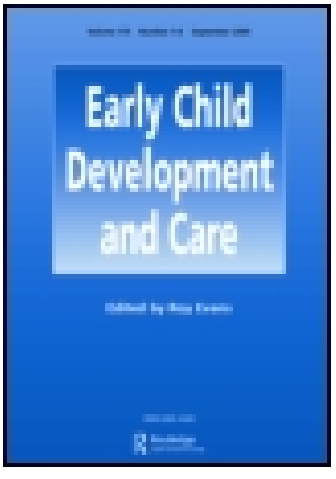

Early Child Development and Care
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/gecd20

The impact of preschool twins' physical difficulties on parental perceptions towards separation, closeness and friendship

Maria Markodimitraki[a], Michalis Linardakis[a], Maria Kypriotaki[a] & George Manolitsis[a]

[a] Department of Preschool Education, University of Crete, Gallos Campus, 74100 Rethymnon, Crete, Greece

Published online: 15 May 2015.

Early Child Development and Care, 2015
http://dx.doi.org/10.1080/03004430.2015.1043295

The impact of preschool twins' physical difficulties on parental perceptions towards separation, closeness and friendship

Maria Markodimitraki*, Michalis Linardakis, Maria Kypriotaki and George Manolitsis

Department of Preschool Education, University of Crete, Gallos Campus, 74100 Rethymnon, Crete, Greece

(*Received 29 December 2014; accepted 17 April 2015*)

The aims of this study were to: (a) provide descriptive data of twins with physical difficulties among 120 Greek twins of preschool age; and (b) to investigate the impact of twins' health condition on parental perceptions towards twins' separation, closeness and friendship. The administration of School Policy for Twins and Higher Multiples Questionnaire to the parents of 60 twin pairs led to the following three-group sample based on twins' health condition: Group 1 consisted of pairs of healthy twins, Group 2 consisted of pairs of a healthy twin and a non-healthy co-twin and Group 3 consisted of pairs of non-healthy twins. The main results of this study are summarised as follows: (a) twins' health condition did not affect parents' preference to keep their twins together (school/home), rather than separate them; (b) twins' health condition affected twins' emotions towards separation; and (c) twins' health condition did not affect significantly twins' closeness and twins' preferences in friendship. This study attempts to advance investigation of the impact physical difficulties may have on parents' perceptions.

Keywords: twins; physical difficulties; separation; closeness; friendship

Introduction

Psychologists have been overwhelmingly biased in their theorising about the nature and nurture of twins for the last 130 years. Twin children have received a utilitarian treatment as 'the finest natural experiment'(Segal, 2010, p. 317) or as a tool of behavioural genetics (Bouchard & Propping, 1993; Fulker & Cardon, 1993; Ginn, 2014), as organisms having half or all same genes in order to prove similarities or differences with non-twin population. Unfortunately the results of respective clinical studies have hastily been generalised to the entire healthy population of twin children (see Harris, 2006; Klein, 2003; Piontelli, 2002). Under the shadow of the scientific prejudice 'for twin, read problem', studies are mainly focused on the disadvantages of healthy twin children, for example, on the 'difficulties' of their educational experience, the 'problematic' development of the twin secret language, on their 'problematic' puberty, etc. (Oliver & Plomin, 2007; Verkerk, Jeukens-Visser, van Wassenaer-Leemhuis, Kok, & Nollet, 2014). The absence of a potential that is directed towards the search of twin advantages is evident in healthy twin pair studies and more than ever evident in non-healthy twin pair studies (Deary, Pattie, Wilson, & Whalley, 2005; Newman & Luke, 2000; Piontelli,

*Corresponding author. Email: markodim@edc.uoc.gr

2002). However, luckily, in the last decade, slowly but surely scientific interest is turned in methodological designs where twins are studied in real life context (Hayashi & Hayakawa, 2004; Hayashi et al., 2006; Hayashi, Mikami, Nishihara, Maeda, & Hayakawa, 2014; Kugiumutzakis, Kokkinaki, Markodimitraki, & Vitalaki, 2005).

Disabilities in twins

Scientific interest in disabled twin studies is lime-lighted on the disability itself. For example, there are studies on how prone twins are to allergy, eczema and hay fever in comparison to non-twins (McKeever et al., 2001; Nystad, Roysamb, Magnus, Tambs, & Harris, 2005). There are also studies on the impact of high bilirubin level in twins, the duration of the gestational period and labour and twins' birthweight on their development (Lytton, Watts, & Dunn, 1987; Nan et al., 2013). Additionally, findings indicate that twins with cerebral palsy are at greater risk compared to singletons and this might be responsible for epilepsy in addition with pre- and peri-natal factors such as obstetric trauma, prematurity and neurological damage (Pharoah, Price, & Plomin, 2002; Ross, Kraus, & Perlman, 2012; Sharma, 2005). Moreover, many researchers have studied the language development of twins. A higher incidence of speech and language delays was found in comparison to singletons (Hayashi et al., 2014; Preedy, 1999; Thorpe, Greenwood, Eivers, & Rutter, 2001; Verkerk et al., 2014) while numerous researchers have focused on determining the genetic basis for linguistic abilities (Hay, 1999; Viding et al., 2003). Finally, reading disability and attention deficit hyperactivity disorder (ADHD) are two more problems found in higher incidence in twins in comparison to singletons (Davis et al., 2014; Haworth et al., 2009; Hay, O'Brien, Johnston, & Prior, 1984; Levy et al., 1996; Tymms & Preedy, 1998; Willcutt, Pennington, Olson, & DeFries, 2007).

