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VALENCE IN THE READING THE MIND IN THE EYES TEST: A BRAZILIAN STUDY

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Valence in the Reading the Mind in the Eyes Test: A Brazilian study

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Summary

Abstract

The processes involved in social cognition are crucial to successful social interactions and adequate social functioning. One of the most important is emotion recognition abilities. Impairments in those processes have been documented in various psychopathologies, leading to a series of difficult outcomes. A very commonly used instrument to access those constructs is the Reading the Mind in the Eyes Test (RMET), a measure of decoding emotional states based on perceptual visual information. The test comprises 36 black and white images of only the eye and eyebrows region of several faces in which the respondent selects one of four emotional labels that best describes each picture. However, the instrument itself does not measure the valences of the mental states it presents. Thus, the goal of this study is to define the RMET items valences based on a Brazilian sample. We recruited 186 Brazilian adults that underwent an online cross-sectional quantitative data collection. From the 36 picture-words pairs, 7 items were classified as neutral, 12 as positive and 17 as negative, while in the 45 words-only items, 13 were classified as positive, 1 as neutral and 31 as negative. Our classification showed important differences when compared to a study from the United States, suggesting that culture models played an important role in emotional valence classification.

Key words: Social cognition; Theory of Mind; Mental state recognition.

Introduction

Social cognition is "the processing of stimuli relevant to understanding agents and their interactions" (Happé et al., 2017), and it is related to how brain function supports cognitive processes intrinsic to social behavior (de Siqueira Rotenberg et al., 2020). The field contemplates four basic features: mentalism, process, cross-fertilization and real-world issues (Fiske & Taylor, 2021). Mentalism refers to cognitive or mental representations, which indicates how the general knowledge about ourselves and others caters the necessary expectations to function in the world. The second feature, process, represents how cognitive elements form, operate, and change. They are the steps between confronting social stimulus and reacting. The cross-fertilization concept alludes to the interdisciplinary feature of the field that often communicates with (and depends on) others, such as neuroscience.

The most studied domains in social cognition are social cue perception, experience sharing, Theory of Mind (ToM), and emotion experience and regulation (Green et al., 2015). Percepting social cues is key to social interactions. In everyday life, humans are required to identify and interpreter cues from other's faces, voices, gestures, postures…. The ability to do that accurately allows people to appropriately respond others, which is the base to maintain social relationships (Green et al., 2015). Regarding the shared experience component, there is a common neural coding between one observing other's behavior, thought to facilitate understanding of mental states (Kosmidis et al., 2008). It can be separated in two processes: motor resonance and affect sharing (Bliksted et al., 2014). The ToM construct will be discussed in depth later in this paper, but in summary it refers to inferring other people's thoughts and emotions (Dehelean et al., 2021). As regards to the last aspect, social interactions frequently include a lot of emotion. An individual's ability to adapt to the difficulties of social life depends on their emotional reactions to others and how they deal with those reactions (Green et al., 2015).

Studies using functional magnetic resonance imaging (fMRI) investigated brain areas related to social cognitive responses, mostly the medial prefrontal cortex (mPFC), the superior temporal sulcus (STS), and the fusiform gyrus (FFA). In a study developed by Castelli, Frith, Happé & Frith (2002), people watched animated triangles interact with each other. Some of them followed a script that resembled mental inferences, such as persuading. Others performed simple goals, such as dancing, and others just moved physically, like floating. When watching the human-like mental state triangle movements, distinct activation patterns emerged, among them were mPFC, STS and FFA. This was one of the first studies to show attribution of human-like mental states to inanimate object, dubbed a ToM effect (Fiske & Taylor, 2021).

Conversely, researchers are often interested in how all these processes relate to the current social scenario, such as biases and prejudice, and how its findings can contribute to clinical advances (Fiske & Taylor, 2021). Social cognition is a domain greatly influenced by culture (Fiske & Taylor, 2021; Vogeley & Roepstorff, 2009). It has been shown that culture underlies various cognitive processes, such as categorization; learning and memory; schooling and literacy; spatial cognition; problem solving and verbal reasoning; and creativity (Matsumoto, 2001). Regarding emotion and mental states recognition, studies have shown differences in fear recognition across cultures (Elfenbein & Ambady, 2002) and even amygdala activation distinctions (Chiao et al., 2008).

Social cognition deficits have been related to over thirty disorders and potentially represent an under-recognized domain of impairment in psychopathology, associated with functional and clinical importance (Cotter et al., 2018) in different contexts such as eating disorder (Mason et al., 2021); PTSD (Stevens & Jovanovic, 2019); OCD (Jansen et al., 2020), depression (Weightman et al., 2014), and even suicide (Dueweke & Schwartz-Mette, 2018) and cyberbullying (Chen et al., 2017). The most studied, however, are the constructs of facial emotion recognition and ToM, especially regarding to the contexts of autism spectrum disorders (Fernandes et al., 2018; Velikonja et al., 2019) and psychosis spectrum disorders (Buck et al., 2016; Dalkner et al., 2019; de Siqueira Rotenberg et al., 2020; Dehelean et al., 2021; Deng et al., 2021; García-Fernández et al., 2020; Kim et al., 2020; Li et al., 2020; Marotta et al., 2018; Miskowiak et al., 2019; Sen et al., 2020; Szmulewicz et al., 2020; Vlad et al., 2018). Additionally, approaches such as the Research Domain Criteria (RDoC), which proposes a transdiagnostic overview of psychopathology, also includes social cognition constructs, for example, reception and production of facial communication (Cuthbert & Insel, 2013; Gur & Gur, 2016).

The ToM construct is the ability to assume other's beliefs, intentions, and thoughts (cognitive ToM), and infer other's feelings and emotions (affective ToM) (Dehelean et al., 2021). Face perception, in turn, is a global primal skill and it was key to socialization and survival of the humankind. Humans make spontaneous inferences from faces all the time and, among those inferences, emotion recognition skills take place. This process anchors on the happiness versus anger duality and it leads to emotion overgeneralization (Fiske & Taylor, 2021). The capacity of understanding non-verbal information about emotion and intention are believed to be crucial factors for adequate social functioning (Marotta et al., 2018).

One way to objectively examine emotion recognition and ToM abilities is through the Reading the Mind in the Eyes Test (RMET) (Baron-Cohen et al., 2001), which is a widely used instrument to measure the capacity of adults to recognize emotions in others and it is majorly used to access the affective component of ToM. It is a measure of decoding emotional states based on perceptual visual information (de Siqueira Rotenberg et al., 2020). The test comprises 36 black and white images of only the eye and eyebrows region of several faces. The respondent must select one of four emotional labels that best describes each of the photographs. Additionally, participants are given a list of definitions that includes all the descriptors, which they can refer to if they are unsure of the meaning of a word.

Individuals with ASD, SZ, and BD during euthymia have shown general impairments in facial emotion recognition and inadequacy in the ability to attribute mental states (Happé et al., 2017; Li et al., 2020; Marotta et al., 2018). Implicit social perceptual process (automatic decoding ability) and reasoning about emotional mental states are also affected areas in these populations (de Siqueira Rotenberg et al., 2020; Dehelean et al., 2021). This finding may be related to difficulties in interpersonal connections and understanding others' emotional intentions (de Siqueira Rotenberg et al., 2020; Li et al., 2020), supporting the link between social cognitive impairment and psychosocial functioning, particularly in social and occupational challenges (Dalkner et al., 2019).

Lower RMET scores are thought to be dependent on a number of factors, including: cognitive performance, specifically in deficits in memory and the ability to focus attention (Dehelean et al., 2021); impairments in accurate semantic interpretation of a social situation and accurate understanding of social cues and executive functioning (de Siqueira Rotenberg et al., 2020); and weaker verbal abilities and lack of vocabulary knowledge (Dalkner et al., 2019). Since only individuals with BD with severe memory problems displayed poor ToM performances, the overlap between RMET results and verbal memory performance is quite substantial in current literature (Dalkner et al., 2019; de Siqueira Rotenberg et al., 2020). Interesting findings revealed that healthy participants are not affected by this connection (Dalkner et al., 2019), leading to a "ground effect" hypothesis.

Curiously, increased psychiatric symptoms are associated with poorer RMET scores. Mild psychiatric symptoms coexist with lower levels of empathy and emotional identification abilities, which is linked to worse ToM. It is unclear if reference and persecutory delusions, which cause people to mistakenly assign other people's mental states to them, are related to such deficiencies in ToM, or if delusions themselves can impair ToM skills. In addition, individuals with schizophrenia who experience this scenario had worse premorbid social functioning, a higher risk of developing psychiatric illnesses, and more jumbled symptoms (Dehelean et al., 2021). The RMET score's gender disparity is also noticeable. A typical finding in the literature is that euthymic female individuals with BD were better at recognizing emotions (Dalkner et al., 2019; Dehelean et al., 2021); however, in the SZ population, male patients were more successful (Deng et al., 2021).

The RMET, nonetheless, can only evaluate whether the subject can infer the emotion right or wrong. Healthy adults display a 70% accuracy performance in the test while people with ASD go as high as 62% accuracy rates (Baron-Cohen et al., 2001). One way of thoroughly investigating ToM performance is by analyzing the valence of the displayed RMET emotions. This approach might be crucial to understand ToM deficits in people's relationships and quality of life.

An attentional bias toward positive emotions have been shown in individuals without mental disorders (Joormann & Gotlib, 2007). Conversely, individuals with depression who have a history of suicide attempt underperformed interpreting neutral feelings. In individuals with major or violent suicide attempts, these effects were considerably worse, which might indicate that ambiguity in neutral statements makes it easier to overinterpret their valence (Ferrer et al., 2020). Individuals with borderline personality disorder considerably struggle to analyze the valence of both positive and neutral emotions when compared to a control group (Anupama et al., 2018).

There are nearly 100 studies that considered RMET through a valence analysis (Hudson et al., 2020) using a variety of methods. Some of them considered only the RMET picture (Meijer-van Abbema & Koole, 2017; Scott et al., 2011), other the correct adjective (Hezel & Mcnally, 2014) or even the Dictionary of Affect in Language (Konrath et al., 2014). However, the methodology varied in a range of pre-categorization by the authors (Meijer-van Abbema & Koole, 2017) to classification made by samples with undergraduate students (Scott et al., 2011).

In our perspective, the most methodologically reliable classification is the one developed by Harkness and colleagues (2005). They gave all the 36 photographs with the correct adjective below to a sample of 12 women. These women ranked each slide on a 7-point scale in which 1 was very negative, 4 neutral and 7 very positive. Items that were significantly ranked below neutral were considered negative (n=12), the ones with mean ratings were categorized as neutral (n=16), and the ones significantly above neutral were classified as positive (n=8). In 2020, Hudson et al. (2020) attempted to unify the valence classification, using a similar method to Harkness et al. (2005). They amplified the sample, including 225 people, and made it more diverse, including men and people from different races and ethnicities. The RMET instrument was presented online with both pictures and correct adjective, and the previous 7-point scale was also used. The final dataset included 164 participants (82% female) of 18.2 years old as a mean age. As a result, 7 items were categorized as neutral, 13 as negative and 16 as positive. Because of the large sample size, even small deviations from neutral were significant, making it less likely to categorize items as neutral.

Cultural models and emotion models play a key role when considering valence, acceptability and desirability of emotions. These shared mental representation of the world at the intersubjective level determine what is considered to be appropriate and expected as well as guide how people on an individual level perceive and value different types of emotions and mental states (Senft et al., 2023). The explanations around such differences are usually linked to the individualism-collectivism paradigm, which reflects differences in how people relate to one another and give individual goals priority over group goals or vice-versa (Campos & Kim, 2017). This central focus has a significant impact on a number of different processes, including cognitive styles (Choi et al., 2007) and self-construal (Markus & Kitayama, 1991).

