Received: May 2024 / Accepted: September 2024
Published online: April 2025

French and Chinese neological morphological causative construction in media texts

Construction causative morphologique néologique en français et en chinois dans les textes médiatiques

Jiahui Zhu
Université Sorbonne Nouvelle & Lattice (CNRS/ENS-PSL/USN)
jiahui.zhu@sorbonne-nouvelle.fr

ABSTRACT

The verbal suffixes *-iser* in French and -化 [huà] in Chinese are particularly productive in expressing causative relations. The morphological causative constructions associated with these two suffixes exhibit a polysemous nature in each of these two languages. In this paper, we study the causative relationships expressed by neological morphological causative constructions associated with these two suffixes. Within the framework of the Cognitive Construction Grammar (Goldberg, 1995) and the Causal Event Structure (Croft, 2012), we investigate in this article: (1) the directions of force transmission among the participants in the events, which are represented by these constructions; (2) the transformational outcomes that these constructions can symbolize. By combining these two dimensions, we classify different types of causal events represented by these constructions in each of these two languages. As a byproduct, our research results show that morphological causative constructions in French and Chinese are able to express similar causative relationships.

Keywords: morphological causative constructions, neologism, polysemy, causal event structure

RÉSUMÉ

Les suffixes verbaux *-iser* en français et -化 [huà] en chinois sont particulièrement productifs pour exprimer des relations causatives. Les constructions causatives morphologiques associées à ces deux suffixes présentent une nature polysémique dans chacune des deux langues. Cet article analyse les relations causatives exprimées par les constructions causatives

morphologiques néologiques en français et en chinois. En nous appuyant sur les modèles théoriques de la Grammaire Cognitive des Constructions (Goldberg, 1995) et de la Structure des Événements Causaux (Croft, 2012), nous examinons dans cet article : (1) les différentes directions de la transmission de forces entre les participants des événements représentés par ces constructions ; (2) les divers résultats transformationnels que ces constructions peuvent symboliser. En combinant ces deux dimensions, nous classifions les différents types d'événements causaux représentés par ces constructions dans chacune des deux langues. En outre, nous démontrons que les constructions causatives morphologiques en français et en chinois sont capables d'exprimer des relations causales similaires.

Mots-clés : construction causative morphologique, néologisme, polysémie, structure des événements causaux

1. Introduction

The causative relationship can be represented through a morphological mechanism (Dixon, 2000, p. 74), which is shown in both French and Chinese (Tang, 2002; Fradin, 2003; Zhang & Song, 2007; Namer, 2009; Willems, 2012; Lignon, 2010; Zhang, 2019). In both languages, the suffixes *-iser* and -化[huà] are notably productive in representing causative relationships (Lignon, 2010; Zhang, 2019). This productivity is exemplified by the large variety of root types used to create these neologisms. More precisely, the French suffix *-iser* can represent causative relationships by forming derived verbs based on common nouns (e.g. *verduriser* < verdure ('greenery') + *-iser*), proper nouns (e.g. *neymariser* < *Neymar* (a Brazilian footballer's name) + *-iser*), and adjectives (e.g. *chiquiser* <chic ('posh') +*-iser*). Similarly, the Chinese suffix -化[huà] can represent causative relationships by forming derived verbs based on adjectives (e.g. 精准化 [jīng zhǔn huà]＜精准 [jīng zhǔn] ('accurate')＋-化 [huà]), common nouns (e.g. 碎片化 [suì piàn huà]＜碎片 [suì piàn] ('fragment')＋-化 [huà]), proper nouns (e.g. 抖音化 [dǒu yīn huà]＜抖音 [dǒu yīn] (a mobile app for short videos and social networking)＋-化 [huà]), and verbs (e.g. 恶搞化 [è gǎo huà]＜恶搞 [è gǎo] ('spoof')＋-化 [huà]). Given their productivity in the conceptualization of causative relationships, this article focuses particularly on the morphological causative constructions associated with these two suffixes.

Before introducing the research issue, we explain the definition of the morphological causative constructions associated with the suffixes *-iser* in French and -化 [huà] in Chinese. As Zhu (2024) has demonstrated and as further discussed below, the interpretation of a

complete causative relationship (from cause to consequence) cannot be conceptualized through the verb alone; it requires the interaction of arguments within the sentence containing the derived verb. In other words, predicting the causative value conveyed by a sentence containing the derived verb based on this verb is challenging, as it relies not only on the verb's semantic-syntactic characteristics but also on the whole sentence construction. Therefore, it is reasonable to posit that the minimal linguistic unit, through which the morphological mechanism expresses a complete causative relationship, is the sentence containing the derived verb. From the perspective of Cognitive Construction Grammar (Section 2.1), this paper adopts the term *morphological causative constructions associated with the suffixes -iser in French and -化 [huà] in Chinese* to refer to the sentences in which these derived verbs occur rather than to these verbs themselves. It is essential that these sentences conceptualize a complete causative relationship. In other words, not all sentences containing derived verbs with *-iser* or -化 [huà] are considered causative constructions.

The morphological causative constructions in French and Chinese are polysemous (Zhang & Song, 2007, p. 105; Namer, 2009, p. 182; Lignon, 2010; Zhang, 2019). The study of the various causative values associated with the suffixes *-iser* in French and -化 [huà] in Chinese has already gained significant attention from linguists. For instance, in French, based on the relationship between the base and the derived form, Lignon (2010, p. 2-3) analyzed the polysemy of the suffix *-iser* and identified its four semantic uses associated with the interpretation of causative relation: locative ('put (in)to X[1]'), ornative ('provide with X'), causative/factitive ('make (more) X') and resultative ('make into X'). In addition to the semantic uses related to causative relationships, the semantic uses of *-iser* are also related to inchoative ('become X'), performative ('perform X') and similative ('act like X').