Parental perceptions on closeness and separation in healthy twins

Quite a few studies have emerged from our literature review on the way parents of typically developing twins perceive closeness/separation in home and school setting. More specifically, Koch (1966) found that some American twins separated in school indicated that they really wanted to be in the same classroom with their twin. However, more recent findings show that separating twins in school fosters individuation, separate identity development and less pathological dependency for twins (Gleeson, Hay, Johnston, & Theobald, 1990; Segal & Russell, 1992). Additionally, Gleeson et al. (1990) found that by third grade approximately 60% of Australian twins were placed in separate classrooms. Approximately one-third of twins' parents reported that after being separated their twins were unhappy for an extended period of time. Segal and Russell (1992) concluded to similar findings as they found that approximately 84% of American twins aged 6.9–11.5 years were currently separated in school. A few years later Preedy's findings (1999) showed that prior to the start of school approximately 80% of the parents surveyed indicated that their children had never or very seldom been separated. Finally, the most recent research data on twin's closeness are quite interesting as they confirm its association with zygosity and sex (Hayashi et al., 2014). More specifically, twins' close tie in monozygotic (MZ) pairs was found to be significantly higher than that in dizygotic (DZ) pairs, and female pairs were more likely to have a strong close tie than male pairs. It should be considered, however, that all the above findings derive from non-disabled twin studies.

Parental perceptions on friendship in healthy twins

Regarding parental perceptions on friendship in twins, Preedy's (1999) findings show that twins have mostly common friends. This indicates their desire to share experiences totally or after selection. It also indicates their desire not to allow anyone to 'invade' their twin relationship and disrupt their unity. Twins play and interact with each other from the time they are conceived (Kawakami & Yanaihara, 2012; Piontelli, 2010) and especially when they are younger, they mostly share the same friends. Recently, in Hayashi and colleagues'(2014) study, it was investigated the relationship between twin language, twins' close ties, and social competence in a prospective longitudinal study. It was found that social competence is not affected directly by twins' close tie, but it is affected when a twin language is found. In general, peer effects have been found to be both theoretically important and empirically significant in school settings. The effects of peers may be particularly large in early education and care environments where more interaction among peers occurs throughout the day. Frequent interactions between children can stimulate development, not only for language and communication skills but also for social and problem-solving skills (Harms, Clifford, & Cryer, 1998; Webster-Stratton, & Reid, 2004). Research on peer effects for school-age children has shown that disadvantaged children benefit most from peers with higher ability levels (Summers & Wolfe, 1977; Thiemann & Goldstein, 2004; Zimmer & Toma, 2000). Moreover, successful peer interaction has been identified as a critical component in promoting self-efficacy for children with disabilities (Gresham, 1984; Guralnick, 1986; Robert & Zubrick, 1992).

Limitations in current research

Literature review on children with disabilities and their siblings showed that studies are limited to non-twin children. More specifically, the main corpus of the studies is focused on their healthy siblings and the emotional consequences of disability in siblings' relationship. It has been shown that healthy siblings communicate greater aggressive behaviour, they are more stressed and exhibit psychosomatic problems, whereas simultaneously they undergo intense feelings of guilt and anger. Their self-respect is low, they are less sociable than children who have healthy siblings and they cope with attachment problems (Breslau & Prabucki, 1987; Lobato, Barbour, Hall, & Miller, 1987; Ross & Cuskelly, 2006; Stoneman, 2005). What is more, the healthy brothers/sisters often face contradictory feelings. On one hand, they love and concern for their sibling who may need their help. On the other hand, they feel anger and distress or even fear for the emotional burden they involuntarily carry. The latter may have negative consequences on their cognitive, social and emotional development (Begun, 1989; Biale, 1989; Breslau, Weitzman, & Messenger, 1981; Mc Hale & Gamble, 1989). The siblings of a disabled child will often welcome their own illness or injury and hence the need for the treatment, attention and nurturing that go with it. Some such children regress in their development and imitate their disabled siblings' behaviour at times of stress (Bryan, 1999).

In conclusion, despite the importance of all the studies mentioned above, it should be noted that most of them focus on non-twin children and their disabled sibling or they focus on healthy twins. The poor literature on twins with physical difficulties highlights the disability itself and not the impact of the disability on twin emotional bonding.

Aim of the study

In a preliminary attempt to critically examine parental perceptions on twin separation, closeness and friendship in families that have one or both twins with physical difficulties, we identified twins with physical difficulties in a Greek sample (120 twins) and compared parental perceptions on their separation in home (different care, room and walk) and school setting (different class) and friendship in relation with twins' health condition. We stand critically on the extent to which these perceptions arouse from parental stereotypes on twin situation and twins' individuation. We hypothesised that: (1) in pairs where twins' health condition is the same (Group 1 = both twins are healthy, Group 3 = both twins face physical difficulties), parents prefer their twins to be together in home and school setting in comparison with pairs of healthy twins with co-twins who face physical difficulties, where parents prefer them to be separately, (2) the similar health condition affects their closeness and (3) twins' health condition affects their friendships. This is an exploratory study since these hypotheses came out from relevant studies on non-twins with a disabled sibling. It is also a developmental study since parental perceptions are investigated on a developmental trajectory (right after birth, before twins' entering school, at the time of the study, in the near future, when twins enter higher classes at school). We know little about families with twin children, in which one or both have a disability. The enquiry into the effect of this experience on the twin bond as it is perceived by twin parents is one of the basic purposes of this study. Additionally, to the best of our knowledge there are no findings added on closeness/separation in disabled twins since the time of this study. The same counts for friendship. That is why it is important to determine whether twins' playing together and interacting with common peers or twins' sticking together and having few friends also depend on their and their co-twin state of health which is also of our interest. Moreover, it is important to study the effect of twins' health conditions on parental perceptions towards separation, closeness and friendship particularly in a Greek sample given that there is no social or educational policy grounded in systematic investigations proposed to parents of twins and teachers.

Method

Participants

We sent questionnaires to 60 families with twin children (60 pairs × 2 children = 120 twin children). Responses were collected by the parents of the 120 twins of our sample (60 questionnaires for the 60 pairs of twins). Questionnaires were completed by 31 mothers, 2 fathers, while 15 were completed by both parents. In 12 questionnaires it is not indicated whether they were completed by mother, father or both parents. As already mentioned, there is not any twin organisation in Crete, not even in Greece, whose members could take part in this research. So, we conducted public kindergartens and nursery schools in order to find our sample.