To the extent of our knowledge, no study of this kind has been conducted in Brazil with Brazilian subjects so far. Considering the important role of cultural influences in facial emotional recognition and social cognition, the main goal of the present study is to define the RMET items valences based on a Brazilian sample, replicating the study by Hudson et al. (2020), discussing cultural influences.

Methods

Design

This is a cross-sectional study.

Ethical procedures

This study was approved by the Psychology Institute of the Federal University of Rio Grande do Sul's ethics committee, registered under the 64202622.0.0000.5334 CAAE number, and it follows the ethical procedures of researches in Human and Social Sciences, described in the 466/2012 (Brasil, 2012) and 510/2016 (Brasil, 2016) Brazilian resolutions of the National Health Council (CNS).

Data collection procedures

We recruited 186 participants through non-probabilistic sampling, using social media and peers' propagation and posters placed in the Psychology Institute of the Federal University of Rio Grande do Sul. They all signed an online form declaring informed consent. Data was collected online, asynchronously, through the Google Forms platform. Participants completed the instruments described below.

Instruments

Sociodemographic questionnaire (Appendix 1): An online form asking information about age, gender, race/ethnicity, occupation, state and city of residence, history of mental illness, years of study, and income. The social class distribution was assessed using the ABEP model (Associação Brasileira de Empresas de Pesquisa (ABEP), 2021).

DSM–5 self-rated Level 1 cross-cutting symptom measure – Adults (Appendix 2): This instrument is a self-applied tool to help track psychopathological traits in adults. It was developed and published in the Diagnosis Statistic Manual 5th edition- DSM-5, and we used the Brazilian Portuguese version (American Psychiatric Association, 2014). This instrument presents an acceptable to good internal consistency. All domains presented a moderate (.30 < rs < .50) to strong range (r > .50) of positive association (Bravo et al., 2018).

Reading the Mind in the Eyes Test (RMET) valence adaptation: Developed by Baron-Cohen et al. (2001) and validated in Brazil by Sanvicente-Vieira et al. (2013) (Appendix 3). It consists of the same 36 plus training black and white pictures of the original instrument; however, they were presented with the correct adjective centered below the image (Appendix 4). The pictures were presented in a 750 x 480 pixels dimension and the participant had to choose one of 7 items on a Likert scale, being: 1- Very negative; 2- Negative; 3- Somehow negative; 4- Neutral; 5- Somehow positive; 6- Positive and 7- Very positive (Hudson et al., 2020). They were also shown another 45 words, which compose the RMET possible answers range, and ask to classify them in the same Likert scale as the image-word pair.

Participants

From the 186 initial sample, 4 participants were excluded because they did not meet the inclusion criteria of age (above 18 years old) and nationality (Brazilian). Then, we screened the remaining 182 participants for indicators of potential severe psychopathological traits using the "DSM–5 self-rated Level 1 cross-cutting symptom measure – Adults" results. From that analysis, we excluded 60 more participants. All participants were literate.

The resultant 122 sample was composed by 66.1% women, 32.1% men and 1.8% non-binary with a mean age of 41.1 years, ranged from 18-72. The majority of participants identified as white (86.6%), followed by bi-racial (8.9%), black (2.7%), asian (0.0%) and others (0.9%). The sample's years of study mean was 18.9 with a range of 5 -52 years. The most frequent occupation was student (17%), followed psychologist (14.3%), public servant (13.4%) and retired (9.8%). The great majority was from the south region of Brazil (83.9%) followed by the southeast region (10.8%). 38% of the sample belong to the highest social class (A), followed by 32.4% in the second highest (B1), 19.4% in the third highest (B2), 9.3% in the first middle one (C1) and 0.9% in the second middle one (C2). There were no participants in the lowest social class (D).

Statistical analysis

Data analysis followed Hudson et al. (2020) approach. First, in order to inspect the responses for evidence of nonsystematic responding, we calculated a mean valence score for each item using the data from all 122 participants. We transformed each participant into one variable and conducted a Pearson correlation analysis between those variables and mean valence ratings for all the 36 RMET items. Since correlations close to zero suggest random responding and negative correlations suggest scale reversal, we excluded participants whose overall ratings correlated with mean ratings at less than $r = .20$ ($n = 15$). The final sample was composed of 107 subjects.

Second, we conducted the valence analyses. The mean valence rating of each RMET item was first compared to the neutral rating (i.e., 4) using a series of one-sample t-tests. This analysis was also repeated with the 45 words-only RMET items. Because of the multiple comparisons, statistical significance was considered if $p < .001$. Then, we calculated bootstrapped confidence intervals for the one-sample t-test of each item based on a random sample size of 60 and 1,000 iterations.

Finally, we ran additional analyses to explore a different approach in categorizing emotional valences. We transformed the participants' valence responses (ranged 1-7) into z-scores considering 4 as the mean and 1 as the standard deviation. Items with z-scores above or below 1 were considered positive or negative, respectively. The analyses were made using R and RStudio software (RStudio Team, 2020) (scripts are available in Appendix 5).

Results

Preliminary analysis

After conducting the Pearson's correlation analysis, the final dataset included 107 participants (68.6% women, 29.4% men, 2% non-binary) with a mean age of 40.1 years (SD=17.5 years). The were no significant differences in the other sociodemographic variables compared to the first 179 sample.

Valence analysis

The result of the series of one-sample t-tests were that 7 items failed to differ significantly from neutral (items 6, 10, 12, 23, 24, 27). From the remaining items, 12 were classified as positive (items 1, 3, 15, 16, 18, 20, 21, 25, 28, 29, 30, 31) and 17 as negative (items 2, 4, 5, 7, 8, 9, 11, 13, 14, 17, 22, 26, 32, 33, 34, 35, 36). These results are shown in Figure 1.

Original RMET item	Brazilian RMET Item	Valence	t	p-value	CI	Mean
20. FRIENDLY	20. AMIGÁVEL		18.801	p<.001	5.78 - 6.19	5.98
31. CONFIDENT	31. CONFIANTE		15.160	p<.001	5.40 - 5.82	5.61
18. DECISIVE	18. DECIDIDO		15.822	p<.001	5.40 - 5.79	5.60
25. INTERESTED	25. INTERESSADO		11.865	p<.001	5.07 - 5.50	5.29
1. PLAYFUL	1. BRINCALHÃO		8.331	p<.001	4.89 - 5.44	5.17
30. FLIRTATIOUS	30. PAQUERADOR		10.754	p<.001	4.94 - 5.36	5.15
3. DESIRE	3. DESEJOSO		10.020	p<.001	4.87 - 5.31	5.09
28. INTERESTED	28. INTERESSADO		8.957	p<.001	4.82 - 5.28	5.06
15. CONTEMPLATIVE	15. CONTEMPLATIVO		9.718	p<.001	4.81 - 5.24	5.03
16. THOUGHTFUL	16. PENSATIVO		9.172	p<.001	4.72 - 5.12	4.93
29. REFLECTIVE	29. REFLEXIVO		6.347	p<.001	4.48 - 4.93	4.71
21. FANTASIZING	21. FANTASIOSO		4.239	p<.001	4.27 - 4.75	4.51
10. CAUTIOUS	10. CAUTELOSO		2.426	0.01693	4.04 - 4.42	4.23

6. FANTASIZING	6. FANTASIOSO		2.014	0.0465	4.00 - 4.44	4.22
27. CAUTIOUS	27. CAUTELOSO		2.020	0.04588	4.00 - 4.40	4.21
24. PENSIVE	24. PENSATIVO		0.994	0.3224	3.88 - 4.36	4.12
12. SCEPTICAL	12. CÉTICO		-1.194	0.2351	3.67 - 4.08	3.88
19. TENTATIVE	19. INCERTO		-3.096	0.002505	3.44 - 3.88	3.66
23. DEFIANT	23. DESAFIADOR		-2.909	0.004411	3.42 - 3.89	3.65
32. SERIOUS	32. SÉRIO		-3.485	p<.001	3.35 - 3.82	3.59
17. DOUBTFUL	17. DESCRENTE		-6.634	p<.001	3.18 - 3.56	3.37
4. INSISTING	4. INSISTENTE		-5.440	p<.001	3.13 - 3.59	3.36
34. DISTRUSTFUL	34. DESCONFIADO		-6.700	p<.001	3.10 - 3.51	3.31
7. UNEASY	7. APREENSIVO		-8.284	p<.001	3.10 - 3.45	3.28
33. CONCERNED	33. PREOCUPADO		-8.242	p<.001	3.06 - 3.42	3.24
9. PREOCCUPIED	9. PREOCUPADO		-7.962	p<.001	2.98 - 3.39	3.19
11. REGRETFUL	11. ARREPENDIDO		-6.896	p<.001	2.93 - 3.40	3.17
22. PREOCCUPIED	22. PREOCUPADO		-10.856	p<.001	2.85 - 3.20	3.03
5. WORRIED	5. PREOCUPADO		-14.129	p<.001	2.67 - 3.00	2.84
13. ANTICIPATING	13. AFLITO		-12.999	p<.001	2.46 - 2.86	2.66
35. NERVOUS	35. NERVOSO		-15.927	p<.001	2.33 - 2.70	2.51
14. ACCUSING	14. ACUSADOR		-12.655	p<.001	2.20 - 2.70	2.45
36. SUSPICIOUS	36. SUSPEITO		-15.427	p<.001	2.20 - 2.60	2.4
8. DESPONDENT	8. ABATIDO		-19.410	p<.001	2.14 - 2.49	2.32
2. UPSET	2. CHATEADO		-21.397	p<.001	1.95 - 2.29	2.12
26. HOSTILE	26. HOSTIL		-19.157	p<.001	1.70 - 2.13	1.92

Figure 1: This figure shows the valence classification of the 36 RMET items (word-picture pair) considering one-sample t-tests. They are displayed from the most positive item (largest mean value) to the most negative item (smallest mean value). The light grey color represents positive valence; the medium gray, neutral valence; and the dark grey, negative valence.

We also calculated bootstrapped confidence intervals (1,000 iterations) for the one-sample t-test of each item based on a sample size 60, following the same parameters as of Hudson et al. (2020). In these analyses, 6 items (6, 10, 12, 19, 24, 27) did not differed significantly from neutral, so they were classified as neutral. The results are shown in Figure 2.

