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An experimental study on Brazilian Portuguese metaphor processing

Um estudo experimental do processamento de metáforas do português brasileiro

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Abstract: An experimental study on the psycholinguistic processing of Brazilian Portuguese attributive metaphors (X is a Y), *e.g.*, "*Irene é um furacão*" ("Irene is a hurricane"), was carried out with the aim of highlighting, from reading times (RTs), the understanding of familiar, high-apt ("well-built") expressions, the vehicle of which is conventionalized. In the first phase of the research, two norming studies were carried out, aimed at the ranking of attributive metaphors, *e.g.* "*Algumas mulheres são furacões*" ("Some women are hurricanes"), regarding familiarity, aptness (adaptation), and conventionality. In the second phase of the research, a self-paced, non-cumulative, moving-window reading experiment was conducted, using, for the composition of the stimuli, the metaphors, *e.g.,* "*Irene é um furacão*", which have reached, in the normative studies of the first phase, ratings of "very familiar", "very high-apt", and "highly conventionalized". Brazilian Portuguese evidence in favor of the direct processing of metaphors was

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obtained, as recommended by the Class-inclusion model of Glucksberg and Keysar (1990), since there were no significant differences between the average RTs in the three conditions: "Metaphor", "Literal" and "Literal Declaration of Class Inclusion." In contrast to the findings of Janus and Bever (1985), who observed reading times of new metaphors that were significantly longer than those of literal expressions, according to the predictions of the Standard Pragmatic Model of indirect processing.

Keywords: psycholinguistic processing of metaphor; class-inclusion; dual reference; norming studies; figurative language comprehension; Brazilian Portuguese.

Resumo: Um estudo experimental do processamento psicolinguístico de metáforas nominais do português brasileiro (X é um Y), p. ex., "Irene é um furacão", foi realizado com o objetivo de evidenciar, a partir de tempos de leitura (*RTs*), a compreensão de expressões familiares, *high-apt* ("bem construídas") e cujo veículo se acha convencionalizado. Na primeira fase da pesquisa, realizaram-se dois *norming studies* ("estudos normativos") com vistas ao ranqueamento de metáforas nominais (p. ex. "Algumas mulheres são furacões") em relação a familiaridade, *aptness* ("adequação") e convencionalidade. Na segunda fase da pesquisa, um experimento de leitura automonitorada (*self-paced*, *non-cumulative*, *moving-window reading*) foi conduzido, recorrendo, para a composição dos estímulos, às metáforas, p. ex., "Irene é um furacão", que alcançaram, nos estudos normativos da primeira fase, *ratings* (ou "classificações") de "muito familiares", "*very high-apt*" e "altamente convencionalizadas". Evidências do português brasileiro em favor do processamento direto de metáforas foram obtidas, conforme preconiza o modelo de *Class-inclusion*, de Glucksberg e Keysar (1990), pois não se revelaram diferenças significativas entre os *RTs* médios nas três condições: "metáfora", "literal" e "declaração literal de inclusão em Classe", em contraposição aos achados de Janus e Bever (1985), que observaram tempos de leitura de metáforas novas significativamente maiores do que os de expressões literais, conforme as predições do Modelo Pragmático Padrão de processamento indireto.

Palavras-chave: processamento psicolinguístico da metáfora; *class-inclusion*; *dual reference*; *norming studies*; compreensão de linguagem figurada; português brasileiro.

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1 Introduction

This article intends to include Brazilian Portuguese (BP) in the literature about understanding metaphors, polarized, according to Glucksberg (2003), between indirect processing, whose assumptions have proven testable hypothesis, and direct processing models, based on empirical evidence of interference caused by "Familiarity", "Aptness", and "Conventionality" variables. To achieve this, we report on the results for the research in which we have been involved for the past two years, investigating the understanding of metaphors that have been conventionalized in BP, which are suggestive of direct processing, according to Glucksberg and Keysar's Class-inclusion model (1990).[1]

During the initial research phase, two pre-tests were performed – norming studies, in which participants ranked metaphorical expression, such as, "*Algumas mulheres são furacões*" ("Some women are hurricanes"), according to Familiarity, Aptness, and Conventionality.[2] In linguistics literature, the instruments conceived to evaluate metaphorical expressions are called norming studies (BLASKO; CONNINE, 1993; BOWDLE; GENTNER, 2005; DULCINATI et al., 2014), or norming pre-tests (JONES; ESTES, 2006), or even rating experiments (THIBODEAU; DURGIN, 2011), or, simply, rating tasks (HARRIS, 1976). Rankings were designed to select expressions, among those that received the highest ratings in both, as guiding the construction of stimuli for the self-monitored reading experiment conducted in the subsequent phase. For instance, high ratings assigned to "*Algumas mulheres são furacões*" ("Some women are hurricanes") were the basis for building the stimulus "*Irene é um furacão*" ("Irene is a hurricane"), which, included in appropriate contexts (paragraphs), would enable the metaphorical interpretation (Irene being a hectic woman) or a literal one (Irene being the hurricane that hit the Caribbean and the USA in 2011).

As the majority of experiments described in the literature focus on this form (DULCINATI et al., 2014, p. 72), we opted to use nominal

[1] The research in question, advised by the first author, was conducted by the latter author, as part of the requirements for obtaining the title of Master in Linguistics (RICCI, 2016). Approval by USS – RJ CEP, CAAE 50572215.80000.5290, report 1 412 627, on Feb. 22, 2016.

[2] Results of the aforementioned norming studies were presented during the XXXI ENANPOLL (RIBEIRO et al., 2016)

metaphors – such as X is a Y – in which X is the topic and Y is the vehicle; in the examples above, "*Algumas mulheres*" ("Some women") and "Irene" / "*furacões*" ("hurricanes") and "*furacão*" ("hurricane"), respectively.

Finally, the decision to propose a self-monitored reading task involving BP expressions in several contexts was designed to overcome the methodological frailties identified by Janus and Bever (1985) in the experiments conducted up to then - supporting (cf. CLARK; LUCY, 1975; GIBBS JR., 1979, 1981) or refuting (cf. ORTONY et al., 1978; GLUCKSBERG; GILDEA; BOOKIN, 1982) what is conventionally called the Standard Pragmatic Model of indirect metaphor processing (cf. SEARLE, 1993 [1979]; GRICE, 1975) – in which context is not provided, nor is reading time measured after the stimuli have been presented. Janus and Bever (1985) measured reading time spent on critical fragments of contextualized expressions, that is, of nominal syntagmas that contain the vehicle – locus of "the Problem to Recognize" metaphorical meaning – and noticed that "new" metaphors took, on average, significantly longer reading times than did equivalent expressions with literal meanings. Therefore, the literature on the topic has produced a gap that this BP study intends to fill: by adopting the key approach used in the experiment conducted by Janus and Bever (1985), it offers chronometric findings in favor of the direct processing of familiar, high-apt metaphors, whose vehicle is conventionalized.

2 Literature review

Traditionally, echoing the Aristotelian view of metaphor as a deviation of ordinary language (GARRET, 2007), metaphor interpretation is considered optional (GLUCKSBERG, 2003; BOWDLE; GENTNER, 2005). According to what is conventionally called the Standard Pragmatic Model (SPM), metaphor processing (as well as that of figurative language in general) takes place in three stages. Initially, the listener/reader derives the literal meaning of the expression. In the second stage, the listener/reader decides if the interpretation is appropriate in the context of the utterance and should be accepted, or not, with the meaning intended by the speaker. If it is implausible, the initial representation is rejected, and the third stage is reached, that of seeking metaphorical interpretation. Thus, the failed initial interpretation of literal meaning works as a "trigger" that sets off the search for a metaphorical meaning that accounts for

the utterance (SEARLE, 1993 [1979], p. 89-90). Therefore, nominal metaphors, such as, for instance, "Some jobs are jails" (example obtained from GLUCKSBERG; KEYSAR, 1990; GLUCKSBERG, 1998, 2003) would be recognized as assertions that do not meet the maxim of quality (GRICE, 1975), and one way of understanding them would be to convert them into similes, "Some jobs are like jails", true literal statements, since any two given things may be similar in numerous ways.