Data used for this study were drawn from a study on a wider research area, where cognitive, social and emotional development of twins in Crete, Greece, and their educational needs were investigated. They were first analysed for examining the impact of short separations at home and school on twin preschoolers (Markodimitraki, 2010). This study is a second attempt to further analyse these data based on the detection of twins with physical difficulties in the random sample of 120 preschool aged twins (mean age: 4.5 years old, SD = 1.42; mean gestational age: 35.5 weeks, SD = 2.09;

mean born weight: 2.371 kg, SD = 411.12), who attended kindergarten or nursery schools in Crete, the biggest island of Greece. Our twin sample was consisted of seven (7) pairs of MZ boys, six (6) pairs of MZ girls, fourteen (14) pairs of DZ boys, thirteen (13) pairs of DZ girls and twenty (20) pairs of DZ twins of different sex. Fifty-four pairs were born by caesarean section and six pairs by vaginal delivery. This study had the approval of the Ethics Committee of the Department of Preschool Education, University of Crete.

Measures

The questionnaire *School Policy for Twins and Higher Multiples* constructed by Preedy (1999) was administered to parents of twins. It is a 30-item structured parental-informant questionnaire, adapted and translated in Greek by the first author and then translated back in English by an independent translator who was blinded to the original questionnaire as proposed by Sperber (2004). The questionnaire asked parents for some general information at first, then some information for twins' birth history, current physical development, social development, relationship, individuality and identification and finally their emotional development.

Coding

We adopted the term *physical difficulties* used by Preedy (1999). As such it is considered eyesight problem, hearing problem, asthma, eczema, allergy, epilepsy, cerebral palsy and speech problem. Our purpose was not to examine the medical aspect of those difficulties and get deeply into details referring to their severity. We aimed to stand on the parents' views of how any officially diagnosed or not diagnosed physical difficulty of their twin/twins is perceived by them on the way they estimate their twin children's relationship. We split our sample into three groups: Group 1 consisted of the healthy twins (Group 1 from now on), Group 2 consisted of the healthy twins with their non-healthy co-twins (Group 2 from now on) and Group 3 consisted of the non-healthy twins (Group 3 from now on). Twins'*closeness/separation* was measured by questions referring to their being in the same or separate classroom/school, their reactions when separated, their feelings in case of their co-twin's illness, their ability to cooperate or compete and types of separation in their daily life (different bedrooms, care, stroll time, hospitalisation, etc.). Finally, *friendship* was measured using questions referring to their social network (see Appendix).

For zygosity clarifications of same-sex twin infant pairs, we used the Zygosity Questionnaire for Young Twins (Goldsmith, 1991). The Zygosity Questionnaire for Young Twins includes descriptions of the physical resemblance of twins (e.g. eye colour, height and hair colour) and it is used to diagnose zygosity when DNA methods are not available while it yields 95% agreement with bloodtyping (Nichols & Bilbro, 1966). Opposite-sex twin infant pairs were classified as DZ on the basis of the sex difference (Wilson, 1983).

Procedure

The introduction of the questionnaire informed the participants about the aim of the study and encouraged them to provide true and unbiased answers so as to promote

the validity and reliability of the results. The introduction also reassured participants about the anonymity of the research.

In most cases the questionnaires were distributed to parents personally by the Kindergarten or Nursery teachers. The researchers conducted a meeting of the head teachers of the Nursery Schools and Kindergartens of the largest city of Crete (Heraklion), they informed them about the aim of their study and they asked them if there were twins in their schools. If there were twins in the Nursery School and Kindergarten, the researchers asked twins' parents to participate in their research. Once the parents accepted to participate in the study, the researchers handed the questionnaire to the parents personally after making an appointment. In some cases, the researchers sent it to them by post or e-mail. Parents had a week to complete and return it. The parents of two pairs of twins showed no interest in filling in the questionnaire. The time of questionnaire completion ranged from 15 to 20 minutes.

Results

For the statistical analysis of the data, we used the Fisher's exact test on contingency tables, in order to compare the percentages of different groups, as well as the non-parametric Kruskal–Wallis test to compare the mean values of the three groups.

Physical difficulties

It was found that physical difficulties were experienced by 20 (17%) twin preschoolers of the total sample. From those 20 twin preschoolers one (1) had hearing problems, two (2) epilepsy, three (3) cerebral palsy, four (4) eczema, six (6) asthma, nine (9) eyesight problems, nineteen (19) allergies, twenty (20) other problems (heart problems, kidney problems, dermatitis or were hermaphrodites) and twelve (12) had speech problems. The health problems' categories were overlapping, so that one twin could suffer from more than one problem (Figure 1).

Separation

To test if the separation of the twins through different bedrooms is related to the group, we used the Fisher's exact test. The percentage of parents who place twins in different bedrooms is 37.5% in Group 2 whereas in Groups 1 and 3 the percentages are 0% and 15%, respectively (Table 1). The test showed that the difference of the percentages is statistically significant (Fisher's exact test = 4.76, $p < .05$). Additionally, we tested if there is any relation between the Group (1, 2, 3) and the variables 'Parents take care of their twins separately' and 'Parents take a walk separately with each of their twins'. Both tests showed no significant difference in the percentages (Fisher's exact test = 1.71, $p > .05$ and Fisher's exact test = 1.02, $p > .05$). As for twin separation in school setting, we tested if twin preferences for classroom separation differ among the three groups. The test showed that the percentages differ significantly (Fisher's exact test = 12.14, $p < .01$). The 31.3% of the twins in Group 2 prefer to be in different classrooms, according parental reports, whereas the percentages of twins in Groups 1 and 3 are 0% and 10.7%, respectively. Moreover, we used the Fisher's exact test to examine if there are differences in whether twins attend (for the younger ones)/attended (for the older ones) kindergarten among the three groups. Fisher's exact test showed high statistical difference (Fisher's exact test = 11.30, $p < .01$). The percentage of

