

DOI: <https://doi.org/10.18454/RULB.2020.21.1.10>СОПОСТАВИТЕЛЬНЫЙ АНАЛИЗ КОНЦЕПТОВ *SPICY* / *ОСТРЫЙ* / 辣 В АНГЛИЙСКОЙ, РУССКОЙ И КИТАЙСКОЙ ЛИНГВОКУЛЬТУРАХ

Научная статья

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**Аннотация**

Данная статья посвящена сходствам и различиям концептов *SPICY* / *ОСТРЫЙ* / 辣 в английской, русской и китайской лингвокультурах. Цель исследования заключается в обеспечении лучшего понимания картин мира соответствующих народов. Методами исследования являются концептуально-семантический и сопоставительный анализ. В исследовании рассматриваются лексические значения вербализаторов концептов в трех языках, и также анализируются часто употребляемые фразеологические единицы, содержащие эти лексемы. Результаты показывают, что, во-первых, общее представление об *остром* вкусе совпадает у английского и китайского народов, а у русского народа наблюдается некое противоречие об его восприятии; во-вторых, концепт 辣 в китайской лингвокультуре чаще переносится в другие когнитивные области, чем *ОСТРЫЙ* / *SPICY* в русской и английской лингвокультурах; в-третьих, *SPICY* / 辣 ассоциируются с положительными и отрицательными эмоциями, положениями и ситуациями, а *ОСТРЫЙ* с такими не ассоциируется. Полученные результаты позволяют выявить семантическую структуру концептов *SPICY* / *ОСТРЫЙ* / 辣 в сопоставительном аспекте и раскрыть культурные ценности, познавательный процесс и процесс вербализации информации английского, русского и китайского народов.

**Ключевые слова:** сопоставительная лингвистика, когнитивная лингвистика, лингвокультура, концепт, острый.

COMPARATIVE ANALYSIS OF THE CONCEPTS *SPICY* / *OSTRYI* / 辣 IN THE ENGLISH, RUSSIAN AND CHINESE LINGUOCULTURES

Research article

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**Abstract**

This article is devoted to the similarities and differences of the concepts *SPICY* / *OSTRYI* / 辣 in the English, Russian and Chinese linguocultures with the aim of providing a better understanding of the worldviews of these nations. The research methods include conceptual-semantic and comparative analyses. Lexical meanings of the concept verbalizers are considered, as well as actively used phraseological units which contain these lexemes. The results prove that, firstly, general ideas about the *spicy* flavor coincide in the English and Chinese linguocultures, while in the Russian linguoculture certain contradiction has been observed; secondly, 辣 in the Chinese linguoculture is more frequently transferred to other cognitive domains than *OSTRYI* and *SPICY* in the Russian and English linguocultures; besides, *SPICY* / 辣 are associated with both positive and negative feelings, emotions, conditions and situations, while *OSTRYI* is not associated with any other phenomena. The results allow to present the semantic structures of these concepts from a comparative perspective and demonstrate the cultural values, perceptual experiences, associational patterns and verbalization processes of the English, Russian and Chinese nations.

**Keywords:** comparative linguistics, cognitive linguistics, linguoculture, concept, spicy.

**Introduction**

Concept is considered to be one of the central issues in cognitive linguistics, which focuses on such aspects of language sciences, as the language interaction with cognition, the shaping of our thoughts and the evolution of language alongside with the changes in the mindset across time. As structured mental representation, concept plays a crucial role in explaining how mental processes can be both rational and implemented in the brain and in accommodating the need for structure-sensitive mental processes [14]. Besides, concept is fundamental, controversial and problematic within the relatively short history of linguistics as a branch of the humanities, since it implies the focus shifting to the wide complex of knowledge-oriented disciplines [19, P. 471].

