

Information Integration Theory and Functional Measurement: Applications in Psychology

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This special issue contains a selection of papers presented at the third Conference on Information Integration Theory and Functional Measurement held in San Diego, California, on August 8–9, 2011¹. The studies reported in these papers largely rely on Information Integration Theory (IIT) and Functional Measurement (FM). For a comprehensive discussion of IIT and FM theory the reader is referred to Anderson's books (1981, 1982, 1996, 2008). A condensed explanation of this theory can be found in the editorial of the 2009 conference (Hofmans, 2010).

Although all contributions rely on IIT and FM, the 2011 conference was characterized by diversity: Contributions were from researchers from all over the world representing a wide diversity of nationalities; recent new procedures for identifying individual differences in integration rules and in scale values (Hofmans & Mullet, in press) have sparked renewed interest in the joint use of nomothetic and idiographic approaches by explicitly focusing on diversity while studying average patterns; and the reported applications were highly diverse most probably because the topics studied using IIT and FM keep expanding year after year.

In what follows, we overview the papers presented in this issue. They can be categorized in the following broad categories of applied research topics: sports decision making, intuitive physics, equity and fairness, child development, attitude formation, trusting beliefs, quality of life, sleep, extreme settings, and methodological issues.

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APPLICATIONS OF FUNCTIONAL MEASUREMENT

Sports decision making. (a) Eric Fruchart and Etienne Mullet explored the factors that handball players take into account when deciding whether or not to move from one team to another. Although the decision seems to be also taken on the basis of other factors, they showed that wage and potential future career moves were the most important ones. (b) Eric Fruchart and Annie Carton studied under which conditions soccer referees are inclined to destabilize a match. They showed that many referees are unaware of destabilizing a match, while others are consciously inclined to destabilize it if specific conditions are fulfilled.

Intuitive physics. (c) Michele Vicovaro explored what people think about the consequences of a collision between two objects varying in size and texture. He found that people integrate size and texture information by rules resembling the physical laws of motion and friction. He also found that a large number of participants failed to consider the possibility that an object may bounce back after a collision.

Equity and fairness. (d) Joeri Hofmans found that Adams' equity model (equity follows from comparing one's own input-outcome ratio to that of a comparison person) is subject to important individual differences in the sense that different individuals follow different integration rules. Moreover, these differences in integration rules were found to relate to differences in equity sensitivity. (e) Jen-Shou Yang discussed how people integrate moral obligation and self-interest when they have to decide on the appropriateness of other's behavior. His results showed that both moral obligation and self-interest play a vital role in this decision, and that these factors are integrated using an adding-type rule.

Child development. (f) Anne Schlottmann, Rachel M. Harman, and Julie Paine noted that, whereas the expected value model prescribes additive outcomes, young children also use averaging. They explored conditions that make this averaging bias appear, finding that it does not reflect a general difficulty with additive value or risky judgment per se. Instead, the bias appears because children find it difficult to appreciate the implications of independence. They understood, however, that judgment of probabilistic situations involves inference beyond the information presented, and so use averaging as default for judging population properties, while adding is default for sample properties. (g) Wilfried Hommers, Martin Lewand, and Dominic Ehrmann studied moral development by combining elements of Kohlberg's stage theory and Functional Measurement. They found that, when deciding on the degree of punishment for an egoistically as well as for an altruistically motivated offender, subjects ranging from elementary

school age to young adulthood as well as from different moral levels integrated personal and societal risks according to an averaging model.

Attitude formation. (h) Frederik Van Acker and Esther Bakker studied how information about the advantages and disadvantages of breastfeeding determine women's attitudes toward it. They concluded that health related advantages are the most important determinant. They also found individual differences in the way people combine information about advantages and disadvantages. These differences were mainly related to which information is taken into account and to what extent this is being done. (i) In studying the attitude-action gap, Olivier Mairesse, Cathy Macharis, Kenneth Lebeau, and Laurence Turcksin explored why people's generally positive attitude toward the environment does not translate into the purchase of environmentally friendlier cars. Their results indicated that individuals are indeed positive toward environmental performance, but that this factor is largely outweighed by other car attributes.

