

Do Conception Delays Explain Some Changes in Twinning Rates?

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The probability of a twin birth depends strongly and almost equally on the age of the mother and on the number of children she has had. Even when these variables are held constant, the frequency of twinning varies between countries or geographic regions and between years or decades. This variation has been thought perhaps to result from economic and environmental factors, but another explanation can be suggested.

Bulmer (1959) found that twins are frequent among the earliest conceptions after marriage. Eriksson and Fellman (1967) found twins to be frequent among illegitimate births and suggested that the mothers of twins conceive more easily than other women; in other words, that they are more fecundable. We can present some new evidence for this hypothesis, and we believe that high fecundability in the mothers of twins can account for variations in the twinning rate.

Fig. 1 shows the wide range of twinning rates in the US white population, in different parts of the country and for three periods, centering on 1937, 1954 and 1964. The nine geographic divisions are shown in descending order according to the twinning rates in 1937. The two regions at the right, with the lowest rates in 1937, had nearly stable twinning rates over the three time periods. They are the oldest and most urban parts of the country.

Tab. I shows that the variation in the preceding figure is not due to differences in maternal age or birth order. Adjustment for maternal age alone *increases* the differences between the extreme populations, but this effect is compensated by birth order. In the right column, adjusted for both variables, the difference between urban and rural areas remains, as does the difference between 1937 and 1954 within the rural areas.

Fig. 2 is based on averages for all of USA. Each line shows the twinning rate for one maternal age group over the years. The trend has been downward for all except the youngest and oldest women. The lower average birth rank in more recent years accounts for only a small part of the decline. Note that the long-term trend was interrupted by a brief rise in 1945-1946, at the end of the war. Actually, the rise

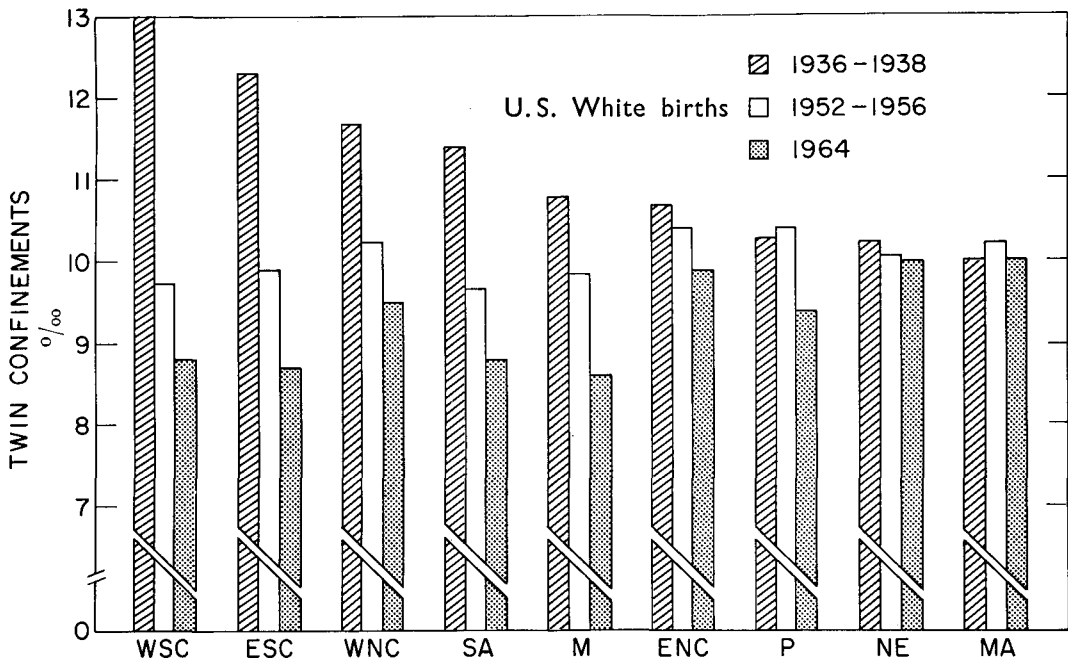


Fig. 1. Twinning rates for three periods in each of nine geographic division of the USA: West South Central, East South Central, West North Central, South Atlantic, Mountain, East North Central, Pacific, New England, and Middle Atlantic.

