

# Avaliação de bem-estar animal, incluindo dor, em equinos

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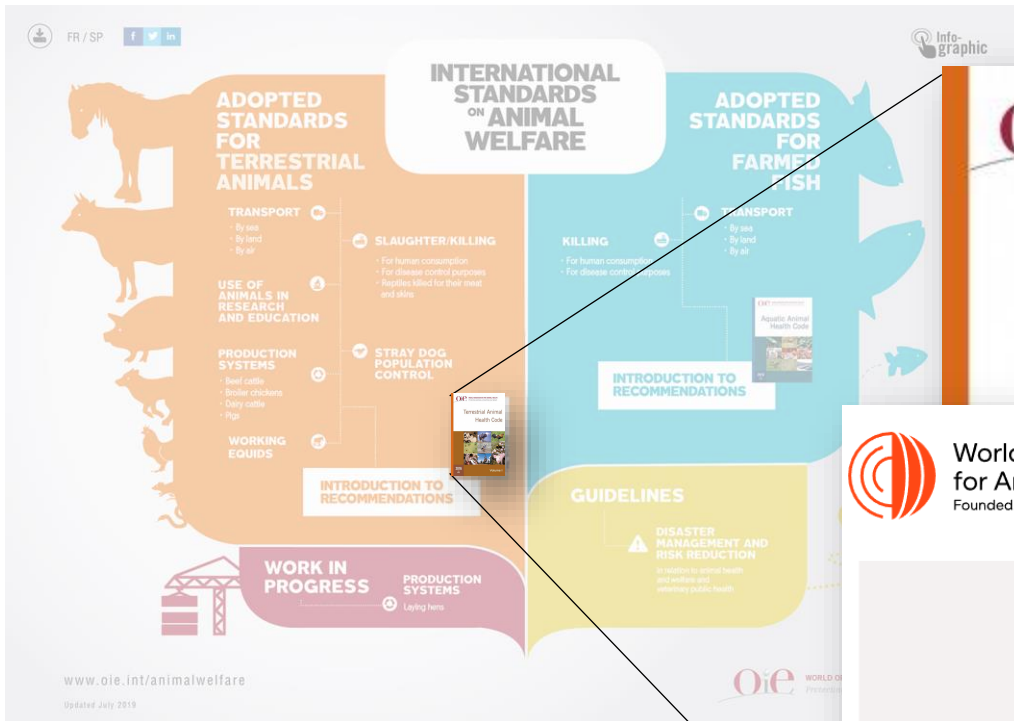


# Equinos no Brasil



- **Maior rebanho de equinos na América Latina**
- **Terceiro rebanho mundial.**
- **Equinos + Muares (mulas) + Asininos (asnos) = 08 milhões de cabeças**
- **Produção de cavalos: R\$ 7,3 bilhões (MAPA)**

# World Organisation for Animal Health



- Animal Diseases
- Monkeypox
- Avian Influenza
- COVID-19
- SEARCH
- WHO WE ARE
- WHAT WE DO
- WHAT WE OFFER
- MEDIA
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## CHAPTER 7.12.

### WELFARE OF WORKING EQUIDS

#### Article 7.12.1.

#### Introduction

In many countries, working equids, used for transport and traction, contribute directly and indirectly to households' livelihoods and benefit communities as a whole. Working equids may be of direct or indirect use in production and commercial activities.

Specifically, they contribute to agricultural production and food security by transporting, for instance, water and fodder for other livestock, firewood and other daily needs to the homestead and agricultural products to the market. They provide draught power for agricultural work and transport. They may supply manure, *milk*, *meat* and hides for household use or income.

The welfare of these working equids is often poor because their owners lack sufficient resources to meet their needs or have insufficient knowledge of the appropriate care of equids. Certain working contexts, such as working in construction industries or in harsh environments, may present a particular risk to their welfare.





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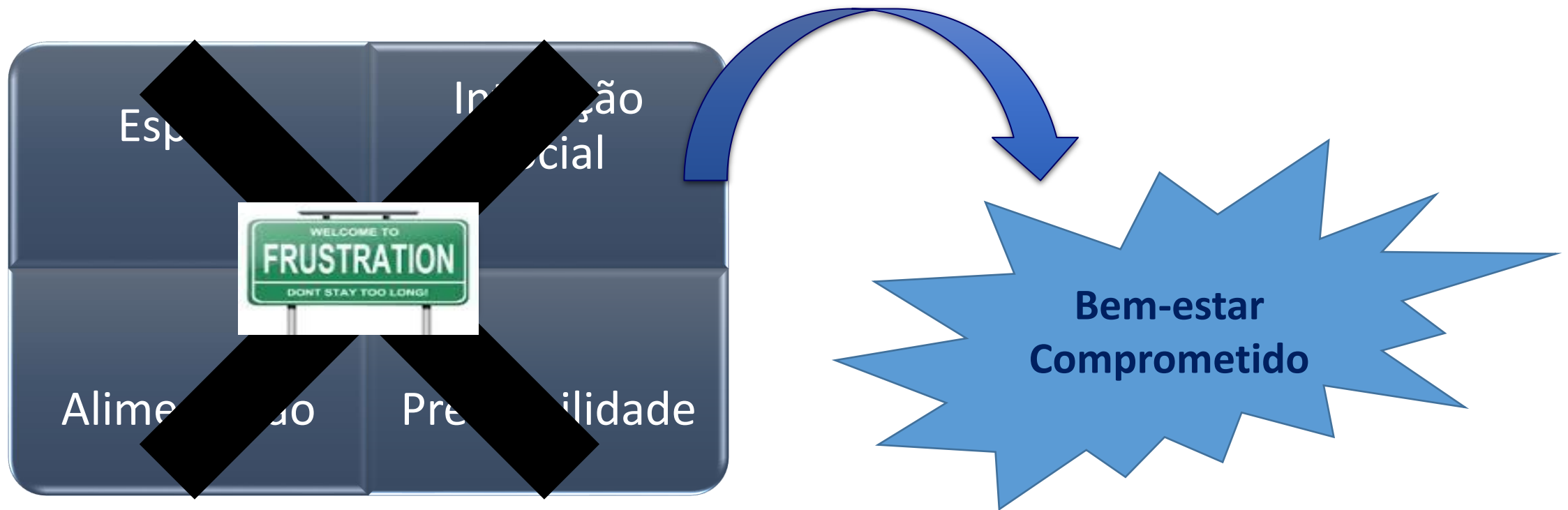
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# Ciência que aborda bem-estar animal



## Equinos tem necessidades biológicas



# Necessidades biológicas dos equinos



- **Necessidades comportamentais** (Jensen & Toates 1993)
  - Acesso a água e comida
    - Alimentação 60-70% do tempo
      - 80% do tempo o sistema digestivo deve estar repleto.



