parental

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## WHAT THIS EVIDENCE ADDS

**Current evidence:** The developmental niche is a framework that describes the influence of culture on gross motor development.<sup>1</sup> The environment in the first 2 years of life is most often at the infant's home, where parental practices affect infant motor development.<sup>2-4</sup> Parents from different backgrounds have different beliefs about the motor development of their infant.<sup>5</sup>

**Gap in the evidence:** Little is known about the relationship between parental beliefs and motor development among Dutch parents of infants born very preterm (VPT) compared with parents of infants born full-term (FT). The stressful event of preterm birth and the risks of gross motor delays may alter parental beliefs and perceptions. Parental practices may be influenced by these altered beliefs.

**How does this study fill this evidence gap?** We compared parental beliefs of parents of infants born VPT with parents of infants born FT using the Parental Beliefs on Motor Development (PB-MD) questionnaire. All parents, both parents of infants born VPT and FT, think that motor development is one of the most important aspects of development during the first year of life, though they do not hold clear beliefs in favor of actively promoting motor development. Most parents believe that they have a role in stimulating motor development, whereas parents of infants born VPT more often express that they stimulate their infant by creating the right environment and/or using toys or equipment.

**Implication of all the evidence:** Despite the few differences between the parents of infants born VPT and FT, we think that there are differences in beliefs among Dutch parents. Because the PB-MD questionnaire is originally designed to compare parental beliefs between cultures, we are lacking tools to gain insight or measure parental beliefs regarding motor development within our Dutch population. However, knowledge about parental beliefs and practices is important for pediatric physical therapists to be able to adapt to the needs of parents in applying interventions.

beliefs and perceptions. For example, earlier research showed that, due to stereotyping, mothers of healthy infants born preterm chose less mature toys to play with than those mothers would choose for infants born FT.<sup>18</sup> This also supports that parental beliefs or perceptions may influence parenting practices.<sup>19</sup> In a cross-cultural study, there were differences between Israeli and Dutch parents; the Dutch parents found stimulation of motor development less important than Israeli parents.<sup>20</sup> But one can imagine that when their infant is at risk of motor developmental delay, like in infants born preterm, parents may feel the need to actively stimulate their infant's motor development and perhaps more actively seek advice.

Considering motor development, the pediatric physical therapist (PPT) is often involved in monitoring motor development and providing early intervention during the first year of life of infants at risk for motor development. Family-centered care is considered best practice in early intervention,<sup>21,22</sup> comprising active collaboration between the PPT and parents, respecting and honoring differences in ideas, values, and customs.<sup>23</sup> Earlier research supports that Dutch mothers believe they can influence the timing of the milestones of their infant.<sup>24</sup> Consequently, for effective collaboration with parents, it is important to understand parental beliefs and how parents consider their role in stimulating their infant's motor development. Parents' perspectives of their parenting role may affect parenting behaviors,<sup>25</sup> but little is known.

The first step is to better understand the beliefs of VPT parents about motor development and their supportive role by comparing them with the beliefs and supportive role of FT parents. If a difference in parental beliefs is found between VPT and FT parents, this might indicate a possible relation between birth status and parental beliefs. This led to the following research questions: (1) What are the similarities and/or differences in parental beliefs about motor development between Dutch VPT

and FT parents? and (2) Do VPT and FT parents differ in their beliefs about their own supportive role in their infant's motor development?

## METHODS

### Study Design

This study was part of a large prospective cohort study, GODIVA—Gross mOTOR Development of Infants using home-Video registration with the Alberta Infant Motor Scale (AIMS). The overall aim of the GODIVA study was to better understand infant gross motor development from birth until independent walking and the factors related to the shape and speed of gross motor developmental curves. Two longitudinal substudies were initiated, with the first following infants born FT from 3.5 to 15.5 months of age (GODIVA-KIT study) and a subsequent one following infants born VPT from 3.5 to 17 months corrected age (CA) (GODIVA-PIT study). For the current study, data from both substudies were used. Part of the GODIVA-KIT data has previously been used to answer a different research question concerning the changeover time in parental beliefs about gross motor development of infants born FT.<sup>26</sup>

### Participants

For the GODIVA-KIT study, FT parents were recruited between May 2016 and April 2018 through open registration. Infants were recruited by distributing flyers at birth centers, day-care centers, well-baby clinics, and maternity care offices in the larger cities of the Netherlands. Infants were excluded from the study if they were born before 37 weeks' gestational age (GA) or diagnosed with pathology.

