Session: J10 - Editor's Choice
Date: Friday 24 September 2010
Time: 11:30 AM
Title: Academic formation and conceptions of accident and injury among non-English speaking students: A geometric data analysis hard look at terminologization and injury notions
Authors: Danilo Blank (presenter), Marilyn Agranonik, Norma Marzola, Marcelo Goldani
Institution: Universidade Federal do Rio Grande do Sul, Porto Alegre, RS, Brazil
Safety 2010 World Conference
21st-24th September 2010 - Queen Elizabeth II Conference Centre, London, UK

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Porto Alegre / Brazil
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Porto Alegre / Brazil
Undergraduate curriculum

General language

word

terminologization?

Specialized language

term
Safety 2010 World Conference
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Academic formation and conceptions of accident and injury among non-English speaking students:

A geometric data analysis hard look at terminologization and injury notions

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Porto Alegre / Brazil
Academic formation and conceptions of accident and injury among non-English speaking students:

A geometric data analysis hard look at terminologization and injury notions
geometric data analysis
Background:
Injury prevention

Active measures?

Behavioral interventions

Safety education

Passive measures?

Dependable terminology

Accident?

Injury?
Methods:
A Web-based survey on students' conceptions of 'accident'

Authors: Danilo Blanka, Guilherme Hohglafe Neta, Elisa Grandob, Pauline Z. Siqueirab, Roberta P. Lunkeb, João Leonardo Pietrobeib, Norma Regina Marzola, Marcelo Z. Goldanaa

Affiliations: 

a Professor, Department of Pediatrics,

b Research Fellow, Department of Pediatrics,

c Graduation Program on Education, Núcleo de Estudos da Saúde da Criança e do Adolescente (NESCA), Hospital de Clínicas de Porto Alegre, Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil

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Subjects: Allied Health, Computers in Medicine

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To report the implementation of an open source web survey application and a case study of its first utilisation, particularly as to aspects of logistics and response behaviour, in a survey of Brazilian university students' conceptions about injury causing events. We developed an original application capable of recruiting respondents, sending personal email invitations, storing responses and exporting data. Students of medical, law, communication and education schools were asked about personal attributes and conceptions of the term accident, as to associations and preventability. The response rate was 34.5%. Half of the subjects responded by the second day, 66.3% during the first week. Subjects around 4.2% (95% CI 3.3-5.1) refused to disclose personal information, whereas only 2.8% (95% CI 2.1-3.5), on average, refused to answer questions on conceptions and attitudes. There was no significant difference between early and late respondents in respect to selected attributes and conceptions of accident (P-value varied from 0.145 to 0.971). The word accident evoked the notion of preventability to 81.5% (95% CI 83.2 to 87.0) of the subjects, foreseeability to 59.3% (95% CI 47.7-73.0), fatality to 15.1% (95% CI 13.3-17.1) and intentionality to 2.3% (95% CI 1.6-3.2). Web surveying university students' conceptions about injuries is feasible in a middle-income country setting, yielding response rates similar to those found in the literature.

Keywords: Wounds and injuries; health surveys; Internet; health; knowledge; attitude; medical information systems; open source software; software development view references (54)
A Web-based survey on students' conceptions of 'accident'


Affiliation: Faculdade de Medicina da Universidade Federal de Ribeirão Preto, Ribeirão Preto, São Paulo, Brazil.

To report the implementation of an open source web survey application and a case study of its first utilisation, particularly as to aspects of logistics and response behaviour, in a survey of Brazilian university students' conceptions about injury causing events. We developed an original application capable of recruiting respondents, sending personal e-mail invitations, storing responses and exporting data. Students of medical, law, communication and education schools were asked about personal attributes and conceptions of the term accident, as to associations and preventability. The response rate was 34.5%. Half of the subjects responded by the second day, 66.3% during the first week. Subjects around 4.2% (95% CI 3.3-5.4) refused to disclose religious persuasion, and 19.2% (95% CI 17.2-21.3) refused to disclose political persuasion, whereas only 2.8% (95% CI 2.1-3.8), on average, refused to answer questions on conceptions and attitudes. There was no significant difference between early and late respondents in respect to selected attributes and conceptions of accident (P-value varied from 0.145 to 0.971). The word accident evoked the notion of preventability to 85.1% (95% CI 83.2 to 87.0) of the subjects, foreseeability to 50.3% (95% CI 47.7-53.0), fatality to 15.1% (95% CI 13.3-17.1) and intentionality to 2.3% (95% CI 1.6-3.2). Web surveying university students' conceptions about injuries is feasible in a middle-income country setting, yielding response rates similar to those found in the literature.