However, Glucksberg, Gildea, and Bookin (1982) question the priority of literal meaning/optionality of metaphorical interpretation, an assumption in SPM, based on evidence obtained from a series of sentence check experiments inspired by Stroop's test (1935). Stroop (1935) illustrated the competition among attentional processes that enables one to capture the automatism of the initial reading processing phases, translated into errors or longer reaction times in answering questions about the color in which a word (e.g., red) is written, when it is printed in a different color (e.g., green). Glucksberg, Gildea, and Bookin (1982.) argue that participants took longer to consider the metaphors they were presented, e.g., "some surgeons are butchers", as false, than it took them to consider "jumbled" metaphors, e.g. "some jobs are butchers", as false, since the metaphorical meanings available in the metaphors, rather than the jumbled metaphors, interfered in the evaluation of these expressions' literal meanings. By resorting to the Stroop effect logic, or to the "compulsion" to read the word when prompted to use the name of the color in which it is printed, Glucksberg, Gildea, and Bookin (1982) refute the SPM model, according to which metaphorical interpretations are only considered when literal meanings prove themselves unmanageable, supporting the theory that metaphorical interpretations may not be inhibited, or, in their own words, that the metaphorical meaning may not be ignored.

According to Glucksberg and his collaborators (GLUCKSBERG; KEYSAR, 1990; GLUCKSBERG, 1998; GLUCKSBERG, 2003), the different theories (cf. TVERSKY, 1977; ORTONY, 1993 [1979]) that treat metaphors as implied comparisons fail because, in literal comparisons, the equation "X is like Y" is bidirectional, e.g.: "copper is like tin" or "tin is like copper", "coffee is like tea" or "tea is like coffee", while, in metaphors, the elements may not be switched, e.g.: "some jobs are jails", but not "*some jails are jobs", "sermons are sleeping pills", but not "*sleeping pills are sermons". The apparent reversibility of metaphor elements produces a new expression, e.g.: "some surgeons are butchers"

and "some butchers are surgeons" are different in the foundations that sustain the construction of each one of them.

According to Glucksberg and his collaborators (GLUCKSBERG; KEYSAR, 1990; GLUCKSBERG, 1998), metaphors are what they seem to be: class inclusion statements, as well as literal assertions of category inclusion. The metaphor "sermons are sleeping pills", for instance, behaves as a statement of inclusion of "sermons" in the metaphorical category of "sleeping pills", as well as the assertion "a tree is a plant" includes "tree" in the "plant" class (GLUCKSBERG; KEYSAR, 1990, p. 12). According to them, evidence that, in nominal metaphors, "X is Y" expresses the class inclusion relation, rather than an equality relation, is the possibility of easily paraphrasing metaphorical comparisons in metaphors (in the paradigmatic form), e.g.: "my job is like a jail" → "my job is a jail"; whereas it is impossible to paraphrase literal comparisons in true statements, e.g.: "bees are like hornets" → "*bees are hornets" (GLUCKSBERG; KEYSAR, 1990, p. 7-11) or "my lawyer was like a shark" → "my lawyer was a shark", but not "barracudas are like sharks" → "*barracudas are sharks" (GLUCKSBERG, 1998, p. 41).

According to Glucksberg and Keysar's theoretical model (1990) – Class-inclusion – metaphors are understood as class, or category, inclusion statements, in which the metaphorical vehicles have what they call Dual Reference. For instance, "shark" refers to a marine predator (or a category of those) as well as an abstract category of predatory beings in general, to which it lends its name. In "my lawyer is a shark", the expression vehicle ("shark") defines a taxonomic relation between marine predator and lawyer, both housed in the abstract category of predatory beings in general, which receives the name of the prototypical member: "shark." In short, metaphors whose vehicles refer to conventionalized metaphorical categories are processed directly, as are literal category inclusion assertions, in the terms of the class-inclusion/dual reference model, in which the latter provides explanation both for the "metaphor's non-reversibility" and for the possibility of paraphrasing metaphorical comparisons in statements, which enables one to distinguish metaphors from comparisons (GLUCKSBERG, 2003, p. 95). Understanding these facts, Glucksberg (1998, 2003) rejects the hypothesis that metaphors would be processed based on their conversion into similes, supported by Johnson's empirical findings (1996), that metaphors in the form of a statement, e.g.: "my lawyer is a shark" were understood more quickly

than similes, "my lawyer is like a shark", despite the latter having an additional word ("like") when compared to the first.

By legitimating the possibility that the prototypical member designates the metaphorical category, Glucksberg and Keysar (1990, p. 8) argue that several languages use the strategy to label supraordinate categories routinely. American Sign Language uses signs for basic furniture items, "chair", "table", "bed", to refer to the "furniture" category. Burmese, spoken in Southeast Asia (Burma, Thailand, Malaysia, and Singapore), resorts to the double function of names that refer to highly prototypical objects and classes (DENNY, 1986; CRAIG, 1986 *apud* GLUCKSBERG; KEYSAR, 1990). Even non-classifying languages, such as Hebrew and English, provide examples of using prototypical names to designate categories, such as the last name of someone who was accused of war crimes, Demjanjuk, who, in Israel and in North-American articles and newspapers, became the word to identify a "common individual capable of unspeakable acts" (SHINOFF, 1987 *apud* GLUCKSBERG; KEYSAR, 1990) – although John Demjanjuk, was not found guilty, ultimately, of the crimes attributed to the sadistic guard at the Treblinka concentration camp, in Poland, nicknamed "Ivan, the Terrible". In a large number of indigenous languages from the southwestern regions of the United States, there are plenty of examples of the occasional names of prototypical members to label the categories in which they are included. In the Hopi language, the name of the most abundant species, cottonwood, may designate all trees called deciduous trees, which lose their leaves completely during the fall and winter (TRAGER, 1938 *apud* GLUCKSBERG; KEYSAR, 1990). In the Shoshoni language, the word for "eagle" is also used for large birds in general (HAGE; MILLER, 1976 *apud* GLUCKSBERG; KEYSAR, 1990). According to Glucksberg and Keysar (1990), the underlying principle for the dual reference examples above – using the prototypical member to refer to the category – explains what happens in metaphors: the vehicle is used to refer to the metaphorical, abstract category, in addition to referring to the actual being. There are cases in which the metaphor vehicle's dual reference is explicit, such as in the speech of an spectator present during John Demjanjuk's trial, transcribed by Glucksberg and Keysar (1990, p. 8): I know his name is Demjanjuk, but I don't know if he is a Demjanjuk. It is also explicit in the example provided by Glucksberg (2003, p. 94): "Cambodia was Vietnam's Vietnam", in which the first mention of 'Vietnam' refers to the country, whereas the second reference points to the supraordinate abstract category of disastrous military

interventions resulting from the armed conflict in southeast Asia (and vice versa in Portuguese).

Finally, in mapping the metaphor psycholinguistics research field explored thus far, Glucksberg (2003) highlights the evidence in Blasko and Connine's cross-modal priming experiments (1993) (in this case, semantic priming associated with a lexical choice task), in which high familiarity and aptness ratings accelerate the activation of the metaphorical meaning of the metaphor vehicle. Thus, Glucksberg (2003) lists, in addition to the vehicle conventionality, the role played by the Familiarity and Aptness variables in the fast access to the metaphorical meaning, and, therefore, tributary of the direct processing of metaphorical expressions.

3 Experiment 1: Familiarity and Conventionality norming study

Experiment 1 was designed to assess participants' familiarity in relation to metaphors that have been constructed for such a purpose by the researcher. Familiarity is understood here as subjective familiarity, according to Blasko and Connine's definition (1993, p. 305): "the perceived experience with the metaphor."[3] Beyond obtaining familiarity ratings for metaphors – classified as familiar and unfamiliar – the conventionality of expressions was estimated, whose figurative meaning of vehicles was collected from prestigious BP dictionaries.[4] To achieve this, each of the participants chose, among three words, the one that in his/her opinion captured the meaning the expression intended to communicate. Based on the answers, it was determined whether or not the vehicle (Y) had evoked the figurative meaning, or extended meaning recorded in the reference dictionaries, allowing or not allowing one to infer whether this meaning was or was not conventionalized in the sample's individual's repertoire.

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[3] As opposed to objective familiarity, estimated based on metaphorical frequency, by using the Google search engine with corpus (THIBODEAU; DURGIN, 2011, p. 209).

