Creation of a list of homonyms in Brazilian Portuguese for linguistic processing tasks

Elaboração de lista de homônimos do Português Brasileiro para tarefas de processamento linguístico

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ABSTRACT

Purpose: This paper presents procedures and steps to create a list of homonyms, their meanings and representative images. **Methods:** One hundred and three homonyms in Brazilian Portuguese were secluded through searches in text books and dictionaries and the meanings were verified. The homonyms were analyzed and selected according pre-established criteria. Twenty-six homonyms with two meanings were selected and one image was used to represent each meaning. To test the instrument, twenty elementary school children in 4th (n = 10) and 5ht (n = 10) grades were selected from a private school in São Paulo. To identify the meanings of major and minor occurrence, the students gave their understanding of the words presented to them orally. The students were also asked to name the fifty-two images to determine the degree of recognition. Percentages of accuracy were calculated. **Results:** Among the 26 homonyms, two were excluded because the students were unable to name them. Two images were little recognized and, therefore, replaced with others that better represented the homonyms. **Conclusion:** A list of 24 homonyms and 48 images (one for each meaning) was developed. The results of the presentation of these items to elementary school children in the 4th and 5th grades proved the adequacy of the list. The material is seen as efficient for use in recognition tasks and can be applied in semantic priming tasks.

RESUMO

Objetivo: Apresentar procedimentos e etapas de elaboração de uma lista de homônimos, de seus significados e de imagens que os representam. **Método:** Levantaram-se, por meio de pesquisa em livros escolares e dicionários, 103 homônimos do Português Brasileiro e seus significados. Os homônimos foram selecionados por critérios: serem substantivos; não eliciar mais que dois significados; representáveis por imagens. Selecionaram-se 26 homônimos e foram encontradas 2 imagens para cada significado. Para testar o instrumento participaram 20 crianças do 4º (N=10) e 5º anos (N=10) do Ensino Fundamental de escola particular do município de São Paulo. Para identificar os significados de maior e menor ocorrência, os escolares referiram o significado de cada palavra que lhes foi apresentada oralmente. Para verificar o reconhecimento das 52 imagens (uma imagem para cada um dos dois significados do homônimo), as 20 crianças foram instruídas a nomeá-las na apresentação em PowerPoint. As porcentagens de acertos foram calculadas. **Resultados:** Dos 26 homônimos, dois foram excluídos, pois não houve nomeação para os significados. Duas imagens pouco reconhecidas foram substituídas por outras que melhor representaram os homônimos. **Conclusão:** A lista de homônimos resultante apresenta 24 homônimos e 48 imagens (uma para o significado de maior e outra para o de menor ocorrência). A apresentação dos itens a escolares de 4º. e 5º. anos do EF indicou adequação da lista. O material mostrou-se reconhecível e apropriado para tarefas de *priming* semântico ou outras de processamento linguístico com homônimos em Português Brasileiro.

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INTRODUCTION

During the act of communication, different linguistic, cognitive, metacognitive and pragmatic skills are needed to capture the information and ideas contained in the sentences of oral or written discourse. Efficient access to the meaning of a word and syntactic knowledge are among the skills that function in an automatic manner, whereas self-monitoring and inferences function on the metacognitive level[1,2]. These skills are important to comprehension, as they assist in the construction and integration of a coherent model of meaning. Rapid access to the lexicon is needed for the efficient identification of the meaning of a word, with faster access leading to a better expression of the knowledge of the word as well as the automatic retrieval its phonology and meaning. Vocabulary is acquired over the course of repeated exposure, which facilitates the learning of new words (quantity of representations) and through opportunities regarding the refinement of its meanings (quality of representations)[3,4].

In tasks involving homonyms, it is necessary to access the mental lexicon of the different meanings of a word and the discursive context must be considered to identify the correct meaning. Failure to activate relevant information and inhibit irrelevant information may be one of the factors that hinder comprehension, which could cause problems when inferences depend strongly on prior knowledge[5].