For the (current) GODIVA-PIT study, VPT parents were recruited between May 2017 and December 2019 from the

Wilhelmina Children's Hospital (University Medical Centre Utrecht), Radboud University Medical Centre (Nijmegen), Isala Hospital (Zwolle), and by TOP (transmural development support for infants born VPT and their parents) PPTs throughout the Netherlands.<sup>27</sup> Infants were recruited at the regular neonatal follow-up or during their first contact with the TOP PPT. Most parents of infants in the Netherlands born before 32 weeks' gestation and/or weighing less than 1500 g are advised to participate in the TOP program. Eligible infants were born before or at 32.0 weeks' GA or with a birth weight (BW) of less than 1500 g and younger than 7.5 months (corrected for preterm birth) at the start of the study. Their parents had to understand the Dutch language. Infants were excluded if diagnosed with a known syndrome, a neuromuscular disorder, severe neuroimaging abnormalities (eg, cystic periventricular leukomalacia, intraventricular hemorrhage grade III or IV), meningitis, bronchopulmonary dysplasia (defined as oxygen supplementation >36 weeks' postmenstrual age), congenital anomalies, necrotizing enterocolitis requiring surgical procedures, prolonged tube feeding (defined as beyond hospital discharge), and severe visual or hearing disorder.

## Procedures and Measures

When infants met the inclusion criteria, parents were asked to participate and received information accompanied by a request for informed consent. After approximately a week, parents were contacted to answer any questions and asked to return signed consent forms if they agreed to participate. Booklets with information, checklists, and instructions were sent to them. The GODIVA-KIT and GODIVA-PIT studies had similar protocols in which parents were asked to record their infant 6 times with the AIMS home-video method<sup>28</sup> if their infant was born FT and 7 times if born preterm. In addition, before parents in both studies started filming, they received a demographic questionnaire and the Parental Beliefs on Motor Development (PB-MD) questionnaire<sup>29</sup> by e-mail, being asked to fill this out before the first time recording their infant. FT parents received the questionnaire when their infant was 3 months old. VPT parents received the questionnaire when their infant was 3, 5, or 7 months' CA.

## Measurement

The PB-MD questionnaire has 4 sections. The first section includes 7 statements and the second section includes 4 case descriptions, followed by statements representing possible interpretations and approaches. In these 2 sections, parents rate their agreement with the statements on a 6-point scale from 1 (*disagree*) to 6 (*strongly agree*). Factor analysis of the first 2 sections reveals a single-item indicator and 5 scales measuring such beliefs as: (1) stimulation of motor development is important; (2) motor development occurs naturally; (3) seeking advice on motor development is important; (4) order of motor development is important; and (5) children should follow their own pace in motor development.<sup>29</sup> Scale scores are calculated from the means of the corresponding scale items (recoded where needed). The third section contains 2 open-ended questions on ideas about parenting, specifically how parents consider their

role in their infant's gross motor development and whether parents think they should do something to support this. The fourth section, on sources of information about motor development, was not part of our study. The reliability and validity of the PB-MD questionnaire are good.<sup>20,29</sup>

## Ethics

Both the GODIVA-KIT and GODIVA-PIT studies were approved by the Medical Ethical Board of the University Medical Centre Utrecht (METC/UMCU) with protocol nos. 16/366C and 17-186/C, respectively. Parents gave written informed consent prior to participation. Video data were stored on a secure server at Utrecht University of Applied Sciences.

## Data Analysis

Sample characteristics were calculated with descriptive measures. Chi-square and Fisher's exact tests were performed to compare most infant and parent characteristics between the infants born VPT and FT. Cramer's *V* and Cohen's *d* were calculated for the effect size, with  $d < 0.2$  being small,  $d = 0.2-0.7$  medium, and  $d > 0.8$  large effect sizes.<sup>30-32</sup> For BW and GA, independent Student's *t* tests were calculated for effect sizes. Scale scores were calculated by averaging the sum of the scale items.