[4] AULETE. *Aulete Digital:* o dicionário da língua portuguesa na internet; HOUAISS; VILLAR. *Dicionário Houaiss da Língua Portuguesa*, 3. ed. (2009); FERREIRA. *Novo Aurélio século XXI*: o Dicionário da Língua Portuguesa (1999); and the 6th edition of FERREIRA. *Miniaurélio: o Minidicionário da Língua Portuguesa* (2004).

Participants: 81 students from the Severino Sombra University, in Vassouras, RJ, Brazil, between 18 and 56 years of age, 16 males and 65 females, all native speakers of BP, who had never participated in experiments about metaphor understanding and who had volunteered to participate.

Materials: 84 nominal metaphors (X is a Y) were constructed, by the researcher, with no repetitions in the vehicles (Y) or topics (X). Topics in the expressions were modified by "some", and both topics (X) and vehicles (Y) are concrete nouns, with the same gender, for instance: "*Alguns carros são abacaxis*" ("Some cars are lemons"). Some topics (X) are exceptions, as they are common gender nouns, and some vehicles are overly common nouns, e.g.: "*Alguns motoristas são lesmas*" ("Some drivers are snails"). Figurative meanings of all vehicles (Y) are recorded in at least two of the reference dictionaries. Understood literally, all constructed expressions are false.

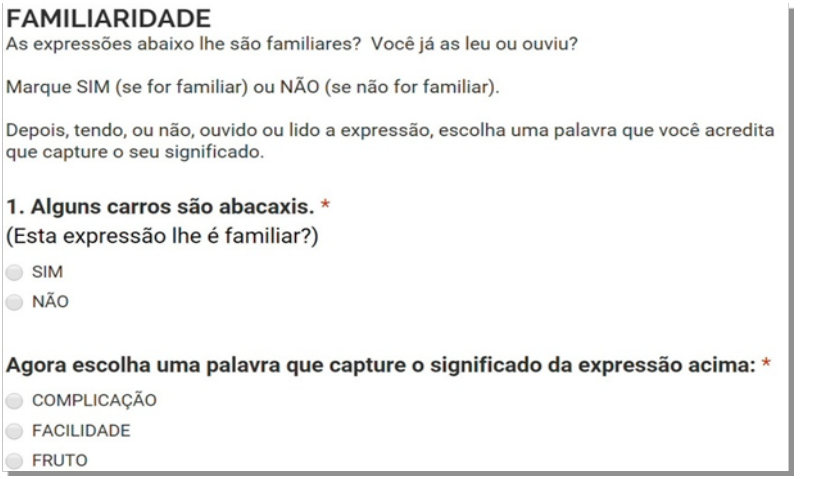
Procedures: On pre-defined days, groups of participants (maximum of 19) were placed in one of the rooms at USS – RJ[5] Distance Learning Support Center, and, after having signed the Free and Informed Consent Form, they performed the proposed task in, on average, 15 minutes. Each of the participants sat before a 17" LCD screen exhibiting the Google form (Google Chrome on Windows 7) that contained the questions to be answered (each of the screens was connected to a PC with ABNT2 wired keyboard and a wired optical USB mouse with three buttons and scroll). In the heading on each of the form blocks, immediately above the expression they were expected to evaluate (as familiar or unfamiliar), the participants could read the instructions in Portuguese, regarding the procedure to be adopted: "Do the expressions below sound familiar to you?" "Have you ever read or heard them?" And it continued: "Check YES (if it is familiar) or NO (if it is not familiar)". "After that, if you have heard or read the expression before, choose a word that, in your opinion, captures its meaning."

Hence, it was possible to estimate the conventionality of the Vehicle (Y) of each of the metaphors, whose figurative meanings were listed among the choices, as well as to assess the quality of the participation of sample components, since the other choices would

[5] Distance Learning Support Center at the Severino Sombra University in Vassouras, RJ, Brazil.

refer to the expression's literal meaning or to the metaphor's opposite. In distributing multiple choices, we were careful to alternate, within the form, the positions where the options appeared (see excerpt of the form in Figure 1). Answering all questions was mandatory, thus making it impossible for participants to leave any questions blank when they submitted the form on the internet. At the end of each session, participants were given access to the purposes of the experiment and were able to clarify any potential doubts.

Figure 1 – Excerpt from the Familiarity form



3.1 Experiment 2: Aptness and Conventionality norming study

Experiment 2 was designed to evaluate the 'aptness' of the expressions in the set of 84 metaphors, whose familiarity was assessed in Experiment 1. In accordance with the most widely accepted definition of aptness: "the extent to which the statement captures important features of the topic" (CHIAPPE et al., 2003, p. 97),[6] participants were asked to rate each of the expressions from 1 to 5, evaluating their effectiveness

[6] Dulcinati et al. (2014, p. 74), warn that this metaphor property has been assigned several different definitions.

in conveying the meaning they intend to convey. In addition, similar to Experiment 1, the expressions' conventionality was also estimated.

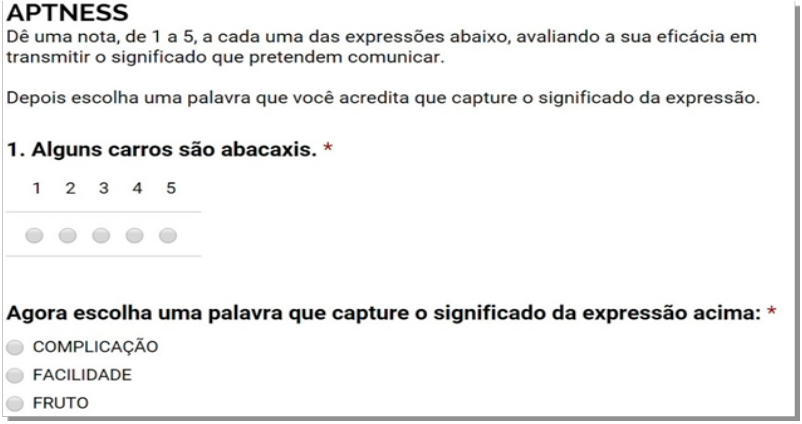
Participants: 79 students from Severino Sombra University in Vassouras, RJ, Brazil, 19 to 44 years of age, 28 males and 51 females, all native speakers of BP, who had never participated in experiments about metaphor understanding and who volunteered to participate.

Materials: The same 84 nominal metaphors (X is a Y) provided to participants in Experiment 1.

Procedures: On pre-defined days, groups of participants (maximum of 19) were placed in one of the rooms at the USS – RJ[7] Distance Learning Support Center, and after having signed the Free and Informed Consent Form, they performed the proposed task in, on average, 15 minutes. Each of the participants sat before a 17" LCD screen exhibiting the Google form (Google Chrome on Windows 7) that contained the questions to be answered (each of the screens connected to a PC with an ABNT2 wired keyboard and a wired optical USB mouse with three buttons and scroll). In the heading on each of the form blocks, immediately above the expression they were expected to evaluate, the participants could read the instructions in Portuguese, regarding the procedure to be adopted: "Rate each of the expressions below from 1 to 5, evaluating their effectiveness in conveying the meaning they intend to convey" and "After that, choose a word that, in your opinion, captures its meaning. Similar to Experiment 1, we were able to estimate the conventionality for each metaphor vehicle (Y), whose figurative meanings were listed among the choices, as well as to assess the quality of the participation of the sample components, as the other choices would refer to the expression's literal meaning or to the metaphor's opposite. In distributing multiple choices, we were careful, within the form, to alternate the positions where the options appeared (see excerpt of the form in Figure 2). Answering all questions was mandatory, thus making it impossible for participants to leave any questions blank when they submit the form on the internet. Similar to Experiment 1, at the end of each session, participants were given access to the purposes of the experiment and were able to clarify any potential doubts.

[7] At the same facilities where Experiment 1 was held.

Figure 2 – Excerpt from the Aptness form



3.2 Results of norming studies

Results of both norming studies totaled 26,880 evaluations for the 84 metaphorical expressions constructed for this purpose: 13,608 evaluations performed by the 81 participants in Experiment 1, regarding the metaphors' "Familiarity" and "Conventionality"; and 13,272, evaluations performed by the group of 79 participants in Experiment 2, who ranked them regarding "Aptness" and "Conventionality" – in both cases, these were performed in the subsequent research stage in order to construct the set of stimuli in the self-monitored reading experiment. Selection of higher rating metaphors concerning their "Conventionality" was based on the average of estimates obtained in both experiments.