Thus, comprehending a text, whether written or told orally, requires the individual recognition of words, the precise retrieval of their meanings and the determination of the relevance of these meanings to the discursive context so that inappropriate meanings are disregarded[2,3,6].

All linguistic processes that involve the meaning of a word in a text are important to comprehension. Homonymy is the property of certain words to have different meanings and even different grammatical functions, despite having a single phonological form; for example: a sound mind and body; the sound of music; you sound like you have a cold[7-9]. To be understood, one must consider the discursive context in constructions with homonyms, since it is precisely this context that allows one to establish the appropriate meaning[10-12]. Studies on the identification or discrimination of homonyms generally seek the meaning with the greatest number of occurrences, which is considered the dominant meaning, and that which occurs less frequently is denominated the secondary meaning[11,12].

Semantic priming tasks that use homonyms are excellent strategies for determining the velocity of access to the integration and inhibition of meanings. Priming is identified by the improvement in the performance of perceptive or cognitive skills related to a baseline produced in the context of previous experiences. Semantic priming regards an improvement in the velocity or accuracy of the response to a semantic cue[13]. When a homonym is presented in an isolated fashion, all meanings of the word are accessed. However, when the homonym is presented at the end of a sentence, the correct meaning is identified based on the discursive context[11,14-16].

Two experiments that used semantic priming tasks with homonyms proved useful with regard to evidencing three comprehension processes: accessing, integrating and inhibiting word meaning[11]. The experiments investigated these processes on the word and sentence levels, seeking to identify speed and precision in reaching meanings of greater occurrence (dominant) or less frequent occurrence (secondary) in homonyms. The results of the experiments discriminated individuals with good fluency and accurate reading skills from those with difficulties regarding the rapid access to or inhibition of a meaning of less frequent occurrence, characterizing such individuals as having poor reading comprehension[11]. Such results justify the use of homonyms to investigate reading comprehension skills with regard to isolated vocabulary words and as well as on the textual level in which the discursive context is specified.

Thus, the decision was made to study information processing for textual comprehension using semantic priming tasks with homonyms based on the belief that such tasks can demonstrate differences in the performance of schoolchildren with good and poor reading comprehension and indicate possible causes of the difficulty in comprehension related to language processing. To meet these goals, it was necessary to make a list of homonymous nouns and distinguish meanings of greater occurrence from those of less frequent occurrence using the vocabulary of schoolchildren in the 4th and 5th grades of elementary school. This age group was chosen based on the fact that textual comprehension is a curricular objective in these grades[17].

The aim of this study is to present the procedures of the creation of a list of homonyms of Brazilian Portuguese, the identification of their meanings and the use of representative images of each meaning. This paper therefore describes the pilot of a study conducted to investigate the effects of semantic priming with the use of homonyms on reading comprehension.

METHODS

A pilot, prospective, quantitative, experimental study was conducted after approval from the Human Research Ethics Committee of *Universidade Federal de São Paulo* (UNIFESP) under process number 33431014.9.0000.5505. Signed written authorization from the director of the school was obtained. The legal guardians of the 4th and 5th grade students included in the study signed a statement of informed consent. The children also agreed to participate by signing a child statement of informed consent.

Procedures

Selection of homonyms

To ensure that the list of homonyms was part of the vocabulary of 4th and 5th grade students in elementary school, a survey was performed of text books, in which 103 homonyms were identified. The meanings of these homonyms were verified by entries in two school dictionaries: *Moderno dicionário da língua portuguesa* [Modern Dictionary of the Portuguese Language][18] and *Minidicionário contemporâneo da língua portuguesa* [Contemporary Mini-Dictionary of the Portuguese Language][19].