The single-item indicator and scale scores were tested for normality, considering normality to obtain when skewness and kurtosis were between  $-2$  and  $2$ . The single-item indicator and the scale scores (sections 1 and 2) were normally distributed and therefore a multivariate analysis of variance was conducted on the differences between VPT and FT parents. Partial eta squared ( $\eta_p^2$ ) values were calculated for the effect of the differences. For all tests, a *P* value of less than .05 was considered significant. For  $\eta_p^2$ , effect sizes of more than 0.01 are considered small, more than 0.06 medium, and more than 0.14 large.<sup>30,31,33</sup>

The open-ended questions (section 3) were coded using a previously developed coding scheme.<sup>29</sup> After training, the researchers of the GODIVA-PIT and GODIVA-KIT studies and 5 master's PPT students independently coded the open questions in pairs, together with one of the researchers. Identified codes were rated as dichotomous outcomes (yes = 1; no = 0). The percentage of parents who mentioned a code was calculated. Differences between percentages were calculated with chi-square or Fisher's exact tests, with Cramer's *V* analysis for effect sizes.

## RESULTS

### Demographics of the VPT and FT Samples

Data from the demographic questionnaire of 37 VPT parents and 110 FT parents were analyzed and compared (Table 1). Infant characteristics were, as expected, only significantly different for their GA and BW. Parental characteristics differed only in paternal education, where fathers of infants born FT had a higher educational level. Significantly more infants born VPT ( $P \leq .001$ ; Cramer's *V* = 0.919) had one or both parents speaking a non-Dutch language. Also, more infants

**TABLE 1**

Demographics and Comparison of Characteristics of Infants Born VPT and FT

	VPT (n = 37)	FT (n = 110)	p-values	Effect Size ( $\eta_p^2$ )
Gender (female)	16 (48.6%)	66 (60%)	.155 <sup>a</sup>	0.100 <sup>b</sup>
GA, mean (SD), wk	29.5 (2.1)	39.9 (1.12)	<b>&lt;.001<sup>c</sup></b>	<b>6.876<sup>d</sup></b>
BW, mean (SD), g	1198 (341)	3556 (451)	<b>&lt;.001<sup>c</sup></b>	<b>5.532<sup>d</sup></b>
Birth order			.211 <sup>c</sup>	0.145 <sup>b</sup>
First	25 (67.6%)	56 (50.9%)		
Second	9 (24.3%)	40 (36.4%)		
Third or higher	3 (8.1%)	14 (12.7%)		
Pediatric physical therapy/TOP			<b>&lt;.001<sup>a</sup></b>	<b>0.758<sup>b</sup></b>
Yes	34 (91.9%)	12 (10.9%)		
No	3 (8.1%)	98 (89.1%)		
Maternal age, y			.780 <sup>c</sup>	0.109 <sup>b</sup>
≤24	0 (0%)	2 (1.8%)		
25-29	7 (18.9%)	17 (15.5%)		
30-34	21 (56.8%)	55 (50.0%)		
35-39	7 (18.9%)	28 (25.5%)		
≥40	2 (5.4%)	8 (7.3%)		
Paternal age, y			.579 <sup>c</sup>	0.161 <sup>b</sup>
≤24	0 (0%)	1 (0.9%)		
25-29	3 (8.1%)	15 (13.6%)		
30-34	15 (40.5%)	32 (29.1%)		
35-39	16 (43.2%)	44 (40.0%)		
≥40	3 (8.1%)	16 (14.5%)		
Unknown	0 (0%)	2 (1.8%)		
Maternal education			.282 <sup>c</sup>	0.161 <sup>b</sup>
No education	0 (0%)	0 (0%)		
Primary	1 (2.7%)	0 (0%)		
Secondary lower	0 (0%)	2 (1.8%)		
Secondary higher	6 (16.2%)	15 (13.6%)		
Tertiary	30 (81.1%)	93 (84.5%)		
Paternal education			<b>.008<sup>c</sup></b>	<b>0.305<sup>b</sup></b>
No education	0 (0%)	2 (1.8%)		
Primary	0 (0%)	1 (0.9%)		
Secondary lower	5 (13.5%)	1 (0.9%)		
Secondary higher	8 (21.6%)	16 (14.5%)		
Tertiary	24 (64.9%)	90 (81.8%)		
Parental language			<b>&lt;.001<sup>a</sup></b>	<b>0.919<sup>b</sup></b>
Dutch	30 (81.1%)	105 (95.5%)		
Other than Dutch	7 (18.9%)	5 (4.5%)		
Age (CA) of infant			<b>&lt;.001<sup>c</sup></b>	<b>0.386<sup>b</sup></b>
3.5 mo	30 (81.1%)	110 (100%)		
5.5 mo	3 (8.1%)			
7.5 mo	4 (10.8%)			

Abbreviations: BW, birth weight; CA, corrected age; FT, full-term; GA, gestational age; VPT, very preterm.

