

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 **17** Number **6**

December 2014

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 Zwiijnenburg, *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*

OBSTETRICS
Louis Keith, *Chicago, IL*

PSYCHIATRIC GENETICS
Wendy Slutske, *Columbia, MO*

QUANTITATIVE & POPULATION GENETICS
Peter Visscher, *Brisbane*

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*
Aldur Eriksson, *Helsinki*
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*
Michael Rutter, *London*
Roger Short, *Melbourne*
Tim Spector, *London*
Antonia Stazi, *Rome*
Martine Thomis, *Leuven*
Karen Thorpe, *Brisbane*
Mark Umstad, *Melbourne*

Subscription Rates 2014

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 AUD180
Nonprofessional/
retired member..... AUD140
Student member..... AUD100

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

INSTITUTIONAL SUBSCRIPTION RATES

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

	Print and online	Electronic Only
Australia	589 AUD	536 AUD
N America	642 USD	585 USD
UK and ROW	414 GBP	377 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, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 8RY, UK

Orders from N America should be addressed to:

Cambridge University Press, Journals Fulfillment Department, 100 Brook Hill Drive, West Nyack, NY 10994-2133, 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 Qld 4029 Australia
E-mail: ists@qimr.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

- Improving the Power to Detect Risk Variants for Allergic Disease by Defining Case-Control Status Based on Both Asthma and Hay Fever **505**
Manuel A. R. Ferreira
- The Genetic Correlation Between Procrastination and Impulsivity **512**
John C. Loehlin and Nicholas G. Martin
- Sex Differences in Genetic and Environmental Influences on Educational Attainment and Income **516**
Ragnhild E. Ørstavik, Nikolai Czajkowski, Espen Røysamb, Gun Peggy Knudsen, Kristian Tambs and Ted Reichborn-Kjennerud
- Heritability of Preferred Thinking Styles and a Genetic Link to Working Memory Capacity **526**
Jennifer M. Fletcher, Anthony D. G. Marks, Donald W. Hine and William L. Coventry
- The Covariation Between Burnout and Sick Leave Due to Mental Disorders Is Explained by a Shared Genetic Liability: A Prospective Swedish Twin Study With a Five-Year Follow-up **535**
Lisa Mather, Gunnar Bergström, Victoria Blom and Pia Svedberg
- Increasing Phenotypic and Genetic variations in Hyperactivity/Inattention Problems from Age 3 to 13 Years: A Cross-Sectional Twin Study **545**
Yoon-Mi Hur
- Exposure to Air Pollution From Traffic and Neurodevelopmental Disorders in Swedish Twins **553**
Tong Gong, Catarina Almqvist, Sven Bölte, Paul Lichtenstein, Henrik Anckarsäter, Tomas Lind, Cecilia Lundholm and Göran Pershagen
- Risk Factors Influencing Smoking Behavior: A Turkish Twin Study **563**
Sevgi Yurt Öncel, Danielle M. Dick, Hermine H. Maes and Fazil Aliev
- International Network of Twin Registries (INTR): Building a Platform for International Collaboration **574**
Dedra Buchwald, Jaakko Kaprio, John L. Hopper, Joonhng Sung, Jack Goldberg, Isabel Fortier, Andreas Busjhan, Athula Sumathipala, Wendy Cozen, Thomas Mack, Jeffrey M. Craig and Jennifer R. Harris
- Human Genetics Society of Australasia Position Statement: Population-Based Carrier Screening for Cystic Fibrosis **578**
Martin B. Delatycki, Jo Burke, Louise Christie, Felicity Collins, Michael Gabbett, Peter George, Eric Haan, Liane Ioannou, Nicole Martin, Fiona McKenzie, Peter O'Leary, Nicole Scoble-Williams, Gillian Turner and John Massie
- Pregnancy Prognosis Associated With an Isolated Single Umbilical Artery in Twin Pregnancy **584**
Thomas J. Cade, Fabricio Da Silva Costa, Karen Reidy, Lex W. Doyle, Sarah E. Mitchell, Ricardo Palma-Dias and Mark P. Umstad
- Dichorionic Triamniotic Triplet Pregnancy Complicated by Twin Anemia Polycythemia Sequence: The Place of Fetal Therapy **589**
Thérèse H. Griersmith, Alison M. Fung and Susan P. Walker

News, Views and Comments

- College-Age Twins: University Admission Policies / Twin Research: Birth Weight and Neuromotor Performance; Transfusion Syndrome Markers; Vanishing Twins and Fetal Sex Determination; MZ Twin Discordance for Wilson's Disease / Media: Big at Birth; Planned Separation of Conjoined Twins; X Factor Twins; Cinema: *The Identical* **594**
Nancy L. Segal