# Necessidades biológicas dos equinos



- **Necessidades comportamentais**

- **Interação social**

- 24 horas por dia (visual) contato

- “Comportamento social é muito importante” (Nelson & Panksepp, 1998)



© Rob Mook



# Necessidades biológicas dos equinos



- **Necessidades comportamentais**
  - Manejo e ambiente com previsibilidade e controle
  - Respostas ao estress





# Alguns desafios que os tutores dos equinos podem enfrentar

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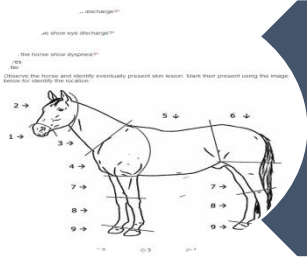
- **Falta de recursos** para o atendimento das necessidades básicas para manutenção de indicadores positivos de qualidade de vida.
- Indicadores de saúde sugestivos de bem-estar comprometido.

# Alguns desafios que os tutores dos equinos podem enfrentar

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- Indicadores sociais sugestivos de bem-estar comprometido.
- A presença dos eqüinos pode mitigar alguns desafios.



## Indicadores baseados nos animais

- Ausência de prolongados períodos de fome e sede

- Expressão de comportamentos de importância biológica
- Estados emocionais positivos
- Interação homem-animal positiva
- Ausência de comportamento anormal

**Boa  
alimentação**

**Bom  
alojamento**

**Bom  
comportamento**

**Boa  
saúde**

- Conforto para o descanso
- Conforto térmico
- Espaço para movimentar-se

- Ausência de lesões
- Ausência de doenças
- Ausência de dor causada por atividades de manejo (e outras)



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*Animal Welfare* 2016, 25: 481-488  
ISSN 0962-7286  
doi: 10.7120/09627286.25.4.481

## ***Welfare assessment of horses: the AWIN approach***

*E Dalla Costa<sup>\*†</sup>, F Dai<sup>†</sup>, D Lebelt<sup>‡</sup>, P Scholz<sup>‡</sup>, S Barbieri<sup>†</sup>, E Canali<sup>†</sup>, Aj Zanella<sup>§</sup> and M Minero<sup>†</sup>*

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# AWINHorse



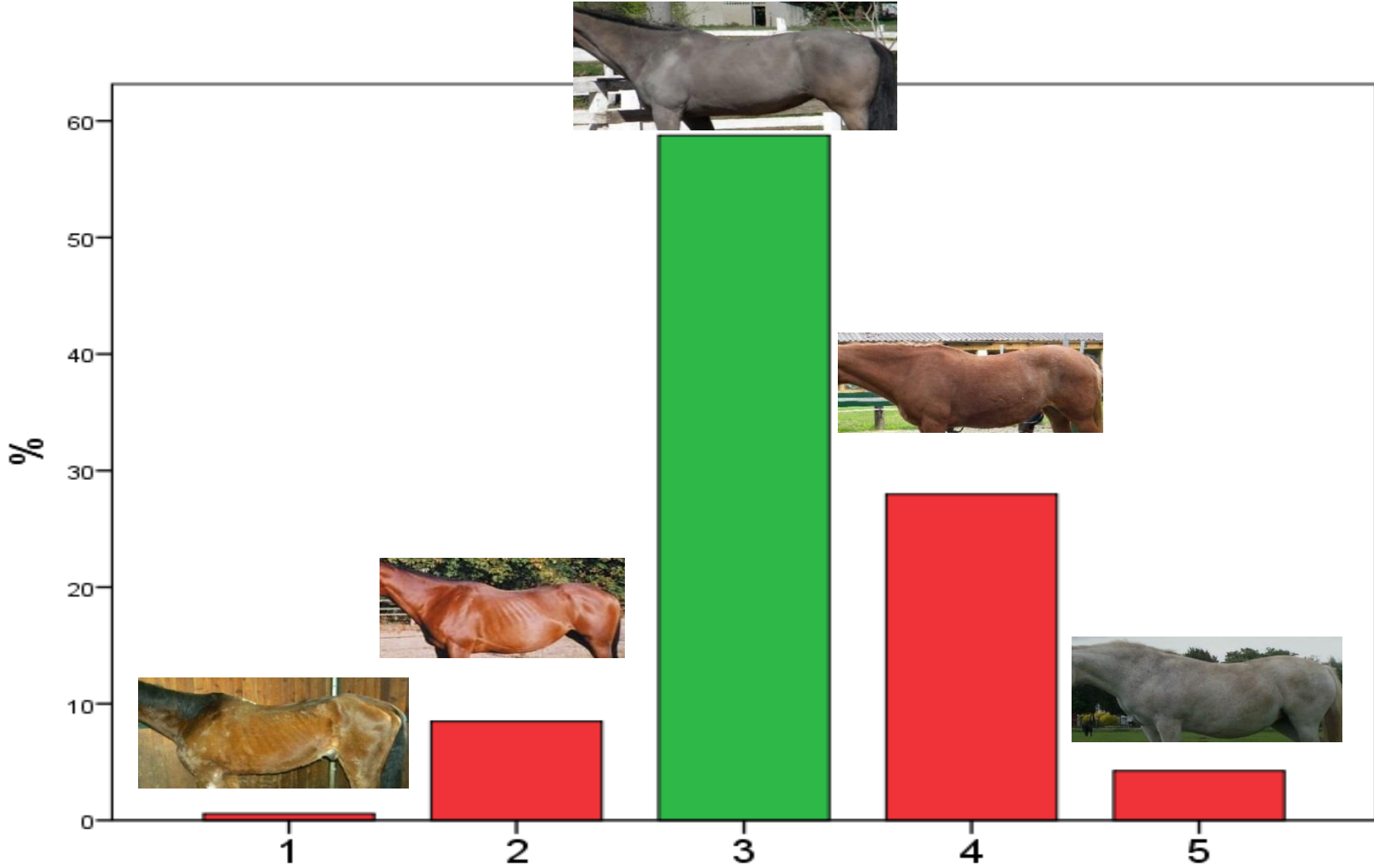
[Start Assessment](#)

[Results](#)