From this list of 103 homonyms, a team composed of speech-language therapists and a linguist selected those that met the following criteria: noun; elicitation of only two meanings;

and words that could be represented by images. The list was reduced to 26 homonyms that constituted the following linguistic material used in the study: *bala* [hard candy; bullet], *banco* [bank; bench], *botão* [button (for clothing); button (to activate a device)], *carta* [letter; card], *carteira* [wallet; school desk], *casa* [house; button hole], *concha* [shell; ladle], *folha* [leaf; sheet of paper], *galo* [rooster; bump], *laranja* [orange (fruit); orange (color)], *linha* [thread; line], *macaco* [monkey; jack (for changing a tire)], *manga* [mango; sleeve], *pasta* [paste; briefcase/plastic folder], *pata* [paw; female duck], *pilha* [battery; pile], *planta* [plant; blueprint], *prato* [plate; cymbal], *rosa* [pink; rose], *salto* [high heel; leap], *sombra* [shadow; eye shadow], *tanque* [utility sink; tank (military vehicle)], *teclado* [keyboard (for computer); keyboard (musical instrument)], *terra* [earth (dirt); earth (planet)], *vela* [candle; sail], *xadrez* [chess; plaid] (Chart 1).

Chart 1. List of 26 homonyms initially selected and corresponding meanings

Bala	- firearm projectile [bullet] - sugar-based snack [hard candy]
Banco	- type of seat [bench] - place in which financial transactions are made [bank]
Botão	- round object used to secure parts of clothing [button] - piece of a device that initiates an action when pressed [button]
Cartas	- closed manuscript addressed to someone [letter] - individual piece of a pack of playing cards [card]
Carteira	- small holder made of leather or other material in which money, ID and credit cards are stored [wallet] - chair with support for writing [school desk]
Casa	- construction designed for habitation [house] - opening in clothing to insert buttons [button hole]
Concha	- calcareous hull of certain mollusks [shell] - type of large spoon for serving soup [ladle]
Folha	- organ that develops on the stem or branches of a plant [leaf] - piece of paper in square or rectangular shape [sheet]
Galo	- male poultry with crest and short, broad wings [rooster] - swelling on forehead or head resulting from a collision [bump]
Laranja	- citrus fruit [orange] - color, blend of red and yellow [orange]
Linha	- thin string used for sewing [thread] - graphic representation of a single dimension that can be considered the movement from a point [line]
Macaco	- mammal of the primate order [monkey] - device used to lift heavy weights [jack]
Manga	- part of clothing that covers the arm [sleeve] - fruit of the mango tree [mango]
Pasta	- portion of solid material made with any type of powder (flour, cement, etc.) and mixed or kneaded with other ingredients [paste] - type of flat leather or plastic bag/container used to store or transport documents, money, etc. [briefcase/document holder]
Pata	- foot or hand of an animal [paw] - female palmiped [duck]
Pilha	- group or mount of objects placed with some on top of others [pile] - device that emits electrical current [battery]
Planta	- any vegetal matter [plant] - design representing details of a building [blueprint]
Prato	- metal, ceramic or plastic flatware on which food is served [plate] - round metal percussion instrument struck to give emphasis [cymbal]
Rosa	- flower of a rosebush [rose] - color, blend of red and white [pink]
Salto	- sudden movement in which the body is raised off the ground and vaulted to a different place [leap] - elongated heel of a women's shoe [high heel]
Sombra	- space without light or less bright due to the interposition of an opaque object [shadow] - type of eye makeup [eye shadow]
Tanque	- reservoir for washing clothes [utility sink] - armed military vehicle [tank]
Teclado	- electronic device with keys for musical accompaniment [keyboard] - device connected to computer with keys that enables inputting data and initiating programs [keyboard]
Terra	- planet of the solar system [earth] - soil [earth]
Vela	- cylindrical object with fatty, combustible substance with a wick throughout the length of its center used for lighting [candle] - strong fabric unfurled from the mast of a watercraft to enable wind propulsion [sail]
Xadrez	- board game with 64 squares on which 32 pieces are moved [chess] - print on cloth with colors arranges in alternating squares [plaid]

Source: Moderno dicionário da língua portuguesa[18] and Minidicionário da língua portuguesa[19]

Selection of images

Sites and files available on the internet were searched for four images that represented each of the meanings of the 26 homonyms. The speech-language therapists and linguist involved in the creation of the material met to select what they judged by consensus to be the best images to represent each of the meanings of the homonyms.