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Authors: Danilo Blanck, Guilherme Hohgraebe Neto, Elisa Grandi, Pauline Z. Siqueira, Roberta P. Lunkes, João Leonardo Pietrobelli, Norma Regina Marzola, Marcelo Z. Goldani

Affiliations:

a Professor, Department of Pediatrics,
b Research Fellow, Department of Pediatrics,
c Graduation Program on Education, Núcleo de Estudos da Saúde da Criança e do Adolescente (NESCA), Hospital de Clínicas de Porto Alegre, Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil

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# Checklist for Reporting Results of Internet E-Surveys (CHERRIES)

**Study project:** An original open source application designed to implement web-based surveys: The case of students’ conceptions of the term accident

**Guarantor:** Danilo Blank (blank@ufrgs.br)

<table>
<thead>
<tr>
<th>Item Category</th>
<th>Checklist Item</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>Describe survey design</td>
<td>The study followed a cross-sectional observational design to collect quantitative information by means of a self-administered web-based questionnaire. The target sample frame comprised the entire population of first and last-year students regularly registered in each and every medical, law, communication and education schools in the greater Porto Alegre, a southern Brazilian city of just over 1.5 million people. Since we gained access to lists of e-mail addresses of such university students, who have virtually 100% Internet access, the sample can be viewed as probabilistic.</td>
</tr>
</tbody>
</table>

**IRB (Institutional Review Board) approval and informed consent process**

<table>
<thead>
<tr>
<th>IRB approval</th>
<th>Informed consent</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The study was approved by the Committee on Research Ethics of the University of Rio Grande do Sul (UFRGS), and also by the research ethics committees of all other universities involved.</td>
<td>Subjects’ free and informed consent to participate in the survey was obtained through a tacit consent strategy, whereby the approval of the terms of the research was understood as the invitee chose to click on the link to the survey website, which was explicitly positioned in the invitation e-mail message right after the statement concerning the absolute confidentiality of the research. The translation of the Portuguese e-mail invitation is: “Dear student of (...) School of (...) University, I would ask a few minutes of your time to participate in a scientific research within the health profession field.”</td>
<td></td>
</tr>
</tbody>
</table>
Target sample: first-year and last-year students of
• medicine,
• law,
• communication,
• education.
Target sample: first-year and last-year students of
- medicine,
- law,
- communication,
- education.
Target sample: first-year and last-year students of
- medicine,
- law,
- communication,
- education.
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• medicine,
• law,
• communication,
• education.
Target sample: first-year and last-year students of • medicine, • law, • communication, • education.
Target sample: first-year and last-year students of
- medicine,
- law,
- communication,
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• education.
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- medicine,
- law,
- communication,
- education.
Target sample: first-year and last-year students of
- medicine,
- law,
- communication,
- education.
Target sample: first-year and last-year students of
• medicine,
• law,
• communication,
• education.
Target sample: first-year and last-year students of medicine, law, communication, and education.
The questionnaire:
Proportion of subjects endorsing displayed meaning of the word “accident” (n=943).

- Preventable?: 82.8%
- Predictable?: 25.1%
- Controlled by fate?: 26.1%
- Done on purpose?: 4.2%
Acidente

Injúria

Lesão
Acidente = accident

Injúria

Lesão
Acidente = accident

Injúria ≈ injury

Lesão
Acidente = accident !?!

injury ⇒ Injúria ≈ injury !

Lesão

⇒ ≈ lesion (!)

⇐ injury (!?!)
The word \{ lesão, acidente, injúria \} makes you think primarily of physical damage, moral damage or material damage?
Which of these best fits your idea of *lesão*?

- Loss
- Physical impairment
- Offense
- Stain
- Traumatism
Which of these best fits your idea of *injúria*?

- Theft
- Wound
- Defamation
- Loss
- Calumny
Which of these best fits your idea of *acidente*?

- Misfortune
- Imbalance
- Chance
- Loss of control
- Negligence
When you hear the word *acidente*, do you think that what happened was done on purpose?
When you hear the word *acidente*, do you think that what happened was a *work of fate*?
When you hear the word *acidente*, do you think that what happened could have been *foreseen*?
When you hear the word *acidente*, do you think that what happened could have been *prevented*?
How preventable do you think that death causing \{lesões, acidentes, injúrias\} are?
18. Existe alguém de quem você **gostava muito**, que tenha **morrido** no **trânsito**, ou **afogado**, ou por **queimadura**, ou por uma **queda**, ou por **intoxicação**, ou **assassinado**?

- [ ] Sim
- [ ] Não
- [ ] Prefiro não responder

19. **Você mesmo já teve alguma vez que ser** **hospitalizado** por causa de um **trauma no trânsito**, ou por ter se **afogado**, ou por causa de uma **queimadura**, **queda**, ou **intoxicação**, ou por **agressão**?

- [ ] Sim
- [ ] Não
- [ ] Prefiro não responder

20. **Você **costuma fazer coisas** que são consideradas **perigosas**?