In Chinese, the suffix -化 [huà] is multifunctional, capable of deriving verbs, nouns, and adjectives. When this suffix is used to derive verbs, it is often used to express causative relationships and can represent a variety of causative relationships (Zhang & Song, 2007, p. 109). However, the existing studies on -化[huà] have not yet classified the causative relationships it is related to. No studies have compared the causative relationships associated with this suffix to those in other languages (e.g. French). This paper aims to address this gap and to study whether this diversity is comparable to what has been observed in French. Through a study of the semantic-syntactic rules of verbs derived with -化 [huà], Zhang (2019) argues that the semantic interpretation of a sentence construction involving such a derived verb is closely tied to the verb's argumental structure. Especially, when the derived verb

[1] X refers to the referent of the base of the verb derived with *-iser*.

functions as a transitive verb, the suffix can be identified as a causative suffix. However, when the derived verb functions as an intransitive verb, the causative value of -化 [huà] becomes less prominent.

In addition to the lexical-semantic characteristics of the derived verb and its semantic-syntactic properties, the semantic interpretation of morphological causative constructions is also influenced by the semantic-syntactic features of the whole construction (Zhu, 2024, p. 13). In other words, the polysemy of morphological causative constructions in French can arise from different interaction among the arguments (Namer, 2009, p. 183; Zhu, 2024, p. 13). The specific interaction among the arguments can specify the semantic relationship represented by the construction and produce the polysemy of the morphological causative constructions. For example, the polysemy of morphological causative constructions in both French and Chinese is evident in sentences that employ the same derived verb. We take the French sentences (1) and (2), and the Chinese sentences (3) and (4) as examples.

(1) *Toutes les associations de lutte contre la violence routière seraient*
all ART[2].PL association-PL of fight again ART.SG road violence be-COND.PRS
en revanche plus inspirées de prendre davantage à leur compte ces
on_the_other_hand more inspired to take more for A.POSS ownership A.DEM
réseaux-là pour ***« facebookiser »*** *leur croisade […]* (*La Provence*, 09/06/2014)
networks-those to **publish_on_Facebook** A.POSS crusade
'All associations combating road violence would, however, be better inspired to take more ownership of these networks to leverage Facebook in their crusade and contribute to further reducing the number of road fatalities.'

(2) *[…] d'abord il* ***« facebookise »*** *Twitter.* (*Télérama*, 21/03/2016)
[…] firstly 3SG.SBJ **make_like_Facebook** Twitter
'Firstly, he makes Twitter like Facebook.'

Both French morphological causative constructions (1) and (2) are linked to the verb *facebookiser*[3] (< *Facebook* (name of a social network) + *-iser*). The construction (1) suggests that the associations use Facebook to publish their activities against road violence, making Facebook a tool in the service of their cause. In contrast, the construction (2) implies that the

[2] 3: Third person; A.POSS: Possessive adjective; ART: Article; AUX: Auxiliary; COND: Conditional; COP: Copula; A.DEM: Demonstrative Adjective; DEM: Demonstrative; DET: Determiner; FUT: Future; PFV: Perfective; PL: Plural; POM: Pre-verbal Object Marker; PPST: Past Participle; PROG: Progressive; PRS: Present; SG: Singular; SBJ: Subject.

[3] This verb appears in 2007: « Le sport national sur internet : se facebook-iser ('The national pastime on the internet: turning into Facebook') » (*Le Nouvel Observateur*, 20/12/2007).

action of “facebookiser” causes Twitter to become like Facebook. Thus, the morphological causative construction (1) emphasizes a transformation of means, while the construction (2) describes a transformation of property.

Concerning Chinese morphological causative constructions (3) and (4), both are associated with the verb 微信化[4] [wēixìnhuà](＜微信 [wēi xìn] (n. ‘Wechat’)＋-化 [huà]). The construction (3) refers to the transformation of SuNing’s sales methods, which are transformed from not using to actively using WeChat. In contrast, the causative relationship expressed by the construction (4) is that Musk will transform Twitter to adopt the properties of WeChat. Thus, the construction (3) emphasizes a transformation of means, while the construction (4) describes a transformation of property.

(3) 苏宁 开始 将 销售业务 微信化. (*Sina Weibo*, 16/02/2014)
Sūníng kāishǐ jiāng xiāoshòuyèwù **wēixìnhuà.**
SuNing start POM sales_operations **transform_into_using_WeChat**
‘SuNing starts using Wechat for sales operations.’

(4) 马斯克 要 把 推特 微信化. (*Sina Weibo*, 01/11/2022)
mǎ sī kè yào bǎ tuī tè **wēixìn-huà**
Musk FUT POM Twitter **make_like_WeChat**
‘Musk will transform Twitter into something like WeChat.’

As illustrated in examples (1) to (4), the morphological causative constructions associated with the suffixes *-iser* in French and -化 [-huà] in Chinese can represent various causative relationships, even when linked with the same verbs. Thus, in this work, the following questions occur naturally: what different causative relationships are expressed by French and Chinese, respectively? How are these causative relationships conceptualized by the morphological causative constructions in question? Can the morphological causative constructions in these two languages represent the same causative relationships?

