Valutazione/Review Id: **426757**

1 VALUTAZIONE/REVIEW

1.1 Dati del candidato per cui si sta eseguendo la valutazione / PhD student Personal Data

Cognome /
Surname

Epiphany

Nome /
Name

MARINA OTTAVIA

Titolo della tesi / Title of the
Thesis

Gloryless Measurements: The use of Mixed Effect Linear Models for a Rasch analysis of the accurateness and response times of implicit measurements

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surname

Robust

Nome supervisore / Supervisor
name

Egidio

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institution

1.3 Valutazione / Review

Il titolo è coerente con il contenuto dell'elaborato?

Does the title adequately convey the content of the

dissertation?

Si / Yes

Valore scientifico complessivo (originalità, rilevanza dello specifico ambito di ricerca,

accuratezza)

Overall scientific merit: originality, relevance in the specific field, completeness

Eccellente / Excellent

Introduzione e bibliografia (l'introduzione fornisce informazioni sufficienti sull'argomento di ricerca della tesi, i riferimenti

bibliografici citati sono appropriati e completi)

Introduction and bibliography: the introduction contains enough information on the object of the thesis, bibliographical references are

suitable and complete

Eccellente / Excellent

Metodologia - Analisi dei dati (i metodi sono appropriati, l'analisi dei dati è adeguata ed esaustiva - se

pertinente)

Methodology - Data Analysis: appropriate methods / suitable and exhaustive data analysis (if applicable)

Eccellente / Excellent

Descrizione del lavoro di

ricerca

Research work description

Eccellente / Excellent

Risultati (i risultati sono presentati in modo chiaro e convincente, il numero e la qualità dei grafici e delle immagini sono

adeguati)

Results: convincing and clearly presented results / suitable number and quality of tables and figures

Eccellente / Excellent

Discussione e conclusioni (interpretazione corretta dei risultati, contributo all'avanzamento nel campo della

ricerca)

Discussion and Conclusions: correct interpretation of the results / advance of the results in the research field

Eccellente / Excellent

Valutazione finale

Overall

evaluation

Il candidato può essere ammesso all'esame finale

The candidate can be admitted to the final examination

Commenti e suggerimenti - Esplicitare con chiarezza le modifiche/integrazioni

richieste

Specific comments and suggestions - Clarify the corrections/additions requested

This thesis is so well written there is little to critique. The following are some highlights of the thesis. First, the presentation indicates clearly what each Chapter is about, how it is structured, and has excellent transitions between Sections and between Chapters. It is a model of how a thesis should be presented. I congratulate the Candidate on the thesis as a whole, but in particular, on the clarity of the presentation.

Second, the advantages and disadvantages of the methods used to investigate the relevant hypotheses are clearly presented and show a thorough understanding of the mathematical and statistical methods, and the related data collection designs. The successively more sophisticated analyses of the same data is an efficient exposition of the research. Having affectively neutral (Dark and Milk chocolate), and affectively sensitive stimuli (Black and White Race) added to the breadth of the relevance of the work.

The Preface of this thesis is exemplary. In the first sentence it sets the point of the thesis – the identification and

assessment of processes that govern attitudes and behaviours of which the person is not aware consciously. It also summarises the current methods of making inferences regarding such factors and their limitations.

The approaches to be followed to overcome these limitations are made explicit. It also sets the example of a very efficient, complete, and fluent exposition of the material to follow.

Chapter 1 introduces clearly the distinction between automatic (unaware) processes and controlled (aware processes) and how they are studied. In particular, response times to specific tasks concerned with the variable of interest are summarised and explained. The controlled processes, which have a cognitive component, can be assessed in a traditional way using direct measures. The automatic processes must be assessed by implicit measures which are not controlled explicitly through cognition.

The Chapter reviews the attempts to measure and disentangle automatic and controlled processes in terms of methods and contexts. It also summarises the possible relationship between the two processes. Of particular relevance is when the explicit process overrides a possible implicit, undesirable response or attitude. The Chapter goes on to review the Implicit Association Test (IAT). How response times is an indicator of an implicit factor is well explained.