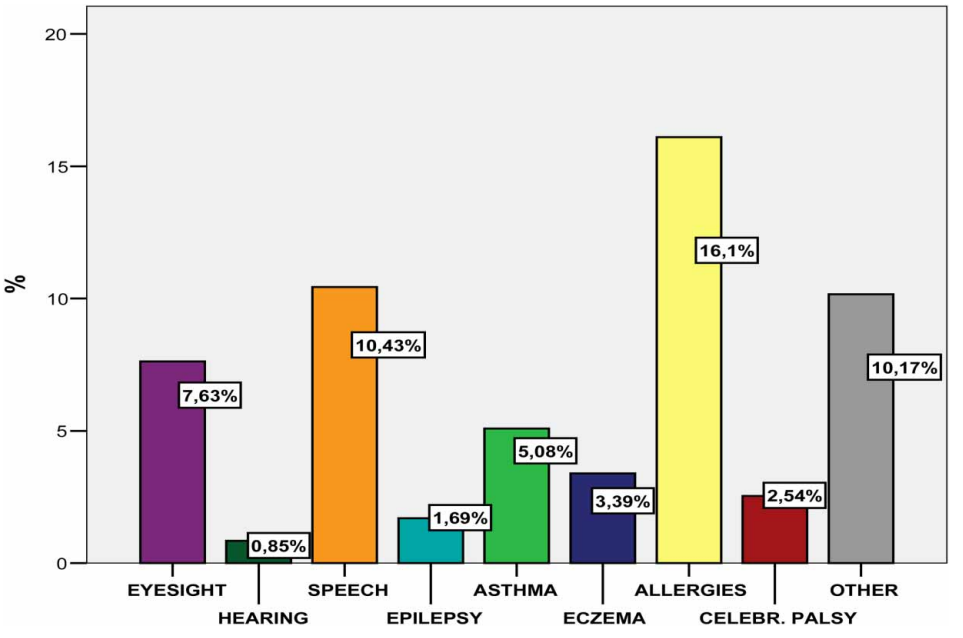

Figure 1. Frequencies of the difficulties experienced by twin preschoolers.

twins who do not/did not attend kindergarten in Group 2 is 50%, whereas the percentages in Groups 1 and 3 are 12.5% and 0%, respectively. We also tested if the percentages of the twins who attend kindergarten in the same classroom differ among the three groups. The Fisher's exact test showed no significant difference (Fisher's exact test = 1.69, $p > .05$). The percentages of the three groups were 81.8% for Group 1, 100% for Group 2 and 78.9% for Group 3. We used Pearson Chi square to test whether there were differences among the parents of three groups on their preferences in having their twins in the same class in primary school. In all three groups the percentages of the twins whose parents prefer them to be in the same class in primary school are high (64.7%

Table 1. Percentages of the three groups on selected questions regarding to separation, closeness and friendship.

Separation	Group 1	Group 2	Group 3
Parents place twins in different bedrooms	0.0	37.5	15.0
Twins prefer to be in different classrooms	0.0	31.3	10.7
Twins do not/did not attend kindergarten	12.5	50.0	0.0
Twins attended kindergarten in the same classroom	81.8	100.0	78.9
Parents' preferences in having their twins in the same class in primary school	64.7	46.2	57.1
'Separation promotes individuality': parental perceptions	52.6	61.5	57.1
Closeness			
Competition between twins	57.9	72.7	52.0
Friendship			
Twins play mostly together/share the same friends	68.4	75	70.4

for Group 1, 46.2% for Group 2 and 57.1% for Group 3), and the differences are not statistically significant [$X^2(2) = 1.03$, $p > .05$]. Additionally, we used Fisher's exact test to check parental perceptions on whether separation promotes individuality in the three groups. We found that in all three groups the percentages of positive parental answers were 52.6% for Group 1, 61.5% for Group 2 and 57.1% for Group 3 with no statistical significant differences (Fisher's exact test = 2582, $p > .05$). Percentages are summarised in Table 1.

Closeness

To test our hypothesis on closeness, we checked if the reactions of the twins when separated differ among the three groups. The analysis showed that the mean values of the three groups differ significantly, with the twins that both are non-healthy being more upset when separated [Kruskal–Wallis test: $X^2(2) = 5.57$, $p < .10$, weakly significant]. Moreover, we used the Kruskal–Wallis Test to check whether in cases where a twin is sick or upset, the co-twin is affected in all three groups. The differences were found to be statistically significant [$X^2(2) = 0.51$, $p > .05$]. As for cooperation and competition among twins of the same pair, we used Pearson Chi square test to check whether there were differences among the three groups. It was found that in all three groups the percentages of competition is high (57.9%, 72.7% and 52%, respectively, for Groups 1, 2 and 3, see Table 1), with no significant differences [$X^2(2) = 1.35$, $p > .05$]. We used the Kruskal–Wallis Test in order to check whether twins of all groups join their forces for mutual aid, support or annoying others. No statistically significant differences were found [$X^2(2) = 4.71$, $p > .05$ for mutual aid; $X^2(2) = 1.80$, $p > .05$ for support; $X^2(2) = 0.65$, $p > .05$, for annoyance].

Friendship

Results show that slightly more twins in Group 2 prefer to play mostly together (75%) in comparison with Groups 1 (68.4%) and 3 (70.4%) (Table 1). Examining the variable of whether *they sometimes play together,* twins of Group 1 are shown to slightly prefer to do so (31.6%). Percentages in Groups 2 and 3 are 25% and 22.2%, respectively. Moreover, examining the variable of whether they *hardly ever play together,* only twins of Group 3 were shown to prefer so in a very low percentage (7.4%) while twins of Groups 1 and 2 showed no such a preference (0% and 0%, respectively).

In summary, twins' health condition significantly affects parental perceptions in bedroom separation but it does not affect them in different caring and outdoor activities. Parents place twins of Group 2 mostly in different rooms but they do not take care of them separately or go for a walk with each one of them influenced by their health condition. Moreover, twins' health condition was found to significantly affect their school separation, as twins of Group 2 are reported to prefer mostly being in different classrooms although they mostly attend kindergarten together. Later, in primary school, parents of all twin groups prefer their twins to be in the same classroom despite their perception that separation promotes individuality.