Original REMET item	Brazilian RMET item	p-value	Bootstrapped CI	Bootstrappped Valence
20. FRIENDLY	20. AMIGÁVEL	<.05	5.70 - 6.21	
18. DECISIVE	18. DECIDIDO	<.05	5.38 - 5.86	
31. CONFIDENT	31. CONFIANTE	<.05	5.23 - 5.86	
25. INTERESTED	25. INTERESSADO	<.05	5.00 - 5.58	
28. INTERESTED	28. INTERESSADO	<.05	4.95 - 5.55	
1. PLAYFUL	1. BRINCALHÃO	<.05	4.87 - 5.56	
30. FLIRTATIOUS	30. PAQUERADOR	<.05	4.62 - 5.16	
3. DESIRE	3. DESEJOSO	<.05	4.75 - 5.31	
15. CONTEMPLATIVE	15. CONTEMPLATIVO	<.05	4.75 - 5.28	
16. THOUGHTFUL	16. PENSATIVO	<.05	4.60 - 5.10	
29. REFLECTIVE	29. REFLEXIVO	<.05	4.43 - 5.00	
21. FANTASIZING	21. FANTASIOSO	<.05	4.12 - 4.83	
10. CAUTIOUS	10. CAUTELOSO	0.05402563	4.00 - 4.48	
27. CAUTIOUS	27. CAUTELOSO	0.05604405	4.00 - 4.45	
24. PENSIVE	24. PENSATIVO	0.4523324	3.81 - 4.41	
6. FANTASIZING	6. FANTASIOSO	0.5828094	3.78 - 4.38	
12. SCEPTICAL	12. CÉTICO	0.08967236	3.50 - 4.03	
19. TENTATIVE	19. INCERTO	0.05425163	3.38 - 3.96	
32. SERIOUS	32. SÉRIO	<.05	3.33 - 3.91	
23. DEFIANT	23. DESAFIADOR	<.05	3.30 - 3.90	
4. INSISTING	4. INSISTENTE	<.05	3.20 - 3.83	

17. DOUBTFUL	17. DESCRENTE	<.05	3.15 - 3.68	
7. UNEASY	7. APREENSIVO	<.05	3.13 - 3.56	
34. DISTRUSTFUL	34. DESCONFIADO	<.05	3.08 - 3.60	
33. CONCERNED	33. PREOCUPADO	<.05	2.96 - 3.41	
9. PREOCCUPIED	9. PREOCUPADO	<.05	2.95 - 3.48	
11. REGRETFUL	11. ARREPENDIDO	<.05	2.81 - 3.40	
22. PREOCCUPIED	22. PREOCUPADO	<.05	2.76 - 3.16	
5. WORRIED	5. PREOCUPADO	<.05	2.58 - 2.98	
13. ANTICIPATING	13. AFLITO	<.05	2.46 - 3.03	
35. NERVOUS	35. NERVOSO	<.05	2.30 - 2.75	
8. DESPONDENT	8. ABATIDO	<.05	2.11 - 2.58	
36. SUSPICIOUS	36. SUSPEITO	<.05	2.08 - 2.68	
14. ACCUSING	14. ACUSADOR	<.05	2.05 - 2.68	
2. UPSET	2. CHATEADO	<.05	1.88 - 2.35	
26. HOSTILE	26. HOSTIL	<.05	1.58 - 2.12	

Figure 2: This figure shows the valence classification of the 36 RMET items (word-picture pair) considering the bootstrapped one-sample t-tests. They are displayed from the most positive item (highest CI) to the most negative item (lowest CI). The light grey color represents positive valence; the medium gray, neutral valence, and the dark grey, negative valence.

We then transformed the mean valences into z-scores to explore an additional approach. With this, 19 items had z-scores between -1 and 1, hence were classified as neutral (items 4, 6, 7, 9, 10, 11, 12, 16, 17, 19, 21, 22, 23, 24, 27, 29, 32, 33, 34), 9 items had z-scores above 1 and were classified as positive (items 1, 3, 15, 18, 20, 25, 28, 30, 31), and 8 items had z-scores below -1 and were classified as negative (items 2, 5, 8, 13, 14, 26, 35, 36). These results are shown in Figure 3.

Original REMET item	Brazilian RMET Item	Valence	Z-score
20. FRIENDLY	20. AMIGÁVEL		1.98
31. CONFIDENT	31. CONFIANTE		1.61
18. DECISIVE	18. DECIDIDO		1.60
25. INTERESTED	25. INTERESSADO		1.29
1. PLAYFUL	1. BRINCALHÃO		1.17
30. FLIRTATIOUS	30. PAQUERADOR		1.15
3. DESIRE	3. DESEJOSO		1.09
28. INTERESTED	28. INTERESSADO		1.06
15. CONTEMPLATIVE	15. CONTEMPLATIVO		1.03
16. THOUGHTFUL	16. PENSATIVO		0.93
29. REFLECTIVE	29. REFLEXIVO		0.71
21. FANTASIZING	21. FANTASIOSO		0.51
10. CAUTIOUS	10. CAUTELOSO		0.23
6. FANTASIZING	6. FANTASIOSO		0.22
27. CAUTIOUS	27. CAUTELOSO		0.21
24. PENSIVE	24. PENSATIVO		0.12
12. SCEPTICAL	12. CÉTICO		-0.12
19. TENTATIVE	19. INCERTO		-0.34
23. DEFIANT	23. DESAFIADOR		-0.35
32. SERIOUS	32. SÉRIO		-0.41
17. DOUBTFUL	17. DESCRENTE		-0.63
4. INSISTING	4. INSISTENTE		-0.64
34. DISTRUSTFUL	34. DESCONFIADO		-0.69
7. UNEASY	7. APREENSIVO		-0.72
33. CONCERNED	33. PREOCUPADO		-0.76
9. PREOCCUPIED	9. PREOCUPADO		-0.81
11. REGRETFUL	11. ARREPENDIDO		-0.83
22. PREOCCUPIED	22. PREOCUPADO		-0.97
5. WORRIED	5. PREOCUPADO		-1.16

13. ANTICIPATING	13. AFLITO		-1.34
35. NERVOUS	35. NERVOSO		-1.49
14. ACCUSING	14. ACUSADOR		-1.55
36. SUSPICIOUS	36. SUSPEITO		-1.60
8. DESPONDENT	8. ABATIDO		-1.68
2. UPSET	2. CHATEADO		-1.88
26. HOSTILE	26. HOSTIL		-2.08

Figure 3: This figure shows the valence classification of the 36 RMET items (word-picture pair) considering z-scores transformation. They are displayed from the most positive item (highest Z score) to the most negative item (lowest Z score). The light grey color represents positive valence, the medium gray, neutral valence; and the dark grey, negative valence.

Words-only valence analysis

The same one-sample t-tests were run in the 45 words-only RMET items. In these analyses, only one item failed to differ significantly from neutral (item P42). From the remaining items, 13 were classified as positive (items P1, P8, P9, P11, P16, P18, P26, P27, P28, P29, P34, P35, P38) and 31 as negative (items P2, P3, P4, P5, P6, P7, P10, P12, P13, P14, P15, P17, P19, P20, P21, P22, P23, P24, P25, P30, P31, P32, P33, P36, P37, P39, P40, P41, P43, P44, P45) These results are shown in Figure 4.

Brazilian RMET word Item	Valence	t	p-value	IC	Mean
P28. AFETUOSO		39.386	>.001	6.50 - 6.77	6.64
P29. GRATO		39.027	>.001	6.46 - 6.72	6.59
P8. DIVERTIDO		36.001	>.001	6.31 - 6.58	6.45
P11. AMIGÁVEL		31.631	>.001	6.26 - 6.56	6.41
P27. SOLIDÁRIO		21.918	>.001	6.16 - 6.59	6.37
P38. CARINHOSO		30.655	>.001	6.19 - 6.49	6.34
P9. RELAXADO		19.103	>.001	5.89 - 6.33	6.11
P26. ENCORAJADOR		25.378	>.001	5.94 - 6.27	6.10
P34. SATISFEITO		23.117	>.001	5.89 - 6.24	6.07
P18. ENTUSIASMADO		21.349	>.001	5.78 - 6.14	5.96
P16. ALIVIADO		19.018	>.001	5.65 - 6,03	5.84
P35. CURIOSO		15.211	>.001	5.34 - 5.74	5.54
P1. CONSOLADOR		14.347	>.001	5.30 - 5.71	5.50
P42. INTRIGADO		0.824	0.4119	3.88 - 4.29	4.08
P40. PERPLEXO		-4.630	>.001	3.36 - 3.74	3.55
P17. TÍMIDO		-5,648	>.001	3.38 - 3.70	3.54
P12. CHOCADO		6.894	>.001	3.07 - 3.49	3.28
P36. INCRÉDULO		-7.685	>.001	3.07 - 3.45	3.26
P19. INSISTENTE		-6.251	>.001	2.98 - 3.47	3.22
P39. ENVERGONHADO		-8.995	>.001	2.98 - 3.35	3.17
P10. SARCÁSTICO		-6.238	>.001	2.85 - 3.41	3.13
P20. INDIFERENTE		-9.069	>.001	2.94 - 3.32	3.13
P7. CONVENCIDO		-7.180	>.001	2.72 - 3.28	3.00
P43. INDECISO		-13.265	>.001	2.74 - 3.07	2.91
P25. AFOBADO		-11.444	>.001	2.64 - 3.04	2.84
P3. ENTEDIADO		-13.067	>.001	2.60 - 2.97	2.79
P6. INCOMODADO		-14.174	>.001	2.60 - 2.95	2.78
P30. DOMINADOR		-8.453	>.001	2.44 - 3.03	2.74
P14. ALARMADO		-12.022	>.001	2.49 - 2.92	2.70
P21. CONSTRANGIDO		-14.459	>.001	2.49 - 2.85	2.67
P13. IMPACIENTE		-15.941	>.001	2.40 - 2.76	2.58
P22. DESENCORAJADO		-20.194	>.001	2.10 - 2.44	2.27
P37. ANSIOSO		-17.789	>.001	2.08 - 2.46	2.27

P33. SUPLICANTE		-18.519	>.001	1.97 - 2.36	2.17
P23. DECEPCIONADO		-21.553	>.001	1.98 - 2.32	2.15
P31. CULPADO		-18.172	>.001	1.95 - 2.35	2.15
P15. DESANIMADO		-21.200	>.001	1.96 - 2.31	2.13
P2. IRRITADO		-21.768	>.001	1.84 - 2.20	2.02
P44. CIUMENTO		-19.595	>.001	1.82 - 2.22	2.02
P5. ARROGANTE		-20.931	>.001	1.55 - 1.98	1.77
P4. HORRORIZADO		-27.742	>.001	1.46 - 1.80	1.63
P41. ATERRORIZADO		-25.931	>.001	1.44 - 1.81	1.63
P32. TRANSTORNADO		-33.479	>.001	1.29 - 1.59	1.44
P45. RAIVOSO		-32.696	>.001	1.30 - 1.61	1.46
P24. DEPRESSIVO		-32.942	>.001	1.16 - 1.48	1.32

Figure 4: This figure shows the valence classification of the 45 RMET response options (words-only item). They are displayed from the most positive item (largest mean value) to the most negative item (smallest mean value). The light grey color represents positive valence; the medium gray, neutral valence; and the dark grey, negative valence.

Discussion

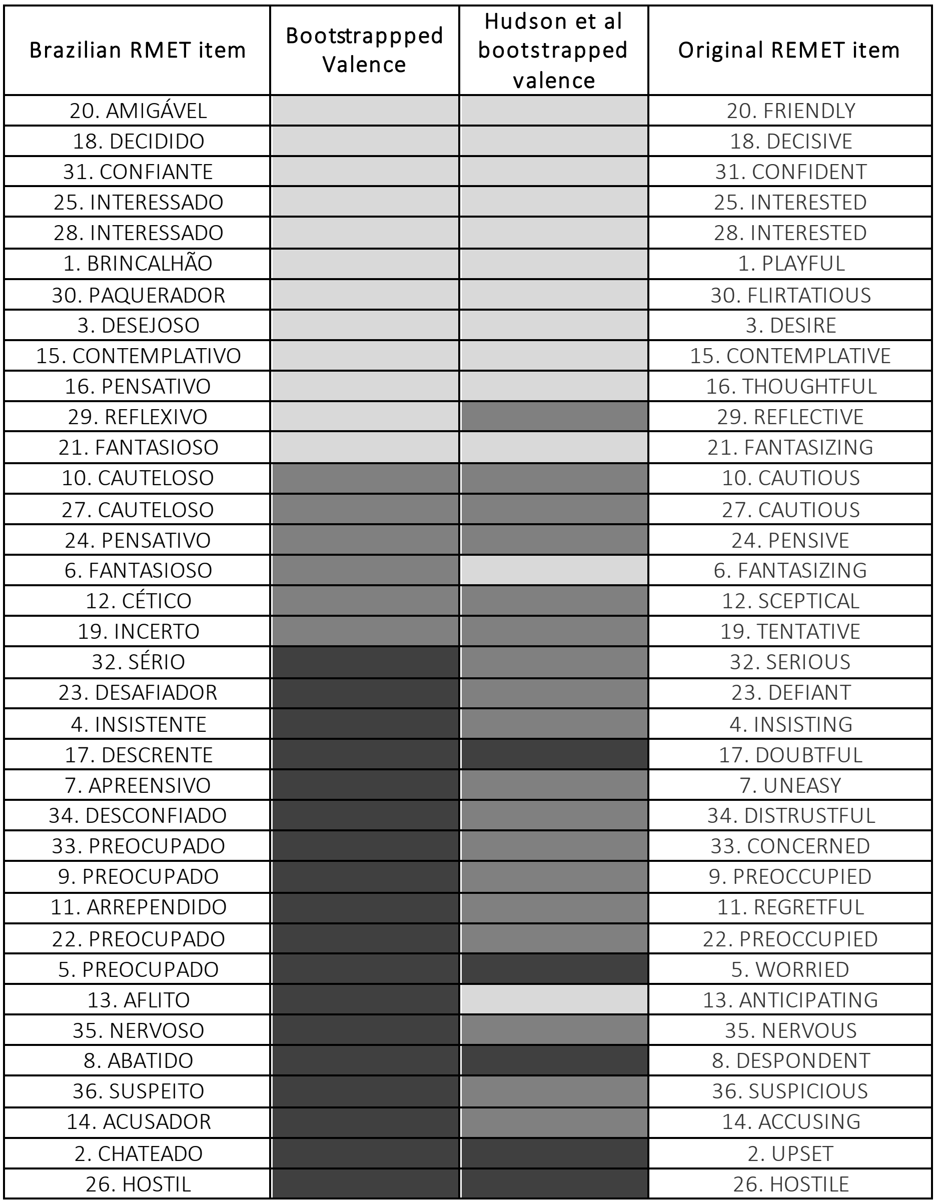
Our goal in this study was to replicate Hudson et al. (2020) study to validate a valence classification to the Reading the Mind in the Eyes Test (RMET) based on a Brazilian sample. In order to do that, we followed their analysis' steps, conducting a series of one-sample t-tests comparing each RMET items' means to the neutral value (4). This is the first study to run analyses of this kind in a Latin America context. The first analyses found 7 items classified as neutral, 12 as positive and 17 as negative. After the bootstrapped analysis, 5 were classified as neutral, 19 as negative and 12 positive. Subsequently, we suggested a z-score analysis with the same sample resulting in 9 items being positive, 19 being neutral and 8 being negative.