In the Russian and European Terminology Schools, concept is studied as a basic phenomenon represented symbolically inside the mind of a human being and contrasted to a language unit. Kubryakova defines concept as an operational meaningful unit of memory, mental lexicon, conceptual system and brain language, the whole picture of the world reflected in the human psyche [2, P. 90]. As a unit of our thought, concept can be studied by analyzing the semantics of its verbalizer, which usually refers to a lexeme that is frequently and systematically used to verbalize the corresponding concept in certain linguoculture. Kubryakova pointed out that although the purpose of semantic analysis is to understand the structure of lexemes, while conceptual analysis guarantees the understanding of the world, these two procedures interact with each other to a great extent [1, P. 85]. At the core of a concept stands the general understanding or sensual image of a phenomenon, which is usually demonstrated by the direct meaning of the concept verbalizer; and at the periphery of a concept stand sets of transferred meanings. These parts together form the cognitive features of a certain concept, since a concept necessarily expresses all its compositions in their final form; only in its entirety it is the concept of consciousness, distinct from its private display in the form of notion [17, P. 49].

In recent years, linguists have shown great interest in linguistic means and concepts which represent taste properties, since, on the one hand, they are closely related to foods and the action of feeding, which play a significant role in the daily life of all humans; on the other hand, they are also used to describe smells, feelings, emotions, associations, human characters, etc., which to a certain extent reflect the cognitive pattern of lifestyles. In this frontier the four so called "basis tastes (*sweet, salty, sour, bitter*)" have been studied more detailedly than the rests, including *spicy*.

*Spicy* is a flavor which is considered to be sharp and strong. Scientists usually use the technical term *pungency* to refer to such characteristic of food products. Commonly it is referred to as *spiciness, hotness* or *heat* in daily life [21]. Some scholars consider it as a sense of pain or heating rather than a real taste, since it does not work on the taste buds of humans as other typical tastes, such as *sweet, salty, sour* and *bitter*. Capsaicin and piperine, for example, have been proved to bind to a receptor on cells that detect temperature and cells that send messages of pain [15]. However, in the English, Russian and Chinese language worldviews, people still prefer to range it into the class of flavors, as far as such phrases like "*spicy flavor*", "*ostraya pishcha*" and "*la wei*" are largely used in corresponding linguocultures until now.

In recent years, the concept SPICY and its verbalizers in different languages have been studied in the following investigations: Laenko [4] analyzed the concept SPICY in the concept sphere of English and Russian; Hu [8] studied the phenomenon of polysemy in the English and Chinese languages, taking *sour, sweet, bitter* and *spicy* as examples; Yin [10] compared the meanings of English and Chinese words which describe the tastes of *sour, sweet, bitter* and *spicy*; Luo [9] analyzed English and Chinese conceptual metaphors which contain *sour, sweet, bitter* and *spicy*; Xu [6] compared the semantics of *spicy* and other taste-denoting words in Russian and Chinese. However, a relevant research, which bases on a linguocultural approach and combines western and eastern cultures at the same time, has not been carried on until now.

### Methodology

The main research methods are conceptual-semantic and comparative analyses. Both direct and transferred meanings of the adjectives *spicy / ostryi / la* are discussed, as well as cultural representative phraseological units, which contain these lexemes. On this ground we distinguish the common understanding of the *spicy* flavor and cognitive features of certain concepts in the English, Russian and Chinese linguocultures in order to guarantee a better understanding of perceptual experiences and verbalization processes of these nations.

### Materials

Empirical materials of the current research include four explanatory dictionaries of the Russian language (Explanatory Dictionary of the living Great Russian Language by V.I. Dal, Dictionary of the Russian Language by S.I. Ozhegov, Big Explanatory Dictionary of the Russian Language by S.A. Kuznetsov, Explanatory Dictionary of the Russian Language by D.N. Ushakov), three explanatory dictionaries of the English language (Cambridge Dictionaries, Oxford Dictionaries Lexico, Collins online Dictionary) and two explanatory dictionaries of the Chinese language (Xinhua Chinese Dictionary, Modern Chinese dictionary); five phraseological dictionaries of the Russian language (Phraseological Dictionary of the Modern Literary Russian Language by A.N. Tikhonov, Phraseological Dictionary of the Russian Language by A.I. Molotkov, Phraseological Dictionary of the Russian Language by V.M. Mokienco, Phraseological Dictionary of the contemporary Russian Language by Yu.A. Larionov, Dictionary of Russian proverbs and sayings by V.P. Zhukov), one English-Russian phraseological dictionary (Great English-Russian Phraseological Dictionary by A.V. Kunin), one Russian-English phraseological dictionary (Modern Russian-English Phraseological Dictionary by D.I. Kvesevich), two English phraseological dictionaries (Cambridge International Dictionary of Idioms, Oxford Dictionary of Idioms), one Chinese phraseological dictionary (Online Phraseological Dictionary); search engines (Google, Yandex, Baidu) and corpora (Russian National Corpus, British National Corpus, BLCU corpus center).