Furthermore, twins' health condition significantly affects their emotional state when separated, as twins of Group 3 are more upset in such cases. Additionally, twins of all groups are competitive and cooperative regardless of their health condition.

Finally, no significant relation was found between group of twins and the way they play with their peers (Fisher's exact test = 2.02, $p > .05$). For all three groups, the majority of twins prefer to play together.

Discussion

The aim of this developmental study was first to detect twins with physical difficulties among 120 Greek twins of preschool age, who attend nursery and kindergarten in Crete, second to investigate parental preferences on their placement in bedrooms, taking care, strolling and schooling together with or separately from their co-twin in regard to his/her health condition, on twins' closeness and friendship, and finally to compare and critically examine parental preferences for twins in the three different groups. The main results of this study are summarised as follows: (a) twins' health condition did not affect parents' preference to keep their twins together (school/home), rather than separate them; (b) twins' health condition affected twins' emotions towards separation; and (c) twins' health condition did not affect significantly twins' closeness and twins' preferences in friendship.

Our first hypothesis was partly confirmed as for one aspect of separation, in home setting (bedrooms), parents were shown to prefer their twins of Group 2 mostly to be separated. However, in other aspects of separation (outdoor activities) the above preference was not confirmed. A potential explanation for this could be parental stereotypes on twin situation. Too many parents grow up their twins trying to make a schedule on their lives so that they eat, take a walk, play and sleep at the same time because rearing twins is a time-consuming matter and parents need to take some rest. Additionally, taking a walk with both twins has to do with the so called 'prima donna effect', that is the admiration parents get from other people showing up twins (Preedy, 1999). The same goes for twins of all three groups in school separation. Twins' parents mostly prefer them to be together regardless of their health condition. However, twin separation in school setting is probably an issue that concerns their parents even from early childhood as they prefer to keep their twins at home when one of them faces physical difficulties but they prefer them to attend school when they both are healthy or non-healthy. In this case they might be afraid whether twins of Group 2 are ready to attend school or they might think they still need for the most of the day their help and support. As a result, parents keep healthy co-twins at home as well, so that non-healthy twins do not feel bad. Twins' parents confuse justice with equality as they make efforts to equally treat their twins by keeping them both at home, overlooking the fact that such a treatment could be really unfair to healthy twins. As twins get older and they start school, parents are shown mostly to prefer separating them. Since then it might have been obvious that each twin has to follow his/her own path according his/her abilities. The preference for school separation is in line with parents' general perception that separation promotes individuality. However, the parental preference is not in line with the attitude they finally keep. They choose to have their twins together in primary school, a choice that was confirmed in a previous study too (Markodimitraki, 2010). Nevertheless, separation is a process which should take place step by step starting from short separations right from early infancy. Twins do not suddenly start differ from their co-twins in childhood. They are different persons, sui generis, from their conception and their differences should always be respected by their parents and later their teachers. As for the twins of Groups 1 and 3 it seems to be much easier for the parents to keep them in the same classroom.

When they are together, they share the same teachers, subjects and classmates and parents often feel that they can keep an eye on their progress and help them more easily and more effectively without wasting so much time and energy.

Our second hypothesis was confirmed as the results showed difference, though weakly significant, among twins of Groups 1, 2 and 3, where twins of Group 3 get more upset when separated. It seems as their special twin bond works to protect them from the pain that a potential separation might cause. These findings are in line with the findings on twins' cooperation during the first (Markodimitraki & Kornilaki, 2010) and the second years of life (Zahn-Waxler, Robinson, & Emde, 1992) which confirm a developmentally increasing empathy between twins of the same pair. However, the high percentage of competition in all groups of twins, though not with significant differences, shows that all twins, regardless of their health condition, might try to show they are different and they find ways to remind it to their teachers and parents. Finally, their health condition does not significantly affect their behaviour as a unit against the others or to support each other because a competition might be underpinned which does not enforce their intrapair support to flourish. Another possible explanation is that they might have underestimated or they might have not understood the strength of their twin bond. Findings derived from studies on empathy in early childhood confirm MZ twins' competition against each other although they cooperate more than DZ twins do (Segal, 1984).

The last hypothesis of this study was not confirmed as it was found that for all three groups, the majority of twins prefer to play together and there are no significant differences among the three groups. Twins of Group 1 may have no limitations in relation to their health condition and keep their closeness not only in their daily routine but in their social life as well. Additionally, they may not be used to short separations even for playing with different peers in different contexts. Furthermore, healthy twins of Group 2 feel responsible to take care of their unhealthy co-twins. The latter feel more secure having on their side a co-twin who knows their problem. Finally, twins of Group 3 may have restricted options to play with other children depending on the severity of their health condition. Also, they may be treated by their parents as a unit in the context of playing. This practice helps parents in terms of saving time and energy and makes them feel more relaxed that their children have each other to play.

Results of this study highlight the importance of investigating physical difficulties in twins' development that are often detected earlier in twins than in single children. This may be due to the extra clinical attention they attract whether as twins or as being, for example, infants of relatively low birth weight and/or premature birth. Physical difficulties in twins are an extra problem added to social stereotypes against them. Working on issues related to twins' development makes the understanding of twin situation easier. If parents, teachers and all those who are engaged in twins' nurture, care and education know how things 'work' in intrapair relationship, they will be able to understand if and where the real problem is and evaluate its real implications. In addition, studying physical difficulties and their emotional impact on parents and healthy twins, who often feel denial, anger, guilt and grief, point out the need for skilled counselling in coping with them. Moreover, the findings of this study are encouraging as they show an interest that moves beyond genetic factors and scientific bias on twin situation to twins' development in real life. They indicate the necessity for a counselling policy, which is totally absent in Greece, to help parents of twins get informed about the developmental advantages of short separations from early infancy. There is, also, a necessity for a school policy for the management of multiples,

healthy and non-healthy, that would adopt a flexible approach, particularly with regard to separating multiples or keeping them together. It is important for parents and teachers to make decisions based upon detailed information and expert knowledge about the children both as individuals and as twins. Some multiples have special needs, but being a multiple in itself must not be regarded as a disability (Preedy, 1999). All multiples will need special consideration so that issues which impact on them do not inhibit their educational progress.