The application of Cognitive Construction Grammar (Goldberg, 1995) and the Causal Event Structure (Croft, 2012) in explaining the semantic formation of morphological causative constructions in French and Chinese has been explored by Zhu (2024). By applying these two theories, Zhu (2024, p. 13) demonstrates that the semantic formation of morphological causative constructions in these two languages, despite their typological differences, can be explained by the same semantic schema. This work demonstrates the applicability of these

[4] This verb appears in 2013: “浦发银行推出了首家真正微信化的微信银行 [pǔ fā yín háng tuī chū le shǒu jiā zhēn zhèng wēi xìn huà de wēi xìn yín háng] (‘Shanghai Pudong Development Bank has launched the first truly WeChat-integrated WeChat bank’)” (People’s Daily, 13/11/2013).

two theoretical frameworks in analyzing the semantic interpretation of morphological causative constructions. Moreover, it highlights their suitability for comparative studies between French and Chinese.

Based on these research findings, the present study adopts these two theoretical models as frameworks. They are used to analyze the diversity of causative relationships represented by morphological causative constructions in French and Chinese. Additionally, it compares how these causative relationships are expressed in these two languages. These two theories are characterized by their support for the holistic conceptualization of phrasal constructions in semantic interpretation. While both frameworks have been widely used in the study of causative constructions involving non-derived verbs (e.g. Bouveret, 2022; Shi, 2018), their application to the analysis of the semantic interpretation of morphological causative remains unexplored. Furthermore, the comparative studies of morphological causative constructions in French and Chinese are relatively scarce. This article aims to fill this gap by exploring the applicability of these theories in the semantic study of morphological causative constructions and conducting a comparative analysis between French and Chinese. To do so and to avoid semantic opacity caused by lexicalization when interpreting causative relationships, we construct a corpus centered on neologisms. This corpus contains morphological causative constructions featuring neological verbs derived with the morphemes *-iser* in French and -化 [-huà] in Chinese. With the popularity of the Internet in the post-2000s, the suffixes *-iser* in French and -化 [-huà] in Chinese have demonstrated high productivity in forming neologisms. Therefore, our study focuses on morphological causative constructions involving neologisms created after the year 2000.

In this paper, we first introduce these two theoretical frameworks (Section 2) which will be used throughout the study. Then we describe our corpus (Section 3). Using this corpus, we study the interaction patterns among arguments represented by these neological morphological causative constructions, which involve verbs formed through denominal and deadjectival derivation. These patterns serve as the basis for classifying the various causative relationships expressed by these constructions in French and Chinese, respectively, which allows us to explore the similarities between these two languages (Section 4).

2. Theoretical frameworks

This research uses the Cognitive Construction Grammar (Goldberg, 1995, 2006) and the Causal Event Structure (Croft, 2012) to decode the semantic interpretation of morphological

causative constructions in French and Chinese. Before delving into their application, we first introduce these two theoretical frameworks.

2.1. Cognitive Construction Grammar

As explained by examples (1)-(4), the polysemy of morphological causality can appear in constructions which use the same derived verb. This illustrates that the semantic interpretation of morphological causality is not exclusively determined by the verb itself. To explain the semantic formation of morphological causative constructions in both languages, we first introduce the theoretical model of Cognitive Construction Grammar (Goldberg, 1995), which is characterized by its rejection of verb-centrism at the semantic level.

In 1995, Goldberg introduced a theoretical framework for studying grammar: Cognitive Construction Grammar. Within this framework, a construction (CxG) is defined as a conventional symbolic entity that pairs form with meaning, whose properties cannot be entirely predicted or derived (Goldberg, 1995, p. 4). This approach encompasses symbolic units ranging from individual lexical items to complex phrasal structures (Goldberg, 2006, p. 5). Croft (2007, p. 471) further clarifies that, within the concept of *construction* (CxG), the distinction between syntactic units and lexical units lies solely in their degree of schematization (in terms of meaning) and complexity (in terms of form) (see Table 1).

Construction Type	**Traditional Name**	**Examples**
Complex and (mostly) schematic	syntax	[SBJ *be*-TNS VERB-*en by* OBJ]
Complex and (mostly) specific	idiom	[*pull*-TNS NP-*'s leg*]
Complex but bound	morphology	[NOUN-*s*] [VERB-TNS]
Atomic and schematic	Syntactic category	[DEM], [ADJ]
Atomic and specific	word/lexicon	[*this*], [*green*]

Table 1. The syntax-lexicon continuum (Croft, 2007, p. 471).

As shown in Table 1, the notion of construction allows us to establish a continuum between the lexicon and syntax along two dimensions: from specific to schematic (at the semantic level) and from atomic to complex (at the formal level). In other words, much like lexical unit, which is interpreted as a holistic entity, a sentence containing a verb is also interpreted as an entity, rather than as the semantic composition of its components.

According to Goldberg (1995), the semantic interpretation of a phrasal construction containing a verb cannot be reduced to the semantic-syntactic rules of the lexicon. In fact, the formation and interpretation of a construction result from a "mapping" of a scenario onto discourse, based on human experiences (Goldberg, 1995, p. 39). Goldberg presents a hypothesis about how humans encode scenarios in discourse: "Constructions which

correspond to basic sentence types encode as their central senses event types that are basic to human experience" (Goldberg, 1995, p. 39). As the vehicle for representing real-world scenarios, the phrasal construction conceptualizes these scenarios by representing the relationships between the participants within them.

