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# Fullerton Virtual Twin Study

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Virtual twins (VTs; same-age unrelated siblings reared together from early infancy) have been studied at California State University (CSU), Fullerton since 1991. The current sample includes over 130 pairs. Past and current research have focused on siblings' similarities and differences in general intelligence and body size. Future research in these areas will continue as new pairs continue to be identified. These studies will be supplemented by analyses of personality, social relations and adjustment using monozygotic (MZ) twins, dizygotic (DZ) twins, full siblings and friends, as well as new VTs, who have participated in Twins, Adoptees, Peers and Siblings (TAPS), a collaborative project conducted between CSU Fullerton and the University of San Francisco, from 2002 to 2006.

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## Virtual Twins: A Brief History

Virtual twins (VTs) are same-age unrelated brothers and sisters, reared together from early infancy (see Holden, 2000). As such, these twin-like pairs represent a special class of adoptive siblings. VTs come in two varieties: adoptive-adoptive and biological-adoptive. The majority of pairs identified thus far are adoptive-adoptive. The mean age of the siblings is 8.10 years ( $SD = 8.56$ ), with a range of 4.01 to 54.84 years. The majority of individuals (70%) are, however, less than 7 years of age (Segal & Hershberger, 2005). The mean age difference between siblings is 3.10 months (2.80), with a range of 0 to 9.20 months.

VTs replicate the social and rearing situations of monozygotic (MZ) and dizygotic (DZ) twins. (They are, of course, more like DZ twins, given their lack of physical identity.) VTs also represent the 'reverse' situation of MZ twins reared apart (MZA), who share 100% of their genes, but not their environments. MZA twins offer a direct estimate of genetic influence on behavioral and physical traits. VTs, because of their closely matched ages and rearing histories, offer a direct estimate of shared environmental effects.

VTs first came to the attention of this investigator in 1990 when a mother who had adopted a newborn son who was just 5 days younger than the biological son she had just delivered. Since then, over 150 VT pairs have been identified and over 130 VT pairs have participated in ongoing studies at California State University, Fullerton. In order for a pair to be selected for the study, all criteria listed below must be met:

1. Adoptive siblings must be adopted into the family before one 1 year of age.
2. The age difference between siblings must be 9 months, or less.
3. Pair members attending school must be enrolled in the same grade (but not necessarily the same class or school).
4. Both siblings must be free of cognitive deficits.
5. Participants must be at least four 4 years of age to take part in the study.

Opposite-sex pairs are also accepted, as are pairs in which members differ in ethnicity. (The latter is acceptable, given that ordinary DZ twins born to mixed-race couples often differ physically, see Segal, 2000b.). Adults, as well as children, are included in the study.

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## Research Aims

The major aims of this ongoing investigation are two-fold. The first aim is to estimate the extent to which shared environments influence a range of behavioral and physical traits, including intelligence, personality, height and weight. Comparative data from extant twin, sibling and adoption studies, as well as data from TAPS (Twins, Adoptees, Peers and Siblings), a collaborative effort between California State University, Fullerton and the University of San Francisco; (McGuire & Segal, 2002–2006), provide important backdrops against which to assess the findings. The second aim is to assess VT pairs' social-interactional features (e.g., co-operation and competition) and to compare them with those of MZ and DZ twins, peers and siblings, using an evolutionary framework.

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## Pair Recruitment and Procedures

VTs participating in the Fullerton study are recruited from multiple sources. The majority have been identified through publications and organizations targeted to families with adopted children. The remainder have been identified through personal referrals, other psychological studies, the media, the

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Internet and multiple birth organizations. VT pairs are located mostly across the United States and Canada. Several parents have provided more than one pair, either because of adopting two sets or because the birth of naturally (or artificially) conceived twins and triplets occurred around the time of an adoption.

Families of qualified pairs receive a packet of materials by mail containing forms requesting information on children's birth and adoption history, parents' age and occupation, children's school history and other measures. Parents also complete the Child Behavior Checklist, the Adjective Checklist (describing their children), a Social Relationship Survey and the Sibling Inventory of Differential Experience. Older VTs complete different versions of these forms on their own. Local testers are hired to administer the age-appropriate Wechsler Intelligence test to each sibling. With only a few exceptions, pair members are tested by separate examiners.

### Research Accomplishments

Five papers have been published or are in press, four on general intelligence and one on body size (Segal, 1997a, 2000a; Segal & Allison, 2002; Segal & Hershberger, 2005; Segal, McGuire, Havlena, Gill, & Hershberger, in press). Several book chapters, some detailing procedures and findings (Segal, 1997b, 2000b, 2004; Segal & Hill, 2005; Segal, Chavarria, & Stohs, in press) and one presenting a unique narrative/case study (Segal, 2005), are also available.

### Future Plans

Longitudinal analyses of IQ data, available for a subsample of VT pairs who have also participated in TAPS, are currently in press (Segal et al., in press). The examination of filmed segments of the TAPS VTs completing joint tasks are also ongoing, and analyses of questionnaires concerning friendship, social coordination and other aspects of social relatedness are planned. Future directions also include analyses of personality traits and problem behaviors for VT pairs in both the Fullerton and TAPS samples. Efforts to attract additional VT pairs are underway.

The Twin Studies Center is also conducting prospective behavioral assessments of young Chinese twins separated at birth who are being raised by separate families. Individuals who know of such pairs are encouraged to contact the center.

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