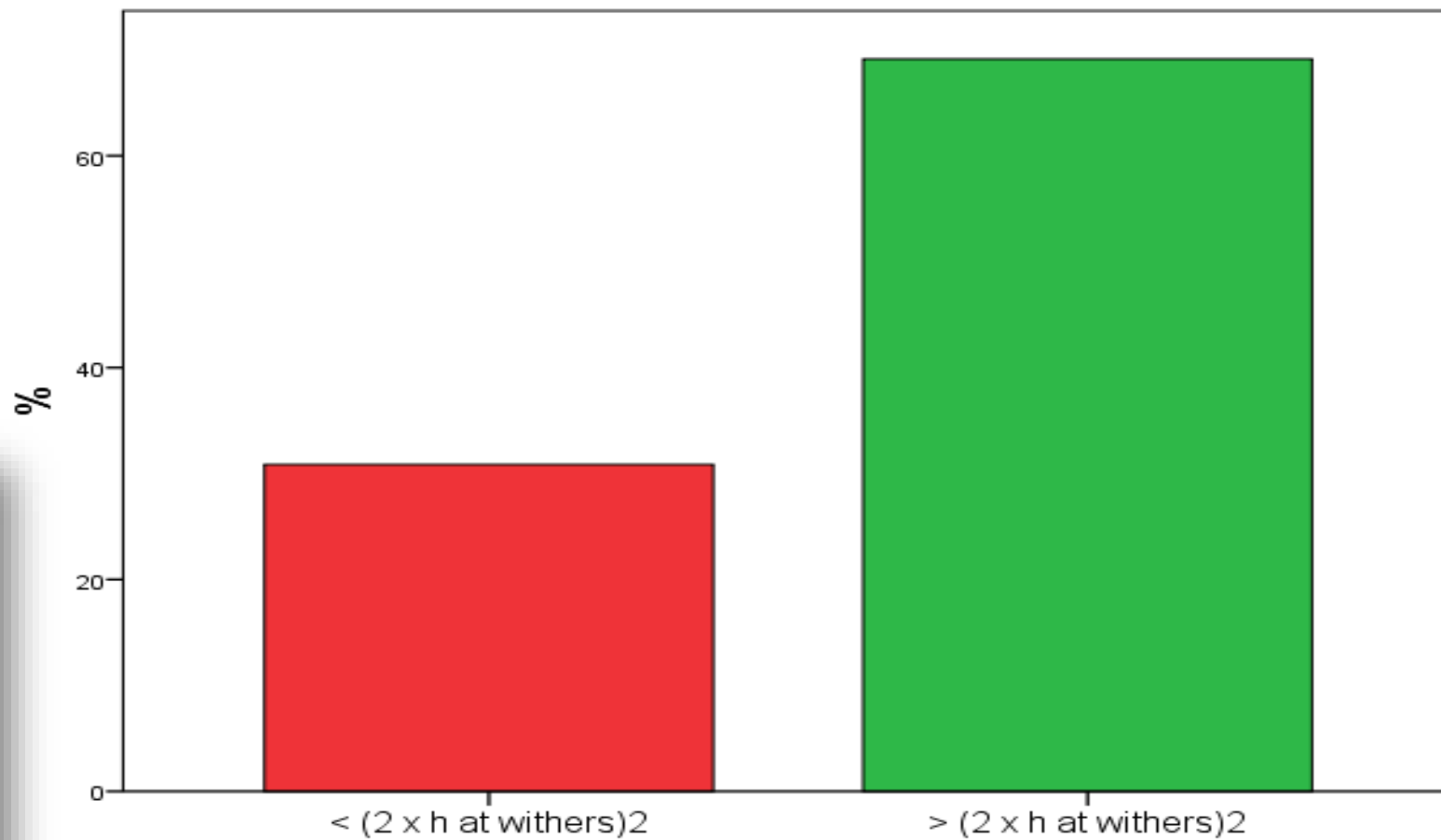
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# Escore de condição corporal