Adjustment of list of homonyms and images to target age group

To test the instrument and determine its applicability to children in the 4th and 5th grades of elementary school (50% of each gender; mean age = 119.7 months) and reach decisions regarding the need for changes and adaptations, a pilot study was conducted with 10 children in the 4th grade and 10 in the 5th grade of a private school in the city of São Paulo (Brazil) at the end of the first semester of 2015. Schoolchildren who met the following inclusion criteria were selected for the study; absence of complaints related to or indications of hearing impairment; uncorrected visual impairment; neurological, behavioral or cognitive disorders; enrollment in 4th or 5th grade of elementary school; and no history of having to repeat a school year.

Classification of meanings

To identify which of the meanings of each homonym was more or less frequent, the children were asked: "*What meaning do you know for the words I am going to say?*" Thus, the student was instructed to say what each word meant. The evocation of more than one meaning was expected to be spontaneous and enable the identification of meanings of greater or less occurrence for each word[11].

Two responses were possible: a) a single meaning attributed; and b) two meanings spontaneously attributed to the homonym presented. When a single meaning was attributed, the response received a score of 3 points. When two meanings were attributed, the first received a score of 2 points and the second received as score of 1 point.

The classification of homonyms was confirmed based on occurrence, as follows: **greater occurrence** – when one

meaning was attributed more than the other by at least 70% of the children, demonstrating clear dominance; **less occurrence** – when one meaning was attributed between 5 and 30% of the time in relation to the other meaning[11].

In some cases, neither meaning demonstrated clear dominance (attributed 70% of the time) and two lists of homonyms were created: one clearly demonstrating which meaning was attributed more and which was attributed less and another list with the homonyms that were present in the students responses despite not demonstrating a clear dominance of one of the meanings.

Recognition of images representing each meaning of homonyms

After the 20 participants had given the meaning or meanings for each word, they were shown 52 pictures (one for each of the two meanings of the 26 homonyms) individually in a random fashion on PowerPoint and asked to name the images. Images named correctly by at least 13 students (65%) were classified as **good;** those named correctly by seven to 12 students were given a **medium** score and those named correctly by six students or less were classified as **poor**. Any image with a medium or poor score was reviewed by the team for the decision to maintain or exclude it based on whether the naming error occurred due to an unawareness of the meaning or the non-recognition of the image. The homonym was excluded in the former case and the image was replaced in the latter case with a different image that better represented the meaning of the homonym. For this choice, the entire image selection process was repeated.

Statistical method

The schoolchildren's answers were scored and expressed as percentage values for presentation in tables.

RESULTS

Table 1 displays the scores of the schoolchildren's answers and the percentages for each meaning of the homonyms. Meanings for the homonyms *casa* (button hole) and *planta* (blueprint) did not elicit evocations and were therefore excluded from the list.

Table 1. Sum of children's scores for each meaning of homonyms according to schooling

Homonym	Meaning	4th Grade	5th Grade	Total	Percentage
BALA	Hard candy	30	28	58	96.6%
BALA	Bullet	00	02	02	3.33%
BANCO	Bench	24	16	40	66.6%
BANCO	Bank	06	14	20	33.3%
BOTÃO	Button (clothing)	24	24	48	80%
BOTÃO	Button (device)	06	06	12	20%
CARTA	Letter	27	23	50	83.3%
CARTA	Card	03	07	10	16.6%

Table 1. Continued...