Considering the individual, familiarity should be regarded as a discrete variable, involving exclusively two factors or "feelings": the feeling of familiarity with "something", and the feeling of "unfamiliarity" with such "something", if what is perceived by the individual seems, respectively, familiar or not familiar to him/her. However, considering groups of individuals, it is permissible to admit degrees of familiarity, such as the "Familiarity" ratings obtained among participants in Experiment 1, which resulted in "unfamiliar", "little familiar", "moderately familiar", "familiar" and "very familiar", listed in Table 1.

Table 1 – Familiarity ratings in Experiment

Expression ratings	Answers YES (%)[8]
Very familiar metaphors	between 80 and 100
Familiar metaphors	equal to or higher than 60 and lower than 80
Moderately familiar metaphors	equal to or higher than 40 and lower than 60
Little familiar metaphors	equal to or higher than 20 and lower than 40
Unfamiliar metaphors	lower than 20

Four expressions, that is to say, less than 5% of the total, were considered familiar by less than half of the participants: "Some neighbors are toads" (familiar to 41.98%), "*Alguns carros são abacaxis*" ("Some cars are lemons") (40.74%), "*Algumas explicações são véus*" ("Some explanations are veils") (39.51%), and the least familiar to the group, "*Alguns indivíduos são avestruzes*" ("Some individuals are ostriches") (37.04%). The vast majority, 75 out of the 84 expressions (89% of the total), was considered familiar by 60% of the participants or more: from those that sounded familiar to a little bit more than half of the group, for instance, "*Alguns pensadores são águias*" ("Some thinkers are eagles") (60.49%) and "*Algumas amigas são camaleões*" ("Some friends are chameleons") (64.02%) to those that sound familiar to everyone, e.g.: "*Algumas sogras são cobras*" ("Some mothers-in-law are snakes") (100%) and "*Algumas mulheres são furacões*" ("Some women are hurricanes") (100%). This majority included metaphors ranked as "familiar" and "very familiar", a pre-requisite for selecting stimuli for the self-monitored reading experiment to be performed in the subsequent research stage.

However, we decided to increase the minimum score to 85% of positive answers (YES) in judging the familiarity of expressions, maintaining 59 (or 70%) of the 84 candidates within the selection to make up the set of stimuli for the planned self-monitored reading experiment. Therefore, the selected metaphorical expressions were considered familiar by 85% of the participants, for instance, from "*Alguns politicos são raposas*" ("Some politicians are rats" – adapted to convey the idea of slyness) (85.19%), to "*Alguns professors são carrascos*" ("Some teachers are executioners" - adapted to convey the idea of mercilessness)

[8] "Do the expressions below sound familiar to you?" Have you ever read or heard them?" "Check YES (if it is familiar) or NO (if it is not familiar)". (see excerpt of "Familiarity" form in Figure 1).

(98.77%), to those that were unanimous in the group, e.g.: "Some drivers are snails" (100%) and "*Alguns músicos são feras*" ("Some musicians are animals" – adapted to convey the idea of greatness) (100%).

Table 2 – Aptness ratings in Experiment 2

Expression ratings	Scores (1 to 5)[9]
Very high-apt metaphors	5
High-apt metaphors	4
Moderate-apt metaphors	3
Low-apt metaphors	2
Very low-apt metaphors	1

The Aptness ranking, in accordance with the scores between 1 and 5 given by the participants in Experiment 2 regarding the effectiveness of expressions, resulted in the following ratings: very low-apt, low-apt, moderate-apt, high-apt, and very high-apt, listed in Table 2.

From participants in Experiment 2, none of the 84 expressions received a score of lower than 2 for Aptness, which meant there were no low-apt or very low-apt ratings for the metaphors. Only 6, that is 7% of the total, received scores lower than 4, characterized as moderate-apt, namely: "*Alguns carros são abacaxis*" ("Some cars are lemons" – adapted to convey the idea of "problematic") (with an average of 3.94), "*Alguns estudantes são traças*" ("Some students are bookworms") (with 3.89), "*Algumas explicações são véus*" ("Some explanations are veils") (3.86), "*Alguns vizinhos são sapos*" (Some neighbors are toads") (3.77) and the two expressions with the lowest ratings, "*Alguns humanos são canários*" ("Some humans are canaries") (3.65) and "*Alguns indivíduos são avestruzes*" (Some individuals are ostriches") (3.57). In terms of "effectiveness", almost all expressions – 78, or approximately 93% -- received scores between 4 and 5, limiting most expressions to the highest ratings, high-apt or very high-apt, e.g.: "*Alguns viciados são zumbis*" ("Some addicts are zombies") (averaging 4.08), "*Alguns advogados são tubarões*" ("Some lawyers are sharks") (4.32), "*Algumas estradas*

[9] "Rate each of the expressions below from 1 to 5, evaluating their effectiveness in conveying the meaning they are intended to convey" (cf. excerpt of "Aptness" form, Figure 2).

são serpentes" ("Some roads are serpents") (4.35), "*Alguns cunhados são malas*" ("Some brothers-in-law are a pain" – adapted to convey the idea of nuisance) (4.72), "*Algumas mães são leoas*" ("Some mothers are lionesses") (4.82), and the one that was the closest to reaching a perfect score "*Algumas meninas são gatas*" ("Some girls are foxes" – adapted to convey the idea of attractiveness) (4.91).

Despite the high scores assigned to most expressions, we applied the same strict standards previously adopted, raising the minimum score of the metaphors' aptness ratings to 4.5, thus preserving 61 out of the 84 (or 73%) of the candidates for stimuli in the planned self-monitored reading experiment. Therefore, the selected metaphorical expressions presented ratings of equal to or greater than 4.5, e.g.: "*Alguns policiais são gorilas*" ("Some police officers are gorillas") (4.54), "*Alguns pais são bananas*" ("Some fathers are doormats" – adapted to convey the idea of submission) (4.67), as well as "*Alguns trabalhos são prisões*" ("Some jobs are jails") (4.71), "*Algumas modelos são aviões*" (meaning "Some models are gorgeous") (4.8), and those that were almost unanimous within the group "*Alguns lutadores são touros*" ("Some fighters are bulls") (4.89) and "*Alguns mestres são espelhos*" ("Some masters are mirrors") (4.89).

Average "Conventionality" estimates, obtained from the results of Experiments 1 and 2, translated into the following ratings: "new metaphors", "little conventionalized metaphors", "moderately conventionalized metaphors", "conventionalized metaphors", and "highly conventionalized metaphors" (Table 3). Estimates regarding "Conventionality", collected in Experiments 1 and 2, were gathered in average estimates, weighted in relation to the number of participants in each of them in order to allow it to benefit from the totality of observations. The adoption of the same minimum level (85%) used to select expressions based on familiarity, in this study, limited the stimuli for the planned self-monitored reading experiment for highly conventionalized expressions.

Table 3 – "Conventionality" ratings in Experiments 1 and 2

Expression ratings	**Congruent answers (%)**[10]
Highly conventionalized metaphors	between 80 and 100
Conventionalized metaphors	equal to or higher than 60 and lower than 80
Moderately conventionalized metaphors	equal to or higher than 40 and lower than 60
Little conventionalized metaphors	equal to or higher than 20 and lower than 40
New metaphors	lower than 20

Therefore, 43 expressions from the original set were selected to construct the stimuli for the self-monitored reading experiment, performed in the subsequent research stage. This selection included: "very familiar" metaphors (in at least 85% of the evaluations by participants in Experiment 1), very high-apt metaphors (with ratings equal to or higher than 4.5, obtained in the ranking in Experiment 2), and "highly conventionalized" metaphors (in 85% or more of the average estimates in the evaluations by the participants in Experiments 1 and 2) (see Table 4).