### Discussion and results

First of all, by analyzing the above-mentioned empirical materials, we can discover that in the English and Chinese linguocultures verbalizers *spicy / la* are originally used to describe certain characteristics of *flavor*, which means that their direct meanings belong to the semantic field of *flavor*. However, in the Russian linguoculture the verbalizer *ostryi* is originally used to describe the sharpness of weapons (such as knife and spear), it is then transferred from the source domain onto the target domain (which means to the semantic field of *flavor* in this case) on the basis of metaphorical mapping. Therefore, lexical meanings of the word *ostryi*, which are transferred from its direct meaning, are not taken as objects in the current research.

So, the verbalizers *spicy / ostryi / la* in the semantic field of *flavor* are interpreted as follows:

1) in the Cambridge Dictionaries the adjective *spicy* is defined as "1. containing strong flavors of spices; 2. flavored with spices that are hot to the taste" [12]; and in the Oxford Dictionaries Lexico it is treated as «flavored with or fragrant with spice» [20].

2) in the Dictionary of the Russian Language by S.I. Ozhegov the direct meaning of the word *ostryi* is defined as "sil'no deistvuyushchii na vkus ili obonyanie / strong-tasting or strong-smelling" [5]; in the Large Explanatory Dictionary of the Russian Language by S.A. Kuznetsov it is interpreted as «1. sil'no deistvuyushchii na organy chuvstv; rezkii / acting strongly upon the sense organs; sharp; 2. s bol'shim kolichestvom soli, pryanoesti, spetsii; edkii, pryanyi / with a large amount of salt, spices, aromatic plants; hot, pungent» [3]; and in the Explanatory Dictionary of the Russian Language by D.N. Ushakov it is defined as «pryani, edkii, zhguchii, no presnyi / pungent, sharp, hot, but with no clearly recognized taste» [7].

3) in the Xinhua Chinese Dictionary the direct meaning of the adjective *la* is explained as "xiang jiang, suan, la jiao deng de ci ji xing wei dao / a sharp flavor similar to that of ginger, garlic, chilli pepper and etc." [11].

The statements show that in the English and Chinese linguocultures the *spicy* flavor is accepted in a similar way: it is considered to be sharp and strong, and it is associated with certain kinds of spices. However, in the Russian linguoculture this flavor is defined less clearly: some people believe that the perception of *spicy* is related to the usage of salt, while others consider that *spicy* is a separate flavor and therefore should not contain any other clearly recognized tastes.

Furthermore, lexemes *spicy* / *la* are also actively used in sets of transferred meanings in the English and Chinese linguocultures, while transferred meanings of the lexeme *ostryi*, which come from the semantic field of *flavor*, have not been observed in the Russian linguoculture.

1) *spicy*:

- good-looking, attractive, sexy (*She's looking spicy today*);
- exciting, interesting (especially because of being shocking or dealing with sexual matters or being mildly indecent) (*a spicy novel; spicy details; spicy jokes*);
- piquant, racy (*spicy gossip*);
- vigorous, colorful, stimulating (*He is known for his spicy political commentary*);
- slightly scandalous, improper, risqué (*a spicy Hollywood romance*);
- being rude, mean and/or sarcastic toward someone for no apparent reason (*No need to get spicy*);

2) *ostryi*:

No certain meanings transferred from the semantic field of *flavor* are observed;

3) *la*:

- sting (*yan jing fa la*);
- extremely hot, unbearably hot (*tai yang la de ru huo shao*);
- shrewd, sophisticated (*lao la*);
- spiteful, cruel, mean, ruthless (*du la; hen la*);
- shrewish (*po la*);
- painful (*Kong qi shi ren bi zi li lao shi zuo la, wen du wu yi shi zai ling xia*);
- dissipated, dissolute (*la lang*);
- intractable (*la guai zi*).