Homonym	Meaning	4th Grade	5th Grade	Total	Percentage
CARTEIRA	Wallet	27	30	57	95%
CARTEIRA	School desk	03	00	03	5%
CASA	House	30	30	60	100%
CASA	Button hole	00	00	00	0%
CONCHA	Shell	30	28	58	96.6%
CONCHA	Ladle	00	02	02	3.33%
FOLHA	Leaf	28	23	51	85%
FOLHA	Sheet (of paper)	02	07	09	15%
GALO	Rooster	30	29	59	98.3%
GALO	Bump	00	01	01	1.66%
LARANJA	Orange (fruit)	27	24	51	85%
LARANJA	Orange (color)	03	06	09	15%
LINHA	Thread	24	26	50	83.3%
LINHA	Line	06	04	10	16.6%
MACACO	Monkey	30	29	59	98.3%
MACACO	Jack (for changing tire)	00	01	01	1.66%
MANGA	Mango	30	29	59	98.3%
MANGA	Sleeve	00	01	01	1.66%
PASTA	Paste	18	22	40	66.6%
PASTA	Briefcase/document holder	12	08	20	33.3%
PATA	Paw	23	19	42	70%
PATA	Female duck	07	11	18	30%
PILHA	Battery	24	29	53	88.3%
PILHA	Pile	06	01	07	11.6%
PLANTA	Plant	30	30	60	100%
PLANTA	Blueprint	00	00	00	0%
PRATO	Plate	30	27	57	95%
PRATO	Cymbal	00	03	03	5%
ROSA	Pink	16	18	34	56.6%
ROSA	Rose	14	12	26	43.3%
SALTO	High heel	23	14	37	61.6%
SALTO	Leap	07	16	23	38.3%
SOMBRA	Shadow	27	27	54	90%
SOMBRA	Eye shadow	03	03	06	10%
TANQUE	Utility sink	30	22	52	86.6%
TANQUE	Tank	00	08	08	13.3%
TECLADO	Keyboard (computer)	13	23	36	60%
TECLADO	Keyboard (instrument)	17	07	24	40%
TERRA	Earth (soil)	19	24	43	71.6%
TERRA	Earth (planet)	11	06	17	28.3%
VELA	Candle	30	29	59	98.3%
VELA	Sail	00	01	01	1.66%
XADREZ	Chess	21	27	48	80%
XADREZ	Plaid	09	03	12	20%

The meanings of 13 homonyms demonstrated clear dominance based on the percentage of greater occurrence. Eleven others did not achieve the expected 70%, but the two meanings were attributed by the schoolchildren and these homonyms remained on the final list.

Chart 2 displays the two lists of homonyms based on the dominance found in the meanings.

Chart 3 displays the scores regarding the correct naming of the images for each meaning of the homonyms. Based on the analysis of the data, the final list comprised 24 homonyms (13 with clear dominance and 11 without clear dominance). Appendix A displays the images of the meanings with greater or less occurrence.

Chart 2. Lists of homonyms according to dominance and meanings of greater or less occurrence

Homonyms with clear dominance	Homonyms without clear dominance
BOTÃO	BALA
CARTA	BANCO
CARTEIRA	CONCHA
FOLHA	GALO
LARANJA	MACACO
LINHA	MANGA
PATA	PASTA
PILHA	ROSA
PRATO	SALTO
SOMBRA	TECLADO
TANQUE	VELA
TERRA	
XADREZ	

Chart 3. Score of correct responses when naming images of each meaning of homonyms

Homonym	Meaning	4th Grade	5ht Grade	TOTAL
BALA	Hard candy	10	10	20
BALA	Bullet	10	05	15
BANCO	Bench	09	08	17
BANCO	Bank	09	09	18
BOTÃO	Button (clothing)	10	10	20
BOTÃO	Button (device)	09	10	19
CARTA	Letter	10	09	19
CARTA	Card	09	08	17
CARTEIRA	Wallet	10	10	20
CARTEIRA	School desk	07	05	12
CASA	House	10	10	20
CASA	Button hole	01	00	01
CONCHA	Shell	10	10	20
CONCHA	Ladle	04	04	08
FOLHA	Leaf	10	09	19
FOLHA	Sheet (of paper)	07	06	13
GALO	Rooster	10	09	19
GALO	Bump	06	08	14
LARANJA	Orange (fruit)	10	10	20
LARANJA	Orange (color)	10	09	19
LINHA	Thread	09	09	18
LINHA	Line	07	09	16
MACACO	Monkey	10	10	20
MACACO	Jack (for changing tire)	05	05	10
MANGA	Mango	10	09	19
MANGA	Sleeve	05	05	10
PASTA	Paste	10	08	18
PASTA	Briefcase/document holder	10	10	20
PATA	Paw	10	10	20
PATA	Female duck	03	04	07
PILHA	Battery	10	08	18
PILHA	Pile	06	04	10
PLANTA	Plant	09	08	19
PLANTA	Blueprint	01	01	02
PRATO	Plate	10	10	20
PRATO	Cymbal	04	03	07

Chart 3. Continued...