Tab. I. Effect of adjustment for maternal age and birth order

Geographic division	Central year	Crude rate	Adjusted for maternal age	Adjusted for maternal age and birth order
Middle Atlantic	1937	10.0	—	—
New England	1937	10.3	10.1	10.0
East South Central	1937	12.3	13.0	11.9
West South Central	1937	13.0	13.9	13.1
East South Central	1954	9.9	10.6	9.9
West South Central	1954	9.8	10.5	9.8

was confined to 1946 and was sharper than appears in the two-year averages. This rise appeared in all age groups under 35, women whose husbands were returning from war. It occurred even in the youngest mothers, an age group that has not participated in the long-term decline. We therefore expect different explanations of the 1946 peak and of the long downward slope.

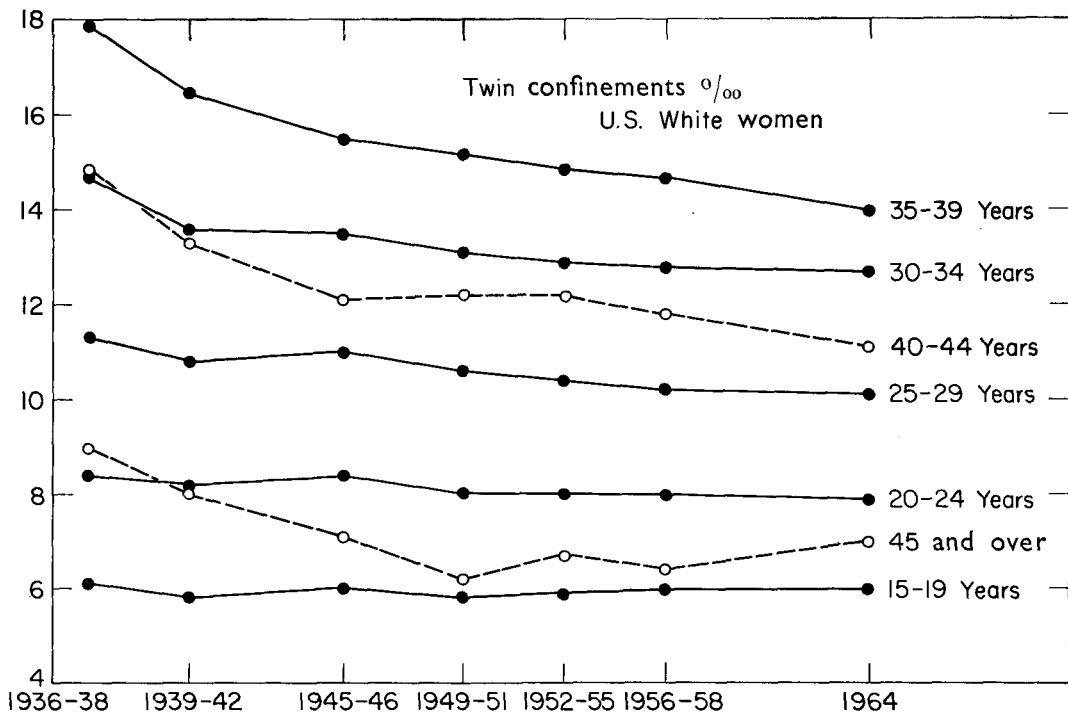


Fig. 2. Changes in twinning rates at different maternal ages.

The explanation of the 1946 peak is nearly certain. All US births rose in 1946 and 1947, beginning nine months after the beginning of military demobilization.

Fig. 3 shows the exact relation between demobilization and births each month in California. The first month of very numerous discharges was October, 1945. Nine months later, twin births rose to 39% above the October level. Singleton births rose at the same time, but to only 21% above October. Singleton births continued to rise for three more months before they reached a level 39% above October, and they remained high for three months after the wave of twin births had ended.

It is apparent that, among the wives of discharged soldiers, most twin conceptions occurred within two months following return of the husbands, while singleton conceptions were spread out over four to six months. Women are known to vary widely in ease of conception, and the average delay to conception is about five months. From these curves, and from calculations for all of the US, we estimate that DZ twin conceptions occurred, on the average, 2.2 months earlier than conception of singletons or MZ twins, after correction for the prematurity of twins.