Comparing both analyses, some important differences in the results came up. In our study, only 12 items were classified as positive, while in Hudson et al.'s study there were 16 positive items. The items 6, 10 and 19 were considered neutral in our study and positive in theirs, while the item 13 was considered negative in our study and positive in theirs. In both studies, the number of neutral items were the same, however, the items differ among themselves. In addition to the items prior discussed, items 9, 22, 33, 35 and 36 were considered negative in our study and neutral in Hudson et al. (2020). Curiously, items 9, 22 and 33 consist of different words in English, but they were translated to the same word in Brazilian Portuguese: "preocupado". This also happened to item 5, but, in this case, they were both considered negative. This might be a reason why they were all classified as negative in our study and not in Hudson et al. (2020). In addition, items 23 and 27 were considered neutral in our study and negative in Hudson et al. (2020). These results are summarized in Figure 5.

Brazilian RMET Item	Valence	Hudson et al. study 1a	Original REMET item
20. AMIGÁVEL			20. FRIENDLY
31. CONFIANTE			31. CONFIDENT
18. DECIDIDO			18. DECISIVE
25. INTERESSADO			25. INTERESTED
1. BRINCALHÃO			1. PLAYFUL
30. PAQUERADOR			30. FLIRTATIOUS
3. DESEJOSO			3. DESIRE
28. INTERESSADO			28. INTERESTED
15. CONTEMPLATIVO			15. CONTEMPLATIVE
16. PENSATIVO			16. THOUGHTFUL
29. REFLEXIVO			29. REFLECTIVE
21. FANTASIOSO			21. FANTASIZING
10. CAUTELOSO			10. CAUTIOUS
6. FANTASIOSO			6. FANTASIZING
27. CAUTELOSO			27. CAUTIOUS
24. PENSATIVO			24. PENSIVE
12. CÉTICO			12. SCEPTICAL
19. INCERTO			19. TENTATIVE
23. DESAFIADOR			23. DEFIANT
32. SÉRIO			32. SERIOUS
17. DESCRENTE			17. DOUBTFUL
4. INSISTENTE			4. INSISTING
34. DESCONFIADO			34. DISTRUSTFUL
7. APREENSIVO			7. UNEASY
33. PREOCUPADO			33. CONCERNED
9. PREOCUPADO			9. PREOCCUPIED
11. ARREPENDIDO			11. REGRETFUL
22. PREOCUPADO			22. PREOCCUPIED
5. PREOCUPADO			5. WORRIED
13. AFLITO			13. ANTICIPATING
35. NERVOSO			35. NERVOUS
14. ACUSADOR			14. ACCUSING
36. SUSPEITO			36. SUSPICIOUS
8. ABATIDO			8. DESPONDENT
2. CHATEADO			2. UPSET
26. HOSTIL			26. HOSTILE

Figure 5: This figure shows a comparison between valence classification of the 36 RMET items (word-picture pair) in our study and in Hudson et al. (2020) study. They are displayed from the most positive item (largest mean value) to the most negative item (smallest mean value) following our results. The light grey color represents positive valence; the medium gray, neutral valence; and the dark grey, negative valence.

The bootstrap analyses were an attempt of the original authors to diminish the sample size effect on the statistical significance when classifying the items as neutral or not. In their study, the number of neutral items went from 7 to 18 items, the positives went from 16 to 13 and negatives from 13 to 5, being the category with the greater loss and, assumingly, the most ambiguous stimuli. In our study, however, the bootstrap analyses did not present the same results. The number of items classified as neutral dropped from 7 to 5, the negatives increased from 17 to 19 and the number of positives stayed the same. These results are shown in Figure 6.



Brazilian RMET item	Bootstrappped Valence	Hudson et al bootstrapped valence	Original REMET item
20. AMIGÁVEL			20. FRIENDLY
18. DECIDIDO			18. DECISIVE
31. CONFIANTE			31. CONFIDENT
25. INTERESSADO			25. INTERESTED
28. INTERESSADO			28. INTERESTED
1. BRINCALHÃO			1. PLAYFUL
30. PAQUERADOR			30. FLIRTATIOUS
3. DESEJOSO			3. DESIRE
15. CONTEMPLATIVO			15. CONTEMPLATIVE
16. PENSATIVO			16. THOUGHTFUL
29. REFLEXIVO			29. REFLECTIVE
21. FANTASIOSO			21. FANTASIZING
10. CAUTELOSO			10. CAUTIOUS
27. CAUTELOSO			27. CAUTIOUS
24. PENSATIVO			24. PENSIVE
6. FANTASIOSO			6. FANTASIZING
12. CÉTICO			12. SCEPTICAL
19. INCERTO			19. TENTATIVE
32. SÉRIO			32. SERIOUS
23. DESAFIADOR			23. DEFIANT
4. INSISTENTE			4. INSISTING
17. DESCRENTE			17. DOUBTFUL
7. APREENSIVO			7. UNEASY
34. DESCONFIADO			34. DISTRUSTFUL
33. PREOCUPADO			33. CONCERNED
9. PREOCUPADO			9. PREOCCUPIED
11. ARREPENDIDO			11. REGRETFUL
22. PREOCUPADO			22. PREOCCUPIED
5. PREOCUPADO			5. WORRIED
13. AFLITO			13. ANTICIPATING
35. NERVOSO			35. NERVOUS
8. ABATIDO			8. DESPONDENT
36. SUSPEITO			36. SUSPICIOUS
14. ACUSADOR			14. ACCUSING
2. CHATEADO			2. UPSET
26. HOSTIL			26. HOSTILE

Figure 6: This figure shows a comparison between valence classification of the 36 RMET items (word-picture pair) in our study and in Hudson et al. (2020) study, both after the bootstrapped analysis. They are displayed from the most positive item (largest mean value) to the most negative item (smallest mean value) following our results. The light grey color represents positive valence; the medium gray, neutral valence; and the dark grey, negative valence.

While translation might have an impact when analyzing the differences in results between both studies, cultural models might have played its part as well. As previously mentioned, social cognition is a domain greatly influenced by culture (Fiske & Taylor, 2021; Vogeley & Roepstorff, 2009). Latino cultural contexts place a strong emphasis on convivial collectivism, which achieves interdependent relationship goals through the outward expression of good emotions and deemphasizes negativity in the service of smooth social interaction, whereas negative emotions are thought as generally undesirable and inappropriate (Campos & Kim, 2017). This might be an explanation for the overinterpretation of negative emotions of our sample when compared to Hudson et al. (2020).

Besides cultural differences, the differences in the included samples' characteristics may have also influenced the different results. The mean age of our sample (40.1 years) was a lot older than theirs (18.41 years). Also, their sample was composed totally of undergraduate students while ours was predominantly students (17%), psychologists (14.3%), public servants (13.4%) and retired people (9.8%). We also excluded participants with potential psychopathologies, which might contribute to these differences as well.

There are not too many similar studies in the literature to compare ours to, especially with a methodology that we consider more robust. However, we can look at Scott and colleagues (2011) as an example. They conducted a similar study in an all-undergraduate students' sample from the United States. The main difference from Hudson et al. is that they only used the 36 RMET pictures to classify their valences. The results are similar to Hudson et al.'s: 10 negative stimuli, 17 neutral and 9 positive. An European example is Meijer-van Abbema & Koole (2017), two Dutch authors, who pre-categorized themselves the 36 RMET pictures into 18 negatives, 9 positives and 5 neutrals before presenting to their sample of Dutch Christians. We could not find another similar study with a Latino sample for comparison purposes, neither an Asian one.

Then, we explored and suggested a different approach to identifying the emotional valences in RMET items trough z-score transformation. Z-scores are the most simple and common way to standardize scores and are widely used in psychological tests. Because of its fixed mean and standard deviation, one can look at a z-score and easily understand or compare it in z-score tables, which are also easily available in most statistics textbooks (Slick, 2006). The z-score transformation and analysis classified 9 items as positive, 19 as neutral and 8 as negative.

A novelty to our study when compared to Hudson et al. (2020) is the valence analysis to the words-only items. Only one neutral item, 13 positive items, and 31 negative items were obtained after conducting a series of one-sample t-tests. One hypothesis is that, people tend to be more dichotomic regarding how they feel about the meaning of the word without the picture (a confusing variable). Hezel & McNally (2014) conduced a valences' classification to the 36 RMET items using only the words instead of the picture-word pair. Their results show this dichotomy: they classified 20 negative words, 13 positives and only 3 neutral. Another possibility is that the test itself is built with more negative valence options to choose from.

The limitations of this study include the geographic location and social status of participants, that lie most on the south states of Brazil (specially Rio Grande do Sul) and higher classes, which are not representative of the Brazilian population. Also, the mean years of study of the sample (18.5 years) is very high compared to the mean years of study of the Brazilian population (7.8 years) (Brasil, 2022), which might represent a bias when interpreting the RMET stimuli. At last, the sample size (n=107) was smaller than the one used in the original study (n=164), which may cause some differences in the analyses. The assets of this study encompass a more diverse sample than the original study, which can be characterized as a non-WEIRD sample (*Western, Educated, Industrialized, Rich, Democratic*). It is also the first Brazilian study to analyze and classify valences in the RMET items and also the first study to analyze the valences of the words-only RMET items, as far as we are aware of. We also excluded potential psychopathological variables in our sample, which may represent a bias when interpreting mental states.

After conducting a series of statistical analyses to try to determine the best valence classification possible to the RMET items in a Brazilian sample, we got results that differ significantly when compared to a sample from United States (Hudson et al, 2020), especially regarding the number of negative and neutral items. Our z-score analysis results was the one that approached their study the most. However, considering cultural and emotion modules, such as desirability of positive emotions to the detriment of negative ones, we believe the results from the one-sample t-tests represents Brazilian population the most. In addition, we also concur with Hudson et al. (2020) that these classifications are, in some level, arbitrary, and agree with interpreting the results as a continuous variable (as shown in Appendix 6).