Homonym	Meaning	4th Grade	5^{ht} Grade	TOTAL
ROSA	Pink	10	10	20
ROSA	Rose	07	08	15
SALTO	High heel	09	06	15
SALTO	Leap	05	05	10
SOMBRA	Shadow	10	10	20
SOMBRA	Eye shadow	01	02	03
TANQUE	Utility sink	06	07	13
TANQUE	Tank	04	04	08
TECLADO	Keyboard (computer)	10	10	20
TECLADO	Keyboard (instrument)	08	08	16
TERRA	Earth (soil)	10	10	20
TERRA	Earth (planet)	03	06	09
VELA	Candle	10	10	20
VELA	Sail	07	06	13
XADREZ	Chess	09	10	19
XADREZ	Plaid	08	05	13

DISCUSSION

Understanding comprehension in different processes enables researchers and clinicians to identify the skills and difficulties children may have. Tasks with homonyms allow the investigation of aspects of information processing, the determination of accessing, integrating and inhibiting meanings during comprehension and the identification of possible comprehension difficulties[11,20].

The present study describes the process of selecting linguistic material and images for the construction of an instrument for use in semantic priming tasks involving homonyms that can help determine processes of accessing and inhibiting meanings during reading comprehension.

Homonymy is a phonic manifestation of a linguistic sign that has two or more meanings. Homonyms and images that represent the different meanings of these words are elements of two different languages – one verbal, comprising the word itself (linguistic sign), and the other non-verbal, comprising images, which are visual (iconic) signs that represent objects in the real world[21].

The analysis of the occurrence of meanings attributed to the homonyms used in the present study enabled discriminating meanings of greater or less occurrence. As 75% of the schoolchildren reported two meanings for the homonyms presented (eight children in the 4th grade and seven in the 5th grade), the decision was made to score each answer, which permitted the identification of two groups of homonyms based on the dominance of the different meanings present in the children's answers (Chart 2). This procedure led to a final list of 24 homonyms.

In the experiments that served as the basis for the present study[11], line drawings were used to represent the homonyms. However, the decision was made to use images closer to reality (iconic signs) in this investigation to have a better representation of each meaning of the homonyms[21]. Thus, photographs and realistic drawings were selected to represent each meaning of the homonyms iconically.

In order for the homonyms to be represented by images, those that came closest to the object in terms of representation were chosen. Thus, homonyms that presented changes in grammatical class were discarded and only nouns were used. As a noun is a class of word that names an entity, it can be easily represented by a sign of an iconic nature, thereby enabling a fast, immediate association with efficient access to its meaning[7-9].

During the naming task, some of the images had less than 12 correct responses and were reviewed by the team to decide whether or not the figure needed to be exchanged for another. The figures for the meanings of the following homonyms were classified as good: *carteira* [school desk]; *concha* [ladle]; *macaco* [jack (for changing a tire)]; *manga* [sleeve]; *pata* [paw]; *pilha* [pile]; *prato* [cymbal]; *tanque* [tank (military vehicle)]; and *terra* [earth (planet)]. The study demonstrated that these images adequately represented the meaning, although some of the schoolchildren were unable to name them correctly during the experiment. The failure to identify the secondary meaning may be explained by four conditioners: 1) the low frequency of the word in the daily life of the student, despite using the object (60% of the students called the ladle a "spoon" and 45% called the school desk a "chair"); 2) naming the entire object rather than the intended portion (50% of the children called the sleeve a "shirt" and 75% called the pile "books"); 3) the low frequency of the word and little or no knowledge of the object presented (30% of the students referred to the jack by its function of "lifting a car" and 15% reported not knowing the word; 65% of the students named the cymbal incorrectly ("tambourine", "drum", "to crash", "I don't know"); and 4) associations among the word, object and semantic field: 60% of the students used the word *pato* [duck] for *pata* [paw]; 60% used words other than tank (military vehicle), such as "cannon", "car of war" and "tractor"; 30% called the planet earth by the name "planet" and another 30% used the word "world".