- [ ] Sempre
- [ ] Quase sempre
- [ ] Às vezes
- [ ] Quase nunca
- [ ] Nunca
- [ ] Prefiro não responder

21. Quando você compra um **produto de limpeza** que você nunca usou, você **lê as instruções**?

- [ ] Sempre
- [ ] Quase sempre
- [ ] Às vezes
- [ ] Quase nunca
- [ ] Nunca
- [ ] Prefiro não responder

22. Nos últimos **trinta dias**, quantas vezes você usou o **cinto de segurança** ao andar de carro?

- [ ] Não andei de carro nos últimos trinta dias
- [ ] Todas as vezes
- [ ] Quase sempre
- [ ] Poucas vezes
- [ ] Quase nunca
- [ ] Nunca
- [ ] Prefiro não responder
23. Nos últimos trinta dias, quantas vezes você usou o **capacete de segurança** ao andar de bicicleta?
   - Não andei de bicicleta nos últimos trinta dias
   - Todas as vezes
   - Quase sempre
   - Poucas vezes
   - Quase nunca
   - Nunca
   - Prefiro não responder

24. Caso exista alguma **criança menor de cinco anos** que more com você, quantas vezes ela usou **cadeirinha de segurança** ao andar de carro, nos últimos trinta dias?
   - Não há nenhuma criança menor de 5 anos em casa
   - Todas as vezes
   - Quase sempre
   - Poucas vezes
   - Quase nunca
   - Nunca
   - Prefiro não responder

25. Caso você tenha **arma de fogo** em casa, você a mantém **trancada** em um **armário chaveado**?
   - Não tenho arma de fogo em casa
   - Sempre
   - Quase sempre
   - Poucas vezes
   - Quase nunca
   - Nunca
   - Prefiro não responder

26. De onde você recebe a maior parte das **orientações sobre segurança** contra acidentes e violências?
   - Mídia
   - Amigos
   - Médico
   - Serviço de saúde
   - Manuais de produtos
   - Literatura científica
   - Outros lugares
   - Prefiro não responder
27. Do ponto de vista de **espiritualidade** e **religiosidade**, qual das opções abaixo **mais** se adapta a você?

- Religioso praticante
- Religioso não praticante
- Místico, sem religião
- Não religioso
- Materialista
- Prefiro não responder

28. E do ponto de vista de **inclinação política**, como você **melhor** se descreveria?

- Muito conservador
- Um pouco conservador
- Moderado
- Um pouco progressista
- Muito progressista
- Prefiro não responder

29. Qual é a sua **data de nascimento**?
29. Qual é a sua **data de nascimento**?

30. Em que **ano** você **ingressou** na **universidade**, **neste curso** em que você está ou que acaba de concluir?

31. Qual é o seu **sexo**?

Por favor, clique no botão de submeter o questionário. Muito obrigado!
Sample disposition:

First-year students (n=1780)
- Med (n=394)
- Law (n=704)
- Edu (n=227)
- Com (n=455)

Stage unknown (n=1916)
- Med (n=391)
- Law (n=597)
- Edu (n=378)
- Com (n=260)

Last-year students (n=1626)
- Med (n=381)
- Law (n=627)
- Edu (n=204)
- Com (n=413)

Sent e-mails (n=5322)

Valid e-mails (n=4718)

Total number of respondents (n=1626)

Total number of eligible respondents (n=1450)

First-year students (n=785)
- Med (n=197)
- Law (n=333)
- Edu (n=89)
- Com (n=166)

Last-year students (n=665)
- Med (n=102)
- Law (n=263)
- Edu (n=177)
- Com (n=123)
Selected overall findings:
<table>
<thead>
<tr>
<th></th>
<th>Lesão</th>
<th>Injúria</th>
<th>Acidente</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical damage</td>
<td>65.5%</td>
<td>6.6%</td>
<td>61.7%</td>
</tr>
<tr>
<td>Moral damage</td>
<td>0.6%</td>
<td>80.4%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Material damage</td>
<td>0.2%</td>
<td>1.2%</td>
<td>13.6%</td>
</tr>
<tr>
<td>All three forms of damage</td>
<td>33.7%</td>
<td>9.1%</td>
<td>23.7%</td>
</tr>
</tbody>
</table>
How preventable do you think that fatal {accidents lesions injuries} are?
<table>
<thead>
<tr>
<th></th>
<th>First year</th>
<th>Last year</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preventable?</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1225 (85.1%)</td>
<td></td>
<td>1225 (85.1%)</td>
</tr>
<tr>
<td>Don’t know</td>
<td>124 (8.6%)</td>
<td>124 (8.6%)</td>
<td>248 (8.6%)</td>
</tr>
<tr>
<td>No</td>
<td>90 (6.3%)</td>
<td>90 (6.3%)</td>
<td>180 (6.3%)</td>
</tr>
<tr>
<td><strong>Predicted?</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>720 (50.3%)</td>
<td></td>
<td>720 (50.3%)</td>
</tr>
<tr>
<td>Don’t know</td>
<td>222 (15.5%)</td>
<td>222 (15.5%)</td>
<td>444 (15.5%)</td>
</tr>
<tr>
<td>No</td>
<td>488 (34.1%)</td>
<td>488 (34.1%)</td>
<td>976 (34.1%)</td>
</tr>
<tr>
<td><strong>Work of fate?</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>215 (15.1%)</td>
<td></td>
<td>215 (15.1%)</td>
</tr>
<tr>
<td>Don’t know</td>
<td>194 (13.6%)</td>
<td>194 (13.6%)</td>
<td>388 (13.6%)</td>
</tr>
<tr>
<td>No</td>
<td>1013 (71.2%)</td>
<td>1013 (71.2%)</td>
<td>2026 (71.2%)</td>
</tr>
<tr>
<td><strong>Done on purpose?</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>33 (2.3%)</td>
<td>33 (2.3%)</td>
<td>33 (2.3%)</td>
</tr>
<tr>
<td>Don’t know</td>
<td>80 (5.6%)</td>
<td>80 (5.6%)</td>
<td>160 (5.6%)</td>
</tr>
<tr>
<td>No</td>
<td>1324 (92.1%)</td>
<td>1324 (92.1%)</td>
<td>2648 (92.1%)</td>
</tr>
</tbody>
</table>