Our study contributed to the literature by providing a classification of valences to the RMET items, both words-picture pair and words-only, based on a Brazilian sample. This more cultural appropriated validation can help other Brazilian studies that aim to analyze emotion valence in their samples and avoid misinterpretations that might have been caused when used the instrument validated in other cultures. Future studies with samples from different states, social classes, and years of study are necessary for a more representative view of Brazilian population.

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Appendixes

Appendix 1

Questionário Sociodemográfico

1. Você tem 18 anos ou mais? ( ) sim ( ) não
2. Data de nascimento _______/_______/_______
3. Gênero com o qual se identifica: ( ) mulher ( ) homem ( ) não binário
4. Etnia/Raça: ( ) branca ( ) preta ( ) parda ( ) indígena ( ) asiática ( ) outras
5. Profissão: ____
6. Nacionalidade: ___________________________________
7. Cidade de nascimento______________________________
8. Estado de nascimento: ______________________________
9. Cidade de residência: _______________________________
10. Estado de residência: _______________________________
11. Histórico de diagnóstico psiquiátrico: __________________
12. Diagnóstico psiquiátrico atual: ________________________
13. Em uso de algum medicamento psiquiátrico: _____________
14. Histórico familiar de diagnóstico psiquiátrico: ____________
15. Escolaridade:
    a. Anos de estudo sem repetição: __________
        i. Analfabeto
        ii. Ensino Fundamental I (1º ao 4º ano)
        iii. Ensino Fundamental II (5º ao 9º ano)
        iv. Ensino Médio
        v. Ensino Superior
        vi. Pós graduação
    b. ( ) Completo ( ) Incompleto
16. A Água utilizada no seu domicílio é proveniente de:
    a. Rede geral de distribuição
    b. Poço ou nascente
    c. Outro meio
17. Considerando o trecho da rua do seu domicílio, você diria que a rua é:
    a. Asfaltada/Pavimentada
    b. Terra/Cascalho

18. Qual é o grau de instrução do chefe da família? Considere como chefe da família a pessoa que contribui com a maior parte da renda do domicílio

	Nomenclatura atual	Nomenclatura anterior
( )	Analfabeto/Fundamental I incompleto	Analfabeto/ Primário incompleto
( )	Fundamental I completo/Fundamental II incompleto	Primário completo/ Ginásio incompleto
( )	Fundamental II completo/ Médio incompleto	Ginásio completo/Colegial incompleto
( )	Médio completo/ Superior incompleto	Colegial completo/Superior incompleto
( )	Superior completo	Superior completo

19. Agora vou fazer algumas perguntas sobre itens do domicílio para efeito de classificação econômica. Todos os itens de eletroeletrônicos que vou citar devem estar funcionando, incluindo os que estão guardados. Caso não estejam funcionando, considere apenas se tiver intenção de consertar ou repor nos próximos seis meses. No seu domicílio tem:

	Quantidade que possui				
Itens de conforto	Não possui	1	2	3	4+
Quantidade de automóveis de passeio exclusivamente para uso particular					
Quantidade de empregados mensalistas, considerando apenas os que trabalham pelo menos cinco dias por semana					
Quantidade de máquinas de lavar roupa, excluindo tanquinho					
Quantidade de banheiros					
DVD, incluindo qualquer dispositivo que leia DVD e desconsiderando DVD de automóvel					
Quantidade de geladeiras					
Quantidade de freezers independentes ou parte da geladeira duplex					
Quantidade de microcomputadores, considerando computadores de mesa, laptops, notebooks e netbooks e desconsiderando tablets, palms ou smartphones					
Quantidade de lavadora de louças					
Quantidade de fornos de micro-ondas					
Quantidade de motocicletas, desconsiderando as usadas exclusivamente para uso profissional					
Quantidade de máquinas secadoras de roupas, considerando lava e seca					

16. Você gostaria de ter acesso aos resultados da pesquisa? ( ) sim ( ) não
Se sim, deixe seu e-mail: ____

Appendix 2

Escala Transversal de Sintomas de Nível 1 Autoaplicável do DSM-5 – Adulto

Instruções: As questões abaixo perguntam sobre coisas que podem tê-lo perturbado. Para cada pergunta, circule o número que melhor descreve o quanto (ou com que frequência) você foi perturbado pelos problemas descritos a seguir durante as DUAS (2) ÚLTIMAS SEMANAS.

		Durante as últimas **DUAS (2) SEMANAS**, o quanto (ou com que frequência) você foi perturbado pelos seguintes problemas?	**Nada** De algum modo	**Muito Leve** Raramente, menos de um ou dois dias	**Leve** Vários dias	**Moderado** Mais da metade dos dias	**Grave** Quase todos os dias	**Maior Pontuação no Domínio (clínico)**
I	1	Pouco interesse ou prazer em fazer as coisas?	0	1	2	3	4	
	2	Sentiu-se desanimado, deprimido ou sem esperança?	0	1	2	3	4	
II	3	Sentiu-se mais irritado, mal-humorado ou zangado do que o usual?	0	1	2	3	4	
III	4	Dormiu menos do que o usual, mas ainda tem muita energia?	0	1	2	3	4	
	5	Iniciou muito mais projetos do que o usual ou fez coisas mais arriscadas do que o habitual?	0	1	2	3	4	
IV	6	Sentiu-se nervoso, ansioso, assustado, preocupado ou tenso?	0	1	2	3	4	
	7	Sentiu pânico ou se sentiu amedrontado?	0	1	2	3	4	
	8	Evitou situações que o deixam ansioso?	0	1	2	3	4	
V	9	Dores e sofrimentos sem explicação (p. ex., cabeça, costas, articulações, abdome, pernas)?	0	1	2	3	4	
	10	Sentimento de que suas doenças não estão sendo levadas suficientemente a sério?	0	1	2	3	4	
VI	11	Pensamentos de ferir a si mesmo?	0	1	2	3	4	
VII	12	Ouviu coisas que outras pessoas não ouviam, como vozes, mesmo quando não havia ninguém por perto?	0	1	2	3	4	
	13	Sentiu que alguém podia ouvir seus pensamentos ou que você podia ouvir o que outra pessoa estava pensando?	0	1	2	3	4	
VIII	14	Problemas com o sono que afetaram a qualidade do seu sono em geral?	0	1	2	3	4	
IX	15	Problemas com a memória (p. ex., aprender informações novas) ou com localização (p. ex., encontrar o caminho para casa)?	0	1	2	3	4	
X	16	Pensamentos, impulsos ou imagens desagradáveis que entram repetidamente na sua cabeça?	0	1	2	3	4	

	17	Sentiu-se compelido a realizar certos comportamentos ou atos mentais repetidamente?	0	1	2	3	4
XI	18	Sentiu-se desligado ou distante de si mesmo, do seu corpo, do ambiente físico ao seu redor ou de suas lembranças?	0	1	2	3	4
XII	19	Sem saber quem você realmente é ou o que você quer da vida?	0	1	2	3	4
	20	Não se sentiu próximo a outras pessoas ou desfrutou das suas relações com elas?	0	1	2	3	4
XIII	21	Bebeu no mínimo 4 drinques de qualquer tipo de bebida alcoólica em um único dia?	0	1	2	3	4
	22	Fumou cigarros, charuto ou cachimbo ou usou rapé ou tabaco de mascar?	0	1	2	3	4
	23	Usou algum dos seguintes medicamentos POR CONTA PRÓPRIA, isto é, sem prescrição médica, em quantidades maiores ou por mais tempo do que o prescrito (p. ex., analgésicos [como paracetamol, codeína], estimulantes [como metilfenidato ou anfetaminas], sedativos ou tranquilizantes [como comprimidos para dormir ou diazepam] ou drogas, como maconha, cocaína ou crack, drogas sintéticas [como ecstasy], alucinógenos [como LSD], heroína, inalantes ou solventes [como cola] ou metanfetamina [ou outros estimulantes])?	0	1	2	3	4

Appendix 3

Reading the Mind in the Eyes Test (RMET)- Brazilian version

Examples of items

15

Contemplativo Afobado

Encorajador Divertido

0

Ciumento Apavorado

Arrogante Raivoso

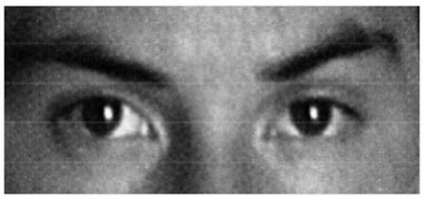
35

Intrigado Nervoso

Insistente Contemplativo

23

Satisfeito Arrependido



Desafiador Curioso

Appendix 4

Example of items of the Reading the Mind in the Eyes Test (RMET) valence adpatation