The one question I had, and which the student might add a sentence, concerned the definition of an error and correct responses. Below Figure 1.1 which illustrates one form of the test, she writes that respondents might be given feedback regarding sorting into an "incorrect category". What constitutes incorrect in this example could be made more clear. In fact, this is the first time that the term "correct category" appears though reference to a correct response is made earlier. The same issue of what it means to be correct appears in conjunction with Figure 1.4 it could be more clear how correct is defined. The evaluative assessment is defined clearly.

In relation to contexts for the IAT, these are reviewed in detail in the Section Fields of Application.

The Chapter goes on to describe some shortcomings of the IAT, in particular that it is a relative measure, conflating a positive evaluation of one object and the negative evaluation of the other. The other problem clarified is the choice of contrasting categories. Here the modification to the IAT, the Single Category Implicit Association Test (SC-IAT) is introduced. The benefits and shortcomings of this test are also illustrated. The advocated research design for the SC-IAT is described. The models used for the analyses of data are also introduced and the contents of the Chapters are summarised.

Chapter 2 deals with the design of the IAT and SC-IAT data collection and the conversion of the responses to scores. It also deals with the development of open source software for scoring the responses, which is one of the aims of the thesis. These aspects are presented very clearly.

The Method section describes the two commensurate objects of classification and evaluation Dark and Milk chocolate. In addition to being relatively benign in terms of affect, there was an opportunity to reward the participants with a choice. This choice provided a form of dependent or criterion variable. This was a clever design.

In terms of participants, though constrained by being students, there were relatively large numbers lending the data to statistical analyses.

Methods of scoring and the formulae well described and applied.

The results regarding the assessments of the IAT compared to the SC-IATs were consistent with predictions, and elaborated the methods described in Chapter 1. In particular, the effects of the IAT design in which relative effects are assessed, compared to that of the SC-IAT where the absolute effects are assessed, were well described.

The technical aspects of using R and SPSS package algorithms for computing measures, and modifications made to the former, are presented in this Chapter. The main result was that The IAT data was better at predicting choice than SC-IATs. That there is an element of confounding of this result with the choice also being relative is well described as a constraint.

Given traditional methods of scoring and analysing the IAT and SC-IAT data, Chapter 3explains the statistical models that are used for more formal analyses and possibly clearer interpretation of the data. The models are clearly presented, showing the students understands them, and in particular, the strengths and limitations for the data at hand. I will not repeat the models, but note that they were of different basic kinds, including the probabilistic Rasch model which has particular measurement properties that are potentially relevant to the data. In particular, the possibility of separating personal from stimulus effects, rather than considering essentially

sample data.

As I inferred it, in the summary, there are two methods of disentangling the implicit and explicit effects – on is to model both, and the other is to control one or other empirically. This is an excellent distinction. Unless I misread something, the Rasch model approach focuses on data where the explicit component has been dealt with empirically.

Chapter 4 elaborates the Rasch model and the expanded 2PL model, and the log-normal model. They are presented comprehensively. The relationship to the more generic linear models with mixed effects are also covered. The various models and formulations, for example, random and fixed effects versions, and their implications for the data collected, are presented comprehensively.

Chapter 5 applied the methods of Chapter 4 to two data sets, one concerned with comparisons of chocolates, the other with race.

The Chapter shows the results of multiple analyses, estimating parameters and conducting tests of fit. The advantages in sensitivity of studying effects, in particular higher reliability, with modelling compared with traditional scoring are shown.

Following the pattern of Chapters 4 and 5, further models are specified in Chapter 6 and applied in Chapter 7. The development of the models in this Chapter, unlike the methods of the previous chapters, permitted bringing together analyses of IAT and SC-IAT data. Further adaptations of models was made to permit obtaining estimates in the Rasch and log-normal models. In addition to fixed effect models, random structure models and their advantages and disadvantages are considered.