# Dimensões da baia: conforto no local de descanso

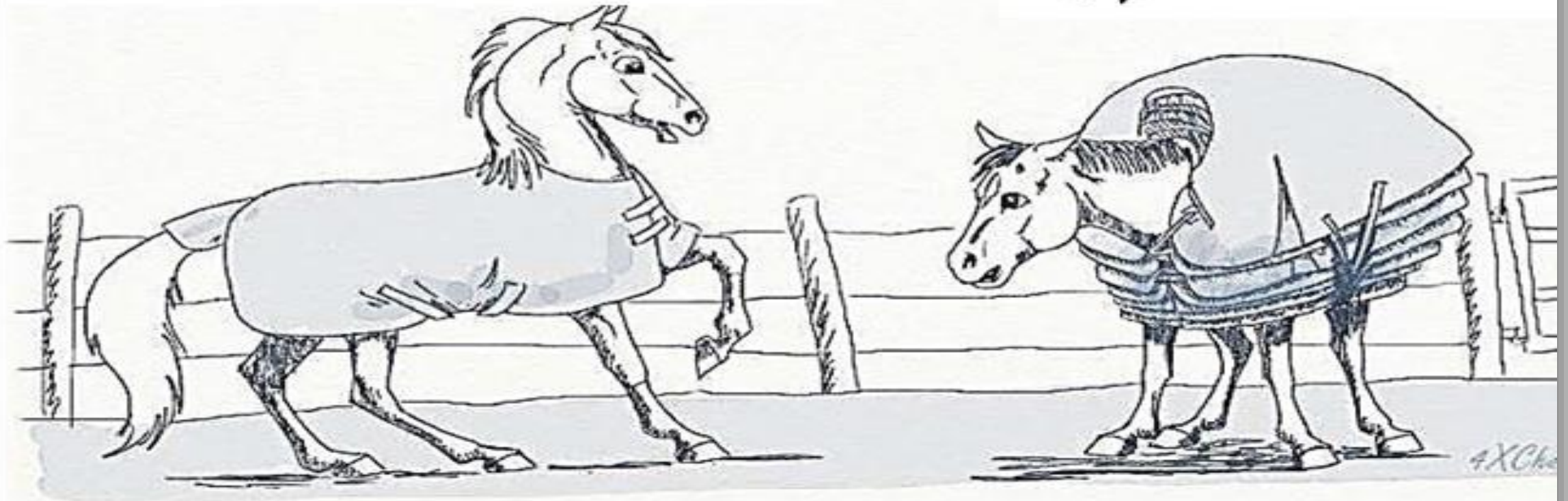


# Conforto térmico



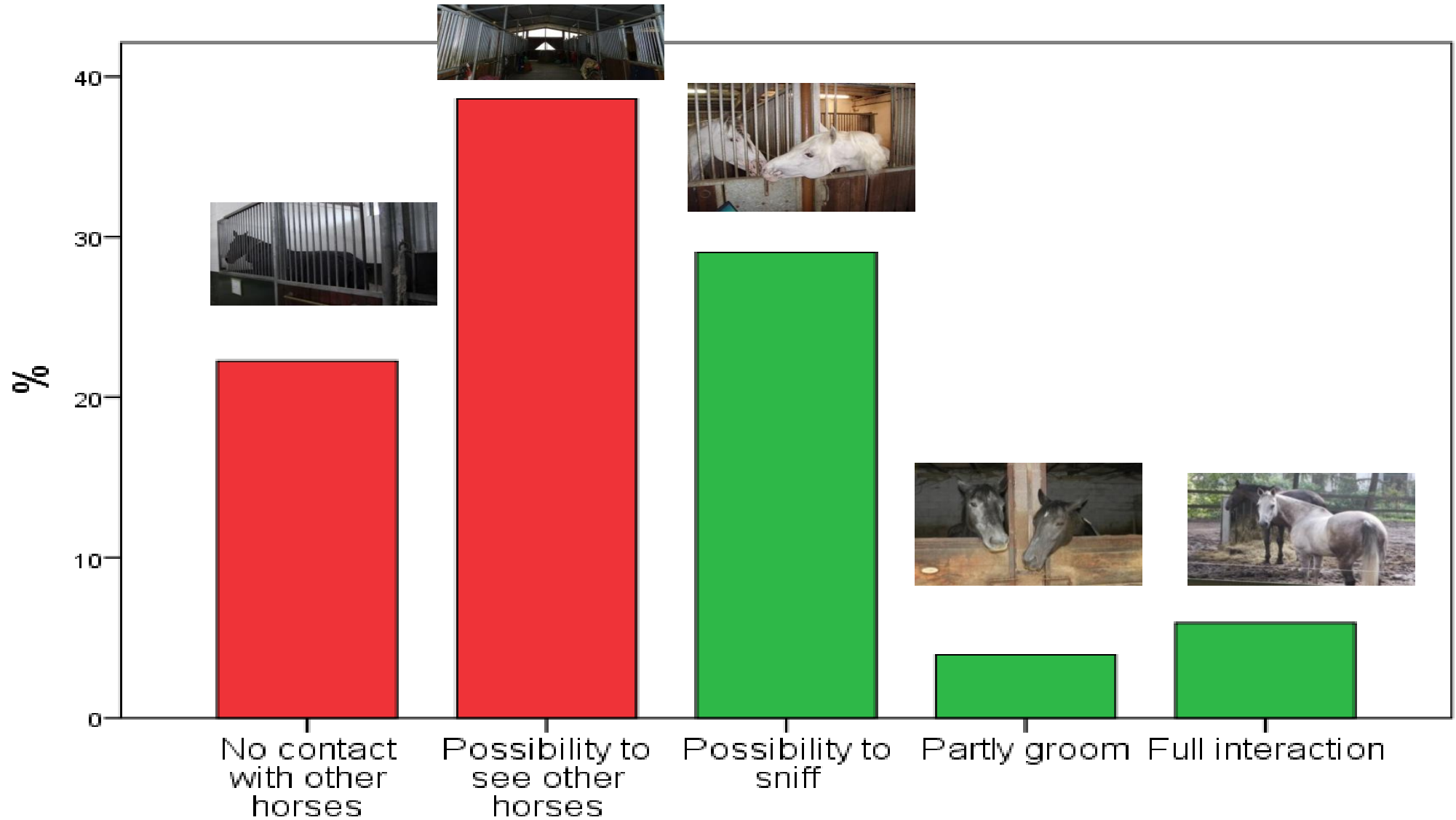
*What happened to you?*

*My mom is cold*





# Expressão de comportamento social

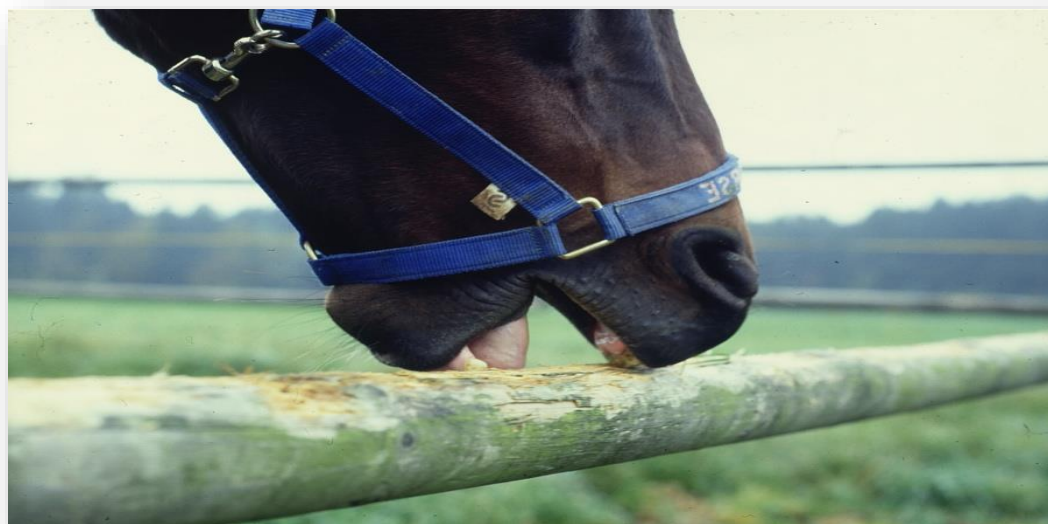


# Expressão de comportamento social

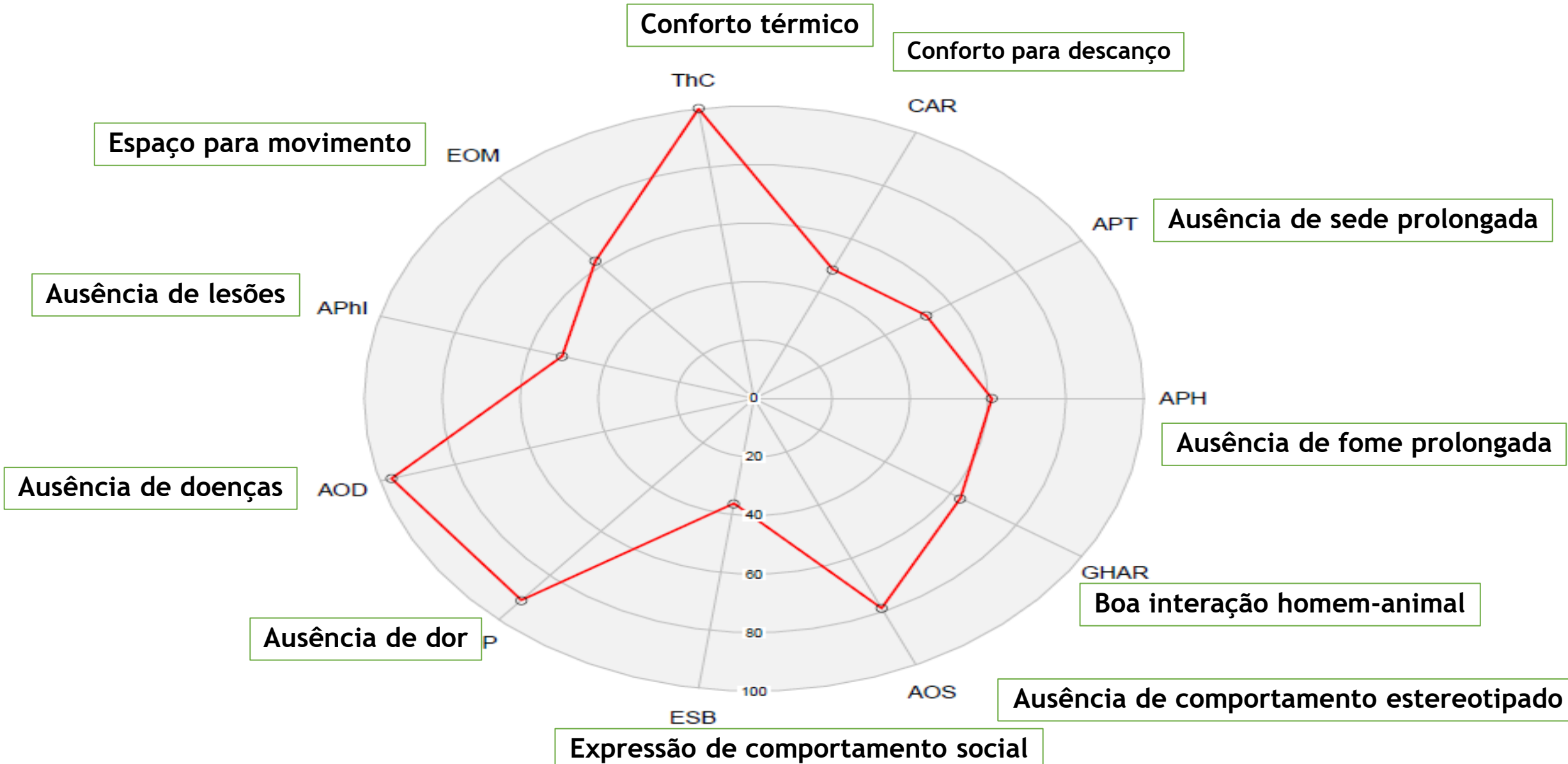




# Expressão de comportamento social



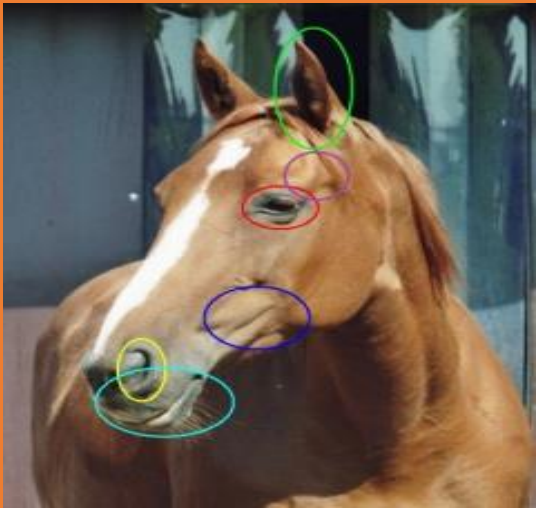
# Resultados (Minero et al.)







<b>Critério</b>	<b>Representação do critério</b>
Nutrição apropriada	Proporção de cavalos com escore corporal apropriado
Ausência de sede prolongada	Proporção de cavalos com água limpa disponível
Conforto na área de descanso	Proporção de cavalos com baias de tamanho suficiente com cama limpa
Facilidade de movimento	Proporção de cavalos com possibilidade de exercício diário
Ausência de lesões	Proporção de cavalos sem lesões
Ausência de doenças	Proporção de cavalos sem sinais clínicos de doenças
Ausência de dor e dor causada por procedimentos de manejo	Proporção de cavalos sem indicadores de dor
Expressão de comportamento social	Proporção de cavalos com possibilidade de interação social
Expressão de outros comportamentos	Proporção de cavalos sem comportamento estereotipado
Boa relação homem-animal	Proporção de cavalos com escore positivo em todos os testes de relação homem-animal



Expressão facial como  
indicador de dor



- Medidas comportamentais
- Expressão facial
- Termografia infravermelha
- Variabilidade cardíaca
- Outros



**Não existe o protocolo perfeito**

## Medidas comportamentais:

- **Composite Pain Scale (CPS)**
- **Horse Grimace Scale (HGS)**
- **Etograma**

## Medidas fisiológicas:

- **Variabilidade cardíaca (HRV)**
- **Glicocorticóides e metabólitos (GCM)**



