

twin research and human genetics

The official journal of the International Society for Twin Studies and the Human Genetics Society of Australasia

Covering all areas of human genetics with an emphasis on twin studies, genetic epidemiology, psychiatric and behavioral genetics, and research on multiple births in the fields of epidemiology, genetics, endocrinology, fetal pathology, obstetrics and pediatrics.

Volume **20** Number **3**

June 2017

Editor

Nicholas G. Martin

twin research and human genetics



The official journal of the
**International Society
for Twin Studies and the
Human Genetics Society
of Australasia**

Twin Research and Human Genetics is the official journal of the International Society for Twin Studies and, as such, is the successor journal to *Acta Geneticae Medicae et Gemellologiae*, which was founded in 1952 by Luigi Gedda. He edited it until its cessation in 1998, with Paolo Parisi as Acting Editor and then Executive Editor from 1968 to 1992. *Acta* became the official journal of ISTS when the society was established in 1974. The subtitle *Twin Research* was adopted in 1979. It was published by The Mendel Institute in Rome, except for the years 1979 to 1983, when it was published jointly with Alan R. Liss in New York.

Twin Research itself was founded in 1998 by Robert Derom, who edited it in 1998 and 1999. It has been edited by Nick Martin since 2000. It was published by Stockton Press (which became part of Nature Publishing Group) from 1998 to 2000, by Australian Academic Press from 2001 to 2012, and by Cambridge University Press since 2012.

The title *Twin Research and Human Genetics* was adopted from the beginning of Volume 8 in 2005 and is a translation of *Acta Geneticae Medicae et Gemellologiae*, Luigi Gedda's original title.

In 2008, *Twin Research and Human Genetics* was also adopted as the official journal of the Human Genetics Society of Australasia.

Editor

Nicholas G. Martin, *Brisbane*

Associate Editors

CLINICAL GENETICS
Petra Zwiijenburg, *Amsterdam*

BEHAVIOR GENETICS
Dorret Boomsma, *Amsterdam*

EPIGENETICS
Jeff Craig, *Melbourne*

TWIN REGISTRIES
Yoon-Mi Hur, *Jeonnam, South Korea*

COMPLEX DISEASES
Jaakko Kaprio, *Helsinki*

ENDOCRINOLOGY
Cornelis Lambalk, *Amsterdam*

HUMAN GENETICS
Jozef Gecz, *Adelaide*

NEWS & VIEWS
Nancy Segal, *Fullerton, CA*

FETAL MEDICINE
Asma Khalil, *London*

PSYCHIATRIC GENETICS
Wendy Slutske, *Columbia, MO*

SOCIAL SCIENCES
Levente Littvay, *Budapest*

STATISTICAL MODELING
Michael Neale, *Richmond, VA*

Book Review Editor

Dorret Boomsma, *Amsterdam*
di.boomsma@psy.vu.nl

Editorial Board

Isaac Blickstein, *Rehovot*
Charles Boklage, *Greenville*
Andreas Busjahn, *Berlin*
Michèle Carlier, *Marseille*
Kaare Christensen, *Odense*
Catherine Derom, *Leuven*
Lindon Eaves, *Richmond, Virginia*
David Evans, *Bristol*
Johan Fellman, *Helsinki*
Jack Goldberg, *Seattle*
Judith Hall, *Vancouver*
Jennifer Harris, *Oslo*
Yoko Imaizumi, *Suita City*
Kirsten Kyvik, *Odense*
Barbara Luke, *Miami*
Nancy Pedersen, *Stockholm*
Daniel Pérusse, *Montréal*
Robert Plomin, *London*
Danielle Posthuma, *Amsterdam*
Shaun Purcell, *Boston*
Roger Short, *Melbourne*
Tim Spector, *London*
Antonia Stazi, *Rome*
Martine Thomis, *Leuven*
Karen Thorpe, *Brisbane*
Mark Umstad, *Melbourne*

Subscription Rates 2017

Individual subscriptions to *Twin Research and Human Genetics* as members of the International Society for Twin Studies (ISTS) and the Human Genetics Society of Australasia (HGSA):

1 YEAR INDIVIDUAL SUBSCRIPTION
Full member AUD 180
Nonprofessional/
retired member AUD 140
Student member AUD 100

For those members who wish to receive a printed copy, an additional fee of AUD 120 may be paid.

ISTS membership application or renewal can be made online at <https://genepi.qimr.edu.au/ists/ists.cgi> Alternatively, the Word document is available upon inquiry from ISTS@qimrberghofer.edu.au

INSTITUTIONAL SUBSCRIPTION RATES

This journal is published 6 times per year. The institutional rates (excluding VAT) are:

	Electronic Only
Australia	802 AUD
N America	710 USD
UK and ROW	458 GBP

EU subscribers (outside the UK) who are not registered for VAT should add VAT at their country's rate. VAT registered subscribers should provide their VAT registration number. Prices include delivery by air when appropriate. Japanese prices for institutions are available from Kinokuniya Company Ltd, P.O. Box 55, Chitose, Tokyo 156, Japan.