*Data are shown as n (%) [adjusted residual, presented only in cases where P<0.05].
### Students’ conceptions of the word *acidente* by course stage*

<table>
<thead>
<tr>
<th></th>
<th>First year</th>
<th>Last year</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preventable? (P=0.744)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>658 (84.6%)</td>
<td>567 (85.8%)</td>
<td>1225 (85.1%)</td>
</tr>
<tr>
<td>Don’t know</td>
<td>68 (8.7%)</td>
<td>56 (8.5%)</td>
<td>124 (8.6%)</td>
</tr>
<tr>
<td>No</td>
<td>52 (6.7%)</td>
<td>38 (5.7%)</td>
<td>90 (6.3%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Predicted? (P=0.002)</strong></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>360 (46.3%) [3.3]</td>
<td>360 (55.1%) [3.3]</td>
<td>720 (50.3%)</td>
</tr>
<tr>
<td>Don’t know</td>
<td>122 (15.7%) [.2]</td>
<td>100 (15.3%) [-0.2]</td>
<td>222 (15.5%)</td>
</tr>
<tr>
<td>No</td>
<td>295 (38.0%) [3.3]</td>
<td>193 (29.6%) [-3.3]</td>
<td>488 (34.1%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Work of fate? (P=0.937)</strong></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>114 (14.8%)</td>
<td>101 (15.4%)</td>
<td>215 (15.1%)</td>
</tr>
<tr>
<td>Don’t know</td>
<td>104 (13.5%)</td>
<td>90 (13.8%)</td>
<td>194 (13.6%)</td>
</tr>
<tr>
<td>No</td>
<td>550 (71.6%)</td>
<td>463 (70.8%)</td>
<td>1013 (71.2%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Done on purpose? (P=0.694)</strong></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>18 (2.3%)</td>
<td>15 (2.3%)</td>
<td>33 (2.3%)</td>
</tr>
<tr>
<td>Don’t know</td>
<td>47 (6.0%)</td>
<td>33 (5.0%)</td>
<td>80 (5.6%)</td>
</tr>
<tr>
<td>No</td>
<td>713 (91.6%)</td>
<td>611 (92.7%)</td>
<td>1324 (92.1%)</td>
</tr>
</tbody>
</table>

*Data are shown as n (%) [adjusted residual, presented only in cases where \( P<0.05 \)].
Proportion of students endorsing displayed meaning of the word *acidente* (n=1450).

- Preventable?: 85.1%
- Predictable?: 50.3%
- Work of fate?: 15.1%
- Done on purpose?: 2.3%

Proportion of subjects endorsing displayed meaning of the word “accident” (n=943).

- Preventable?: 82.8%
- Predictable?: 25.1%
- Controlled by fate?: 26.1%
- Done on purpose?: 4.2%

*accident, and only 26% felt that accidents were controlled by fate. However, 71% thought that accidents could not be predicted, and 4% felt that accidents were done on purpose. Age, location,
Geometric data analysis:
Dimension 1: \( \lambda = 0.096 \) / 60.7% inertia
Dimension 2: \( \lambda = 0.044 \) / 12.6% inertia
Dimension 1: $\lambda = 0.096$ / 60.7% inertia

Dimension 2: $\lambda = 0.044$ / 12.6% inertia

Predictor modalities (subjects’ attributes)
Geometric Data Analysis Perceptual Map

- Predictor modalities (subjects’ attributes)
  - Last year Communication
  - Last year Law
  - Last year Education
  - Last year Medicine

Dimension 1: \( \lambda = 0.096 \) / 60.7% inertia

Dimension 2: \( \lambda = 0.044 \) / 12.6% inertia
**Geometric Data Analysis Perceptual Map**