# Composite Pain Scale (CPS)



**Escala de classificação numérica e verbal:** combinado com a avaliação de **parâmetros fisiológicos** ( Bussières et al., 2008)

## Comportamentos relacionado à dor:

- Postura
- Expressão facial
- Movimento
- Movimento da cabeça/ gestos notáveis
- Sudorese
- Pisar no chão
- Alteração de peso
- Chutes em direção ao abdomen
- Estímulos auditivos
- Appetite
- Tentativa de levantar pata
- Resposta ao toque (*mod. de acordo com SØNDERGAARD AND HALEKOH 2003*)

**Escore 0 - 3**

**5 min.  
Observação  
direta**



## Parâmetros fisiológicos:

- **Frequencia cardíaca**
- **Frequencia respiratória**
- **Sons digestivos**
- **Temperatura retal**

# Composite Pain Scale (CPS)



## Postura



## Gesto:





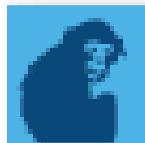
# Composite Pain Scale (CPS)



Movimento da cabeça

Expressão facial de dor





*animals*



*Article*

## Using the Horse Grimace Scale (HGS) to Assess Pain Associated with Acute Laminitis in Horses (*Equus caballus*)

Emanuela Dalla Costa <sup>1,\*</sup>, Diana Stucke <sup>2</sup>, Francesca Dai <sup>1</sup>, Michela Minero <sup>1</sup>, Matthew C. Leach <sup>3</sup> and Dirk Lebelt <sup>2</sup>





Taffarel et al. *BMC Veterinary Research* (2015) 11:83  
DOI 10.1186/s12917-015-0395-8



RESEARCH ARTICLE

Open Access

## Refinement and partial validation of the UNESP-Botucatu multidimensional composite pain scale for assessing postoperative pain in horses

Marilda Onghero Taffarel<sup>1†</sup>, Stelio Pacca Loureiro Luna<sup>2†</sup>, Flavia Augusta de Oliveira<sup>2</sup>, Guilherme Schiess Cardoso<sup>2</sup>, Juliana de Moura Alonso<sup>2</sup>, Jose Carlos Pantoja<sup>2</sup>, Juliana Tabarelli Brondani<sup>2</sup>, Emma Love<sup>3</sup>, Polly Taylor<sup>4</sup>, Kate White<sup>5</sup> and Joanna C Murrell<sup>3</sup>