Word-picture pair item

0

Apavorado

	1	2	3	4	5	6	7	
Muito negativa	○	○	○	○	○	○	○	Muito positiva

Word-only item

Afetuoso

	1	2	3	4	5	6	7	
Muito negativa	○	○	○	○	○	○	○	Muito positiva

Appendix 5

R Studio Analysis Script

```
#### ANALYSIS SCRIPT ####
## Pearson correlation to try to control unsystematic responses
## Exclusion after correlations <.20
library(dplyr)
pospears <- filter(dataset, ((ID != "PART_01") &
                   (ID != "PART_52") &
                   (ID != "PART_59") &
                   (ID != "PART_73") &
                   (ID != "PART_75") &
                   (ID != "PART_87") &
                   (ID != "PART_93") &
                   (ID != "PART_99") &
                   (ID != "PART_100") &
                   (ID != "PART_103") &
                   (ID != "PART_107") &
                   (ID != "PART_138") &
                   (ID != "PART_142") &
                   (ID != "PART_166") &
                   (ID != "PART_170")))

pospearssemtm <- filter(pospears, ((DEPRESSAO_1 != "GRAVE") & (DEPRESSAO_2 != "GRAVE") &
                        (ANSIEDADE_1 != "GRAVE") & (ANSIEDADE_2 != "GRAVE") &
                        (ANSIEDADE_3 != "GRAVE") & (SOMATICO_1 != "GRAVE") &
                        (SOMATICO_2 != "GRAVE") & (SUICIDA != "GRAVE") &
                        (PSICOSE_1 != "GRAVE") & (PSICOSE_2 != "GRAVE") &
                        (SONO != "GRAVE") & (MEMORIA != "GRAVE") & (PENS_COMP_1 != "GRAVE") &
                        (PENS_COMP_2 != "GRAVE") & (DISSOCIACAO != "GRAVE") &
                        (PERSONALIDADE_1 != "GRAVE") & (PERSONALIDADE_2 != "GRAVE") &
                        (SUBSTANCIA_ALCO != "GRAVE") & (SUBSTANCIA_CIG != "GRAVE") &
                        (SUBSTANCIA_MED != "GRAVE")))

RMET <- subset(pospearssemtm, select = c("RMET_1", "RMET_2", "RMET_3",
          "RMET_4", "RMET_5", "RMET_6", "RMET_7", "RMET_8",
          "RMET_9", "RMET_10", "RMET_11", "RMET_12", "RMET_13",
          "RMET_14", "RMET_15", "RMET_16", "RMET_17", "RMET_18",
          "RMET_19", "RMET_20", "RMET_21", "RMET_22", "RMET_23",
          "RMET_24", "RMET_25", "RMET_26", "RMET_27", "RMET_28",
          "RMET_29", "RMET_30", "RMET_31", "RMET_32", "RMET_33",
          "RMET_34", "RMET_35", "RMET_36"))

## One sample t-test to RMET items comparing to neutral valence (4) ####
t.test(pospearssemtm$RMET_1, mu = 4)
t.test(pospearssemtm$RMET_2, mu = 4)
t.test(pospearssemtm$RMET_3, mu = 4)
t.test(pospearssemtm$RMET_4, mu = 4)
t.test(pospearssemtm$RMET_5, mu = 4)
t.test(pospearssemtm$RMET_6, mu = 4)
t.test(pospearssemtm$RMET_7, mu = 4)
t.test(pospearssemtm$RMET_8, mu = 4)
t.test(pospearssemtm$RMET_9, mu = 4)
t.test(pospearssemtm$RMET_10, mu = 4)
t.test(pospearssemtm$RMET_11, mu = 4)
t.test(pospearssemtm$RMET_12, mu = 4)
t.test(pospearssemtm$RMET_13, mu = 4)
t.test(pospearssemtm$RMET_14, mu = 4)
t.test(pospearssemtm$RMET_15, mu = 4)
t.test(pospearssemtm$RMET_16, mu = 4)
t.test(pospearssemtm$RMET_17, mu = 4)
t.test(pospearssemtm$RMET_18, mu = 4)
t.test(pospearssemtm$RMET_19, mu = 4)
t.test(pospearssemtm$RMET_20, mu = 4)
t.test(pospearssemtm$RMET_21, mu = 4)
t.test(pospearssemtm$RMET_22, mu = 4)
```

```
t.test(pospearssemtm$RMET_23,  mu = 4)
t.test(pospearssemtm$RMET_24,  mu = 4)
t.test(pospearssemtm$RMET_25,  mu = 4)
t.test(pospearssemtm$RMET_26,  mu = 4)
t.test(pospearssemtm$RMET_27,  mu = 4)
t.test(pospearssemtm$RMET_28,  mu = 4)
t.test(pospearssemtm$RMET_29,  mu = 4)
t.test(pospearssemtm$RMET_30,  mu = 4)
t.test(pospearssemtm$RMET_31,  mu = 4)
t.test(pospearssemtm$RMET_32,  mu = 4)
t.test(pospearssemtm$RMET_33,  mu = 4)
t.test(pospearssemtm$RMET_34,  mu = 4)
t.test(pospearssemtm$RMET_35,  mu = 4)
t.test(pospearssemtm$RMET_36,  mu = 4)

## Bootstrap analysis. One sample t-test in a reduced sample of 60  ####
# Bootstrap the correlation between drafted and fantasy points
library(psych)
library(boot)
library(tidyverse)

describe(RMET)  #to check mean and median

# create new dataset with random 60 participants
set.seed(123)
sampled_RMET <- RMET[sample(nrow(RMET),  60, replace = FALSE),]

# step 1: define a function that calculates the metric of interest
test <- function(data, indices){
  t.test(data[indices],  mu = 4)$estimate # $estimate for mean RMET
}
tstats <- function(data, indices){
  t.test(data[indices],  mu = 4)$statistic # $statistic for t-value
}

tpvalue <- function(data, indices){
  t.test(data[indices],  mu = 4)$p.value # $p.value for the t-test
}

# step 2: fill in the dataset name, function, and the number of bootstrap samples to be drawn
set.seed(1)
b1 <- boot(sampled_RMET$RMET_1,  tpvalue, R = 1000)
print(b1) #
# mean(b1$t) # $t is bootstraped values

b1ci <- boot(sampled_RMET$RMET_1, test, R = 1000)
boot.ci(b1ci) # confidence interval - basic bootstrap method

set.seed(2)
b2 <- boot(sampled_RMET$RMET_2,  tpvalue, R = 1000)
print(b2) #
# mean(b1$t) # $t is bootstraped values

b2ci <- boot(sampled_RMET$RMET_2, test, R = 1000)
boot.ci(b2ci) # confidence interval - basic bootstrap method

set.seed(3)
b3 <- boot(sampled_RMET$RMET_3,  tpvalue, R = 1000)
print(b3) #
# mean(b1$t) # $t is bootstraped values

b3ci <- boot(sampled_RMET$RMET_3, test, R = 1000)
boot.ci(b3ci) # confidence interval - basic bootstrap method

set.seed(4)
b4 <- boot(sampled_RMET$RMET_4,  tpvalue, R = 1000)
print(b4) #
# mean(b1$t) # $t is bootstraped values

b4ci <- boot(sampled_RMET$RMET_4, test, R = 1000)
boot.ci(b4ci) # confidence interval - basic bootstrap method
```

```
set.seed(5)
b5 <- boot(sampled_RMET$RMET_5,  tpvalue, R = 1000)
print(b5) #
# mean(b1$t) # $t is bootstraped values

b5ci <- boot(sampled_RMET$RMET_5,  test,  R = 1000)
boot.ci(b5ci) # confidence interval - basic bootstrap method

set.seed(6)
b6 <- boot(sampled_RMET$RMET_6,  tpvalue, R = 1000)
print(b6) #
# mean(b1$t) # $t is bootstraped values

b6ci <- boot(sampled_RMET$RMET_6,  test,  R = 1000)
boot.ci(b6ci) # confidence interval - basic bootstrap method

set.seed(7)
b7 <- boot(sampled_RMET$RMET_7,  tpvalue, R = 1000)
print(b7) #
# mean(b1$t) # $t is bootstraped values

b7ci <- boot(sampled_RMET$RMET_7,  test,  R = 1000)
boot.ci(b7ci) # confidence interval - basic bootstrap method

set.seed(8)
b8 <- boot(sampled_RMET$RMET_8,  tpvalue, R = 1000)
print(b8) #
# mean(b1$t) # $t is bootstraped values

b8ci <- boot(sampled_RMET$RMET_8,  test,  R = 1000)
boot.ci(b8ci) # confidence interval - basic bootstrap method

set.seed(9)
b9 <- boot(sampled_RMET$RMET_9,  tpvalue, R = 1000)
print(b9) #
# mean(b1$t) # $t is bootstraped values

b9ci <- boot(sampled_RMET$RMET_9,  test,  R = 1000)
boot.ci(b9ci) # confidence interval - basic bootstrap method

set.seed(10)
b10 <- boot(sampled_RMET$RMET_10,  tpvalue, R = 1000)
print(b10) #
# mean(b1$t) # $t is bootstraped values

b10ci <- boot(sampled_RMET$RMET_10,  test,  R = 1000)
boot.ci(b10ci) # confidence interval - basic bootstrap method

set.seed(11)
b11 <- boot(sampled_RMET$RMET_11,  tpvalue, R = 1000)
print(b11) #
# mean(b1$t) # $t is bootstraped values

b11ci <- boot(sampled_RMET$RMET_11,  test,  R = 1000)
boot.ci(b11ci) # confidence interval - basic bootstrap method

set.seed(12)
b12 <- boot(sampled_RMET$RMET_12,  tpvalue, R = 1000)
print(b12) #
# mean(b1$t) # $t is bootstraped values

b12ci <- boot(sampled_RMET$RMET_12,  test,  R = 1000)
boot.ci(b12ci) # confidence interval - basic bootstrap method

set.seed(13)
b13 <- boot(sampled_RMET$RMET_13,  tpvalue, R = 1000)
print(b13) #
# mean(b1$t) # $t is bootstraped values

b13ci <- boot(sampled_RMET$RMET_13,  test,  R = 1000)
```

```
boot.ci(b13ci) # confidence interval - basic bootstrap method

set.seed(14)
b14 <- boot(sampled_RMET$RMET_14, tpvalue, R = 1000)
print(b14) #
# mean(b1$t) # $t is bootstraped values

b14ci <- boot(sampled_RMET$RMET_14, test, R = 1000)
boot.ci(b14ci) # confidence interval - basic bootstrap method

set.seed(15)
b15 <- boot(sampled_RMET$RMET_15, tpvalue, R = 1000)
print(b15) #
# mean(b1$t) # $t is bootstraped values

b15ci <- boot(sampled_RMET$RMET_15, test, R = 1000)
boot.ci(b15ci) # confidence interval - basic bootstrap method

set.seed(16)
b16 <- boot(sampled_RMET$RMET_16, tpvalue, R = 1000)
print(b16) #
# mean(b1$t) # $t is bootstraped values

b16ci <- boot(sampled_RMET$RMET_16, test, R = 1000)
boot.ci(b16ci) # confidence interval - basic bootstrap method

set.seed(17)
b17 <- boot(sampled_RMET$RMET_17, tpvalue, R = 1000)
print(b17) #
# mean(b1$t) # $t is bootstraped values

b17ci <- boot(sampled_RMET$RMET_17, test, R = 1000)
boot.ci(b17ci) # confidence interval - basic bootstrap method

set.seed(18)
b18 <- boot(sampled_RMET$RMET_18, tpvalue, R = 1000)
print(b18) #
# mean(b1$t) # $t is bootstraped values

b18ci <- boot(sampled_RMET$RMET_18, test, R = 1000)
boot.ci(b18ci) # confidence interval - basic bootstrap method

set.seed(19)
b19 <- boot(sampled_RMET$RMET_19, tpvalue, R = 1000)
print(b19) #
# mean(b1$t) # $t is bootstraped values

b19ci <- boot(sampled_RMET$RMET_19, test, R = 1000)
boot.ci(b19ci) # confidence interval - basic bootstrap method

set.seed(20)
b20 <- boot(sampled_RMET$RMET_20, tpvalue, R = 1000)
print(b20) #
# mean(b1$t) # $t is bootstraped values

b20ci <- boot(sampled_RMET$RMET_20, test, R = 1000)
boot.ci(b20ci) # confidence interval - basic bootstrap method

set.seed(21)
b21 <- boot(sampled_RMET$RMET_21, tpvalue, R = 1000)
print(b21) #
# mean(b1$t) # $t is bootstraped values

b21ci <- boot(sampled_RMET$RMET_21, test, R = 1000)
boot.ci(b21ci) # confidence interval - basic bootstrap method

set.seed(20)
b22 <- boot(sampled_RMET$RMET_22, tpvalue, R = 1000)
print(b22) #
# mean(b1$t) # $t is bootstraped values
```

```
b22ci <- boot(sampled_RMET$RMET_22, test, R = 1000)
boot.ci(b22ci) # confidence interval - basic bootstrap method

set.seed(20)
b23 <- boot(sampled_RMET$RMET_23, tpvalue, R = 1000)
print(b23) #
# mean(b1$t) # $t is bootstraped values

b23ci <- boot(sampled_RMET$RMET_23, test, R = 1000)
boot.ci(b23ci) # confidence interval - basic bootstrap method

set.seed(24)
b24 <- boot(sampled_RMET$RMET_24, tpvalue, R = 1000)
print(b24) #
# mean(b1$t) # $t is bootstraped values

b24ci <- boot(sampled_RMET$RMET_24, test, R = 1000)
boot.ci(b24ci) # confidence interval - basic bootstrap method

set.seed(25)
b25 <- boot(sampled_RMET$RMET_25, tpvalue, R = 1000)
print(b25) #
# mean(b1$t) # $t is bootstraped values

b25ci <- boot(sampled_RMET$RMET_25, test, R = 1000)
boot.ci(b25ci) # confidence interval - basic bootstrap method

set.seed(26)
b26 <- boot(sampled_RMET$RMET_26, tpvalue, R = 1000)
print(b26) #
# mean(b1$t) # $t is bootstraped values

b26ci <- boot(sampled_RMET$RMET_26, test, R = 1000)
boot.ci(b26ci) # confidence interval - basic bootstrap method

set.seed(27)
b27 <- boot(sampled_RMET$RMET_27, tpvalue, R = 1000)
print(b27) #
# mean(b1$t) # $t is bootstraped values

b27ci <- boot(sampled_RMET$RMET_27, test, R = 1000)
boot.ci(b27ci) # confidence interval - basic bootstrap method

set.seed(28)
b28 <- boot(sampled_RMET$RMET_28, tpvalue, R = 1000)
print(b28) #
# mean(b1$t) # $t is bootstraped values

b28ci <- boot(sampled_RMET$RMET_28, test, R = 1000)
boot.ci(b28ci) # confidence interval - basic bootstrap method

set.seed(29)
b29 <- boot(sampled_RMET$RMET_29, tpvalue, R = 1000)
print(b29) #
# mean(b1$t) # $t is bootstraped values

b29ci <- boot(sampled_RMET$RMET_29, test, R = 1000)
