Journal of Experimental Child Psychology 136 (2015) 55–69

Contents lists available at ScienceDirect

Journal of Experimental Child Psychology

journal homepage: www.elsevier.com/locate/jecp

Twins and virtual twins: Do genetic (as well as experiential) factors affect developmental risks?

Nancy L. Segal [a,*], Tony Xing Tan [b], Jamie L. Graham [c,1]

[a] Department of Psychology, California State University, Fullerton, Fullerton, CA 92834, USA
[b] Department of Educational and Psychological Studies, University of South Florida, Tampa, FL 33620, USA
[c] Department of Human Development and Family Sciences, University of Texas, Austin, TX 78712, USA

ARTICLE INFO

Article history:
Received 19 February 2015
Revised 10 March 2015
Available online 18 April 2015

Keywords:
Chinese twins
Virtual twins
Developmental risks
Adoption
Genetic effects
Environmental influences

ABSTRACT

Factors underlying developmental delays and psychosocial risks are of interest to international adoption communities. The current study administered a Pre-Adoption Adversity (PAA) Questionnaire to mostly American parents raising (a) adopted Chinese twins or (b) same-age unrelated adopted siblings. A goal was to replicate earlier analyses of pre-adoption adversity/adjustment among adopted preschool-age Chinese girls. A second goal was to conduct genetic analyses of four content areas (Developmental Delays at Adoption, Initial Adaptation to Adoption, Crying/Clinging, and Refusal/Avoidance) derived from the PAA Questionnaire. A key finding was that age at adoption added less than other predictors to adoptees' externalizing and internalizing behaviors. Family factors (e.g., parental education) contributed significantly to behavioral outcomes among the adopted Chinese twins. Genetic effects were indicated for all four content areas, with shared environmental effects evident for Developmental Delays at Adoption and Crying/Clinging. Future investigators should consider incorporating genetically sensitive designs into developmental research programs.

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* Corresponding author.
E-mail address: nsegal@fullerton.edu (N.L. Segal).
[1] Formerly at California State University, Fullerton.

http://dx.doi.org/10.1016/j.jecp.2015.03.008
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Introduction

Developmental and psychosocial risks associated with adoption have been well documented (Beckett et al., 2007; Bobrovitz, 2006; Marcovitch et al., 1997; Tan & Marfo, 2006). Such risks include delays in motor skills and social behaviors, as well as elevated levels of externalizing and internalizing behaviors. However, factors underlying the nature and origin of these early behaviors require further study.

An unfortunate limitation in the extant literature on international adoptions is reliance on age at adoption as a proxy for pre-adoption adversity (see Beckett et al., 2007; Weitzman & Avni-Singer, 2005). Noting this difficulty, Tan, Marfo, and Dedrick (2010) argued that pre-adoption adversity—whether it is associated with child constitutional risks before institutionalization, the deleterious socioemotional institutional environment (see St. Petersburg–USA Orphanage Research Team, 2008), or the combined influence of these two forces—can manifest itself in observable physical and socioemotional problems and in normatively measurable delays in development at the time of adoption. Thus, conceptually pre-adoption adversity should include the deleterious psychosocial effects of institutional care as well as child-level constitutional vulnerabilities at the time of institutionalization. Given that these effects can manifest themselves in observable short- and long-term post-adoption behavioral and developmental outcomes, capturing these areas of risk constitutes an important methodological advance in the study of adopted children with a history of institutionalization. In their study, Tan and colleagues (2010) found that adopted Chinese children's greater refusal/avoidance and crying/clinging behaviors at the time of adoption, rather than age at adoption, predicted more behavioral adjustment outcomes. These findings, if replicated in a different sample of adopted children, would provide further support for the long-term impact of pre-adoption adversity.

In summary, adverse pre-adoptive social–emotional and developmental experiences (e.g., institutional rearing) have been linked to adopted children's post-adoption behavioral risks (Juffer & van Ijzendoorn, 2005). At the same time, heterogeneity in adopted children's post-adoption outcomes has been reported, even among children adopted from, or into, similar environments (Verhulst, Althaus, & Versluis-den Bieman, 1992). Behavioral–genetic research suggests that this heterogeneity is partly due to genetic influence (Plomin, Fulker, Corley, & DeFries, 1997). Thus, it is likely that the observed developmental and behavioral risks in adopted children might also be attributable to both genetic and environmental factors.

Goals and directions

The dual goals of the current study were defined by the need to better understand factors underlying the nature and origins of developmental risks associated with post-adoption behavioral difficulties. The first goal was to constructively replicate a previous analysis of early developmental and behavioral risks among 452 female Chinese adoptees (Tan et al., 2010). The second goal was to test for genetic influence on early social, cognitive, and motor behaviors that might be affected by pre-adoption adversity. Opportunities to fulfill these objectives were provided by the availability of relevant data from two unique adoptive twin and sibling samples.

The first sample was composed of Chinese twins adopted together (CTTs) by families in the United States. These twin pairs were relinquished soon after birth, most likely due to China's one-child policy that limits urban families to one child and rural families to two children (Evans, 2008). Abandoned infants are typically discovered outside orphanages and police stations and are placed in group care or foster families, pending foreign adoption. The one-child policy, coupled with China's preference for male children, explains why the vast majority of adopted twin and non-twin infants from China are female. Given the goals of the current study, all CTT pairs in the current sample were female and monozygotic (MZ).

The second sample consisted of virtual twins (VTs), defined as same-age unrelated children reared together since birth (Segal, McGuire, & Stohs, 2012). These pairs are composed of either one biological child and one adoptee (VT–AB) or two adoptees (VT–AA). Key defining features of VTs are that pair members are matched in age and time of entry into the family. Therefore, VTs are better suited for

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