# PLOS ONE

 OPEN ACCESS  PEER-REVIEWED

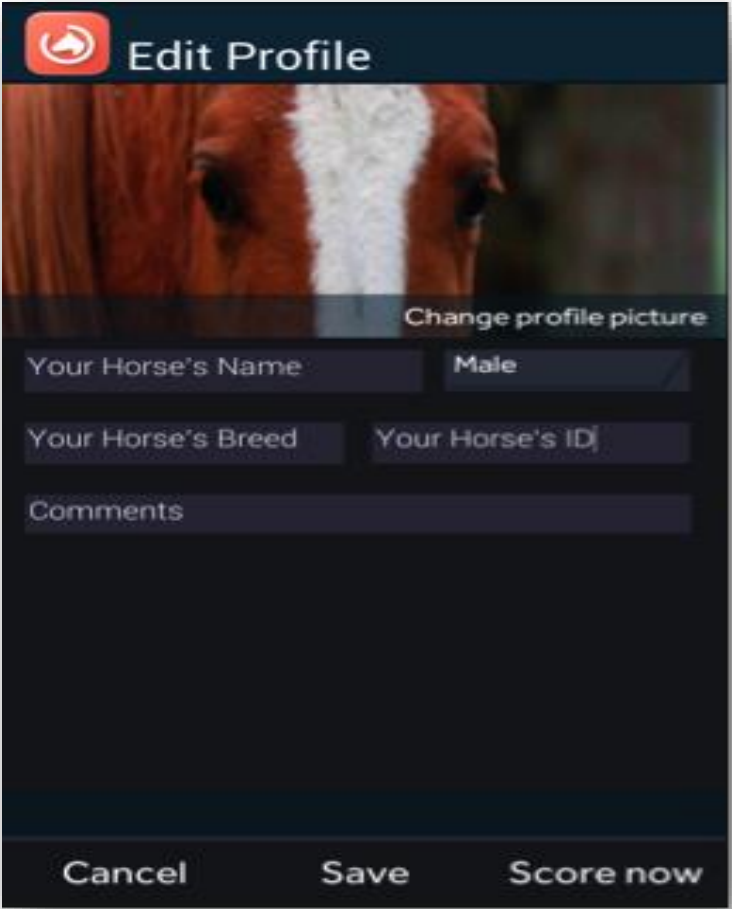
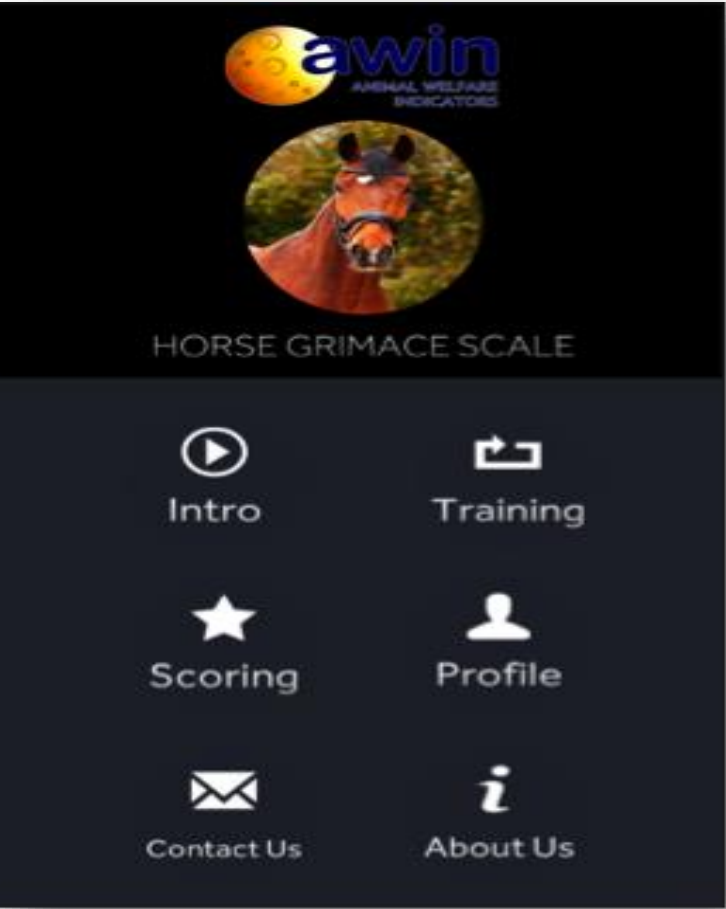
RESEARCH ARTICLE

## Development of the Horse Grimace Scale (HGS) as a Pain Assessment Tool in Horses Undergoing Routine Castration

Emanuela Dalla Costa , Michela Minero, Dirk Lebelt, Diana Stucke, Elisabetta Canali, Matthew C. Leach

Published: March 19, 2014 • <https://doi.org/10.1371/journal.pone.0092281>

# Horse Grimace Scale (HGS) Smartphone Application





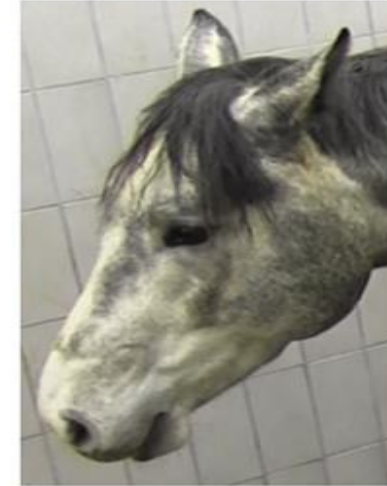
## Stiffly backwards ears



**Not present  
(0)**



**Moderately  
present (1)**



**Obviously  
present (2)**

The ears are held stiffly and turned backwards. As a result, the space between the ears may appear wider relative to baseline.



# HGS: Área acima dos olhos



## Tension above the eye area



**Not present  
(0)**



**Moderately  
present (1)**



**Obviously  
present (2)**

The contraction of the muscles in the area above the eye causes the increased visibility of the underlying bone surfaces. If temporal crest bone is clearly visible should be coded as “obviously present” or “2”.



## Orbital tightening



**Not present  
(0)**



**Moderately  
present (1)**



**Obviously  
present (2)**

The eyelid is partially or completely closed. Any eyelid closure that reduces the eye size by more than half should be coded as “obviously present” or “2”.



## Prominent strained chewing muscles



**Not present  
(0)**



**Moderately  
present (1)**



**Obviously  
present (2)**

Straining chewing muscles are clearly visible as an increase tension above the mouth. If chewing muscles are clearly prominent and recognizable the score should be coded as “obviously present” or “2”.

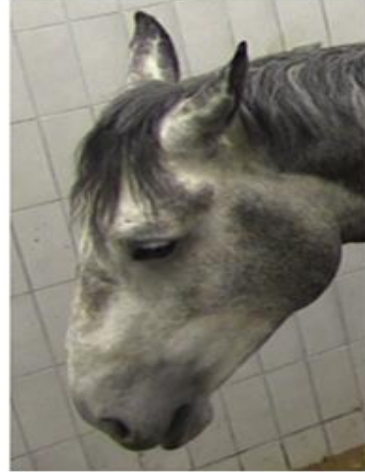




## Strained nostrils and flattening of the profile



**Not present  
(0)**



**Moderately  
present (1)**



**Obviously  
present (2)**

Nostrils look strained and slightly dilated, the profile of the nose flattens and lips elongate.





## Mouth strained and pronounced chin



**Not present  
(0)**



**Moderately  
present (1)**




**Obviously  
present (2)**

Strained mouth is clearly visible when upper lip is drawn back and lower lip causes a pronounced "chin".

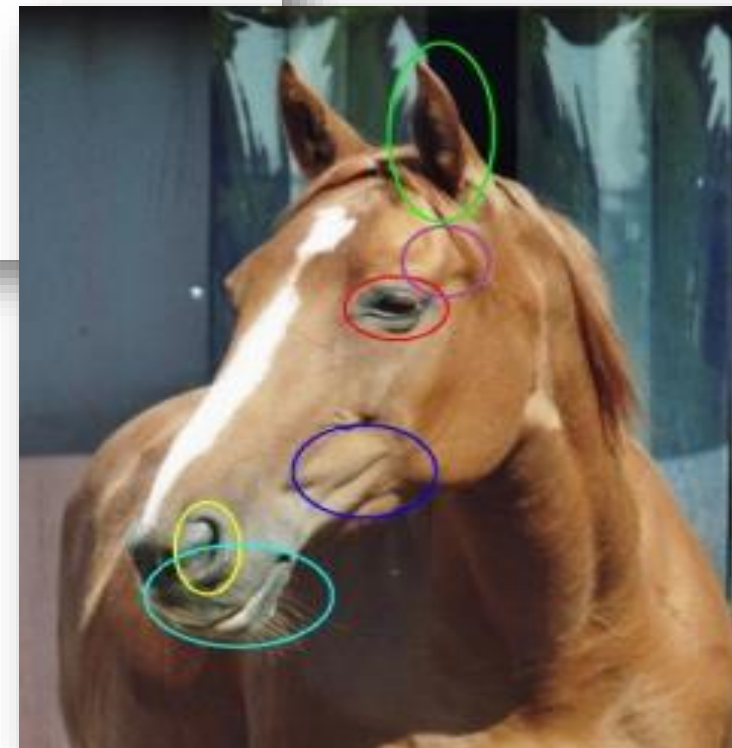
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RESEARCH ARTICLE