Table 4 – The 43 expressions selected in Experiments 1 and 2

The 43 expressions selected	**English versions (* adapted)**	**Familiarity**	**Aptness**	**Conventionality**
Alguns políticos são raposas.	Some politicians are rats.*	85.19%	4.67	97.45%
Algumas crianças são anjos.	Some children are angels.	98.77%	4.77	89.83%
Alguns chefes são toupeiras.	Some bosses are stupid.*	92.59%	4.66	94.92%
Alguns seguranças são armários.	Some security guards are monsters.*	93.83%	4.76	95.56%
Algumas modelos são aviões.	Some models are gorgeous.*	97.53%	4.8	98.73%
Alguns pais são bananas.	Some parents are doormats.*	92.59%	4.67	97.45%
Alguns maridos são cavalos.	Some husbands are jackasses.*	96.30%	4.68	100.00%
Algumas sogras são cobras.	Some mothers-in-law are snakes.	100.00%	4.82	99.36%
Alguns meninos são diabos.	Some boys are devils.	98.77%	4.67	96.84%
Algumas modas são febres.	Some fads are fevers.	96.30%	4.72	96.19%
Algumas senhoras são flores.	Some ladies are flowers.	91.36%	4.68	99.37%
Algumas mulheres são furacões.	Some women are hurricanes.	100.00%	4.81	98.11%
Algumas meninas são gatas.	Some girls are foxes.*	100.00%	4.91	100.00%

[10] "[...] choose a word that captures the expression meaning" (see excerpts from the "Familiarity" and "Aptness" forms in Figures 1 and 2, respectively).

Algumas adolescentes são girafas.	Some teenagers are giraffes.	92.59%	4.63	99.36%
Alguns cordeiros são lobos.	Some sheep are wolves.	91.36%	4.68	96.83%
Algumas mães são leoas.	Some mothers are lionesses.	97.53%	4.82	98.11%
Alguns motoristas são lesmas.	Some drivers are snails.	100.00%	4.85	98.73%
Alguns genros são sanguessugas.	Some sons-in-law are leeches.	91.36%	4.66	98.73%
Alguns avós são santos.	Some grandparents are saints.	86.42%	4.65	87.97%
Algumas tias são vitrolas.	Some aunts are record players.	90.12%	4.72	98.09%
Algumas avós são corujas.	Some grandmothers are proud.*	98.77%	4.73	98.11%
Alguns cunhados são malas.	Some brothers-in-law are pains.*	97.53%	4.72	96.83%
Alguns músicos são feras.	Some musicians are animals.*	100.00%	4.84	100.00%
Algumas motos são foguetes.	Some motorcycles are rockets.	92.59%	4.85	99.37%
Alguns cozinheiros são porcos.	Some cooks are pigs.	97.53%	4.85	94.33%
Alguns locutores são papagaios.	Some announcers are parrots.	92.59%	4.72	96.20%
Algumas atitudes são máscaras.	Some attitudes are masks.	85.19%	4.61	92.42%
Algumas provas são torturas.	Some tests are torture.	98.77%	4.81	100.00%
Alguns botequins são chiqueiros.	Some bars are pigsties.	95.06%	4.85	96.81%
Alguns professores são carrascos.	Some teachers are executioners.	98.77%	4.87	96.20%
Algumas celebridades são antas.	Some celebrities are asses.	88.89%	4.75	99.36%
Alguns fumantes são chaminés.	Some smokers are chimneys.	96.30%	4.86	97.47%
Alguns barracos são fornos.	Some huts are furnaces.	93.83%	4.66	98.72%
Alguns caminhoneiros são tartarugas.	Some truck drivers are tortoises.	95.06%	4.85	98.72%
Algumas casas são fornalhas.	Some houses are stoves.	95.06%	4.72	97.47%
Algumas garotas são violões.	Some girls are curvaceous.*	95.06%	4.8	97.44%
Alguns amigos são pilares.	Some friends are pillars.	87.65%	4.77	96.84%
Algumas torcidas são quadrilhas.	Some team fans are gangs.	92.59%	4.63	89.89%
Algumas críticas são coices.	Some criticisms are kicks.	92.59%	4.72	94.30%
Alguns lutadores são touros.	Some fighters are bulls.	93.83%	4.89	98.08%
Alguns mestres são espelhos.	Some masters are mirrors.	93.83%	4.89	98.73%
Alguns trabalhadores são formigas.	Some workers are ants.	92.59%	4.62	86.08%
Algumas vizinhas são moscas.	Some neighbors are flies.	93.83%	4.51	95.53%

4 Experiment 3: self-monitored reading of BP metaphors

The self-monitored reading experiment (self-paced, non-cumulative, moving-window reading) was designed to evidence direct processing supported by the Class-inclusion theoretical model (GLUCKSBERG; KEYSAR, 1990), for very familiar, very high-apt, and highly conventionalized metaphors in BP, selected in norming studies conducted in our research, observing the reading times impact upon the "Recognition Problem" locus of the metaphorical meaning, that is, the vehicle for each of the expressions (e.g.: "*um furacão*" ("a hurricane") in "*Irene é um furacão*" ("Irene is a hurricane") demanded metaphorical interpretation). The reading times for the corresponding fragments were also recorded, e.g.: "*um furacão*" ("a hurricane") in "*Irene é um furacão*" was to be interpreted literally, as was the reading time for the control fragments, e.g.: "*uma jovem*" ("a young woman") in literal class inclusion statements, in this case, "*Irene é uma jovem*" ("Irene is a young woman").

Participants: 66 volunteers participated in the experiment: 20 men and 46 women, an average of 27 years of age. Thirty-five volunteers were recruited among undergraduate students from the Languages Department at Federal Fluminense University (UFF) and 3 were administrative workers at the institution, the latter with college degrees. Twenty-eight volunteers were students in different areas at the Severino Sombra University (Nursing, Production Engineering, Chemical Engineering, Medicine, and Psychology). Among these, 24 were undergraduate students and 4 were specialists.

Materials: 9 triplets of paragraphs (transcribed in the Appendix), equally divided into 11 fragments/syntagmas, were prepared to include: in type 1: expressions type "X is a Y" constructed based on metaphors selected in the pre-tests, e.g.: "*Irene é um furacão*" ("Irene is a hurricane"), constructed based on "*Algumas mulheres são furacões*" ("Some women are hurricanes") (see Table 4); in type 2: expressions with literal meaning of the same type (X is a Y), e.g.: "*Irene é um furacão*", constructed based on what had been learned from hurricane Irene, which struck the Caribbean and the USA in 2011; and in type 3: class inclusion statements of the same type (X is a Y), e.g.: "*Irene é uma jovem*" ("Irene is a young woman"), categorizing the topic of the expression. In type 1 contexts, the expressions "X is a Y" required metaphorical interpretations; in type 2 contexts, the same expressions (X is a Y) required literal interpretations, and in type 3 contexts, "X is

a Y" were usual literal class inclusion statements. Critical fragments of the - "Y" in all - metaphorical and literal expressions and of literal inclusion statements, were balanced as the number of syllables, 4 (7th segment); and in type and number of constituents, "Det + N" (in the examples, respectively, "*um furacão*", "*um furacão*", "*uma jovem*"). In addition, all the segments of the 9 triplets were equally balanced in number of syllables before the critical fragment, and up to the ninth one. After reading each paragraph, participants answered a question about the content read, by pressing the buttons corresponding to YES or NO on the button box attached to the stimuli exhibition device. The bars in the examples below, on paper, limit the 11 fragments provided in each of the reading windows, at the rhythm imposed by each of the participants upon reading the paragraphs.

Type 1 context: requiring metaphorical interpretation

Com muita frequência, / mulheres brasileiras / trabalham fora, / têm filhos / e estudam. / Irene é / um furacão / que empolga / todo mundo / no trabalho, em casa / e na faculdade.

("Quite frequently, / Brazilian women / have jobs, / have children / and study. / Irene is / a hurricane / who excites / everyone / at work, at home, / and at school.")

Type 2 context: requiring literal interpretation

Com muita frequência, / fenômenos naturais / recebem nomes / de gente / dos mais comuns. / Irene é / um furacão / que assolou / o Caribe / e o leste dos EUA / em 2011.

("Quite frequently, / natural phenomena / are named / after / common people. / Irene is / a hurricane / that struck / the Caribbean / and the eastern USA / in 2011.")

Type 3 context: requiring interpretation of the class inclusion statement

Com muita frequência, / mulheres brasileiras / trabalham fora, / têm filhos / e estudam. / Irene é / uma jovem / que empolga / todo mundo / no trabalho, em casa / e na faculdade.