- **Predictor modalities (subjects’ attributes)**
- **Last year Communication**
- **Last year Law**
- **Last year Education**
- **Last year Medicine**

**First year Communication**

**First year Law**

**First year Education**

**First year Medicine**

**Dimension 1:** $\lambda = 0.096$ / 60.7% inertia

**Dimension 2:** $\lambda = 0.044$ / 12.6% inertia
Dimension 1: $\lambda = 0.096$ / 60.7% inertia

Dimension 2: $\lambda = 0.044$ / 12.6% inertia

Predictor modalities (subjects’ attributes)

- Last year Communication
- First year Communication
- Last year Law
- First year Law
- Last year Education
- First year Education
- Last year Medicine
- First year Medicine
Geometric Data Analysis Perceptual Map

- **Predictor modalities (subjects’ attributes)**
  - First year Communication
  - Last year Law
- **Outcome modalities (conceptions and beliefs)**
  - First year Education
  - Last year Medicine

**Dimension 1:** $\lambda = 0.096 \, / \, 60.7\%$ inertia

**Dimension 2:** $\lambda = 0.044 \, / \, 12.6\%$ inertia

Outcome modalities:
- First year Education
- Last year Medicine

Predictor modalities:
- First year Communication
- Last year Law

Outcome modalities:
- First year Education
- Last year Medicine

Subject modalities:
- First year Communication
- Last year Law

**Outcome modalities (conceptions and beliefs)**
- First year Education
- Last year Medicine

**Predictor modalities (subjects’ attributes)**
- First year Communication
- Last year Law
Dimension 1: $\lambda = 0.096$ / 60.7% inertia

Dimension 2: $\lambda = 0.044$ / 12.6% inertia

Outcome modalities (conceptions and beliefs):
- AMisf
- AMatD
- APhysD
- LPhysD
- APrevis
- APreven
- APreven?
- IDef
- ANegl
- ANContr
- ADest
- LBT
- AChance
- IDef
- ANCont
- APreven
- APreven?
- LDoe
- IWound
- IPhysD
- IPhysD
- IBT

Predictor modalities (subjects’ attributes):
- LStain
- ICal
- AImb
- ILoss
- LBT
- ANPrevis
- APrevis
- LPhysD
- LPhysD
- LPhysD
- LPhysD
- LPhysD

First year Communication
- △ Last year Law
- ● First year Communication
- ▲ First year Law
- ○ Last year Communication
- □ Last year Education
- ◇ Last year Medicine
- ★ First year Education
- ❁ First year Medicine

Outcome modalities (conceptions and beliefs):
- Outcome modalities (conceptions and beliefs)
- Predictor modalities (subjects’ attributes)
Geometric Data Analysis Perceptual Map

- **Predictor modalities (subjects’ attributes)**
- **Outcome modalities (conceptions and beliefs)**

- Last year Communication
- First year Communication
- Last year Law
- First year Law
- Last year Education
- First year Education
- Last year Medicine
- First year Medicine

**Dimension 1:**
\( \lambda = 0.096 / 60.7\% \) inertia

**Dimension 2:**
\( \lambda = 0.044 / 12.6\% \) inertia

**Predictor modalities (subjects’ attributes):**
- Med Last
- Med First
- IPhysD
- SpecS
- ALmb
- ALoss
- APreviv
- APreven?
- AMisf
- AMatD
- LBT
- LPhysD
- LPrevis
- LDef
- LContr
- LNegl
- LDoe
- AChance
- INew
- IMisc
- IMoral
- IMorD
- LStain
- IMisc
- IMorD
- LStain

**Outcome modalities (conceptions and beliefs):**
- PPhysD
- PMed
- PLast
- PFirst
- PInstr
- PHosp
- NRel
- NDear
- NInstr
- NContr
- NPreven
- NDef
- NNegl
- NChim
- NDIrt
- NConstr
- NPrevis
- NLoss
Geometric Data Analysis Perceptual Map

- **Predictor modalities (subjects’ attributes)**
- **Outcome modalities (conceptions and beliefs)**
- **Last year Communication**
- **Last year Law**
- **Last year Education**
- **Last year Medicine**
- **First year Communication**
- **First year Law**
- **First year Education**
- **First year Medicine**

**Dimension 1:** $\lambda=0.096$ / 60.7% inertia

**Dimension 2:** $\lambda=0.044$ / 12.6% inertia

- **Med Last**
- **Med First**
- **IPhysD**
- **IWound**
- **SpecS**
- **ILoss**
- **Almb**
- **AMisf**
- **AMatD**
- **APrevis**
- **APhysD**
- **APreven**
- **LPhysD**
- **LBT**
- **NInstr**
- **NHosp**
- **NRel**
- **Mod**
- **Fem**
- **Last year Medicine**
- **First year Medicine**
- **Last year Education**
- **First year Education**
- **Last year Law**
- **First year Law**
- **Last year Communication**
- **First year Communication**