## Pain assessment in horses using automatic facial expression recognition through deep learning-based modeling

Gabriel Carreira Lencioni , Rafael Vieira de Sousa, Edson José de Souza Sardinha, Rodrigo Romero Corrêa, Adroaldo José Zanella

Published: October 19, 2021 • <https://doi.org/10.1371/journal.pone.0258672>



# Resultado das filmagens

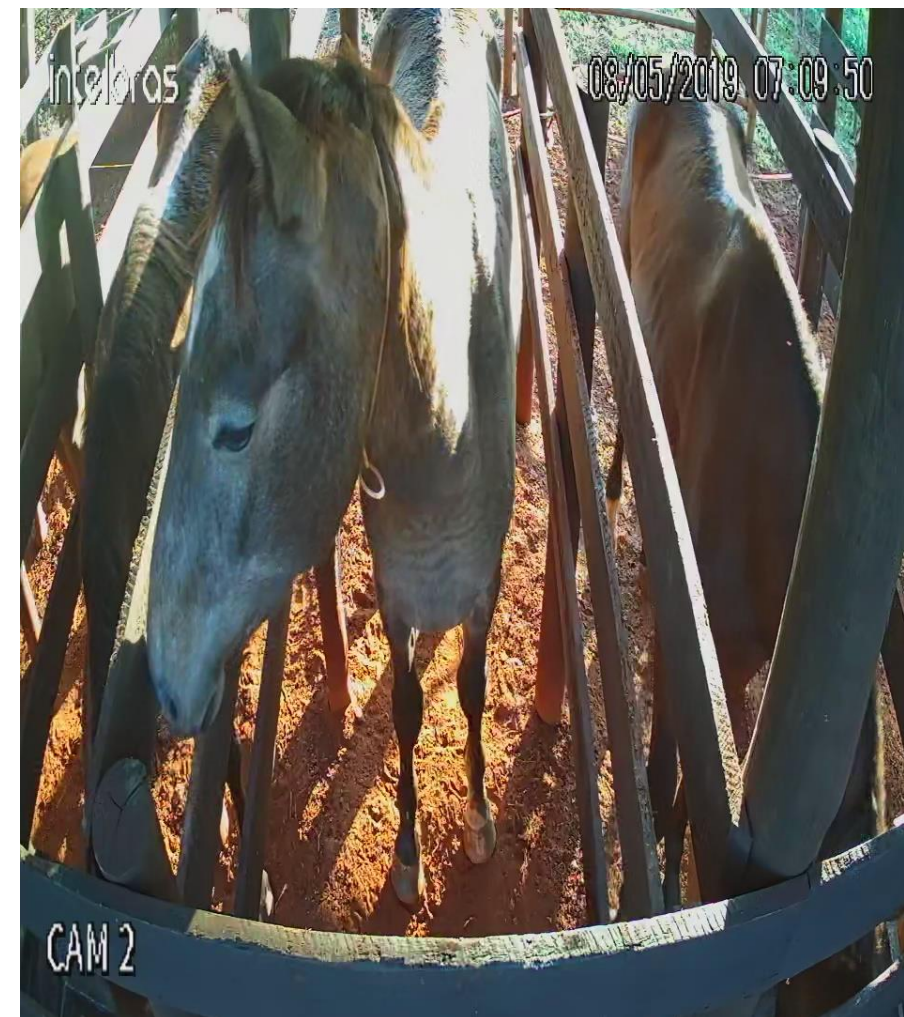


1252 vídeos com  
duração de 30 minutos.

626 horas de filmagem.

Conversão dos vídeos em  
Frames = 185.672 Frames

Seleção dos frames = 3105  
Frames







## • Horse Grimace Scale

- Orelhas
- Olho
- Tensão acima do olho
- Musculatura da mastigação
- Lábios
- Narina



Facial Coding Unit	Score
Ears stiffly backwards	2
Orbital tightening	2
Tension above eye area	0
Prominent strained chewing muscles	2
Mouth strained and pronounced chin	1
Strained nostrils and flattening of the profile	1
<b>Total pain score</b>	<b>8</b>



Facial Coding Unit	Score
Ears stiffly backwards	0
Orbital tightening	0
Tension above eye area	1
Prominent strained chewing muscles	0
Mouth strained and pronounced chin	0
Strained nostrils and flattening of the profile	0
<b>Total pain score</b>	<b>1</b>





- Horse Grimace Scale
  - Orelhas
  - Olho
  - Tensão acima do olho
  - Musculatura da mastigação
  - Lábios
  - Narina