(5) He sneezed the napkin off the table. (Goldberg: 09)

Let us consider the construction (5) as an example. The semantic interpretation of this ditransitive construction is not derived from the intransitive verb *sneeze* itself but rather from the construction as a whole. Goldberg (1995, p. 163) defines this construction as representing a "cause-motion" relation, involving the arguments of cause, path, and theme. In other words, the meaning of the sentence (5) is determined by the relationships between the participants within the motion scenario.

Drawing on the Cognitive Construction Grammar, we propose that the semantic interpretation of morphological causative constructions associated with the suffixes *-iser* in French and -化 [huà] in Chinese is not governed by the verb in isolation but by the relationships between participants in the causal events as a unified whole (Zhu, 2024, p. 2). Even constructions that use the same verbs can be interpreted differently, depending on the relationships between the participants involved in the events they describe. For instance, in French, the semantic distinction between constructions (1) and (2) emerges from the varying relationships among the participants in the events they depict. The construction (1) conveys a "cause-use" relationship, whereas the construction (2) represents a "cause-become" relationship. Similarly, in Chinese, the subtle semantic differences between constructions (3) and (4) stem from the relationships between the participants in the scenarios they illustrate: the construction (3) exemplifies a "cause-use" relationship, while the construction (4) embodies a "cause-become" relationship.

2.2. Causal Event Structure

To decode and classify the different causative relationships represented by morphological causative constructions in French and Chinese respectively, we apply the Causal Event Structure (Croft, 2012). By decoding the causal chains between the participants highlighted by these constructions, this theory allows us to analyze the various causative relationships between the participants in causal scenarios represented by the constructions. Before using this theory in our research, we first introduce some of the main claims of this theory. To study the semantic and syntactic formation of sentences, Croft (2012) proposes the theoretical

model of Causal Event Structure, in which each sentence represents an event. This paper focuses particularly on the semantic aspect of this model.

Compared with the thematic models of the verb (Levin, 1993) or the argument structure of constructions (Goldberg, 1995), Croft's (2012) model focuses on the structure of the event symbolized by the linguistic unit. This event is analyzed through the symbolization of its aspectual and causal structures (Croft, 2012, p. 283). In this study, we primarily apply the causal chain structure within Croft's theoretical model to examine the representation of causative relationships in morphological causative constructions in French and Chinese.

In the composition of a causative event, the interaction between sub-events is represented by the causal chain, where these sub-events are integrated into an overall event through dynamic force relationships among their participants (Talmy, 2000). Croft (2012) postulates that each participant in an event is associated with a sub-event. The transmission of force among participants determines a causal chain linking these sub-events. This causal chain can be distinguished according to the number and the order of participants involved in the transmission of force.

Understanding the transmission of force within an event is crucial for grasping the semantic formation of a construction. When a causal event is conceptualized by a phrasal construction involving the verb, the understanding of this event is closely linked to the semantic framework of the verb used and the argument structure of the construction (Croft, 2012, p. 205-211):

> Verbs have a force-dynamic potential that allows them to be construed in more than one force-dynamic image schema. Argument structure constructions constrain but do not determine the force-dynamic structure of the event expressed by the verb occurring in the construction (Croft, 2015, p. 1)

As expressed by Croft (2012, 2015), concerning the interaction between the verb and the argument structure of a construction, the semantic frame of a verb allows to present a potential dynamic-force structure. This helps to explain why a verb can correspond to different schemas which illustrate force transmission. The argument structure defines more precisely the force-dynamic structure of the event represented by the construction that includes this verb.

For a construction containing a single verb, according to Croft (2012, p. 212), the complex semantic structure of a verb can be cognitively decomposed into sub-events. Each participant profiled by the sentence is linked to an implicit sub-event. These sub-events form a causative relationship among themselves through the transmission of force between the associated participants. Taken together, the interconnected sub-events represent the

development of the composite event. In other words, the activity of the participants during the time interval associated with the corresponding sub-event illustrates each phase of the composite event (Croft & Vigus, 2020, p. 164). Croft's (2012) model provides an approach to study the semantics of a construction containing a verb by investigating the interaction between the arguments in the construction.

By applying the theoretical models of the Cognitive Construction Grammar (Goldberg, 1995) and the Causal Event Structure (Croft, 2012), Zhu (2024) demonstrates that the semantic formation of morphological causative constructions arises from the interaction between the derived verb and the causative construction itself. When the morphological causative construction, associated with the suffixes *-iser* in French and -化 [huà] in Chinese, represents a causal event, the derived verb within the construction outlines a potential causative relationship (Zhu, 2024). In this relationship, the patient of the verb is transformed to establish a connection with the referent of the verb's root (Zhu, 2024). For example, it has the properties of the referent of the root or is in a relationship of ownership with the referent of the root (see Section 4). The interaction between the causal sub-events symbolized by the construction further specifies this transformational relationship (Zhu, 2024).

This interaction between sub-events can be understood as the transmission of force between them. The various ways in which these sub-events transmit force to one another lead to different causal events, which are represented by the causative constructions (Talmy, 2000). For example, in French, the semantic difference between the constructions (1) and (2) stems from the fact that they represent two distinct causal chains. The key distinction lies in the number of participants involved in the represented event. The construction (1) depicts an event with three participants, whereas the construction (2) conceptualizes a causal chain involving only two participants. Similarly, in Chinese, the semantic difference between the constructions (3) and (4) is also related to the number of participants in the causal chains they represent. The construction (3) portrays a causal chain with two participants, while the causal chain described by the construction (4) involves three participants. Consequently, the polysemy of morphological causative constructions associated with the suffixes *-iser* in French and -化 [huà] in Chinese is reflected in the diversity of causal chains among the participants in the events represented by the utterances. Thus, the study of the diversity of morphological causative sub-constructions requires deciphering multiple causal chains.