boot.ci(b29ci) # confidence interval - basic bootstrap method

set.seed(30)
b30 <- boot(sampled_RMET$RMET_30, tpvalue, R = 1000)
print(b30) #
# mean(b1$t) # $t is bootstraped values

b30ci <- boot(sampled_RMET$RMET_30, test, R = 1000)
boot.ci(b30ci) # confidence interval - basic bootstrap method

set.seed(31)
b31 <- boot(sampled_RMET$RMET_31, tpvalue, R = 1000)
print(b31) #
# mean(b1$t) # $t is bootstraped values
```

```
b31ci <- boot(sampled_RMET$RMET_31, test, R = 1000)
boot.ci(b31ci) # confidence interval - basic bootstrap method

set.seed(32)
b32 <- boot(sampled_RMET$RMET_32, tpvalue, R = 1000)
print(b32) #
# mean(b1$t) # $t is bootstraped values

b32ci <- boot(sampled_RMET$RMET_32, test, R = 1000)
boot.ci(b32ci) # confidence interval - basic bootstrap method

set.seed(33)
b33 <- boot(sampled_RMET$RMET_33, tpvalue, R = 1000)
print(b33) #
# mean(b1$t) # $t is bootstraped values

b33ci <- boot(sampled_RMET$RMET_33, test, R = 1000)
boot.ci(b33ci) # confidence interval - basic bootstrap method

set.seed(34)
b34 <- boot(sampled_RMET$RMET_34, tpvalue, R = 1000)
print(b34) #
# mean(b1$t) # $t is bootstraped values

b34ci <- boot(sampled_RMET$RMET_34, test, R = 1000)
boot.ci(b34ci) # confidence interval - basic bootstrap method

set.seed(35)
b35 <- boot(sampled_RMET$RMET_35, tpvalue, R = 1000)
print(b35) #
# mean(b1$t) # $t is bootstraped values

b35ci <- boot(sampled_RMET$RMET_35, test, R = 1000)
boot.ci(b35ci) # confidence interval - basic bootstrap method

set.seed(36)
b36 <- boot(sampled_RMET$RMET_36, tpvalue, R = 1000)
print(b36) #
# mean(b1$t) # $t is bootstraped values

b36ci <- boot(sampled_RMET$RMET_36, test, R = 1000)
boot.ci(b36ci) # confidence interval - basic bootstrap method

#####

### Z-score: neutral items == -1< z<1
(x - 5.17) / 1.45

RMET$RMET_1z <- ((RMET$RMET_1 - 4) / 1)
mean(RMET$RMET_1z)

RMET$RMET_2z <- ((RMET$RMET_2 - 4) / 1)
mean(RMET$RMET_2z)

RMET$RMET_3z <- ((RMET$RMET_3 - 4) / 1)
mean(RMET$RMET_3z)

RMET$RMET_4z <- ((RMET$RMET_4 - 4) / 1)
mean(RMET$RMET_4z)

RMET$RMET_5z <- ((RMET$RMET_5 - 4) / 1)
mean(RMET$RMET_5z)

RMET$RMET_6z <- ((RMET$RMET_6 - 4) / 1)
mean(RMET$RMET_6z)

RMET$RMET_7z <- ((RMET$RMET_7 - 4) / 1)
mean(RMET$RMET_7z)

RMET$RMET_8z <- ((RMET$RMET_8 - 4) / 1)
```

```
mean(RMET$RMET_8z)

RMET$RMET_9z <- ((RMET$RMET_9  - 4) / 1)
mean(RMET$RMET_9z)

RMET$RMET_10z <- ((RMET$RMET_10 - 4) / 1)
mean(RMET$RMET_10z)

RMET$RMET_11z <- ((RMET$RMET_11 - 4) / 1)
mean(RMET$RMET_11z)

RMET$RMET_12z <- ((RMET$RMET_12 - 4) / 1)
mean(RMET$RMET_12z)

RMET$RMET_13z <- ((RMET$RMET_13 - 4) / 1)
mean(RMET$RMET_13z)

RMET$RMET_14z <- ((RMET$RMET_14 - 4) / 1)
mean(RMET$RMET_14z)

RMET$RMET_15z <- ((RMET$RMET_15 - 4) / 1)
mean(RMET$RMET_15z)

RMET$RMET_16z <- ((RMET$RMET_16 - 4) / 1)
mean(RMET$RMET_16z)

RMET$RMET_17z <- ((RMET$RMET_17 - 4) / 1)
mean(RMET$RMET_17z)

RMET$RMET_18z <- ((RMET$RMET_18 - 4) / 1)
mean(RMET$RMET_18z)

RMET$RMET_19z <- ((RMET$RMET_19 - 4) / 1)
mean(RMET$RMET_19z)

RMET$RMET_20z <- ((RMET$RMET_20 - 4) / 1)
mean(RMET$RMET_20z)

RMET$RMET_21z <- ((RMET$RMET_21 - 4) / 1)
mean(RMET$RMET_21z)

RMET$RMET_22z <- ((RMET$RMET_22 - 4) / 1)
mean(RMET$RMET_22z)

RMET$RMET_23z <- ((RMET$RMET_23 - 4) / 1)
mean(RMET$RMET_23z)

RMET$RMET_24z <- ((RMET$RMET_24 - 4) / 1)
mean(RMET$RMET_24z)

RMET$RMET_25z <- ((RMET$RMET_25 - 4) / 1)
mean(RMET$RMET_25z)

RMET$RMET_26z <- ((RMET$RMET_26 - 4) / 1)
mean(RMET$RMET_26z)

RMET$RMET_27z <- ((RMET$RMET_27 - 4) / 1)
mean(RMET$RMET_27z)

RMET$RMET_28z <- ((RMET$RMET_28 - 4) / 1)
mean(RMET$RMET_28z)

RMET$RMET_29z <- ((RMET$RMET_29 - 4) / 1)
mean(RMET$RMET_29z)

RMET$RMET_30z <- ((RMET$RMET_30 - 4) / 1)
mean(RMET$RMET_30z)

RMET$RMET_31z <- ((RMET$RMET_31 - 4) / 1)
mean(RMET$RMET_31z)
```

```
RMET$RMET_32z <- ((RMET$RMET_32 - 4) / 1)
mean(RMET$RMET_32z)

RMET$RMET_33z <- ((RMET$RMET_33 - 4) / 1)
mean(RMET$RMET_33z)

RMET$RMET_34z <- ((RMET$RMET_34 - 4) / 1)
mean(RMET$RMET_34z)

RMET$RMET_35z <- ((RMET$RMET_35 - 4) / 1)
mean(RMET$RMET_35z)

RMET$RMET_36z <- ((RMET$RMET_36 - 4) / 1)
mean(RMET$RMET_36z)

#### WORDS-ONLY ANALYSIS ####
# One-sample t-test for each mean of each word-only RMET item comparing to the neutral value (4)
t.test(pospearssemtm$RMET_P1, mu = 4)
t.test(pospearssemtm$RMET_P2, mu = 4)
t.test(pospearssemtm$RMET_P3, mu = 4)
t.test(pospearssemtm$RMET_P4, mu = 4)
t.test(pospearssemtm$RMET_P5, mu = 4)
t.test(pospearssemtm$RMET_P6, mu = 4)
t.test(pospearssemtm$RMET_P7, mu = 4)
t.test(pospearssemtm$RMET_P8, mu = 4)
t.test(pospearssemtm$RMET_P9, mu = 4)
t.test(pospearssemtm$RMET_P10, mu = 4)
t.test(pospearssemtm$RMET_P11, mu = 4)
t.test(pospearssemtm$RMET_P12, mu = 4)
t.test(pospearssemtm$RMET_P13, mu = 4)
t.test(pospearssemtm$RMET_P14, mu = 4)
t.test(pospearssemtm$RMET_P15, mu = 4)
t.test(pospearssemtm$RMET_P16, mu = 4)
t.test(pospearssemtm$RMET_P17, mu = 4)
t.test(pospearssemtm$RMET_P18, mu = 4)
t.test(pospearssemtm$RMET_P19, mu = 4)
t.test(pospearssemtm$RMET_P20, mu = 4)
t.test(pospearssemtm$RMET_P21, mu = 4)
t.test(pospearssemtm$RMET_P22, mu = 4)
t.test(pospearssemtm$RMET_P23, mu = 4)
t.test(pospearssemtm$RMET_P24, mu = 4)
t.test(pospearssemtm$RMET_P25, mu = 4)
t.test(pospearssemtm$RMET_P26, mu = 4)
t.test(pospearssemtm$RMET_P27, mu = 4)
t.test(pospearssemtm$RMET_P28, mu = 4)
t.test(pospearssemtm$RMET_P29, mu = 4)
t.test(pospearssemtm$RMET_P30, mu = 4)
t.test(pospearssemtm$RMET_P31, mu = 4)
t.test(pospearssemtm$RMET_P32, mu = 4)
t.test(pospearssemtm$RMET_P33, mu = 4)
t.test(pospearssemtm$RMET_P34, mu = 4)
t.test(pospearssemtm$RMET_P35, mu = 4)
t.test(pospearssemtm$RMET_P36, mu = 4)
t.test(pospearssemtm$RMET_P37, mu = 4)
t.test(pospearssemtm$RMET_P38, mu = 4)
t.test(pospearssemtm$RMET_P39, mu = 4)
t.test(pospearssemtm$RMET_P40, mu = 4)
t.test(pospearssemtm$RMET_P41, mu = 4)
t.test(pospearssemtm$RMET_P42, mu = 4)
t.test(pospearssemtm$RMET_P43, mu = 4)
t.test(pospearssemtm$RMET_P44, mu = 4)
t.test(pospearssemtm$RMET_P45, mu = 4)

##### HISTOGRAMS
library(ggplot2)
r1 <- ggplot(data=RMET, aes(x=RMET_1)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
```

```
      axis.ticks.y=element_blank())
r1

r2 <- ggplot(data=RMET, aes(x=RMET_2)) +
 geom_histogram(color="black", fill="grey", binwidth=1) +
 labs(x="", y = "") +
 scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
 theme_void() +
 theme(axis.text.y=element_blank(),
      axis.ticks.y=element_blank())
r2
r3 <- ggplot(data=RMET, aes(x=RMET_3)) +
 geom_histogram(color="black", fill="grey", binwidth=1) +
 labs(x="", y = "") +
 scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
 theme_void() +
 theme(axis.text.y=element_blank(),
      axis.ticks.y=element_blank())
r3
r4 <- ggplot(data=RMET, aes(x=RMET_4)) +
 geom_histogram(color="black", fill="grey", binwidth=1) +
 labs(x="", y = "") +
 scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
 theme_void() +
 theme(axis.text.y=element_blank(),
      axis.ticks.y=element_blank())
r4
r5 <- ggplot(data=RMET, aes(x=RMET_5)) +
 geom_histogram(color="black", fill="grey", binwidth=1) +
 labs(x="", y = "") +
 scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
 theme_void() +
 theme(axis.text.y=element_blank(),
      axis.ticks.y=element_blank())
r5
r6 <- ggplot(data=RMET, aes(x=RMET_6)) +
 geom_histogram(color="black", fill="grey", binwidth=1) +
 labs(x="", y = "") +
 scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
 theme_void() +
 theme(axis.text.y=element_blank(),
      axis.ticks.y=element_blank())
r6
r7 <- ggplot(data=RMET, aes(x=RMET_7)) +
 geom_histogram(color="black", fill="grey", binwidth=1) +
 labs(x="", y = "") +
 scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
 theme_void() +
 theme(axis.text.y=element_blank(),
      axis.ticks.y=element_blank())
r7
r8 <- ggplot(data=RMET, aes(x=RMET_8)) +
 geom_histogram(color="black", fill="grey", binwidth=1) +
 labs(x="", y = "") +
 scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
 theme_void() +
 theme(axis.text.y=element_blank(),
      axis.ticks.y=element_blank())
r8
r9 <- ggplot(data=RMET, aes(x=RMET_9)) +
 geom_histogram(color="black", fill="grey", binwidth=1) +
 labs(x="", y = "") +
 scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
 theme_void() +
 theme(axis.text.y=element_blank(),
      axis.ticks.y=element_blank())
r9
r10 <- ggplot(data=RMET, aes(x=RMET_10)) +
 geom_histogram(color="black", fill="grey", binwidth=1) +
 labs(x="", y = "") +
 scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
```

```
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r10
r11 <- ggplot(data=RMET, aes(x=RMET_11)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r11
r12 <- ggplot(data=RMET, aes(x=RMET_12)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r12
r13 <- ggplot(data=RMET, aes(x=RMET_13)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r13
r14 <- ggplot(data=RMET, aes(x=RMET_14)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r14
r15 <- ggplot(data=RMET, aes(x=RMET_15)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r15
r16 <- ggplot(data=RMET, aes(x=RMET_16)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r16
r17 <- ggplot(data=RMET, aes(x=RMET_17)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r17
r18 <- ggplot(data=RMET, aes(x=RMET_18)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r18
r19 <- ggplot(data=RMET, aes(x=RMET_19)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
```

```
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r19
r20 <- ggplot(data=RMET, aes(x=RMET_20)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r20
r21 <- ggplot(data=RMET, aes(x=RMET_21)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r21
r22 <- ggplot(data=RMET, aes(x=RMET_22)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r22
r23 <- ggplot(data=RMET, aes(x=RMET_23)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r23
r24 <- ggplot(data=RMET, aes(x=RMET_24)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r24
r25 <- ggplot(data=RMET, aes(x=RMET_25)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r25
r26 <- ggplot(data=RMET, aes(x=RMET_26)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r26
r27 <- ggplot(data=RMET, aes(x=RMET_27)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r27
r28 <- ggplot(data=RMET, aes(x=RMET_28)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
```

```
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r28
r29 <- ggplot(data=RMET, aes(x=RMET_29)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r29
r30 <- ggplot(data=RMET, aes(x=RMET_30)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r30
r31 <- ggplot(data=RMET, aes(x=RMET_31)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r31
r32 <- ggplot(data=RMET, aes(x=RMET_32)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r32
r33 <- ggplot(data=RMET, aes(x=RMET_33)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r33
r34 <- ggplot(data=RMET, aes(x=RMET_34)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r34
r35 <- ggplot(data=RMET, aes(x=RMET_35)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r35
r36 <- ggplot(data=RMET, aes(x=RMET_36)) +
  geom_histogram(color="black", fill="grey", binwidth=1) +
  labs(x="", y = "") +
  scale_x_continuous(breaks = c(1,2,3,4,5,6,7)) +
  theme_void() +
  theme(axis.text.y=element_blank(),
        axis.ticks.y=element_blank())
r36
```