**Orelhas**

**Olho**

**Boca e narina**

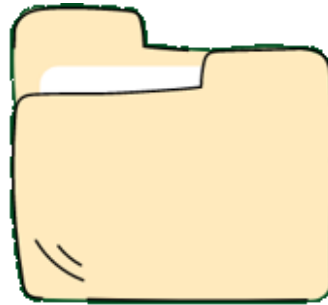
# Avaliação de dor



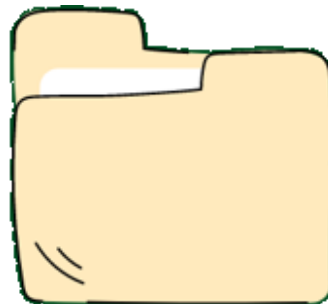
## O software

- Rede neural convolucional
  - Banco de imagens
  - 1º Script – Extrair imagens

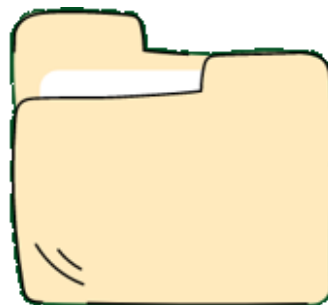
Orelha



Dor ausente

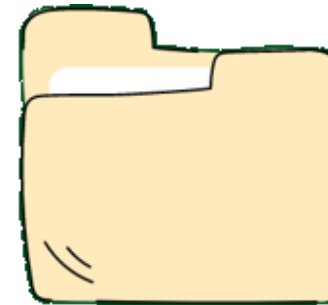


Dor moderada

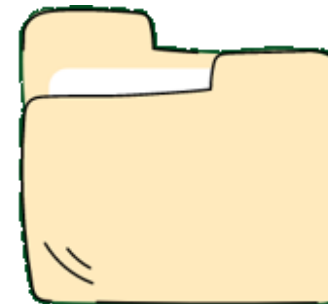


Dor presente

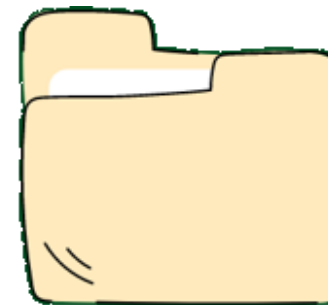
Olho



Dor ausente

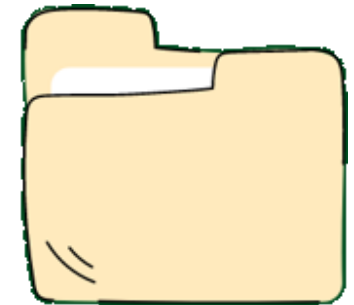


Dor moderada

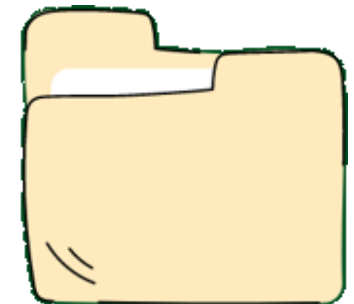


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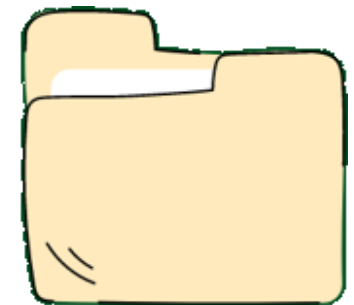
Boca e narina



Dor ausente



Dor moderada



Dor presente



## O software

- Rede neural convolucional
  - Banco de imagens
  - 1º Script – Extrair imagens

Orelha



Dor ausente

Olho



Dor ausente

Boca e narina



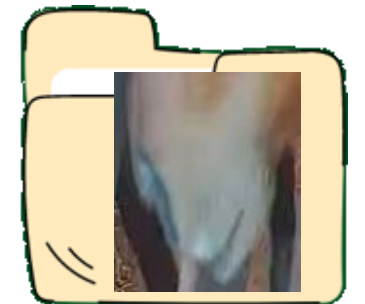
Dor ausente



Dor moderada



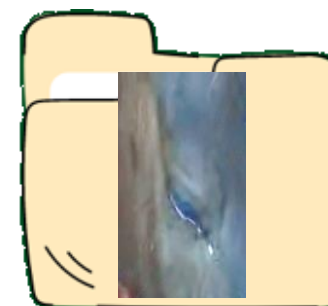
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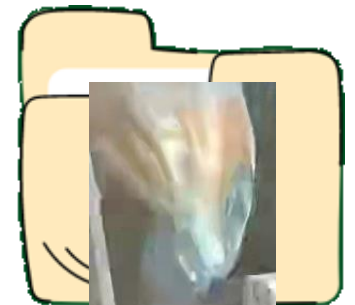
Dor moderada



Dor presente



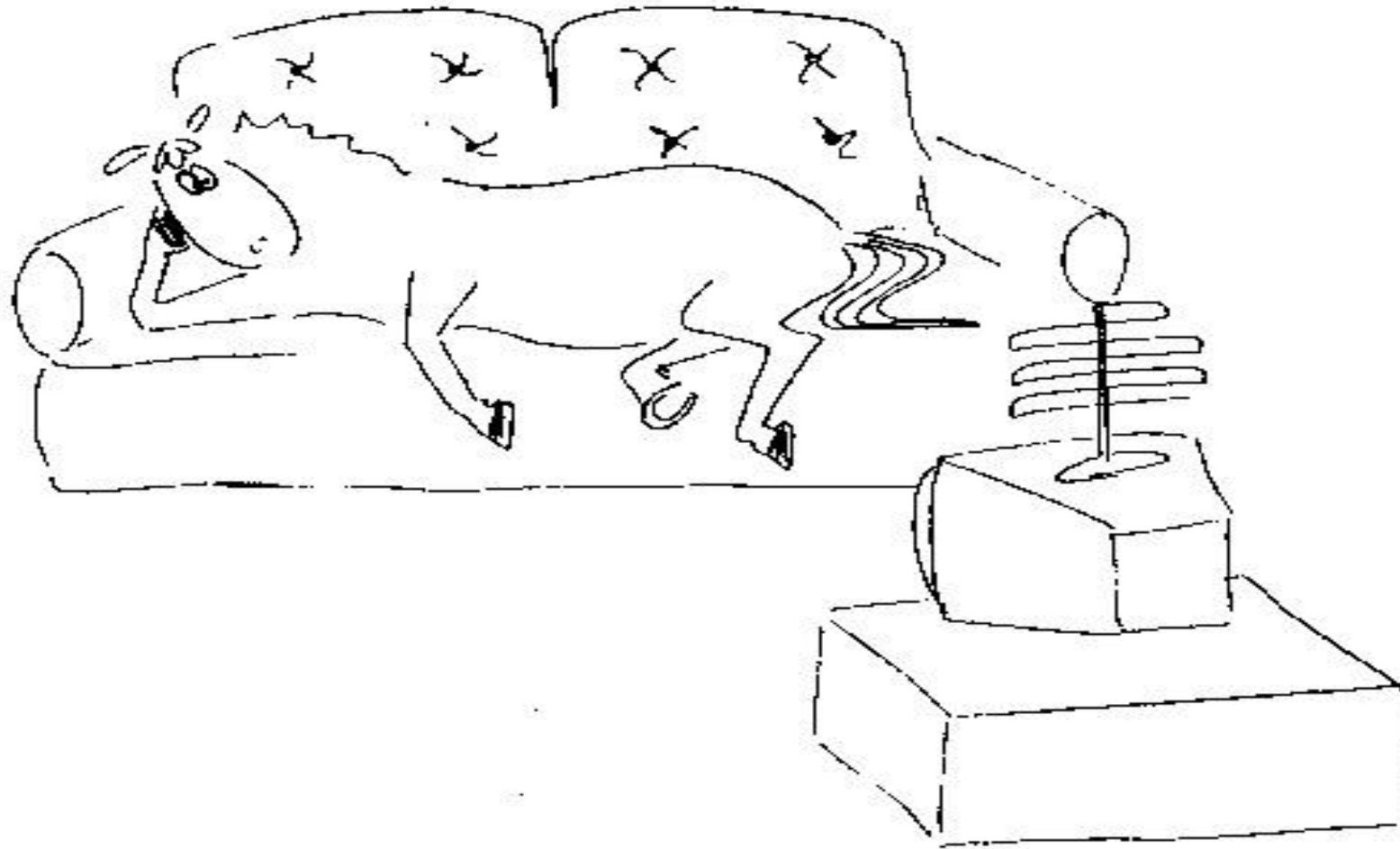
Dor presente



Dor presente



# Qualidade de vida





- Vida que “vale a pena viver”!
- O conceito no final do século XX era predominantemente baseado na “ausência” de sofrimento.
- Identificar estados afetivos positivos é um dos maiores desafios para a avaliação de bem-estar.

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