3. Data

To avoid semantic opacity caused by lexicalization (Huyghe & Lombard, 2022, p. 25), we studied the causative relationship represented by the morphological causative construction associated with the neological derived verb. To address the issues of this paper (Section 1), we constructed a corpus which contains morphological causative constructions featuring neological verbs derived from the suffixes *-iser* in French and -化 [huà] in Chinese. With the rise of the Internet, many neologisms derived from these two suffixes have entered the community since 2000. Thus, we have selected the neologisms from 2000 to the present day. To compile our corpus, we gathered the written data from media discourse. This choice was made by considering the size, operability of data extraction and representativeness of the data (Carter-Thomas, 2009, p. 112-117). More precisely, the data in this research comes partly from traditional media: the French newspapers on the Europresse[5] platform, and Chinese ones: *People's Daily*[6] (a Chinese national newspaper) and *Southern Daily*[7] (a Chinese regional newspaper); and partly from new media: *Twitter*[8] (e.g. Daoust, 2017) for French and *Sina Weibo*[9] for Chinese.

The relevant corpus for our study was compiled semi-automatically according to the following three steps. In the first step, we created a corpus containing as complete data as possible. Thanks to *Spacy* (Montani, Honnibal, Honnibal, Boyd, Van Landeghem, & Peters, 2023) and *Jieba*[10], two Python machine learning libraries, we automatically selected all French sentences containing terms ending in the morpheme *-iser* and its inflections (by extracting raw word forms, e.g., *organiser*, *organise*, *organisent*, without lemmatization), and Chinese sentences containing terms ending in the character -化 [huà].

In the second step, we semi-automatically deleted sentences that are irrelevant to our research. There are two types of sentences that are irrelevant to this study: either they do not present a causative relationship, or they don't contain the derived verbal neologisms.

The first type of irrelevant sentences is those in which the candidate-terms with the suffixes in question do not function as verbs. This type of case mainly occurs in Chinese. As mentioned above, the suffix -化 [huà] can not only derive verbs, but also adjectives and nouns. For example, in the sentence (6), the derived term 少子化 [shǎo zǐ huà] (＜少子 [shǎo zǐ] (n.

[5] https://nouveau.europresse.com

[6] http://www.people.com.cn

[7] https://epaper.southcn.com

[8] https://twitter.com

[9] https://m.weibo.cn

[10] https://github.com/fxsjy/jieba

'childlessness') + -化 [huà]) is a noun, which means "sub-replacement fertility". In this case, the suffix -化 [huà] is used to form the noun.

(6) 日本 主要 是 人口 结构 问题 即 严重
Rìběn zhǔyào shì rénkǒu jiégòu wèntí, jí yánzhòng
Japan main_issue COP population structure problem, i.e. serious
的 少子化［…］. (*People's Daily*, 05/05/2016)
de **shǎozǐhuà** […]
DET **sub-replacement_fertility**
'The main issue in Japan is the population structure, i.e., the severe problem of declining birthrates.'

The second type of irrelevant sentences is those in which the candidate-terms with the specified morphemes are not derived verbal neologisms. To construct a corpus that aligns with the objectives of our study, we first identified all the terms that are not derived neological verbs and then eliminated the sentences containing these terms. To identify these terms, we first adopted the data pre-processing methodology described by Cartier and Huyghe (2021, p. 6). To develop a corpus of French evaluative prefixes (e.g. *archi-*, *hyper-*, *mega-*, *super-*, *ultra-*), they eliminated both faulty forms and the forms that are not accurately prefixed. We used this pre-processing method in our study, and we semi-automatically deleted sentences containing candidate-terms that are:

- Faulty forms: these are primarily the results of spelling errors (i.e., *[11]*démoncriser* in French). They can be automatically eliminated by ensuring that the root does not belong to the lexicon of the target language.
- Non-derived forms: these include the studied character strings but cannot be morphologically analyzable (e.g., *viser* (v. 'target') in French, 感化 [gǎn huà] (v. 'influence and transform someone through emotional or moral persuasion') in Chinese).
- Tokenization errors in Chinese (e.g., 取冰化水 [qǔ bīng huà shuǐ] is a compound word composed of two parts: 取冰 [qǔ bīng] (v. 'to take ice') and 化水 [huà shuǐ] (v. 'to melt into water'). However, automatic tokenization mistakenly identifies 取冰化 [qǔ bīng huà] as a single word ending with 化 [huà]).

On the other hand, from the perspective of neology, we eliminated sentences where the verb is hapax or has already appeared before the year 2000. Hapaxes are terms that appear only

[11] The star (*) refers to a spelling error.

once or twice in media and encyclopedic resources (e.g., *bling-bling-iser*, which appears only once in French; 精勤化 [jīng qín huà], which appears only once in Chinese).

The definition of neologisms is not only tied to a temporal framework but also to the concept of stability. A neologism is defined as a neological lexical unit (Sablayrolles, 2000, p. 148), which forms part of the broader category of linguistic signs. One essential characteristic of linguistic signs is their stability. Stability allows members of a linguistic community to communicate effectively by using these signs; more precisely, it ensures that listeners can understand the intended meaning of the speaker's expression. As a result, hapaxes should not be included in the study of neologisms because they have not been integrated into linguistic usage. Their lack of dissemination indicates that they are neither accepted by the linguistic system nor understood by speakers. In other words, they disrupt the stability of linguistic signs. The analysis of a derived hapax that is not adopted by a linguistic community fails to understand the typical usage of morphological causative constructions associated with the suffixes *-iser* in French and -化 [huà] in Chinese within those respective linguistic communities.