Appendix 6

Figure 7

Original REMET item	Brazilian RMET Item	Rating Histogram	Mean	Median	t	CI
20. FRIENDLY	20. AMIGÁVEL		5.98	6	18.801	5.78 - 6.19
31. CONFIDENT	31. CONFIANTE		5.61	6	15.160	5.40 - 5.82
18. DECISIVE	18. DECIDIDO		5.60	6	15.822	5.40 - 5.79
25. INTERESTED	25. INTERESSADO		5.29	5	11.865	5.07 - 5.50
1. PLAYFUL	1. BRINCALHÃO		5.17	5	8.331	4.89 - 5.44
30. FLIRTATIOUS	30. PAQUERADOR		5.15	5	10.754	4.94 - 5.36
3. DESIRE	3. DESEJOSO		5.09	5	10.020	4.87 - 5.31
28. INTERESTED	28. INTERESSADO		5.06	5	8.957	4.82 - 5.28
15. CONTEMPLATIVE	15. CONTEMPLATIVO		5.03	5	9.718	4.81 - 5.24
16. THOUGHTFUL	16. PENSATIVO		4.93	5	9.172	4.72 - 5.12
29. REFLECTIVE	29. REFLEXIVO		4.71	5	6.347	4.48 - 4.93
21. FANTASIZING	21. FANTASIOSO		4.51	4	4.239	4.27 - 4.75
10. CAUTIOUS	10. CAUTELOSO		4.23	4	2.426	4.04 - 4.42
6. FANTASIZING	6. FANTASIOSO		4.22	4	2.014	4.00 - 4.44
27. CAUTIOUS	27. CAUTELOSO		4.21	4	2.020	4.00 - 4.40
24. PENSIVE	24. PENSATIVO		4.12	4	0.994	3.88 - 4.36
12. SCEPTICAL	12. CÉTICO		3.88	4	-1.194	3.67 - 4.08
19. TENTATIVE	19. INCERTO		3.66	4	-3.096	3.44 - 3.88
23. DEFIANT	23. DESAFIADOR		3.65	4	-2.909	3.42 - 3.89
32. SERIOUS	32. SÉRIO		3.59	4	-3.485	3.35 - 3.82
17. DOUBTFUL	17. DESCRENTE		3.37	4	-6.634	3.18 - 3.56
4. INSISTING	4. INSISTENTE		3.36	3	-5.440	3.13 - 3.59
34. DISTRUSTFUL	34. DESCONFIADO		3.31	3	-6.700	3.10 - 3.51
7. UNEASY	7. APREENSIVO		3.28	3	-8.284	3.10 - 3.45
33. CONCERNED	33. PREOCUPADO		3.24	3	-8.242	3.06 - 3.42
9. PREOCCUPIED	9. PREOCUPADO		3.19	3	-7.962	2.98 - 3.39
11. REGRETFUL	11. ARREPENDIDO		3.17	3	-6.896	2.93 - 3.40
22. PREOCCUPIED	22. PREOCUPADO		3.03	3	-10.856	2.85 - 3.20
5. WORRIED	5. PREOCUPADO		2.84	3	-14.129	2.67 - 3.00
13. ANTICIPATING	13. AFLITO		2.66	3	-12.999	2.46 - 2.86
35. NERVOUS	35. NERVOSO		2.51	2	-15.927	2.33 - 2.70
14. ACCUSING	14. ACUSADOR		2.45	2	-12.655	2.20 - 2.70
36. SUSPICIOUS	36. SUSPEITO		2.4	2	-15.427	2.20 - 2.60
8. DESPONDENT	8. ABATIDO		2.32	2	-19.410	2.14 - 2.49
2. UPSET	2. CHATEADO		2.12	2	-21.397	1.95 - 2.29
26. HOSTILE	26. HOSTIL		1.92	2	-19.157	1.70 - 2.13

Figure 7: This figure shows the continuous valence classification of the 36 RMET items (word-picture pair) considering one-sample t-tests. They are displayed from the most positive item (largest mean value) to the most negative item (smallest mean value).

Appendix 7

Figure 8

Original REMET item	Brazilian RMET Item	Valence	Rating Histogram	Mean	Median	Z-score	Z-score valence	Bootstrapped sample	Bootstrapped IC	Bootstrappped Valence
20. FRIENDLY	20. AMIGÁVEL			5.98	6	1,98		20. AMIGÁVEL	5.70 - 6.21	
31. CONFIDENT	31. CONFIANTE			5.61	6	1,61		18. DECIDIDO	5.38 - 5.86	
18. DECISIVE	18. DECIDIDO			5.60	6	1,60		31. CONFIANTE	5.23 - 5.86	
25. INTERESTED	25. INTERESSADO			5.29	5	1,29		25. INTERESSADO	5.00 - 5.58	
1. PLAYFUL	1. BRINCALHÃO			5.17	5	1,17		28. INTERESSADO	4.95 - 5.55	
30. FLIRTATIOUS	30. PAQUERADOR			5.15	5	1,15		1. BRINCALHÃO	4.87 - 5.56	
3. DESIRE	3. DESEJOSO			5.09	5	1,09		3. DESEJOSO	4.62 - 5.16	
28. INTERESTED	28. INTERESSADO			5.06	5	1,06		15. CONTEMPLATIVO	4.75 - 5.31	
15. CONTEMPLATIVE	15. CONTEMPLATIVO			5.03	5	1,03		30. PAQUERADOR	4.75 - 5.28	
16. THOUGHTFUL	16. PENSATIVO			4.93	5	0.93		16. PENSATIVO	4.60 - 5.10	
29. REFLECTIVE	29. REFLEXIVO			4.71	5	0,71		29. REFLEXIVO	4.43 - 5.00	
21. FANTASIZING	21. FANTASIOSO			4.51	4	0,51		21. FANTASIOSO	4.12 - 4.83	
10. CAUTIOUS	10. CAUTELOSO			4.23	4	0,23		10. CAUTELOSO	4.00 - 4.48	
6. FANTASIZING	6. FANTASIOSO			4.22	4	0,22		27. CAUTELOSO	4.00 - 4.45	
27. CAUTIOUS	27. CAUTELOSO			4.21	4	0,21		24. PENSATIVO	3.81 - 4.41	
24. PENSIVE	24. PENSATIVO			4.12	4	0,12		6. FANTASIOSO	3.78 - 4.38	
12. SCEPTICAL	12. CÉTICO			3.88	4	-0,12		12. CÉTICO	3.50 - 4.03	
19. TENTATIVE	19. INCERTO			3.66	4	-0,34		19. INCERTO	3.38 - 3.96	
23. DEFIANT	23. DESAFIADOR			3.65	4	-0,35		32. SÉRIO	3.33 - 3.91	
32. SERIOUS	32. SÉRIO			3.59	4	-0,41		23. DESAFIADOR	3.30 - 3.90	
17. DOUBTFUL	17. DESCRENTE			3.37	4	-0,63		4. INSISTENTE	3.20 - 3.83	
4. INSISTING	4. INSISTENTE			3.36	3	-0,64		17. DESCRENTE	3.15 - 3.68	
34. DISTRUSTFUL	34. DESCONFIADO			3.31	3	-0,69		7. APREENSIVO	3.13 - 3.56	
7. UNEASY	7. APREENSIVO			3.28	3	-0,72		34. DESCONFIADO	3.08 - 3.60	
33. CONCERNED	33. PREOCUPADO			3.24	3	-0,76		33. PREOCUPADO	2.96 - 3.41	
9. PREOCCUPIED	9. PREOCUPADO			3.19	3	-0,81		9. PREOCUPADO	2.95 - 3.48	
11. REGRETFUL	11. ARREPENDIDO			3.17	3	-0,83		11. ARREPENDIDO	2.81 - 3.40	
22. PREOCCUPIED	22. PREOCUPADO			3.03	3	-0,97		22. PREOCUPADO	2.76 - 3.16	
5. WORRIED	5. PREOCUPADO			2.84	3	-1,16		5. PREOCUPADO	2.58 - 2.98	
13. ANTICIPATING	13. AFLITO			2.66	3	-1,34		13. AFLITO	2.46 - 3.03	
35. NERVOUS	35. NERVOSO			2.51	2	-1,49		35. NERVOSO	2.30 - 2.75	
14. ACCUSING	14. ACUSADOR			2.45	2	-1,55		8. ABATIDO	2.11 - 2.58	
36. SUSPICIOUS	36. SUSPEITO			2.4	2	-1,60		36. SUSPEITO	2.08 - 2.68	
8. DESPONDENT	8. ABATIDO			2.32	2	-1,68		14. ACUSADOR	2.05 - 2.68	
2. UPSET	2. CHATEADO			2.12	2	-1,88		2. CHATEADO	1.88 - 2.35	
26. HOSTILE	26. HOSTIL			1.92	2	-2,08		26. HOSTIL	1.58 - 2.12	

Figure 8: This figure shows a comparison of all the analyses and its classifications of the 36 RMET items (word-picture pair) done in this study. They are displayed from the most positive item (largest mean value) to the most negative item (smallest mean value).