The most important finding is that twins with or without physical difficulties, mostly like to be in the same class and socially interact with common peers. That sends a message to all those who have turned onto twins as a matter of genes, ignoring substantial issues relating to their social, emotional and cognitive development. Apart from similarities or differences derived from shared genes, scientific interest on their emotional bonding from their long-lasting co-existence may be more precious in understanding twins. This study contributes in this direction looking for parental perceptions and practices that enhance cooperation and competition in twins and affect their attitudes.

However, no matter how important findings of this study are, they arise from a specific geographical area, the county of Heraklion, in Crete, Greece and findings cannot be generalised in all Greek population. Another limitation, the most important one, refers to the questionnaire which was not addressed to children but to parents, so that the derived knowledge arises from parents', not twins', perspective. Moreover, the questionnaire was not made to ask detailed information about twins' health condition as its main purpose is to be used before twins enter their school life.

Taking all these limitations into account, we suggest that it would be extremely interesting if a similar research was addressed to children and attempted to cover some other Greek geographical areas. It is also necessary to investigate further the development of social interaction between twins (with or without physical difficulties) and peers in their natural environment, which imposes the need for naturalistic studies with direct observation. Finally, it would have been interesting if researchers explored whether putting twins with serious physical difficulties in 'inclusion' classes together with their typically developing twins affects them not only emotionally but in relation to their school progress as well.

Dealing with the importance of twins' health status on their preferences and on parental perceptions in issues such as separation, closeness and friendship, unexplored interesting aspects of twin relationship are revealed. It also makes more urgent the need to stoop to the development of twins and begin a real dialogue not only among clinical psychologists but mainly among developmental psychologists, educators and doctors, expert and most important sensitised on twin issues.

Acknowledgements

We would like to thank Professor GiannisKugiumutzakis and DespinaLimniotaki, Ph.D. Student, for assistance with adaptation of the questionnaire. Special thanks to the preschool teachers and the mothers and fathers of twins who so generously donated their time and energy to participate in this study.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on contributors

Maria Markodimitraki is an assistant professor of developmental psychology in the Department of Preschool Education, University of Crete, Greece. She teaches courses on introduction to psychology and infant and child development. Her research interests are in imitation, maternal speech, play and emotions in infants' and children's interactions with peers and adults (parents, grandparents and teachers), music experience and language development. She has specialised in twins' development.

Michalis Linardakis is an assistant professor of Statistics in Education in the Department of Preschool Education, University of Crete, Greece. He teaches courses on Statistics in Education and statistical software for social sciences. His research interests are on statistics in education, quantitative research analyses, multivariate statistics and Bayesian statistics.

Maria Kypriotaki is an assistant professor of special psychopedagogy of early childhood in the Department of Preschool Education, University of Crete, Greece. She teaches courses on special education. Her research interests focus on autism spectrum disorders, families of children with special educational needs and children with attention deficit/hyperactivity disorder.

George Manolitsis is an associate professor of psychopedagogy of early childhood in the Department of Preschool Education, University of Crete, Greece. He teaches courses on educational research methods, early literacy development and psychoeducational assessment. His research interests focus on home literacy, early predictors of literacy difficulties, young children's behaviour problems.

References

Begun, A. L. (1989). Sibling relationships involving developmentally disabled people. *American Journal on Mental Retardation*, *93*(5), 566–574.

Biale, R. (1989). Counselling families of disabled twins. *Social Work*, *34*(6), 531–535.

Bouchard, Jr. T. J., & Propping, P. E. (1993). Twins as a tool of behavioral genetics. In *Dahlem Workshop on what are the mechanisms mediating the genetic and environmental determinants of behavior? Twins as a tool of behavioral genetics, May, 1992, Berlin, Germany*. Wiley.

Breslau, N., & Prabucki, K. (1987). Siblings of disabled children: Effects of chronic stress in the family. *Archives of General Psychiatry*, *44*, 1040–1046.

Breslau, N., Weitzman, M., & Messenger, K. (1981). Psychologic functioning of siblings of disabled children. *Pediatrics*, *67*(3), 344–353.

Bryan, E. (1999). Twins with special needs. In A. C. Sandbank (Ed.), *Twin and triplet psychology: A professional guide to working with multiples* (pp. 61–69). London: Routledge.

Davis, O. S., Band, G., Pirinen, M., Haworth, C. M., Meaburn, E. L., Kovas, Y., & Donnelly, P. (2014). The correlation between reading and mathematics ability at age twelve has a substantial genetic component. *Nature Communications*, *5*, 1–6.

Deary, I. J., Pattie, A., Wilson, V., & Whalley, L. J. (2005). The cognitive cost of being a twin: Two whole-population surveys. *Twin Research and Human Genetics*, *8*(4), 376–383.

Fulker, D. W., & Cardon, L. R. (1993). What can twin tell us about the structure and correlates of cognitive abilities? In T. J. Jr. Bouchard (Ed.), *Twins as a tool of behavioral genetics* (pp. 1092–1103). Chichester: Wiley.

Ginn, S. (2014). Nature vs. nurture: The psychology of the twins at the apple's core. In: Tanya R. Cochran, Sherry Ginn, & Paul Zinder, (Eds.), *The multiple worlds of fringe: Essays on the J. J. Abrams science fiction series* (pp. 124–137). Jefferson, NC: McFarland.

Gleeson, C., Hay, D. A., Johnston, C. J., & Theobald, T. M. (1990). "Twins in school". An Australia-wide program. *Acta Geneticae Medicae et Gemellologiae*, *39*(2), 231–244.

Goldsmith, H. (1991). A zygosity questionnaire for young twins: A research note. *Behavior Genetics*, *21*(3), 257–269.

Gresham, F. M. (1984). Social skills and self-efficacy for exceptional children. *Exceptional Children*, *51*, 253–261.