To effectively identify terms that appeared before 2000, it is essential to accurately date the first occurrence of the selected terms. Since there is no established and complete corpus that allows for precisely dating the appearance of French and Chinese terms, in this paper, we established a new method for dating the first occurrence of French and Chinese derived verbs. To date neologisms accurately, it is essential to use data covering as long period as possible. This wide temporal range guarantees the reliability of the results concerning the first occurrences of neologisms.

For dating the first appearance of French derived verbs, we referred to data related to the French language covering the period from the year 1500 to the present day. In particular, we referred to the Google Ngram platform (Lin *et al.*, 2012), which extracts digitized documents from Google Books corpora in contemporary French during the period 1500-2019; to the Europesse platform, which encompasses all major French newspapers since 1840; and to social media platforms like Twitter, which allows us to capture the frequency of usage of French neologisms since 2006, to date the first appearance of French derived verbs.

For Chinese, to determine the first appearance of the derived verbs, we referred to data related to the Chinese language covering the period from 1840 to the present day. On the one hand, we referred to newspaper platforms to date the first appearance of derived verbs. We first used the *Modern Newspaper in China*[12] platform, which provides electronic access to 208

[12] http://tk.cepiec.com.cn

newspapers covering the period 1840-1949. The second platform we used is the *Chinese Digital Library*[13], which allows us access to 456 major Chinese e-newspapers since 1946. The third platform we referred to is the *China Core Newspapers Full-text Database*[14], which includes articles from 618 Chinese newspapers, dating from the year 2000 to the present day. On the other hand, we used the contemporary media *Sina Weibo* which allows us to capture the frequency of use of Chinese neologisms since 2009.

After dating the first appearance of derived verbs in French and Chinese, we removed sentences where the derived verbs appeared and were disseminated before the year 2000. Sentences in which the terms that were hapaxes before the year 2000 but are largely diffused after 2000, are also included in this corpus.

Finally, after eliminating sentences irrelevant to this study and the duplications, our corpus contains 6,900 French morphological causative constructions associated with 982 neological verbs derived with the French suffix *-iser*, and 7,200 Chinese morphological causative constructions associated with 700 neological verbs derived by the suffix -化 [-huà].

4. Causative relationship represented by the morphological causative construction

As shown in Section 2, decoding the semantic structure of morphological causative sub-constructions requires analyzing the multiple dynamic force strategies involved between the sub-events of the causative event. To analyze the transmission of force between these sub-events at the linguistic level, we assume that each argument profiled by a construction is associated with a specific sub-event. Thus, describing the causative relationship of the event represented by morphological causative construction requires clarifying how the arguments interact, i.e., how the participants of the event carry out the transmission of force between them. In this section, we first analyze the different directions of force transmission between participants in causal events that the morphological causative constructions in French and Chinese can represent (Section 4.1). Then, we study various roles played by the referent of the verb's root in these causal scenarios, to understand the different transformational results that these constructions can symbolize. Using the interaction of these two dimensions, we seek to classify the different types of causative relationships represented by these constructions in each of these two languages (Section 4.2).

[13] http://www.apabi.com/jigou?pid=about&cult=US

[14] https://kns.cnki.net/kns/brief/result.aspx?dbprefix=CCND

4.1. Directions of force transmission

Depending on the homogeneity between the causer and the causee, causative constructions can be divided into two categories: the self-causative and the external-causative construction (Le Bellec, 2014; Creissels, 2019; Lamarre, 2003; Zhou, 2004; Shi; 2007).

According to the dynamic-force model, the distinctions between these two causative relationships can be explained by the different directions of the force transmission between participants in causal events. In the process of force transmission of a self-causative event, there exists a phase where the force is redirected towards the initiator. In the events linked to the external-causative relationship, the force is consistently transmitted towards participants other than the initiator of this force. In the former case, the force finally causes a transformation of the initiator of the force, while in the latter case, the force results in a change of other participants.

For causal chains of events linked to these two relationships, their difference is reflected in the number of participants. For the same transformational outcome, the causal chain associated with the self-causative relationship has one less participant than the causal chain associated with the external-causative relationship.

These two different directions of force transmission can be reflected by the causative relationships represented by the morphological causative constructions in French and Chinese. We study the self-causative (Section 4.1.1) and external-causative relationships (Section 4.1.2) symbolized by these constructions in the next two subsections.

4.1.1. Self-causative transformational relationship

When the participants in the causing sub-event and the caused sub-event are the same or are linked by a subordinate relationship (Talmy, 2000, p. 524-527), the morphological causative constructions represent a self-causative transformational relationship.

For example, in the morphological causative construction (7)[15], which is linked to the derived verb *kennedyser*[16] (<*Kennedy* (the surname of John Fitzgerald Kennedy, the 35th president of the United States) + *-iser*), the represented causal event has a single participant: *Nicolas Sarkozy*. This construction conceptualizes that Nicolas Sarkozy transforms himself by exerting a force upon himself in order to be more associated with the political style of John Fitzgerald Kennedy.

[15] According to our corpus-based study, in French, self-causative transformational relationships are primarily expressed through intransitive constructions and reflexive constructions. In Chinese, self-causative transformational relationships are mainly represented by intransitive structures.

[16] This verb appears in 2003: the first instantiation of this verb is in example (7).