<sup>a</sup>Fisher's exact test.

<sup>b</sup>Cramer's *V*.

<sup>c</sup>Chi-square test

<sup>d</sup>Cohen's *d*.

Bold values indicate statistical significance.

born VPT had received pediatric physical therapy than infants born FT.

**Comparison of Parental Beliefs Between VPT and FT Parents**

To answer the first research question, a multivariate test was performed, which showed only a significant difference between parents on the Stimulation scale, albeit with a small effect size ( $F = 5.221$ ;  $P = .024$ ;  $\eta_p^2 = 0.035$ ) (Table 2). This implies that VPT parents agreed more with stimulation of motor development than FT parents (Figure). Despite the significant difference between VPT and FT parents, on average, both groups tended

to disagree with belief in stimulating motor development: VPT mean (SD) score = 2.8 (0.8); FT mean (SD) score = 2.5 (0.7).

The Own Pace scale was significant, showing a small effect size ( $F = 0.012$ ;  $P = .080$ ;  $\eta_p^2 = 0.021$ ). The first statement (which is the single-item indicator) and the Natural Development, Advice, and Order of Milestone Attainment scales did not reveal significant differences between the parents.

Although not significant, all parents expressed a belief that motor development is most important in the first year of life, with a mean (SD) score of 4.6 (1.1) for VPT and 4.8 (1.1) for FT parents.

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**TABLE 2**

Multivariate Analysis of Variance of the Comparison Between VPT and FT Parents on the Scales of the Parental Beliefs on Motor Development

Dimension	Mean (SD)		B	F	SE (Total)	p-values	$\eta_p^2$
	VPT	FT					
Statement 1	4.7 (1.2)	4.9 (1.1)	0.253	1.403	0.213	.238	0.010
Stimulation	2.8 (0.8)	2.5 (0.7)	-0.302	5.221	0.132	<b>.024<sup>a</sup></b>	0.035
Natural Development	2.9 (1.1)	3.0 (0.9)	0.102	0.293	0.188	.589	0.002
Advice	3.0 (1.1)	2.8 (1.0)	-0.139	0.473	0.202	.439	0.003
Order	2.4 (1.3)	2.7 (1.3)	-0.109	0.350	0.185	.555	0.002
Own Pace	4.1 (1.0)	3.9 (0.8)	-0.285	3.115	0.162	.080	0.021

Abbreviations: FT, full-term; VPT, very preterm.

<sup>a</sup>Significant difference ( $P < .05$ ).

Bold values indicate statistical significance.

**Parental Role Regarding Motor Development**

To answer the second research question about parents’ role, the open questions were analyzed. Most parents answered “yes” to the question of whether parents have a supporting role in their infant’s motor development (82.4% VPT parents vs 85.2% FT parents) (Table 3). However, some parents felt that, though they had a role, it was not their goal to accelerate motor development (Table 4).

Few differences were found between VPT and FT parents considering parents’ role in stimulating motor development. One was that more VPT parents (35.3% VPT parents vs 9.3% FT parents;  $P < .001$ ; Cramer’s  $V = 0.363$ ) stated that their role was to follow their child’s (natural) developmental pace (Table 4).

More than 30% of the VPT parents and 20% of the FT parents said that parents should support infant motor development but not oversupport or push their infant (Table 4). Some parents (17.6% VPT parents vs 23.1% FT parents) said they had a signaling role (Table 4). Remarkably, only one of the FT parents described the role of parents as actively stimulating their infant (Table 4).

In answering the second open question of whether parents should do something with the infant and/or the environment to support infant motor development, most VPT parents (61.7%) gave answers about fostering or facilitating by creating the right environment and providing right toys, space, and/or equipment.