("Quite frequently, / Brazilian women / have jobs, / have children, / and go to school. / Irene is / a young woman / who excites / everyone / at work, at home, / and at school.")

Stimuli were distributed (within subjects, counterbalanced in Latin squares) so that participants read paragraphs in all 3 conditions (by reading 3 stimuli per condition and never reading the same stimulus for more than one condition). Eighteen additional distractive paragraphs were interspersed among the 9 target-paragraphs, and the presentation order for the total 27 paragraphs was randomized in each session with each participant. Questions after each of the target-paragraphs required participants to provide approximately as many YES answers as NO answers.

Procedures: In individual sessions, each participant read the stimuli, fragment by fragment, prompted, at the participant's command, on an Apple computer screen, by pressing the "next screen button" from a button box attached to the device. For this, the stimuli presentation followed a protocol built in PsyScope, so as to record reading times and participants' answers. Prior to each session, participants underwent training, consisting of reading 4 stimuli, in order to familiarize themselves with equipment operation and with the experiment routine. Undergraduate students were given a certificate for participating in extra-curricular activities, complementary to the studies they might have been developing. At the end of each session, participants were told the experiment purposes, and any potential doubts they may have had were clarified.

Hypothesis: According to the theoretical class-inclusion model (GLUCKSBERG; KEYSAR, 1990), the very familiar, highly conventionalized, and very high-apt BP metaphors selected during the norming studies should be processed directly, without mediation by the derivation from literal meaning, as are literal class inclusion statements. Alternatively, according to the so-called Standard Pragmatic Model, the same metaphors should be processed indirectly, based on the derivation of the expression's literal meaning and its rejection in the utterance context.

Predictions: Due to the research hypothesis, of direct processing of very familiar, highly conventionalized, and high-apt metaphors, significant differences are not expected between the reading time for these

metaphor vehicles and for the corresponding nominal syntagmas, both in the equivalent literal meaning expressions and in the class inclusion literal statements. If indirect processing prevails, significantly higher average reading times will most likely be observed for the metaphor vehicles than those for the same target-nominal syntagmas in literal interpretation and the target-nominal syntagmas in class inclusion literal statements.

4.1 Self-monitored reading experiment result analysis

We hereby adopt the methodological strictness that, according to Janus and Bever's criticism (1985), is missing in the literature to date, in supporting as well as in rejecting indirect processing of the metaphor that follows the Standard Pragmatic Model. For such, we divided the stimuli into syntagmas and measured the reading times (RT) on the "Recognition Problem" locus of the metaphorical meaning, the vehicles of metaphors. However, unlikely in Janus and Bever (1985), whose findings suggest that new metaphors are processed indirectly, based on the derivation of the expression's literal meaning, we obtained results that support the hypothesis of direct processing of conventionalized, familiar, and high-apt metaphors. In fact, Janus and Bever (1985, p. 485) admit the possibility of direct processing of what they call frozen metaphors, and our findings for BP are apparently no different from that.

Contrary to the predictions associated with the hypothesis of indirect processing, in terms of the Standard Pragmatic Model, participants in the self-monitored reading experiment conducted by us did not spend significantly longer periods in reading the metaphor vehicles, e.g., "*um furacão*" ("a hurricane"), in "*Irene é um furacão*" ("Irene is a hurricane"), than they spent reading the same nominal syntagmas in expressions with literal interpretation, e.g., "*Irene é um furacão*" ("Irene is a hurricane"), referring to the hurricane that struck the Caribbean in 2011. They did not spend longer periods reading the nominal syntagmas corresponding to the literal class inclusion statements, e.g. "*Irene é uma jovem*" ("Irene is a young woman" - adapted), thus suggesting the validity of the hypothesis of direct processing via Glucksberg and Keysar's (1990) Class inclusion/Dual reference, as demonstrated by the average RT listed in Table 5.

Table 5 – Average reading times (RT in ms) for critical fragments (highlighted) under the following conditions: Literal, Metaphorical and Literal Class Inclusion Statement (LCIS)

Contexts	*RT*	Examples (paragraphs extracts)
Literal	954.25	*[...] fenômenos naturais recebem nomes de gente. Irene é* ***um furacão*** *que assolou o Caribe [...].* ("[...] natural phenomena are named after people. Irene is **a hurricane** that struck the Caribbean [...].")
Metaphorical	925.84	*[...] mulheres brasileiras trabalham fora, têm filhos e estudam. Irene é* ***um furacão*** *que empolga todo mundo [...].* ("[...] Brazilian women have job, have children, and go to school. Irene is **a hurricane** who excites everyone [...].")
LCIS	867.89	*[...] mulheres brasileiras trabalham fora, têm filhos e estudam. Irene é* ***uma jovem*** *que empolga todo mundo [...].* ("[...] Brazilian women have job, have children, and go to school. Irene is **a young woman** who excites everyone [...].")

The RT for critical fragments did not exhibit normal distribution for any of the 3 conditions: Literal, Metaphor, or Literal Class Inclusion Statement (LCIS) (for Literal condition, Kolmogorov-Smirnov statistics=0.14, $p<.05$; for Metaphor condition, Kolmogorov-Smirnov=0.12, $p<.05$; and for the LCIS condition, Kolmogorov-Smirnov=0.12, $p<.05$). In addition, significant differences were not detected in Multiple Comparisons among the conditions, LCIS-Literal, LCIS-metaphor, Literal-Metaphor, in statistical analysis per subject (Kruskal-Wallis $X2(2)=2.95$, $p>.05$) and in the analysis per item (Kruskal-Wallis $X2(2)=3.55$, $p>.05$). The Test Power used was estimated at 70%, capable of evaluating differences of, at least, 200 milliseconds (ms) between the RTs of the critical fragments for the conditions and differences, such as those Janus and Bever (1985) reported and that were not present in this case.[11]

[11] The epistemological nature of findings such as ours, which are based on the absence of statistically significant differences among experimental conditions, has been questioned, traditionally, under the terms of the so-called argumentum *ad ignorantiam* (the absence of evidence is not evidence of the absence). Evidence of absence, in the tradition that goes back to Sextus Empiricus' (2nd century) skepticism, should be considered fallacious, as absence of evidence that may simply have not been found.

Participants' answers to the questions on the content in the paragraphs satisfactorily attested to the involvement of individuals in performing the proposed task. Considering the totality of participants (66), we detected the vast majority (94%) of correct answers. What's more, approximately 99% of the participants answered 90% of the questions correctly, ensuring that the results are not attributed to the lack of attention by readers or to their difficulty in understanding stimuli.

The statistically non-significant difference (only 28.4 ms) between the average reading time (average RT) for metaphor vehicles and for the nominal syntagmas interpreted literally suggests that familiar, high-apt, and conventionalized metaphorical meanings (thus considered in the participants' off-line answers in the norming studies) are indeed "available" when the online structuring of predicative expressions and their interpretation in appropriate contexts take place. In relation to this difference (statistically non-significant, of 28 ms), it may be asked whether they caused any "strangeness" and difficulty in interpreting literal expressions that, in the stimuli used, assigned "people's names" to non-human beings, whether animate or inanimate, e.g.. "*Irene é um furacão*" ("Irene is a hurricane") in the paragraph *"[...] fenômenos naturais recebem nomes de gente. Irene é um furacão que assolou o*

However, there has been an increase in the view that some cases in which a proposition is assumed to be true simply because it may not be proven false, or is false because it may not be proven true, are not considered fallacies (WALTON, 1992, p. 381-4). Among such cases, circumstances are admitted in which conclusive evidence does not appear, despite being sought; and the proposition that expresses the absence of such results is assumed to be true or false, although temporarily, considering the possibility of future rejections (p. 383). Therefore, we argue that this is the case of differences between the RT of critical segments for the conditions (as an Alternative Hypothesis) that were not evidenced in the experiment we performed, enticing the defense - at least presumptive defense, under Walton's terms - of the Research Hypothesis. To add further support to the assumption that the experimental findings we obtained are not fallacious, we adduce that, if, on the one hand, the absence of significant differences among RT for critical segments under the 3 conditions may be paraphrased under the terms of non-rejection of the null hypothesis, on the other hand, the test power used in the statistic treatment of data, estimated at 70%, would be capable of surprise differences of, at least, 200 ms, such as those reported by Janus and Bever (1985) in the processing of new metaphors, and, therefore, respond to the challenge that a type II error may be occurring here, that is, not rejecting the false H0. (COOLICAN, 2014, p. 427-8).