(7) *Et c' est là qu' il y a confusion des genres : si Nicolas Sarkozy*
And DEM.SG be.PRS.3SG there that there_is confusion of genres if Nicolas Sarkozy
*souhaite se **"kennedyser"*** […]. (*Le Monde*, 04/01/2003)
wish.PRS.3SG REFL **make/adopt/imitate_the_characteristics_associated_with_Kennedy**.
'And this is where the confusion of genres occurs: if Nicolas Sarkozy wishes to make himself adopt or imitate the characteristics associated with John Fitzgerald Kennedy.'

From a methodological perspective, the self-causative value of the construction (7) can be confirmed by the ability to include the reinforced form "lui-même" ('itself') within the construction (Le Bellec, 2014, p.3138). In other words, the construction (8) is semantically equivalent to the construction (7), suggesting that both constructions depict the same causative relationship.

(8) *Et c' est là qu' il y a confusion des genres : si Nicolas Sarkozy*
And DEM.SG be.PRS.3SG there that there_is confusion of genres if Nicolas Sarkozy
*souhaite se **"kennedyser"** (lui-même)*.
wish.PRS.3SG REFL **imitate_the_characteristics_associated_with_Kennedy** himself
'And this is where the confusion of genres occurs: if Nicolas Sarkozy wishes to make himself adopt or imitate the characteristics associated with John Fitzgerald Kennedy.'

Concerning the Chinese construction (9), this construction is linked to the derived verb 网红化[17] [wǎng hóng huà] (< 网红 [wǎng hóng] (n. 'internet celebrity') +-化 [huà]). The causal event represented by this causative construction involves a single participant: 文化场馆 [wén huà chǎng guǎn] (n. 'cultural venue'). This construction symbolizes that the cultural venue transforms itself into an internet celebrity through its own actions.

(9) 文化场馆 也 在 创新 办 馆 模式
wénhuàchǎngguǎn yě zài chuàngxīn bàn guǎn móshì,
cultural_venues too PROG innovate manage center model
逐步 **网红化**. (*Southern Daily*,19/05/2021)
zhúbù **wǎnghónghuà**
gradually **make/turn_into_an_internet_celebrity**
'Cultural venues are also innovating their management models, gradually turning themselves into internet celebrities.'

From a methodological perspective, the self-causative value of the construction (9) is demonstrated by the ability to include the term "自己" [zì jǐ] ('itself') in this construction

[17] This verb appears in 2016: « "明星的"网红化"与网红的"明星化"["míng xīng de "wǎng hóng huà "yǔ wǎng hóng de "míng xīng huà"]('The "influencerization" of celebrities and the "celebritization" of influencers')». (*People's Daily*, 28/06/2016).

(Basciano, 2010, p. 244-245). This implies that sentence (10) describes the same causative relationship as in the sentence (9).

(10) 文化场馆 也 在 创新 办 馆 模式
wénhuàchǎngguǎn yě zài chuàngxīn bàn guǎn móshì,
cultural_venues too PROG innovate manage center model
逐步 **网红化** (自己).
zhúbù **wǎnghónghuà** (zìjǐ)
gradually **make/turn_into_an_internet_celebrity** (itself)
'Cultural venues are also innovating their management models, gradually turning themselves into internet celebrities.'

4.1.2. External-causative transformational relationship

When the force is consistently transmitted to participants other than the initiator of the force, resulting in changes of participants other than the force initiator, the morphological causative construction represents an external-causative relationship. For example, consider the French construction (11), where the verb is *chic-iser*[18] (< *chic* (adj. 'chic') + *-iser*). This construction represents a causal event involving two distinct participants: the referents of the subject (*we*) and the object (*the jogging*) of the sentence. The construction (11) conceptualizes a causal event in which the force initiated by the agent (*we*) makes another participant, the patient (*the jogging*), become (more) chic.

(11) *On* ***chic-ise*** *le* *jogging.* (le *Nouvel Observateur*, 10/12/2009)
3SG.SBJ **make_chic** ART jogging
'We make jogging chic.'

Consider the Chinese example (12), which involves the derived verb 片段化[19] [piàn duàn huà] (<片段 [piànduàn] (n. 'fragment') + -化 [huà]). The causal event symbolized by this morphological causative construction features two different participants: 微讲座 [wēi jiǎng zuò] (the name of a Chinese application) and 大型讲座 [dà xíng jiǎng zuò] (n. 'large-scale conferences'). This construction conceptualizes an external-causative event where the agent

[18] This verb appears in 2012: « on ne présente plus cette fashionista hors pair qui n'a pas son pareil pour "chic-iser" tout ce qu'elle touche. ('This exceptional fashionista, unmatched in her ability to "chic-ify" everything she touches, needs no further introduction.') » (*Closer*, 21/12/2012).

[19] This term appears in 2001: "流程不再是片段化的碎片连接 [liú chéng bú zài shì piàn duàn huà de suì piàn lián jiē] ('The process is no longer a fragmented connection of pieces')" (*Computer World*, 03/12/2001). In this example, the suffix -化 [huà] is used to form an adjective.

(*WeijiangZuo*) causes another participant, *the large-scale conferences*, to disintegrate into smaller fragments by exerting a force.

(12) “微讲座” 将 大型 讲座 **片段化.** (*People’s Daily*, 09/07/2013)
“wēijiǎngzuò” jiāng dàxíng jiǎngzuò **piànduànhuà**
WeiJiangZuo POM large lecture **split**
‘The WeiJiangZuo app breaks down large-scale lectures.’