From the statements above we can conclude that in the English and Chinese linguocultures the concepts SPICY / LA are associated to both positive and negative feelings and situations. In the English linguoculture there are features of 'beauty', 'attraction', 'sex appeal', 'excitement', 'interest', 'shock', 'stimulation', 'impropriety', 'rudeness' and 'acridness'; in the Chinese linguoculture — 'sting', 'unbearable heat', 'sophistication', 'spite', 'cruelty', 'pain', 'dissoluteness', 'intractability' and 'worryment'; while in the Russian linguoculture no other features have been found.

In addition to the above mentioned, phraseological units related to these concepts are also taken into consideration. Although the meanings of proverbs, sayings or phraseological units do not always related to or depend on the lexical meanings of their separate components, however, their interpretations to a great extent reflect the characteristics of the thinking models and associational patterns of different nations in certain field.

1) In the English linguoculture:

The verbalizer *spicy* is not used in any phraseological units;

2) In the Russian linguoculture:

The verbalizer *ostryi* (in the semantic field of *flavor*) is not used in any phraseological units;

3) In the Chinese linguoculture:

- *chi xiang he la* (have a nice life);
- *xin hen shou la* (heartless and cruel);
- *jiang hai shi lao de la* (older and wiser);
- *mao re huo la* (in great anxiety);
- *Jiang gui zhi xing, dao lao yu la* (The older, the franker).

The phraseological units above demonstrate that in the Chinese linguocultures the concept LA is associated with such features like 'delicacy', 'cruelty', 'wisdom' and 'anxiety', while in the English and Russian linguocultures the concepts SPICY / OSTRYI are rarely associated with features of other cognitive domains.

### Conclusion

From all the statements above, we draw the following conclusions:

1) firstly, the general idea of the spicy flavor is similar for the native speakers of English and Chinese: it is considered to be a sharp and strong flavor which is associated with certain kinds of spices (for example, chilli pepper, garlic, ginger, etc.). However, in the Russian linguoculture certain contradiction has been observed: some believe that the perception of *spicy* also depends on the usage of salt, while others consider that *spicy* as a separate flavor should not contain any other clearly recognized tastes;

2) secondly, the scope of semantics of the concept verbalizer in the Chinese linguoculture is relatively richer than those in the English and Russian linguocultures, which proves that the concept LA is more frequently transferred to other cognitive domains than OSTRYI and SPICY;

3) lastly, in the English and Chinese linguocultures concepts SPICY / LA are associated with both positive and negative feelings, emotions, conditions and situations, while in the Russian linguoculture the concept OSTRYI is not associated with any other phenomena.

To draw it into a nutshell, these facts state that the concepts SPICY / OSTRYI / LA are shaped and perceived differently in the Russian, English and Chinese linguocultures despite the flavor it produces. The cognitive features related to these concepts are conducive to the preservation and reflection of the characteristics of different linguocultures in this certain sphere.

### Конфликт интересов

Не указан.

### Conflict of Interest

None declared.