**Predictor modalities (subjects’ attributes):**
- **IBT**
- **Med Last**
- **Med First**
- **IPhysD**
- **IWound**
- **SpecS**
- **ILoss**
- **Almb**
- **AMisf**
- **AMatD**
- **APrevis**
- **APhysD**
- **APreven**
- **LPhysD**
- **LBT**
- **NInstr**
- **NHosp**
- **NRel**
- **Mod**
- **Fem**

**Outcome modalities (conceptions and beliefs):**
- **Law Last**
- **Law First**
- **Comm Last**
- **Comm First**
- **Edu Last**
- **Edu First**
- **AdolDNEC**
- **AdolDEC**
- **Cons**
- **Progr**
- **NDear**
- **NHosp**
- **Rel**
- **First**
- **Last**

**Predictor modalities (subjects’ attributes):**
- **IBT**
- **Med Last**
- **Med First**
- **IPhysD**
- **IWound**
- **SpecS**
- **ILoss**
- **Almb**
- **AMisf**
- **AMatD**
- **APrevis**
- **APhysD**
- **APreven**
- **LPhysD**
- **LBT**
- **NInstr**
- **NHosp**
- **NRel**
- **Mod**
- **Fem**

**Outcome modalities (conceptions and beliefs):**
- **Law Last**
- **Law First**
- **Comm Last**
- **Comm First**
- **Edu Last**
- **Edu First**
- **AdolDNEC**
- **AdolDEC**
- **Cons**
- **Progr**
- **NDear**
- **NHosp**
- **Rel**
- **First**
- **Last**

**Predictor modalities (subjects’ attributes):**
- **IBT**
- **Med Last**
- **Med First**
- **IPhysD**
- **IWound**
- **SpecS**
- **ILoss**
- **Almb**
- **AMisf**
- **AMatD**
- **APrevis**
- **APhysD**
- **APreven**
- **LPhysD**
- **LBT**
- **NInstr**
- **NHosp**
- **NRel**
- **Mod**
- **Fem**

**Outcome modalities (conceptions and beliefs):**
- **Law Last**
- **Law First**
- **Comm Last**
- **Comm First**
- **Edu Last**
- **Edu First**
- **AdolDNEC**
- **AdolDEC**
- **Cons**
- **Progr**
- **NDear**
- **NHosp**
- **Rel**
- **First**
- **Last**

**Predictor modalities (subjects’ attributes):**
- **IBT**
- **Med Last**
- **Med First**
- **IPhysD**
- **IWound**
- **SpecS**
- **ILoss**
- **Almb**
- **AMisf**
- **AMatD**
- **APrevis**
- **APhysD**
- **APreven**
- **LPhysD**
- **LBT**
- **NInstr**
- **NHosp**
- **NRel**
- **Mod**
- **Fem**

**Outcome modalities (conceptions and beliefs):**
- **Law Last**
- **Law First**
- **Comm Last**
- **Comm First**
- **Edu Last**
- **Edu First**
- **AdolDNEC**
- **AdolDEC**
- **Cons**
- **Progr**
- **NDear**
- **NHosp**
- **Rel**
- **First**
- **Last**

**Predictor modalities (subjects’ attributes):**
- **IBT**
- **Med Last**
- **Med First**
- **IPhysD**
- **IWound**
- **SpecS**
- **ILoss**
- **Almb**
- **AMisf**
- **AMatD**
- **APrevis**
- **APhysD**
- **APreven**
- **LPhysD**
- **LBT**
- **NInstr**
- **NHosp**
- **NRel**
- **Mod**
- **Fem**

**Outcome modalities (conceptions and beliefs):**
- **Law Last**
- **Law First**
- **Comm Last**
- **Comm First**
- **Edu Last**
- **Edu First**
- **AdolDNEC**
- **AdolDEC**
- **Cons**
- **Progr**
- **NDear**
- **NHosp**
- **Rel**
- **First**
- **Last**
Dimension 1: $\lambda=0.096$ / 60.7% inertia

Dimension 2: $\lambda=0.044$ / 12.6% inertia

Geometric Data Analysis Perceptual Map

- **Predictor modalities (subjects’ attributes)**
- **Outcome modalities (conceptions and beliefs)**

- Last year Communication
- First year Communication
- Last year Law
- First year Law
- Last year Education
- First year Education
- Last year Medicine
- First year Medicine

Predictor modalities and outcome modalities are represented as points on the map, with different shapes and colors indicating their category. The map is designed to visualize the relationships and patterns among these modalities.
Geometric Data Analysis Perceptual Map

- Predictor modalities (subjects’ attributes)
- Outcome modalities (conceptions and beliefs)

**Predictor modalities (subjects’ attributes):**
- Last year Communication
- Last year Law
- First year Communication
- First year Law

**Outcome modalities (conceptions and beliefs):**
- Last year Education
- Last year Medicine
- First year Education
- First year Medicine