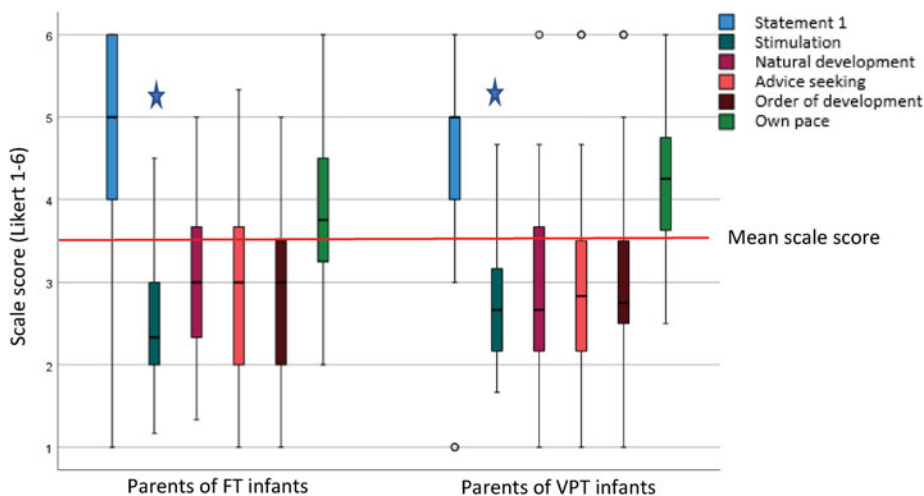
Of the FT parents, 43.5% also reported this ( $P = .085$ ; Cramer’s  $V = 0.146$ ) (Table 4).

Of the FT parents, 16.7% reported actively stimulating their infant, while none of the VPT parents gave that answer ( $P = .007$ ; Cramer’s  $V = 0.219$ ). Both groups of parents described different activities they provided for their infant. The most commonly described activity for stimulating their infant was putting in prone position (29.4% VPT parents vs 23.1% FT parents).

There were no significant differences in the activities parents provided for their infant, although only twice (5.8%) did VPT parents report going to baby swimming; in total, FT parents reported providing infant activities 18 times (16.7%) (baby swimming, yoga, and/or other movement classes).

**DISCUSSION**

Because research on parental beliefs about motor development and how this eventually affects the actual gross motor development of infants is still scarce, the aim of our research was to gain a better understanding of parental beliefs and supporting role in the gross motor development of Dutch infants born VPT and FT. This study demonstrated that there were few differences between Dutch VPT and FT parents in their beliefs about motor development. While VPT parents, as with FT parents, agreed that motor development is one of



**Fig.** Boxplot with the comparison of the first statement and the scales between VPT and FT parents. \* $P < .05$ . FT indicates full-term; VPT, very preterm.

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**TABLE 3**

Percentages of VPT and FT Parents Describing Their Parental Role and Providing Activities Concerning Their Infant's Motor Development

	VPT (n = 34)	VPT, %	FT (n = 108)	FT, %	p-values	Effect Size
<b>Parental role</b>						
In general: Yes, support	28	82.4%	92	85.2%	.437 <sup>a</sup>	0.066
No need to support/no need to compare to other children/children follow their own (natural) pace of development/the baby will develop the skills regardless of support	9	26.5%	29	21.2%	.896 <sup>a</sup>	0.011
Signal/encourage when necessary/consult experts/observe problems	6	17.6%	25	23.1%	.453 <sup>a</sup>	0.064
Follow child according to age norms/or according to child's abilities/follow the child's (natural) developmental pace	14	41.2%	13	12.0%	<b>&lt;.001<sup>a</sup></b>	<b>0.313</b>
Support, but not oversupport/do not push/overstimulate	11	32.4%	22	20.4%	.175 <sup>a</sup>	0.115
Foster motor development, by right environment/toys/equipment/reward/light stimulation/elicit motor development	5	14.7%	25	23.1%	.262 <sup>a</sup>	0.095
Encourage/mild stimulation	4	11.8%	6	5.6%	.259 <sup>b</sup>	0.101
Active stimulation	0	0%	1	0.9%	1.000 <sup>b</sup>	0.048
<b>Activities</b>						
Manipulate movement/active stimulation	0	0%	18	16.7%	<b>.007<sup>b</sup></b>	<b>0.219</b>
Putting in prone position	10	29.4%	25	23.1%	.513 <sup>a</sup>	0.055
Putting in sitting position	0	0%	2	1.9%	1.000 <sup>b</sup>	0.069
Putting in standing position	0	0%	2	1.9%	1.000 <sup>b</sup>	0.069
Stretch	0	0%	0	0%		
Help rolling	1	2.9%	4	3.7%	1.000 <sup>b</sup>	0.020
Massaging	0	0%	1	0.9%	1.000 <sup>b</sup>	0.048
Doing exercises	2	5.9%	1	0.9%	.148 <sup>b</sup>	0.146
Stimulate senses	1	2.9%	0	0%	.245 <sup>b</sup>	0.150
Other manipulating movements	4	11.8%	9	8.3%	.520 <sup>b</sup>	0.047
Adapting activities to age norms/or adapting activities to the child's abilities	7	20.6%	11	10.2%	.132 <sup>a</sup>	0.128
Foster/facilitate through environment/toys/light stimulation	21	61.7%	47	43.5%	.085 <sup>a</sup>	0.146
Other activities, general or not motor	12	35.3%	42	38.9%	.625 <sup>a</sup>	0.042
<b>Parents' outdoor activities in manipulating movement</b>						
Baby swimming	2	5.8%	9	8.3%	1.000 <sup>b</sup>	0.043
Baby yoga	0	0%	2	1.9%	1.000 <sup>b</sup>	0.069
Other movement classes	0	0%	7	6.5%	.194 <sup>b</sup>	0.131