**Список литературы / References**

1. Кубрякова Е.С. Об одном фрагменте концептуального анализа слова ПАМЯТЬ / под ред. Н.Д. Арутюновой / – Логический анализ языка. Культурные концепты. – М.: Наука, 1991, С.85-91
2. Кубрякова, Е.С. Краткий словарь когнитивных терминов / под ред. Е.С. Кубряковой / – М.: Филологический факультет МГУ им. М. В. Ломоносова, 1997
3. Кузнецов С.А. Большой толковый словарь русского языка [Электронный ресурс]. – URL: <https://gufo.me/dict/kuznetsov> (дата обращения: 03.01.2020)
4. Лаенко Л.В. Национальная специфика концепта ОСТРЫЙ в концептосфере английского и русского языков / под ред. З.Д. Поповой, И.А. Стернина / – Язык и национальное сознание: вопросы теории и методологии. – Воронеж: Воронежский государственный университет, 2002, С.95-99
5. Ожегов С.И. Толковый словарь русского языка [Электронный ресурс]. – URL: <http://slovarozhegova.ru> (дата обращения: 03.01.2020)
6. Сюй И. Различия в языковых средствах для обозначения вкуса в русском и китайском языках / под ред. В.В. Робустовой / – Язык. Культура. Перевод. Коммуникация. – М.: "КДУ", Университетская книга, 2018, С.278-281
7. Ушаков Д.Н. Толковый словарь русского языка. [Электронный ресурс]. – URL: <https://dic.academic.ru/contents.nsf/ushakov/> (дата обращения: 06.02.2020)
8. 胡婷. 认知视角下汉英基本味觉词的多义化对比研究 / 胡婷 / – 硕士学位论文. 华中科技大学, 2009
9. 罗韵. 英汉基本味觉词的概念隐喻与对比分析——以“酸, 甜, 苦, 辣”为例 / 罗韵 / – 硕士学位论文. 湖南农业大学, 2016
10. 尹文婷. 汉英“味觉”类词语对比研究——以“酸, 甜, 苦, 辣”为例 / 尹文婷 / – 硕士学位论文. 云南师范大学, 2009
11. 在线新华字典 [电子资源]. – URL: <http://xh.5156edu.com> (访问日期: 03.01.2020)
12. Cambridge Dictionaries [Electronic resource]. – URL: <https://dictionary.cambridge.org/> (accessed: 03.01.2020)
13. Duan G. Effects of spicy stimulation and spicy-food consumption on human pain sensitivity: a healthy volunteer study / G. Duan, Z. Wu, Z. Duan, G. Yang, L. Fang, F. Chen, X. Bao, H. Li / – The Journal of Pain: official journal of the American pain society [Electronic resource]. – URL: <https://www.sciencedirect.com/science/article/abs/pii/S1526590019308703> (accessed: 03.01.2020)
14. Fodor J.A. Psychosemantics: The Problem of Meaning in the Philosophy of Mind / J.A. Fodor / – Cambridge, MA: The MIT Press, 1987
15. Greenwood V. How spicy flavours trick your tongue [Electronic resource]. – URL: <http://www.bbc.com/future/story/20150120-hidden-ways-your-tongue-tastes> (accessed: 28.12.2019)
16. Kireeva I.I. Linguocultural specifics of the language picture of the world / I.I. Kireeva / – Russian linguistic bulletin, 3(11), 2017, P.40-42
17. Kolesov V.V. Conceptology as a form of cognitive linguistics / V.V. Kolesov / – Russian linguistic bulletin, 1(9), 2017, P.48-51
18. Langacker R.W. Metaphor in linguistic thought and theory / R.W. Langacker / – Cognitive Semantics, 1(2), 2016, P.3-29
19. Manerko L.A. Concept understanding in cognitive linguistics and cognitive terminology science / L.A. Manerko / – Languages for Special Purposes in a Multilingual, Transcultural World. – Vienna: University of Vienna, 2013, P.471-483
20. Oxford Dictionaries Lexico [Electronic resource]. – URL: <https://www.lexico.com/> (accessed: 03.01.2020)
21. Tewksbury J.J. Evolutionary ecology of pungency in wild chilies / J.J. Tewksbury, K.M. Reagan, N.J. Machnicki, T.A. Carlo, D.C. Haak, A.L. Penalosa, D.J. Levey / – Proceedings of the National Academy of Sciences, 105 (33), 2008, P.11808-11811

**Список литературы на английском / References in English**

1. Kubryakova E.S. Ob odnom fragmente kontseptual'nogo analiza slova PAMYAT' [Fragment of conceptual analysis of the word MEMORY] / edited by N.D. Arutjunovoj / – Logicheskii analiz yazyka. Kul'turnye kontsepty. – M.: Nauka, 1991, P.85-91 [in Russian]
2. Kubryakova E.S. Kratkii slovar' kognitivnykh terminov [Concise Dictionary of Cognitive Terms] / edited by E.S. Kubryakova / – M.: Filologicheskii fakultet MGU im. M.V. Lomonosova, 1997 [in Russian]
3. Kuznetsov S.A. Bol'shoi tolkovyi slovar' russkogo yazyka [Large Explanatory Dictionary of the Russian Language] [Electronic resource]. – URL: <https://gufo.me/dict/kuznetsov> (accessed: 03.01.2020) [in Russian]
4. Laenko L.V. Natsionalnaya spetsifika kontsepta OSTRYI v kontseptosfere angliiskogo i russkogo yazykov [National features of the concept OSTRYI in the conceptsphere of English and Russian] / edited by Z.D. Popovoi, I.A. Sternina / – Yazyk i natsionalnoe soznanie: voprosy teorii i metodologii. – Voronezh: Voronezhskii gosudarstvennyi universitet, 2002, P.95-99 [in Russian]
5. Ozhegov S.I. Tolkovyi slovar' russkogo yazyka [Dictionary of the Russian Language] [Electronic resource]. – URL: <http://slovarozhegova.ru> (accessed: 03.01.2020) [in Russian]
6. Xu Y. Razlichiya v yazykovykh sredstvakh dlya oboznacheniya vkusa v russkom i kitaiskom yazykakh [Different linguistic means of taste descriptors in the Russian and Chinese languages] / edited by V.V. Robustovoi / – Yazyk. Kultura. Perevod. Kommunikatsiya. – M.: "KDU", Universitetskaya kniga, 2018, P.278-281 [in Russian]
7. Ushakov D.N. Tolkovyi slovar' russkogo yazyka [Explanatory Dictionary of the Russian Language] [Electronic resource]. – URL: <https://dic.academic.ru/contents.nsf/ushakov/> (accessed: 06.02.2020) [in Russian]

