Unlike-sex twins provide a unique natural experiment to investigate the influence of sex on gestation. Our data showed that length of gestation of unlike-sex pairs is similar to that of female same-sex pairs, and significantly (0.4 wks, \( p = .02 \)) longer than that of male same-sex pairs. Birthweight of female unlike-sex twins was similar to female same-sex twins, but male unlike-sex twins weighed 78 g more than male same-sex twins (\( p = .001 \)). These data show that in unlike-sex pairs it is the girl that prolongs gestation for her brother, resulting in a higher birthweight than that of same-sex boys.

Despite the longer gestation of girls, their birthweight is less than that of boys (Anderson & Brown, 1943; de Zegher et al., 1999). Unlike-sex twins provide a unique natural experiment to investigate the influence of sex on gestation, since both a male and a female fetus share the womb. Therefore, we compared birthweight and gestation of same-sex and unlike-sex dizygotic twins to examine which sex of the unlike-sex twins determines the length of gestation, and consequently the birthweight of the co-twin.

Methods

We studied 1929 dizygotic twin pairs of the East Flanders Prospective Twin Survey (EFPTS; Loos et al., 1998), after excluding twin pairs of whom one or both children were stillborn (\( n = 54 \)), had a major congenital malformation (\( n = 53 \)), unrealistic birthweight for a given gestation (\( n = 12 \)), delivery mode unknown (\( n = 22 \)) or birth by cesarean section (\( n = 700 \)). The infants form four groups: males of same-sex pairs (\( n = 936 \)), males of unlike-sex pairs (\( n = 1008 \)), females of same-sex pairs (\( n = 906 \)), and females of unlike-sex pairs (\( n = 1008 \)).

To examine which sex determines the length of gestation, we compared gestation of male same-sex, female same-sex, and unlike-sex pairs. Subsequently, we compared the birthweight of same-sex with that of unlike-sex pairs to check whether any difference in gestation affected the birthweight of the unlike-sex twins. To control for gestation, birthweights were also expressed as standard deviation scores of their respective means per week of gestation (\( z \) scores).

Gestations of the four groups were compared by birthweight classes of 500 g (see Figure 1). We used analysis of variance (ANOVA) to compare birthweight and gestation with SAS 6.12.

Results

Mean gestation of unlike-sex pairs (36.8 wks ± SD 2.7) was similar to that of female same-sex pairs (36.9 wks ± 2.6), but both unlike-sex and female same-sex pairs had a significantly (\( p = .02 \)) longer gestation than male same-sex pairs (36.4 wks ± 2.8). Birthweight of female unlike-sex twins was not significantly different from that of female same-sex twins, but male unlike-sex twins weighed 78 g more than male same-sex twins (\( p = .001 \); Table 1). Even after controlling for gestation (\( z \) scores), the discrepancy between male same-sex and male unlike-sex remained significant. Figure 1 represents the difference of gestation between male same-sex twins (reference group) and male unlike-sex, female unlike-sex and female same-sex, respectively. For any given birthweight class, gestation of male same-sex and male unlike-sex was comparable. Gestation of girls was significantly longer compared to boys for birthweights ranging between 1750 g to 3249 g. This difference decreased with increasing birthweight.

Conclusions

Our findings in dizygotic twins confirm those in singletons (Anderson & Brown, 1943; de Zegher et al., 1999), that is, despite the longer gestation, birthweight of female twins is lower than that of males. Most interesting are the unlike-sex pairs, showing that it is the girl who ‘calls the tune’ concerning gestation. She prolongs gestation for her brother. He will benefit from the longer gestation, which results in a higher birthweight than that of male same-sex twins. We do not know by which mechanism girls play this determining role, nor why unlike-sex boys weigh
significantly more than same-sex boys even after adjustment for gestation.

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References