The homonyms *casa* and *planta* were excluded from the list when the meanings attributed by the students were analyzed.

Both *casa* [button hole] and *planta* [blueprint] achieved a small number of correct responses. The image for *casa* had only a 5% rate of correct responses, whereas the other students called the image "button", "pants" or "hole". For the image of *planta*, 10% of the students gave the correct response and the others used the words "house", "apartment" and "map".

The results demonstrated the need to find a different image for the homonym *sombra* [eye shadow], which 80% of the students named either "eye" or "makeup", and for the homonym *salto* [leap], which 50% of the students named "jumping", "athlete" or "sport" (Chart 3).

As expected, the results led to a list of 24 homonyms of greater or less dominance of the pairs of meanings (and corresponding images) based on the occurrence of the answers of the 20 schoolchildren[11,12].

After the necessary changes, the homonyms and their image representations were recognized and named by the students of the 4th and 5th grades of elementary school, which demonstrated the suitability of the selection performed by the team. The choice of the 4th and 5th grades was based on the fact that the children in this age group had learned to read and write and were expected to have a vocabulary in line with the narrative and descriptive aspects that the homonyms on the list presented[17].

The final list of 24 homonyms and the images of the meanings of greater and less occurrence were used in the priming task experiments with the isolated words as well as the words placed at the end of sentences. Homonyms that preceded the image of the meaning of greater occurrence facilitated access to that meaning, demonstrating that both materials (the list of homonyms and images) enabled the students efficient access to the meaning of each homonym[20].

Therefore, the procedures and criteria used in the present study for access to meanings of greater or less occurrence were efficient. The images used to represent the homonyms selected were also recognized by the schoolchildren and enabled the appropriate application of the priming tasks.

Despite these results, one must bear in mind that the items have not yet been analyzed from the psychometric standpoint. Moreover, the sample that participated in the linguistic experiment and determination of the list was composed of schoolchildren in the same age group with roughly the same level of schooling (4th and 5th grades) enrolled in a single school in the private system of the city of São Paulo. These characteristics suggest the possibility of encountering different results in other age groups, without invalidating the list of homonyms selected, which was restricted to nouns with only two meanings. This condition is fundamental for use in experiments designed to identify or discriminate meanings of homonyms with greater or less occurrence.

CONCLUSIONS

The list created in the present study resulted in 24 homonyms and corresponding images of meanings of greater or less occurrence. The presentation of the items to schoolchildren in the 4th and 5th grades of elementary school demonstrated the adequacy of the homonyms and images selected. The material

proved suitable for the recognition of the schoolchildren and indicated that both the homonyms and corresponding images can be used for evaluations in this age group with regard to semantic priming tasks employed to investigate the access to and inhibition of semantic information in comprehension tasks or other linguistic processing tasks that involve homonyms in Brazilian Portuguese.

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Author contributions

SGR participated in the design of the project and study material, data collection, literature review and drafting of the article; MMSH was co-adviser and participated in the data collection, literature review and drafting of the article; CRBA was the adviser of the study, participated in the discussion of the data and drafting of the article and performed a critical review of the final version.

Appendix A. Images for each meaning of homonyms

Homonyms	Image of meaning with greater occurrence	Image of meaning with less occurrence
bala		
banco		
botão		
cartas		
carteira		
concha		
folha		
galo		
laranja		

Homonyms	Image of meaning with greater occurrence	Image of meaning with less occurrence
linha		
macaco		
manga		
pasta		
pata		
pilha		
prato		
rosa		

Homonyms	Image of meaning with greater occurrence	Image of meaning with less occurrence
salto		
sombra		
tanque		
teclado		
terra		
vela		
xadrez		