Abbreviations: FT, full-term; VPT, very preterm.

<sup>a</sup>Pearson's chi-square test.

<sup>b</sup>Fisher's exact test.

Bold values indicate statistical significance.

the most important things during the first year of life, they do not hold clear beliefs in favor of actively promoting motor development, though they believed more than FT parents that stimulating motor development was important.

Most parents, both VPT and FT parents, believed that stimulating motor development was the role of a parent. VPT parents believed more that their role was to follow their infant's natural pace of development, rather than actively stimulating motor development. VPT parents more often reported stimulating their infant by creating the right environment and/or using toys or equipment.

Although significant, the difference between VPT and FT parents on stimulating motor development, where VPT parents believe more in stimulating motor development, is small. This difference might be related to the fact that infants born VPT almost all receive TOP therapy, performed by a PPT. On the contrary, FT parents visit baby clinics where motor development

is also screened, but the focus of that visit is perhaps different. Despite this difference, for both sets of parents, the average scale score is less than 3.5, which means that parents do not strongly believe that they should stimulate their infant and even tend toward a belief that they should not. That Dutch parents tend to believe less in stimulating motor development of their infant is in line with research on the differences between the beliefs of Israeli and Dutch parents. Research on parenting beliefs in Western cultures has already shown cultural differences.<sup>20,34,35</sup>

VPT parents, as well as FT parents, believe that motor development in the first year is very important, with a mean score on this item of more than 4.5. On the contrary, VPT parents, in particular, do not tend to actively stimulate motor development, rather believing that their infant will develop these skills regardless of support.

There seems to be some contradiction between parents' beliefs about motor development and their practices. One might

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TABLE 4

Quotes From the Open Questions

Quote 1	<i>"Yes. Not to make it go more rapidly but not to slow down growth. She (their daughter) loves practicing and getting undivided attention. Facilitator and guide."</i> (Parent of an infant born VPT)
Quote 2	<i>"Yes, parents can help the child by playfully stimulating the motor development that the child is currently capable of."</i> (Parent of an infant born VPT)
Quote 3	<i>"Yes, but don't force it and practice something for too long."</i> (Parent of an infant born FT)
Quote 4	<i>"... in the first weeks, parents should also be alert to the child's [sleeping or lying] position, in case of a possible preferred position. The child will not 'solve' this on its own..."</i> (Parent of an infant born FT)
Quote 5	<i>"Lots of practice (laying on the tummy), challenge and stimulation can speed up the process, but you can never have this one hundred percent guaranteed."</i> (Parent of an infant born FT)
Quote 6	<i>"... e.g. offering toys, providing space and opportunity to engage in motor activities (laying on tummy, putting in the playpen/on a play mat)."</i> (Parent of an infant born VPT)

Abbreviations: FT, full-term; VPT, very preterm.

expect that if motor development was seen as important in the first year of life, parents would act accordingly, that is, stimulating their infant's motor development. However, beliefs do not seem to naturally align with practices. Possibly, the circumstances of preterm birth and all that comes with it may change the way they interact with their infant but may not change their core beliefs, with the difference between beliefs and practices becoming bigger in these more extraordinary circumstances.

Our study did not find large differences between VPT and FT parents, which may reflect the idea that within the same country, the same cultural model exists. This leads to the assumption of homogeneity in parenting with Dutch parents. Although small, real differences are found between VPT and FT parents. However, this may merely imply that, although the PB-MD questionnaire is a valid and reliable questionnaire to measure differences between cultures, it is less suitable to do so within one culture.