Orders and subscription enquiries should be addressed to:

Cambridge University Press, Journals Fulfillment Department, UPH, Shaftesbury Road, Cambridge CB2 8BS, UK

Orders from N America should be addressed to:

Cambridge University Press, 1 Liberty Plaza, Floor 20, New York, NY 10006, USA

Twin Research and Human Genetics and all other Cambridge Journals can be found at <http://journals.cambridge.org/>

ISTS Website

www.ists.qimr.edu.au

Indexing/Abstracting

This journal is indexed in the following databases: MEDLINE/PubMed, EMBASE/Excerpta Medica, PsycINFO, Science Citation Index®, Journal Citation Reports/Science Edition, Science Citation Index Expanded® (available as the ISI Web of Science®), Current Contents®/Clinical Medicine, Current Contents®/Life Sciences

E-mail Address for Manuscript Submission

See inside back cover for author instructions.

Editorial Office

Nicholas G. Martin
Editor
Twin Research and Human Genetics
QIMR Berghofer Institute of Medical Research
Brisbane Old 4029 Australia
E-mail: ISTS@qimrberghofer.edu.au

Covering all areas of human genetics with an emphasis on twin studies, genetic epidemiology, psychiatric and behavioral genetics, and research on multiple births in the fields of epidemiology, genetics, endocrinology, fetal pathology, obstetrics and pediatrics.

Twin Research and Human Genetics is published six times annually and issued to all financial ordinary, institutional and student members of ISTS and HGSA.

Copyright in all articles rests with authors. A limited set of permanent copyright permission licences has been granted by authors to the publisher to allow publication in this journal. Rights in the reproduction and distribution of the published articles as visual facsimiles of this published edition by either mechanical or digital means is controlled by the publisher and any distributions by CAL for copying of an author's work are due to the publisher in the first instance. All other rights in the words contained in this edition are controlled by the authors. Authors are therefore free to adapt and/or republish the words making up their own articles either online or in print.

Published by Cambridge University Press on behalf of Australian Academic Press Pty Ltd. and the International Society of Twin Studies.
Cambridge University Press,
The Edinburgh Building
Shaftesbury Road
Cambridge CB2 8RU, UK
www.journals.cambridge.org.uk

Articles

- Genotype × Environment Interaction in Psychiatric Genetics: Deep Truth or Thin Ice? **187**
Lindon Eaves
- Genome-Wide Association Study of Post-Traumatic Stress Disorder in Two High-Risk Populations **197**
Whitney E. Melroy-Greif, Kirk C. Wilhelmsen, Rachel Yehuda and Cindy L. Ehlers
- Familiality and Heritability of Fatigue in an Australian Twin Sample **208**
Elizabeth C. Corfield, Nicholas G. Martin and Dale R. Nyholt
- Chromosomal Aberrations in Monozygotic and Dizygotic Twins Versus Singletons in Denmark During 1968–2009 **216**
Lone Kroeldrup, Lisbeth A. Larsen, Christina Fagerberg, Jens M. Hertz and Kaare Christensen
- Perceived Family Cohesion Moderates Environmental Influences on Prosocial Behavior in Nigerian Adolescent Twins **226**
Yoon-Mi Hur, Jeanette Taylor, Hoe-Uk Jeong, Min-Seo Park and Brett C. Haberstick
- Genetic Influence on Accessory Navicular Bone in the Foot: A Korean Twin and Family Study **236**
In Yae Cheong, Hyo Jeong Kang, Hyeonyoung Ko, Joohon Sung, Yun-Mi Song and Ji Hye Hwang
- Massively Parallel Sequencing (MPS) of Cell-Free Fetal DNA (cffDNA) for Trisomies 21, 18, and 13 in Twin Pregnancies **242**
Erqiu Du, Chun Feng, Yuming Cao, Yanru Yao, Jing Lu and Yuanzhen Zhang
- Studies of the Seasonal Pattern of Multiple Maternities **250**
Johan Fellman
- Reporting Correct *p* Values in VEGAS Analyses **257**
Julian Hecker, Anna Maaser, Dmitry Prokopenko, Heide Loehlein Fier and Christoph Lange

News, Views and Comments

- 'Biracial'-Looking Twins: A New Twin Type?/Twin Research: Twins with Cystic Teratomas; Sleep Quality and Body Mass Index; Previabie Membrane Rupture/Print and Online Reports: Twins Born to a Sister Surrogate; NASA Twin Study; African-Cosmopolitan Twin Fashion Inspirations; Triplet Hockey Stars **260**
Nancy L. Segal