Thus it seems likely that all short-term fluctuations in twinning rates can be ex-

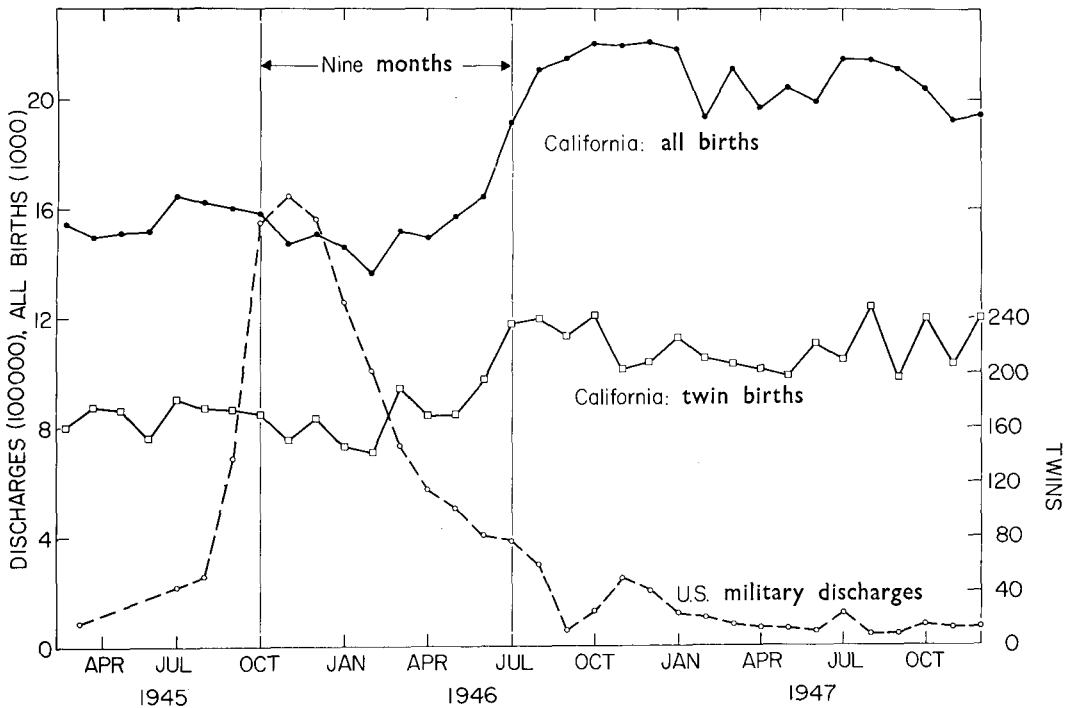


Fig. 3. Interval from demobilization to postwar rise of births.

plained by the greater fecundability of mothers of twins; events that raise birth rates temporarily are likely to affect twins before singletons.

By a different mechanism, the higher fecundability of twin-prone women could also produce twinning differences between geographic areas and economic classes, and the long-term downward trend in the US. Renkonen (1966) has reported that mothers of twins have more pregnancies than other mothers. This might be only sampling bias, since a woman's tendency to bear twins is increased by each pregnancy. But higher fertility is also to be expected if twin-prone women are the most fecundable. Conception delays result in longer intervals between pregnancies and hence in lower total childbearing. If women who conceive easily are also likely to have twins, these women would have more pregnancies than the average woman, and would raise the general twinning rate.

Now consider what happens when birth control becomes widespread, as it has done over the past 30 years in the US. With birth control, a woman will tend to have only as many babies as she wants, and this number does not depend on how easily she conceives. Women with low fecundability and a low twinning tendency will

have about as many babies as women with high fecundability, and the twinning rate will decline toward the average for all women. The distribution of birth control in the US seems to agree well with this hypothesis. High twinning rates and poor birth control are associated in the lowest economic class, in rural parts of the country, and in the earlier years.

The association between fecundability and twinning is probably not related directly to ovulation. Normal mature women ovulate almost every month, so that differences in ovulation cannot explain differences in fecundability. Rather, the evidence suggests that double ovulation is of minor importance in the twinning tendency. Some other physiological condition may determine the probability that, when two ova are released, they will *both* be fertilized and implanted.

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