Guralnick, M. (1986). The peer relations of young handicapped and nonhandicapped children. In P. S. Strain, M. J. Guralnick, & H. M. Walker (Eds.), *Children's social behavior: Development, assessment, and modification* (pp. 93–140). New York: Academic.

Harms, T., Clifford, R. M., & Cryer, D. (1998). *Early childhood environmental rating scale-revised*. New York: Teachers College Press.
Harris, J. R. (2006). *No two alike: Human nature and human individuality*. New York: W.W. Norton.
Haworth, C., Kovas, Y., Harlaar, N., Hayiou-Thomas, M. E., Petrill, S. A., Dale, P. S., & Plomin, R. (2009). Generalist genes and learning disabilities: A multivariate genetic analysis of low performance in reading, mathematics, language and general cognitive ability in a sample of 8000 12-year-old twins. *Journal of Child Psychology and Psychiatry*, *50*(10), 1318–1325.
Hay, D. A. (1999). Adolescent twins and secondary schooling. In A. C. Sandbank (Ed.), *Twin and triplet psychology* (pp. 119–142). London: Routledge.
Hay, D. A., O'Brien, P. J., Johnston, C. J., & Prior, M. R. (1984). The high incidence of reading disability in twin boys and its implications for genetic analyses. *Acta Geneticae Medicae et Gemellologiae: Twin Research*, *33*(2), 223–236.
Hayashi, C., & Hayakawa, K. (2004). Factors affecting the appearance of 'twin language': An original language naturally developing within twin pairs. *Environmental Health and Preventive Medicine*, *9*(3), 103–110.
Hayashi, C., Hayakawa, K., Tsuboi, C., Oda, K., Amau, Y., Kobayashi, Y., & Kato, K. (2006). Relationship between parents' report rate of twin language and factors related to linguistic development: Older sibling, nonverbal play and preschool attendance. *Twin Research and Human Genetics*, *9*(1), 165–174.
Hayashi, C., Mikami, H., Nishihara, R., Maeda, C., & Hayakawa, K. (2014). The relationship between twin language, twins' close ties, and social competence. *Twin Research and Human Genetics*, *17*(1), 27–37.
Kawakami, F., & Yanaihara, T. (2012). Smiles in the fetal period. *Infant Behavior and Development*, *35*(3), 466–471.
Klein, B. S. (2003). *Not all twins are alike: Psychological profiles of twinship*. Westport: Greenwood Publishing Group.
Koch, H. L. (1966). *Twins and twin relations*. Chicago, IL: University of Chicago Press.
Kugiumutzakis, G., Kokkinaki, T., Makrodimitraki, M., & Vitalaki, E. (2005). Emotions in early mimesis. In J. Nadel & D. Muir (Eds.), *Emotional development* (pp. 161–182). Oxford: Oxford University Press.
Levy, F., Hay, D., Waldman, I., McLaughlin, M., Wood, C., & Waldman, I. (1996). Twin-sibling differences in parental reports of ADHD, speech, reading and behaviour problems. *Journal of Child Psychology and Psychiatry*, *37*, 569–578.
Lobato, D., Barbour, L., Hall, L. J., & Miller, C. T. (1987). Psychosocial characteristics of pre-school siblings of handicapped and nonhandicapped children. *Journal of Abnormal Child Psychology*, *15*(3), 329–338.
Lytton, H., Watts, D., & Dunn, B. E. (1987). Twin-singleton differences in verbal ability: Where do they stem from? *Intelligence*, *11*, 359–369.
Markodimitraki, M. (2010). The impact of short separations at home and school on twin pre-schoolers. In R. Zukauskiene (Ed.), *Proceedings of the XIV European conference on developmental psychology ECDP* (pp. 209–304). Bologna: Medimond International Proceedings.
Markodimitraki, M., & Kornilaki, E. (2010). *Cooperative and competitive attitudes in 6-to 10-month-old twin*. In R. Zukauskiene (Ed.), *Proceedings of the XIV European conference on developmental psychology* (pp. 305–310). Bologna: Medimond International Proceedings.
McHale, S. M., & Gamble, W. C. (1989). Sibling relationships of children with disabled and nondisabled brothers and sisters. *Developmental Psychology*, *25*(3), 421–429.
McKeever, T. M., Lewis, S. A., Smith, C., Collins, J., Heatlie, H., Frischer, M., & Hubbard, R., (2001). Siblings, multiple births, and the incidence of allergic disease: A birth cohort study using the West Midlands general practice research database. *Thorax*, *56*, 758–762.
Nan, C., Piek, J., Warner, C., Mellers, D., Krone, E. R., Barrett, T., & Zeegers, M. P. (2013). Trajectories and predictors of developmental skills in healthy twins up to 24 months of age. *Infant Behavior and Development*, *36*, 670–678.
Newman, R. B., & Luke, B. (2000). *Multifetal pregnancy*. Philadelphia: Lippincott Williams & Wilkins.
Nichols, R. C., & Bilbro, W. C. (1966). The diagnosis of twin zygosity. *Acta Geneticae Medicae et Gemellologiae*, *16*, 265–275.

Nystad, W., Roysamb, E., Magnus, P., Tambs, K., & Harris, J. R. (2005). A comparison of genetic and environmental variance structures for asthma, hay fever and eczema with symptoms of the same diseases: A study of Norwegian twins. *International Journal of Epidemiology*, *34*, 1302–1309.

Oliver, B. R., & Plomin, R. (2007). Twins' Early Development Study (TEDS): A multivariate, longitudinal genetic investigation of language, cognition and behavior problems from childhood through adolescence. *Twin Research and Human Genetics*, *10*(1), 96–105.

Pharoah, P. N, Price, T. S., & Plomin, R. (2002). Cerebral palsy in twins: A national study. *Archives of Disease in Childhood. Fetal and Neonatal Edition*, *87*, 122–124.

Piontelli, A. (Ed.). (2002). *Twins-From fetus to child*. London: Routledge.

Piontelli, A. (2010). *Development of normal fetal movements*. Milan: Springer-Verlag.