Chapter 7 shows the empirical applications of the models to the chocolate example, the Rasch and log-normal models, described in Chapter 6. A comparison between a single measure and multiple measure approaches are compared. One point was to deal with the potential local dependence in the data; another related one was identifying effects of individual stimuli. The description of the results and interpretations from models is comprehensive and sophisticated. Both speed of response and accuracy were analysed and presented in detailed tables. The results showed similar accuracy in prediction among the various models, except one condition with some success in explaining more variance in speed estimates than traditional scoring using the log-normal model.

Chapter 8 provided conclusions to the large number of studies, summarised elegantly as

"This thesis was aimed at finding new methods for a rigorous approach to the analyses of implicit measure data by following three paths." These were the sound path, the fair path, and the easy path. Each is summarised in detail, including the multiple aspects considered along each path and in particular in disentangling the individual from stimulus effects in the data.

In terms of editing issues, the thesis is excellent. Perhaps the best in a doctoral thesis I have seen, even better than when written by a person whose first language is English – I presume the candidate's first language is not English. I found only the following few edits.

In Chapter 1, the sentence which includes "....theoretical frameworks have tried to provide a conceptualization of these...." should be "having tried"

In Chapter 3, there is "Grounding on these evidence" which should be "this evidence". In addition, in this context, it would be more conventional to say "Based on this evidence" rather than "Grounding on this evidence". There are a number of places where "grounding" appears and could be changed.

Also Chapter 3 has the sentence "Both models are able to disentangle the automatic component from the automatic one by exploiting the information that can be retrieved from the accuracy responses" Clearly, one of these should be from the non-automatic one or the controlled one.

I make just two observations which are not concerned with any modifications to the thesis, but maybe for future references and work.

The first is substantive and is a point of

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EPIFANIA

Nome /

Name

MARINA OTTAVIA

Titolo della tesi / Title of the

Thesis

Misure senza gloria: L'uso dei Modelli Lineari a Effetti misti per un'analisi di Rasch delle accuratezze e dei tempi di risposta delle misure implicite

Cognome supervisore / Supervisor

surname

ROBUSTO

Nome supervisore / Supervisor

name

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1.2 Dati del valutatore / Evaluator's data

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Ente di appartenenza/Evaluator's

institution

1.3 Valutazione / Review

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Buono / Good

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suitable and complete

Eccellente / Excellent

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pertinente)

Methodology - Data Analysis: appropriate methods / suitable and exhaustive data analysis (if applicable)

Molto buono / Very good

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ricerca

Research work description

Molto buono / Very good

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ricerca)

Discussion and Conclusions: correct interpretation of the results / advance of the results in the research field

Molto buono / Very good

Valutazione finale

Overall

evaluation

Il candidato può essere ammesso all'esame finale ma la tesi richiede minime correzioni/integrazioni; non è
necessaria un'ulteriore valutazione da parte del valutatore.

The candidate can be admitted to the final examination but the thesis requires minor revisions; no addition
review is required by the evaluator

Commenti e suggerimenti - Esplicitare con chiarezza le modifiche/integrazioni richieste

Specific comments and suggestions - Clarify the corrections/additions requested

*Equation 2.4 -> should be variances

line above Equation 4.7 --> this is not an exponential distribution, but an exponential function.

*page 102 (and following): the random effects in the mixed model are alpha_p and alpha_s but then in the text suddenly they are referred by their Rasch model equivalents theta_p and b_s. That is confusing with explicit mentioning.

* Equation 4.18 (and following): What does beta_{s[i]} c_i mean? Shouldn't it be beta_{sc[i]}?

* page 113, line 2: delete 1 "and".

* page 115: explain clearly "outfit" statistics (what does "out" refer to?).

* page 116, line 5: "expected" is not necessary.

* Table 7.2: put lines with comparable fit statistics next to each other.

Otherwise, interesting thesis! Congratulations!