Caribe [...]" ("[...] natural phenomena are named after people. Irene is a hurricane that struck the Caribbean [...]") (see Appendix for the other references). This average RT for the literal interpretation of nominal syntagmas also departed (86.36 ms, a difference that was also not statistically significant) from the average RT of nominal syntagmas in the class inclusion statements, e.g., "*Irene é uma jovem*" ("Irene is a young woman"), which are part of BP speakers' repertoire, as consolidated semantic knowledge. If, therefore, some literal expressions cause "strangeness" (and literal expressions should not cause it), it should be argued that the effect obtained by confronting, e.g., "*Fernanda é uma lesma*" ("Fernanda is a snail"), in the paragraph "*Em certas culturas, animais exóticos são adotados e ganham apelidos. Fernanda é uma lesma que habita um viveiro na casa de criadores nas Filipinas*" ("In some cultures, exotic animals are adopted and given nicknames. Fernanda is a snail that lives in a nursery in a breeder's in the Philippines"), is due, in such cases, to the pragmatic "misfortune" of the literal statement, rather than a breach in the sentence's conditions of truth (see also Matthewson, 2004, p. 409).[12] It is thus true that problems, in principle, inherent in "performative" utterances would be extended to the examples of the so-called "constative" utterances, although this would be endorsed by the literature. At least for Gerken (1994, p. 78), by "describing", "explaining", and "theorizing" we also commit to performative activities, which means stating that it would be more appropriate to consider "constative" or "descriptive" as special cases of "performative." In Petrey (1990), it is possible to determine that even Austin (1962) recognized that the distinction (originally proposed by Austin) was too strong and leaned towards reevaluating it under the terms explained above. In Grandesso (2006), we are able to get in contact with the literature in the Portuguese language that addresses the views exposed herein.

Regarding the hypothesis of the direct processing of metaphors, we return to the key issue to be highlighted: the average RT for metaphor vehicles did not significantly differ from the average RT for the same nominal syntagmas interpreted literally. This did not significantly differ

[12] We thank Dr. Luciana Sanchez Mendes, our colleague at GEPEX – UFF, for the suggestion to direct, towards the path above, the evaluation of the instigating (albeit statistically marginal) difference between the reading times of nominal syntagmas for literal interpretation and for literal class inclusion statements.

from the average RT of the corresponding nominal syntagmas in the literal class inclusion statements (57.95 ms), which leads to the defense of Glucksberg and Keysar's (1990) position that metaphors are what they appear to be: class inclusion statements, metaphorical categories that are the names of the vehicles, which are prototypical members of such categories. The fact that, in the BP data reported here, no significant differences between the RT of critical fragments for the conditions suggests that familiar, high-apt, and conventionalized metaphors are processed as class inclusion statements, according to the Class-inclusion model (GLUCKSBERG; KEYSAR, 1990).

The absence of significant differences between the RT obtained could result, perhaps, from the sample composition. Among the 66 participants in the experiment, there was no actual balance in the distribution between men (1/3) and women (2/3); the individuals selected were originally from different cities (although two were from the same state); and were students or had graduated from two different higher education institutes, a public university, and a private college; they were undergraduate students (59), had undergraduate degrees (1), and had specialist degrees (6); in different majors.

We certainly did not mean to ignore the fact that the understanding of metaphors by individuals within different sociocultural contexts may differ considerably (for an introduction to the studies on the cultural aspects involved in understanding metaphors, refer to Gibbs Jr. (2008) and Ortony (1993 [1979]) and the references recommended in it). So much so that, during the first research stage, evaluations were collected about familiarity, aptness, and conventionality of expressions that originated the stimuli used in the self-monitored reading experiment.

Nevertheless, from that point on, we started to systematize findings from the self-monitored reading experiment under the light of what may be called the "standardization" of the global sample. By restricting the sample to the participants who provided right answers to all questions (100% instead of 94%); and to those who attended UFF and were in the second semester majoring in Languages – we reduced the total to 38 individuals whose average age (previously, 27.3 years, and now, 26.6 years) was altered by less than 1 year; and to a subset whose ratio between men (25%) and women (75%) reflects the public majoring in Languages in the country. If we consider now, the "standardized" sample, there are no reasons to question the results previously shown (see Table 6), which did not

diverge from those previously exhibited (in Table 5, when the total of 66 participants was considered), and, therefore, do not justify other conclusions.

Table 6 – Average reading times (RT) for critical fragments under the conditions: Literal, Metaphor, Literal Class Inclusion Statement (in ms), with 66 and with 38 participants

	Literal	Metaphorical	Control
66 participants	954.25	925.84	867.89
38 participants	1008.02	968.11	930.11

Consequently, one way or another, the hypothesis of the indirect processing of familiar, high-apt, and conventionalized BP metaphors is not supported by the results of the self-monitored reading experiment conducted in this research. Average RT did not differ significantly, thus suggesting that participants, both in the 66 of the original sample and in the 38 in the subset, belonging to a geographically and socially more homogeneous group, understood, with no additional difficulties in relation to the same literal expressions and literal class inclusion statements, the metaphors inserted in appropriate contexts. By interpreting the metaphorical meaning of, e.g., "*Irene é um furacão*" ("Irene is a hurricane") (because apparently Irene disrupts the social environment wherever she goes), native speakers of BP in the selected sample did not find problems, in the same way that they did not find trouble with the literal interpretation of "*Irene é um furacão*" ("Irene is a hurricane") (the hurricane that struck the Caribbean). They had no trouble interpreting the metaphorical meaning of the same expressions that were greater than the trouble they had to interpret "*Irene é uma jovem*" ("Irene is a young woman"), literal class inclusion statement (including Irene in the category of '*jovem*' ('young woman'), which enables us to infer, as proposed by Glucksberg et al. (GLUCKSBERG; KEYSAR, 1990; GLUCKSBERG, 1998; GLUCKSBERG, 2003), that they understood the metaphors as well as they understood the literal class inclusion statements.

Figure 3 – Properties associated with the metaphorical meaning M-furacão of "*furacão*" ("hurricane") at the supraordinate level, and to the literal meaning L-furacão "*furacão*" ("hurricane") at the basic category level

Nível Supraordenado da Categoria:	
propriedades M- furacão:	Muito impetuoso(a)
	Avassalador(a)
	Muito agitado(a)
	Muito Forte
Nível básico da Categoria:	
propriedades L- furacão:	Muito impetuoso(a)
	Avassalador(a)
	Muito agitado(a)
	Muito Forte
	Destruidor(a)
	Muito veloz
	Devastador(a)
	Tumultuador(a)

As Glucksberg (1998, p. 41) hierarchically structures, in 2 reference levels, a basic level and a supraordinate or metaphorical level, to account for "my lawyer is a shark", the metaphorical category "*furacão*" ("hurricane") is illustrated in Figure 3.

According to the Class-inclusion/Dual reference model, before the expression "*Irene é um furacão*" ("Irene is a hurricane"), the listener/reader promptly accesses the metaphorical meaning of the metaphor vehicle, "*furacão*" ("hurricane") – conventionalized (in BP, even included in the dictionary). In the Glucksberg and Keysar's model (1990) of direct metaphor processing by categorization, metaphors such as "*Irene é um furacão*" (Irene is a hurricane") would be understood as literal class inclusion statements, due to the inclusion of topics from pre-existing categories created from conventionalized vehicles.

5 Conclusions

The results of the experiments performed support the hypothesis defended by Glucksberg and Keysar (1990), of direct processing of familiar, high-apt metaphors, whose vehicles are conventionalized,

according to the Class-inclusion model. RTs were measured for the critical fragments for the expressions fit in appropriate contexts, and no significant difference was identified between the RT of metaphor vehicles and the equivalent literal expressions. A significant difference was also not identified between the average RT of metaphor vehicles and literal class inclusion statements, which suggests that the metaphors in question were processed in accordance with the Class-inclusion/Dual reference (GLUCKSBERG; KEYSAR, 1990).