8. Hu T. Ren zhi shi jiao xia han ying ji ben wei jue ci de duo yi hua dui bi yan jiu [A comparative study on the polysemization of basic taste words in Chinese and English — A cognitive perspective] / T. Hu / – Master's thesis. Huazhong University of Science and Technology, 2009 [in Chinese]
9. Luo Y. Ying han ji ben wei jue ci de gai nian yin yu yu dui bi fen xi - yi "suan, tian, ku, la" wei li [A contrastive study of conceptual metaphor of taste between English and Chinese - taking "sour, sweet, bitter, spicy" as examples] / Y. Luo / – Master's thesis. Hunan Agricultural University, 2016 [in Chinese]
10. Yin W. Han ying "wei jue" lei ci yu dui bi yan jiu - yi "suan, tian, ku, la" wei li [Comparative analysis of taste describing vocabularies in English and Chinese] / W. Yin / – Master's thesis. Yunnan Normal University, 2009 [in Chinese]
11. Zai xian xin hua zi dian [Xinhua Online Dictionary] [Electronic resource]. – URL: <http://xh.5156edu.com> (accessed: 03.01.2020) [in Chinese]
12. Cambridge Dictionaries [Electronic resource]. – URL: <https://dictionary.cambridge.org/> (accessed: 03.01.2020)
13. Duan G. Effects of spicy stimulation and spicy-food consumption on human pain sensitivity: a healthy volunteer study / G. Duan, Z. Wu, Z. Duan, G. Yang, L. Fang, F. Chen, X. Bao, H. Li / – The Journal of Pain: official journal of the American pain society [Electronic resource]. – URL: <https://www.sciencedirect.com/science/article/abs/pii/S1526590019308703> (accessed: 03.01.2020)
14. Fodor J.A. Psychosemantics: The Problem of Meaning in the Philosophy of Mind / J.A. Fodor / – Cambridge, MA: The MIT Press, 1987
15. Greenwood V. How spicy flavours trick your tongue [Electronic resource]. – URL: <http://www.bbc.com/future/story/20150120-hidden-ways-your-tongue-tastes> (accessed: 28.12.2019)
16. Kireeva I.I. Linguocultural specifics of the language picture of the world / I.I. Kireeva / – Russian linguistic bulletin, 3(11), 2017, P.40-42
17. Kolesov V.V. Conceptology as a form of cognitive linguistics / V.V. Kolesov / – Russian linguistic bulletin, 1(9), 2017, P.48-51
18. Langacker R.W. Metaphor in linguistic thought and theory / R.W. Langacker / – Cognitive Semantics, 1(2), 2016, P.3-29
19. Manerko L.A. Concept understanding in cognitive linguistics and cognitive terminology science / L.A. Manerko / – Languages for Special Purposes in a Multilingual, Transcultural World. – Vienna: University of Vienna, 2013, P.471-483
20. Oxford Dictionaries Lexico [Electronic resource]. – URL: <https://www.lexico.com/> (accessed: 03.01.2020)
21. Tewksbury J.J. Evolutionary ecology of pungency in wild chilies / J.J. Tewksbury, K.M. Reagan, N.J. Machnicki, T.A. Carlo, D.C. Haak, A.L. Penalzoza, D.J. Levey / – Proceedings of the National Academy of Sciences, 105 (33), 2008, P.11808-11811