Compared with FT parents, VPT parents more often see their role as following the child in their own developmental pace. One possible explanatory factor for this result is that almost all infants born VPT receive TOP pediatric physical therapy. Because the TOP program is a preventive responsive parenting program for infants born VPT and their parents,<sup>27</sup> the latter are perhaps more alert to their infant's abilities and do feel the need to stimulate their infant actively. This is in line with the finding that, although only marginally significant ( $P = .085$ ), VPT parents say their role is to promote motor development more, by creating the right environment, toys, and equipment.

It was apparent that VPT parents were less in favor of active stimulation. Parents often think of premature infants as more vulnerable.<sup>18</sup> When an infant is considered more vulnerable, it may be that VPT parents think stimulating their infant is less important, for fear that one might ask too much of the infant. Our results show that parents of infants born preterm do not go out much for activities such as baby swimming, baby yoga, etc, possibly because they consider their child more vulnerable. At the Wilhelmina Children's Hospital, parents are advised to be cautious about taking their infant born VPT to the daycare center because of the higher risk of respiratory infections in the first year. Perhaps, parents follow this advice in a broader way.

### Limitations of the Study

The first limitation is the small sample size of infants born VPT, which makes generalizing results and conclusions more

difficult. Besides, generalizability of the results to the whole VPT population is not possible, because of the exclusion of infants having severe complications such as bronchopulmonary dysplasia, necrotizing enterocolitis, etc. Parents of these infants could hold different beliefs due to other experiences compared with infants without severe complications.

The aim of the study was to compare beliefs in motor development between VPT and FT parents. As reported in earlier research, cultural background, parental age, parental education, birth order, and assessment age may influence parental beliefs and serve as effect modifiers. Unfortunately, identifying such modifiers proved impossible in the current study because of the small variation in parental characteristics and the small sample size.

Second, infants born FT were approximately 3 months old, but the infants born VPT were 3.5 to 7.5 months' CA and therefore at least 5 months' calendar age. Besides, almost all infants born VPT (92%) had received pediatric physical therapy, compared with only 11% of infants born FT. Since beliefs are formed on the basis of past experiences and/or information from trusted sources,<sup>17</sup> it is possible that changes in beliefs, based on the experience of preterm birth and a minimum of 5 months of caring for infants born VPT, and accompanying information from health care providers, may partly explain the difference between VPT and FT parents (although this was not part of this study). This may make comparisons between the 2 groups difficult. On the contrary, the parent groups are necessarily unequal in their experiences with their infant and little is known about changes in beliefs and the constructs behind them.

### Clinical Implications

For PPTs, it is useful to understand parental beliefs about gross motor development in infants who need intervention. If parents feel motor development to be important in the first year of life but that they do not have to stimulate their infant (who will develop at their own pace), this is valuable information for professionals. If parents have concerns about their infant's motor development, PPTs can give more information on the relevance of stimulating gross motor development. In general, it is valuable to know what parents consider their role to be: for instance, if they believe that their role is to create a stimulating environment, the PPT can respond to this appropriately.

## Future Research

For research, the PB-MD questionnaire is a valid and reliable questionnaire to gain more insight into parental beliefs cross-culturally.<sup>29</sup> Intraculturally, the questionnaire may not be sensitive enough to compare different groups of parents. Moreover, the use of the questionnaire in clinical practice has not yet been tested. As the questionnaire was designed for research, it is not obvious that it is applicable in clinical practice, or even that a questionnaire is the best approach for identifying parental beliefs. Therefore, intracultural research on parental beliefs and on tools for identifying parental beliefs in clinical practice is required. Also, because some of the parental characteristics may serve as effect modifiers, future research on potential effect modifiers should be conducted. Finally, more research into changes of parental beliefs and their influence on parental practices would contribute to a better understanding of what PPTs may be able to contribute during interventions with infants born VPT.

## CONCLUSION

Few significant differences were found in parental beliefs between Dutch VPT and FT parents, perhaps explained by their sharing the same cultural context. Identification of differences in beliefs within the same culture may require a different approach to that of the PB-MD questionnaire. Knowledge of parental beliefs about gross motor development and how parents consider their own supporting role in this, though relevant to PPTs, is scant. Such knowledge would provide possibilities for PPTs to relate to parents and their beliefs regarding gross motor development, helping them to adapt to the parents' needs and practices.

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