Preedy, P. (1999). Meeting the educational needs of pre-school and primary aged twins and higher multiples. In A. Sandbank (Ed.), *Twin and triplet psychology* (pp. 70–99). London: Routledge.

Roberts, C., & Zubrick, S. (1992). Factors influencing the social status of children with mild academic disabilities in regular classrooms. *Exceptional Children*, *59*, 192–202.

Ross, G. S., Krauss, A. N., & Perlman, J. M. (2012). Physical growth and cognitive abilities in concordant versus discordant birth weight twins at three years old. *Early Human Development*, *88*(9), 753–756.

Ross, P., & Cuskelly, M. (2006). Adjustment, sibling problems and coping strategies of brothers and sisters of children with autistic spectrum disorder. *Journal of Intellectual and Developmental Disability*, *31*(2), 77–86.

Segal, N. L. (1984). Cooperation, competition, and altruism within twin sets: A reappraisal. *Ethology and Sociobiology*, *5*(3), 163–177.

Segal, N. L. (2010). Twins: The finest natural experiment. *Personality and Individual Differences*, *49*(4), 317–323.

Segal, N. L., & Russell, J. M. (1992). Twins in the classroom: School policy issues and recommendations. *Journal of Educational and Psychological Consultation*, *3*(1), 69–84.

Sharma, K. (2005). Genetic epidemiology of epilepsy: A twin study. *Neurology India*, *53*(1), 93–98.

Sperber, A. D. (2004). Translation and validation of study instruments for cross-cultural research. *Gastroenterology*, *126*, S124–S128.

Stoneman, Z. (2005). Siblings of children with disabilities: Research themes. *Journal Information*, *43*(5), 339–350.

Summers, A. A., & Wolfe, B. L. (1977). Do schools make a difference? *The American Economic Review*, *67*(4), 639–652.

Thiemann, K. S., & Goldstein, H. (2004). Effects of peer training and written text cueing on social communication of school-age children with pervasive developmental disorder. *Journal of Speech, Language, and Hearing Research*, *47*(1), 126–144.

Thorpe, K., Greenwood, R., Eivers, A., & Rutter, M. (2001). Prevalence and developmental course of secret language. *International Journal of Language & Communication Disorders*, *36*(1), 43–62.

Tymms, P., & Preedy, P. (1998). The attainment and progress of twins at the start of school. *Educational Research*, *40*(2), 243–249.

Verkerk, G., Jeukens-Visser, M., van Wassenaer-Leemhuis, A., Kok, J., & Nollet, F. (2014). The relationship between multiple developmental difficulties in very low birth weight children at 3½ years of age and the need for learning support at 5 years of age. *Research in Developmental Disabilities*, *35*(1), 185–191.

Viding, E., Price, T. S., Spinath, F. M., Bishop, D. V., Dale, P. S., & Plomin, R. (2003). Genetic and environmental mediation of the relationship between language and nonverbal impairment in 4-year-old twins. *Journal of Speech, Language, and Hearing Research*, *46*(6), 1271–1282.

Webster-Stratton, C., & Reid, M. J. (2004). Strengthening social and emotional competence in young children—The foundation for early school readiness and success: Incredible years classroom social skills and problem-solving curriculum. *Infants & Young Children*, *17*(2), 96–113.

Willcutt, E. G., Pennington, B. F., Olson, R. K., & DeFries, J. C. (2007). Understanding comorbidity: A twin study of reading disability and attention-deficit/hyperactivity disorder.

American Journal of Medical Genetics Part B: Neuropsychiatric Genetics, *144B*(6), 709–714.

Wilson, R. S. (1983). The Louisville twin study: Developmental synchronies in behavior. *Child Development*, *54*, 298–316.

Zahn-Waxler, C., Robinson, J. L., & Emde, R. N. (1992). The development of empathy in twins. *Developmental Psychology*, *28*(6), 1038–1047.

Zimmer, R. W., & Toma, E. F. (2000). Peer effects in private and public schools across countries. *Journal of Policy Analysis and Management*, *19*(1), 75–92.

Appendix

Selected questions regarding to separation, closeness and friendship (Preedy, 1999, pp. 92–94).

Social Development			
1. Prior to school the twins were apart:			
		Please √	Comments
a	Often		
b	Occasionally		
c	Very seldom		
d	Never		
2. Separation was in the form of:			
		Please √	Comments
a	Separate bedrooms		
b	Separate childcare		
c	Separate outings		
d	Hospitalization of one only		
e	Other		
3. How did twins attend nursery?			
		Please √	Comments
a	Did not attend nursery		
b	Nursery same sessions		
c	Nursery different sessions		
d	Other		
4. Generally do you believe separation is desirable for the individual development of			

(*Continued*)

(*Continued*).

twins?					
		Please √			Comments
a	Yes				
b	No				
c	Issue not considered				
5. When the twins are separated, how do they react? (√ only one for each child):					
		Please √			Comments
A	Very unhappy				
B	A little unhappy				
C	Unaffected				
D	Very happy				
E	Not separated				
6. Concerning the twins' friendships do they (√ one only):					
		Please √			Comments
A	Play mostly together/share the same friends				
B	Sometimes play together/some common friends				
C	Rarely play together/mostly have own friends				
D	Don't play together/have their own friends				
The twin multiple relationship					
7. Does one twin check what the other one is getting or doing:					
		A	B	C	Comments
a	Often				
b	Occasionally				

(*Continued*)

(*Continued*).

c	Very seldom				
d	Never				
8. If one child is ill or upset is the other affected?:					
		A	B	C	Comments
a	Greatly affected				
b	Affected				
c	Hardly affected				
d	Not affected				
9. Of these phrases which describe the relationship between your twins? (√ those applicable):					
		Please √			Comments
a	They compete constantly with each other				
b	They co-operate and have pride in each other				
c	They compete for parental/adult approval				
d	They are jealous and never praise each other				
e	Other				
d	One twin thinks that the other is always better				
10. Do the twins combine forces to be (√ one in each row):					
		Often	Occasionally	Very seldom	Never	Comments
a	Helpful					
b	Disruptive					
c	Supportive					