**Dimensions:**
1. Dimension 1: $\lambda = 0.096$ / 60.7% inertia
2. Dimension 2: $\lambda = 0.044$ / 12.6% inertia

**Variables:**
- IWound
- IPhysD
- Med First
- Med Last
- IDef
- ABT
- ANContr
- NInstr
- Cons
- Progr
- NHosp
- Med
- Last Comm
- First Comm
- Med
- Last Cons
- First Cons
- Outcome modalities (conceptions and beliefs)

**First year Medicine:**
- AdolDEC
- CDNEC
- CDEC
- CDNEC
- Polit
- NRel
- Law
- First Edu
- First Med
- Last Edu
- Last Med
- Last Cons
- First Cons
- Med
- Last Med
- First Med

**Last year Medicine:**
- AdolDNEC
- AdolDEC
- CDNEC
- CDEC
- CDNEC
- Polit
- NRel
- Law
- First Edu
- First Med
- Last Edu
- Last Med
- Last Cons
- First Cons
- Med
- Last Med
- First Med

**First year Education:**
- IDef
- ABT
- ANContr
- NInstr
- Cons
- Progr
- NHosp
- Med
- Last Comm
- First Comm
- Med
- Last Cons
- First Cons
- Med
- Last Med
- First Med

**Last year Education:**
- IDef
- ABT
- ANContr
- NInstr
- Cons
- Progr
- NHosp
- Med
- Last Comm
- First Comm
- Med
- Last Cons
- First Cons
- Med
- Last Med
- First Med

**Variables:**
- IWound
- IPhysD
- Med First
- Med Last
- IDef
- ABT
- ANContr
- NInstr
- Cons
- Progr
- NHosp
- Med
- Last Comm
- First Comm
- Med
- Last Cons
- First Cons
- Med
- Last Med
- First Med

**Outcome modalities (conceptions and beliefs):**
- Last year Education
- Last year Medicine
- First year Education
- First year Medicine

**First year Medicine:**
- AdolDNEC
- AdolDEC
- CDNEC
- CDEC
- CDNEC
- Polit
- NRel
- Law
- First Edu
- First Med
- Last Edu
- Last Med
- Last Cons
- First Cons
- Med
- Last Med
- First Med

**Last year Medicine:**
- AdolDNEC
- AdolDEC
- CDNEC
- CDEC
- CDNEC
- Polit
- NRel
- Law
- First Edu
- First Med
- Last Edu
- Last Med
- Last Cons
- First Cons
- Med
- Last Med
- First Med

**First year Education:**
- IDef
- ABT
- ANContr
- NInstr
- Cons
- Progr
- NHosp
- Med
- Last Comm
- First Comm
- Med
- Last Cons
- First Cons
- Med
- Last Med
- First Med

**Last year Education:**
- IDef
- ABT
- ANContr
- NInstr
- Cons
- Progr
- NHosp
- Med
- Last Comm
- First Comm
- Med
- Last Cons
- First Cons
- Med
- Last Med
- First Med
Geometric Data Analysis Perceptual Map

- **Predictor modalities (subjects’ attributes)**
- **Outcome modalities (conceptions and beliefs)**
- **Last year Communication**
- **Last year Law**
- **Last year Education**
- **Last year Medicine**
- **First year Communication**
- **First year Law**
- **First year Education**
- **First year Medicine**

**Dimension 1:** \( \lambda = 0.096 \) / 60.7% inertia

**Dimension 2:** \( \lambda = 0.044 \) / 12.6% inertia
Geometric Data Analysis Perceptual Map

- **Predictor modalities (subjects’ attributes)**
  - Last year Communication
  - Last year Law
  - First year Communication
  - First year Law

- **Outcome modalities (conceptions and beliefs)**
  - Last year Education
  - Last year Medicine
  - First year Education
  - First year Medicine

**Dimension 1:** $\lambda = 0.096 \ / \ 60.7\%$ inertia

**Dimension 2:** $\lambda = 0.044 \ / \ 12.6\%$ inertia

- **Med Last**
- **Med First**
- **Law Last**
- **Law First**
- **Comm Last**
- **Comm First**
- **Edu Last**
- **Edu First**

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Outcome modalities:
- IMorD
- LStain
- ICal
- AImb
- ILoss
- LBT
- APrevis
- ANDest
- AMatD
- LT
- AMisf
- APhysD
- APreven
- IDef
- ABT
- ANContr
- ANPrevis
- LPhysD
- NDear
- NHosp
- NSS
- Rel
- Mod
- Fem
- Instr
- Hosp
- Mist
- AdolDEC
- CDEC
- CDNEC
- Polit
- NRel
- Law
- First
- Edu
- Last

Predictor modalities:
- Outcome modalities:
  - First year Medicine
  - First year Education
  - Last year Medicine
  - Last year Education