Trusting beliefs. (j) Giulio Vidotto, Davide Massidda, Stefano Noventa, and Marco Vicentini studied how people combine cognitive beliefs concerning benevolence, competence, honesty, and predictability to form initial trust judgments. They found that the integration rule underlying the relationship between beliefs and trust judgments can best be described by an averaging model with differential weights.

Quality of life. (k) Peter Theuns, Barbara Baran, Rebecca Van Vaerenbergh, Greet Hellenbosch, and Habib Tiliouine presented a cross-cultural study on how people integrate satisfaction with different life domains into one overall judgment of overall satisfaction with life. They found that people differ in the way they integrate this information. In particular, different conceptualization of overall satisfaction with life existed in all three cultural groups included in their study, however, occurring in different numbers. The authors concluded that cultural differences do not come down to distinct conceptualizations applying to a whole culture, but rather show up as differences in the distributions of conceptualizations.

Sleep. (l) Olivier Mairesse, Daniel Neu, Pierre-François Migeotte, Nathalie Pattyn, Joeri Hofmans, Peter Theuns, Raymond Cluydts, and Elke De Valck studied whether habitual short, long, and midrange sleepers differ in the way they integrate homeostatic and circadian information. The results showed that although the three groups used an adding integration rule, functional sleepiness ratings reflect a higher toleration of homeostatic sleep pressure in short sleepers as opposed to long sleepers.

Extreme settings. (m) Etienne Mullet, Guadalupe Elizabeth Morales Martinez, Ioannis Makris, Bernadette Rogé, and Maria Teresa Munoz

Sastre reviewed a number of FM studies on individuals with severe cognitive disabilities or unusual stimulus material. They explained why it was possible for FM to succeed under these extreme situations, thereby drawing attention to some crucial advantages of the FM method. (n) Wilson López-López, Claudia Pineda Marín, María Camila Murcia León, Diana Carolina Perilla Garzón, and Etienne Mullet examined under which conditions lay people are willing to forgive acts committed by actors of the armed conflicts in Colombia. They found that the status, involvement, and regret of the actor are crucial factors for deciding whether to forgive or not. (o) Etienne Mullet, Paul C. Sorum, Nathalie Teysseire, Stéphanie Nann, Guadalupe Elizabeth Morales Martinez, Ramadan Ahmed, Shanmukh Kamble, Cecilia Olivari, and Maria Teresa Munoz Sastre reviewed five FM studies in the domain of bioethics that address the four principles of bioethics - autonomy, justice, benevolence, and non-malevolence. Mullet and his colleagues concluded that autonomy and justice are two principles that strongly dominate lay people's beliefs about bioethics issues, whereas the other two are more peripheral.

Methodological issues. (p) Stefano Noventa, Davide Massidda, and Giulio Vidotto discussed whether the three well-known IIT models - adding, multiplying, and averaging - suffice to describe all possible response behaviors. They concluded that in most cases the three traditional models allow obtaining a good psychological insight. (q) David J. Weiss proposed Factorial Forecasting, a method that might be useful in predicting public response. In Factorial Forecasting, one manipulates aspects of a planned new policy within scenarios according to a factorial design, and asks respondents to project how they would react. To test the validity of the responses, Weiss invoked a coherence criterion that relies on the integration patterns often found in FM.

(r) Ricardo Viegas, Armando M. Oliveira, Ana Garriga-Trillo and Alba Grieco observed that the comparison of utility and disutility requires that both constructs have to be simultaneously measured on a linear scale, a critical issue which is often neglected. They illustrated how FM can be used to derive such scales and hence may be used to compare utility and disutility.

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ⁱ The proceedings of Padova 2007 and Brussels 2009 previous conferences were published in *Teorie & Modelli*, 12, 3-298 (<http://www.pitagoragroup.it/pited/teoriemodelli.html>) and *Psicológica*, 31, 431-715 (<http://www.uv.es/psicologica/paraARCHIVES/2010.html>). Several computer programs for the design of experiments and analysis of data obtained by functional measurement methodology are available on the Functional Measurement website (<http://functionalmeasurement.vub.ac.be/>).