It is important to highlight here that we did not consider extending the idea of direct processing via Class-inclusion to categories other than the pre-existing ones, as aimed by Glucksberg (2008). For Glucksberg (2008), the conventionality of "vehicles" results necessarily from their use in well-constructed expressions. Therefore, high-apt metaphors, despite being new, would be interpreted as class inclusion statements. In the future, such a hypothesis may (and should) be duly tested.

Despite its originality, the present study does not cross the original limits defined for it: that of evaluating in BP the processing of conventionalized, familiar, and high-apt metaphors. Still awaiting the interest of future research, the study of BP metaphor processing with the assistance of eye movement tracking technology in understanding metaphors, as well as the extraction of the potential evoked during the hearing/reading of BP metaphors and investigations based on neuroimaging.

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Appendix: Experimental paragraphs for the chronometric experiment

The experimental paragraphs below are organized in the sequence Literal/Metaphor/Literal Class Inclusion Statement, for each triplet. The translations of some expressions were adapted (*) to retain their original ideas.

1. *Com muita frequência, fenômenos naturais recebem nomes de gente dos mais comuns. Irene é um furacão que assolou o Caribe e o leste dos EUA em 2011.* ("Quite frequently, natural phenomena are given the most common people's names. Irene is a hurricane that struck the Caribbean and the eastern US in 2011.")

   Com muita frequência, mulheres brasileiras trabalham fora, têm filhos e estudam. Irene é um furacão que empolga todo mundo no trabalho, em casa e na faculdade. ("Quite frequently, Brazilian women have jobs, have children, and go to school. Irene is a hurricane who excites everyone at work, at home, and at school.")

   Com muita frequência, mulheres brasileiras trabalham fora, têm filhos e estudam. Irene é uma jovem que empolga todo mundo no trabalho, em casa e na faculdade. ("Quite frequently, Brazilian women have jobs, have children, and go to school. Irene is a young woman* who excites everyone at work, at home, and at school")

2. *Excepcionalmente, móveis italianos têm qualidade e nome no mercado. Bérgamo é um armário que recebe dos clientes ótimas avaliações nos comentários.*

   Excepcionalmente, segurança de rua porta armas para ser respeitado. Bérgamo é um armário que trabalha com ajuda do porte avantajado e da força bruta. ("Exceptionally, security guards carry guns to be respected. Bérgamo is a monster* who works with the help of his massive size and raw strength.")

   Excepcionalmente, segurança de rua porta armas para ser respeitado. Bérgamo é um vigia que trabalha com ajuda do porte avantajado e da força bruta. ("Exceptionally, security guards carry guns to be respected. Bérgamo is a security guard who works with the help of his massive size and raw strength.")

3. *Em certas culturas, animais exóticos são adotados e ganham apelidos. Fernanda é uma lesma que habita um viveiro na casa de criadores nas Filipinas.* ("In certain cultures, exotic animals are adopted and are given nicknames. Fernanda is a snail that lives in a nursery in a breeder's house in the Philippines")

   Costumeiramente, motoristas idosos guiam devagar sem razão no trânsito. Fernanda é uma lesma que atrasa a chegada no trabalho ou lazer quando usa carro. ("Older drivers usually drive slowly in traffic for no reason. Fernanda is a snail that is late to get to work or recreation when she uses a car.")

   Costumeiramente, motoristas idosos guiam devagar sem razão no trânsito. Fernanda é uma chofer que atrasa a chegada no trabalho ou lazer quando usa carro. ("Older drivers usually drive slowly in traffic for no reason. Fernanda is a driver that is late getting to work or recreation when she uses a car.")

4. *Em certas famílias, bichos de estimação distanciam-se do padrão esperado. Tereza é uma cobra que só pica raramente e não tem qualquer veneno, segundo o dono.* ("In some families, pets are different from the expected standard. Tereza is a snake that rarely bites and is not poisonous, according to the owner.")

   Em certas famílias sogras problemáticas implicam muito com genros, sem motivos. Tereza é uma cobra que ataca sem aviso o marido da filha em qualquer lugar. ("In some families, problematic mothers-in-law pick on their sons-in-law for no reason. Tereza is a snake who attacks her daughter's husband anywhere, without warning.")

   Em certas famílias sogras problemáticas implicam muito com genros, sem motivos. Tereza é uma sogra que ataca sem aviso o marido da filha em qualquer lugar. ("In some families, problematic mothers-in-law pick on their sons-in-law for no reason. Tereza is a mother-in-law who attacks her daughter's husband anywhere, without warning.")

5. *Em alguns lugares, primatas em extinção ganham proteção de ONGs e pessoas. Samuel é uma fera que resiste na África à extinção dos gorilas até o momento.* ("In some places, endangered primates are protected by NGOs and individuals. Samuel is a beast that has resisted the extinction of gorillas in Africa to date.")

Por todo o mundo, guitarristas famosos sobem em palcos ou tocam ao ar livre. Samuel é uma fera que fascina o público da banda de rock Skank há muitos anos. ("All over the world, famous guitar players play on stages or in open environments. Samuel is an animal* who has fascinated the audience of the rock band Skank for many years.")

Por todo o mundo, guitarristas famosos sobem em palcos ou tocam ao ar livre. Samuel é um músico que fascina o público da banda de rock Skank há muitos anos. ("All over the world, famous guitar players play on stages or in open environments. Samuel is a musician who has fascinated the audience of the rock band Skank for many years.")

6. *Em filmes infantis, grupos de felinos formam famílias felizes e saudáveis. Maria é uma gata que alegra as crianças na famosa animação Os Aristogatas.* ("In children's movies, groups of felines are happy and healthy families. Marie is a cat that entertains children in the famous animation "The Aristocats."")

   Em qualquer época, meninas sedutoras estão no centro de festas e baladas. Maria é uma gata que encanta os garotos em qualquer reunião de adolescentes. ("Seductive girls are the center of attention in parties and nightclubs at any time. Marie is a fox* who charms boys in any teenage gathering.")

   Em qualquer época, meninas sedutoras estão no centro de festas e baladas. Maria é uma moça que encanta os garotos em qualquer reunião de adolescentes. ("Seductive girls are the center of attention in parties and nightclubs at any time. Marie is a young woman who charms boys in any teenage gathering.")

7. *De tempos em tempos, animais adestrados ficam famosos em filmes de sucesso. Argento é um cavalo que estrela a história Cavaleiro Solitário na pele de Silver.* ("From time to time, trained animals become famous in successful movies. Argento is a horse that stars in the Lone Ranger story playing the role of Silver.")

   Em alguns lugares, maridos ciumentos podem agredir esposas sem punição. Anderson é um cavalo que recebeu até hoje apenas advertências por bater na mulher. ("In some places, jealous husbands may beat their wives without any punishment. Anderson is a jackass* who has only received warnings for beating his wife.")

Em alguns lugares, maridos ciumentos podem agredir esposas sem punição. Anderson é um marido que recebeu até hoje apenas advertências por bater na mulher. ("In some places, jealous husbands may beat their wives without any punishment. Anderson is a husband who has only received warnings for beating his wife.")

8. *Muito raramente, heroínas de filmes são veículos a motor femininos. Rochelle é um avião que atua no sucesso de animação da Disney chamado Aviões.* ("Movie heroes are seldom female motor vehicles. Rochelle is an airplane who acts in the Disney animation hit "Planes."")

   De modo esperado, modelos de beleza são convidadas a posar para fotos. Rochelle é um avião que desfila com sucesso nas capas de revistas e nas passarelas. ("As expected, beauty models are invited to pose for photos. Rochelle is a beauty* who appears successfully in magazine covers and runways.")

   De modo esperado, modelos de beleza são convidadas a posar para fotos. Rochelle é uma jovem que desfila com sucesso nas capas de revistas e nas passarelas. ("As expected, beauty models are invited to pose for photos. Rochelle is a young woman* who appears successfully in magazine covers and runways.")

9. *Para quase todos, produtos japoneses são tidos como muito bons e duráveis. Tagima é um violão que músicos destacados têm como referência de qualidade.* ("For almost everyone, Japanese products are viewed as good and durable. Tagima is a guitar that successful musicians use as reference for quality.")

   De modo habitual, garotas de biquíni são criticadas com rigor por mulheres. Tagima é um violão que revela destemor diante dos olhares de todas na praia. ("Girls in bikinis are usually criticized by women. Tagima is a curvaceous woman* who does not fear being seen by others on the beach.")

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