- Med First
- Med Last
- Pain
- IWound

- Dimension 1: $\lambda = 0.096 \ / \ 60.7\%$ inertia
  - Dimension 2: $\lambda = 0.044 \ / \ 12.6\%$ inertia

- Predictor modalities (subjects’ attributes):
  - First year Communication
  - First year Law
  - Last year Communication
  - Last year Law

- Outcome modalities (conceptions and beliefs):
  - Last year Medicine
  - Last year Education
  - First year Medicine
  - First year Education

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**Predictor modalities (subjects’ attributes):**
- Outcome modalities (conceptions and beliefs):
  - First year Medicine
  - First year Education
  - Last year Medicine
  - Last year Education
Geometric Data Analysis Perceptual Map

- **Predictor modalities (subjects’ attributes)**
- **Outcome modalities (conceptions and beliefs)**

- Last year Communication
- First year Communication
- Last year Law
- First year Law
- Last year Education
- Last year Medicine
- First year Education
- First year Medicine

**Dimension 1:** $\lambda=0.096$ / 60.7% inertia

**Dimension 2:** $\lambda=0.044$ / 12.6% inertia

Predictor modalities (subjects’ attributes):
- IPhysD
- IWound
- IBT
- Med Last

Outcome modalities (conceptions and beliefs):
- IMorD
- LStain
- ICal
- AImb
- ILoss
- LBT
- APrevis
- ANDest
- AMatD
- LT
- AMisf
- APreven
- IDef
- ADest
- ANContr
- ANPrevis
- LDoe
- AChance
- IWound
- IPHysD
- IBT
- NInstr
- Progr
- NDear
- LHosp
- INSS
- Rel
- Mod
- Fem
- IED
- CEDC
- Polit
- First Edu
- First Last
- Last Edu
- Last Med
- First Med

Outcome modalities (conceptions and beliefs):
- Law Last
- Law First
- Comm Last
- Comm First
- Edu Last
- Edu First

**First year Communication**

**First year Law**

**Last year Communication**

**Last year Law**

**Last year Education**

**Last year Medicine**

**First year Education**

**First year Medicine**

**Predictor modalities (subjects’ attributes)**

**Outcome modalities (conceptions and beliefs)**
Dimension 1: $\lambda = 0.096 \, / \, 60.7\%$ inertia

Dimension 2: $\lambda = 0.044 \, / \, 12.6\%$ inertia

**Predictor modalities (subjects’ attributes)**
- First year Communication
- Last year Communication
- First year Law
- Last year Law

**Outcome modalities (conceptions and beliefs)**
- Last year Medicine
- Last year Education
- First year Education
- First year Medicine

**Outcome modalities (conceptions and beliefs)**
- injúria = term

**Predictor modalities (subjects’ attributes)**
- injúria = word

**Outcome modalities (conceptions and beliefs)**
- Outcome modalities (conceptions and beliefs)
- Outcome modalities (conceptions and beliefs)
- Outcome modalities (conceptions and beliefs)
- Outcome modalities (conceptions and beliefs)
Conclusions:
Undergraduate academic formation of Portuguese speakers enhances the notion of *foreseeability* of injury causing events;
Undergraduate academic formation of Portuguese speakers enhances the notion of foreseeability of injury causing events; it does not change predominant conception that injury causing events are largely preventable, whether they be referred to as acidentes, injúrias or lesões;
Undergraduate academic formation of Portuguese speakers enhances the notion of **foreseeability** of injury causing events; it does not change predominant conception that injury causing events are largely **preventable**, whether they be referred to as acidentes, injúrias or lesões; **medical language**: specific semantic spaces for the terms lesão (anatomopathological damage without external causation) and injúria (physical damage, with or without lesion), which approximates the latter to the English injury;
Undergraduate academic formation of Portuguese speakers enhances the notion of **foreseeability** of injury causing events;

it does not change predominant conception that injury causing events are largely **preventable**, whether they be referred to as *acidentes, injúrias* or *lesões*;

**medical language**: specific semantic spaces for the terms *lesão* (anatomopathological damage without external causation) and *injúria* (physical damage, with or without lesion), which approximates the latter to the English injury;

**a conceptual framework of injury** as a nosologic entity: **terminologization** of the word *injúria* in the **medical domain** + lay signification of the word *acidente* (an anteceding, unintentional, and preventable event, which potentially causes injury).
Undergraduate academic formation of Portuguese speakers enhances the notion of foreseeability of injury causing events;

it does not change predominant conception that injury causing events are largely preventable, whether they be referred to as acidentes, injúrias or lesões;

medical language: specific semantic spaces for the terms lesão (anatomopathological damage without external causation) and injúria (physical damage, with or without lesion), which approximates the latter to the English injury;

a conceptual framework of injury as a nosologic entity: terminologization of the word injúria in the medical domain + lay signification of the word acidente (an anteceding, unintentional, and preventable event, which potentially causes injury.
The original perceptual map of the study can be viewed in every detail at