4.2. Morphological causative sub-constructions

As illustrated above, the morphological causative constructions associated with the morphemes *-iser* in French and -化 [-huà] in Chinese are used to interpret the transformational relationships (Tang, 2002; Fradin, 2003; Zhang & Song, 2007; Namer, 2009; Zhu, 2024). More precisely, these constructions can construct the meaning of “agent makes patient become a state” (Fradin, 2003, p. 296; Zhang & Song, 2007, p. 105). The capability to express the “cause-become” relation allows these morphological causative constructions to be further regarded as resultative constructions from the point of view of Cognitive Construction Grammar (Goldberg, 1995; Goldberg & Jackendoff, 2004).

Consequently, apart from the different directions of the force transmission between the participants (towards the initiator itself or other participants) in the causal event, the diversity of transformational relationships represented by the morphological causative constructions is also related to the diversity of transformational results caused by the force transmission (Goldberg & Jackendoff, 2004). For the morphological causative construction, the representation of the transformational results is linked to the role played by the referent of the derived verb’s root in the symbolized causal scenario.

Based on the different roles played by the root of the derived verb in the represented causal event, we classify three different transformational results symbolized by morphological causative constructions: transformation of property, benefactive transformation, and transformation of means. Combining with the dimension related to the direction of force transmission (Section 4.1), we will systematically show how these three transformational results are symbolized by morphological causative constructions in French and Chinese in the following sub-sections.

4.2.1. External-causative sub-construction of property

The morphological causative construction can first refer to the transformational relationship of property. In such constructions, the root of the derived verb does not refer to an argument

that participates in the transmission of force in the event, but only designates the new property acquired by the patient after the interaction with the agent.

When the morphological causative construction is used to symbolize the event related to the external-causative transformation of property, the minimal represented event generally comprises two sub-events: one is associated with the agent and the other with the patient. The causal chain related to this minimal event can be schematized in Figure 1:

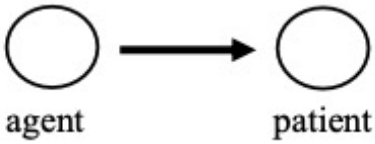


Figure 1. Causal chain of external-causative transformation of property.

In Figure 1, the two black circles represent the participants involved in the transmission of force in the causal event: the agent and the patient. The right arrow indicates the path of the force transmission between these participants. The event representing an external-causative transformation of property can be described as follows: the agent causes the transformation of the patient's property by acting a force on the patient.

In our French corpus, causative morphological constructions associated with the suffix *-iser* represent most frequently the external transformational property. In particular, 50.34% of these constructions convey this transformational relationship. For instance, the construction (13) is associated with the derived verb *RER-iser* (< *RER* (acronym. Réseau Express Régional ('Regional Express Network') + *-iser*). This construction exemplifies this type of transformation. The participants in the symbolized event are the *SNCF management* and the *TER trains of Rhône-Alpes*. In this case, the referent of the derived verb's root does not play an active role in the force transmission involved in the event. It refers to the new state acquired by the *TER trains of Rhône-Alpes* after the interaction with the *SNCF management*. The sub-events conceptualized by the construction (13) are as follows: the SNCF management exerts a force on the TER trains of Rhône-Alpes, and the TER trains of Rhône-Alpes become (more) similar to the RER trains.

(13) *La direction SNCF tente de* ***« RER-iser »***[20] *les TER de Rhône-Alpes.*
ART Management SNCF try to **make_like_RER** ART TER_trains of Rhône-Alpes (*NewPress* (français), 07/06/2011).
'The SNCF management is trying to make the TER trains of Rhône-Alpes like RER.'

[20] This verb appears in 2011: the first instantiation of this verb is in example (13).

Analogously, in our Chinese corpus, morphological causative constructions associated with the suffix -化 [huà] are also most productive in representing the external transformational property in our corpus. Especially, 47.06% of the constructions express this causative relationship. For example, in the Chinese morphological causative construction (14), the participants in the event represented by this construction are the agents 梁羽生, 金庸 [liáng yǔ shēng, jīn yōng] (names of two Chinese authors), and the patient 平民武侠 [píng mín wǔ xiá] (n. 'popular wuxia'). This morphological causative construction is related to the derived verb 诗学化[21] [shī xué huà] (＜诗学 [shīxué] (adj. 'poetic')＋-化 [huà]). The sub-events conceptualized by this construction imply that Liang Yusheng and Jin Yong exert a force on popular wuxia, and then popular wuxia becomes (more) poetic.

(14)	梁羽生、金庸	将	平民	武侠	**诗学化**	了.
	liángyǔshēng 、jīnyōng	jiāng	píngmín	wǔxiá	**shīxuéhuà**	le
	Liang_Yusheng_and_Jin_Yong	POM	popular	wuxia	**poetize**	PFV

'Liang Yusheng and Jin Yong have poeticized popular wuxia.' (*Sina Weibo*, 25/03/2019)

4.2.2. Self-causative sub-construction of property

When the morphological causative construction refers to the event related to the self-causative transformation of property, the minimal represented event involves a single participant. The causal chain for this event can be illustrated in Figure 2. In this figure, the black circle represents the participant who participates in the transmission of force in the event. The arrow represents the path of the force transmission in the event. In this relationship, the initiator of the force also plays the role of the recipient of the force. His property is transformed into the referent of the root of the derived verb.



Figure 2. Causal chain of self-causative transformation of property.

Compared to the external transformational relationship, the self-causative transformation of property is less frequently represented by the neological causative morphological constructions. In our French corpus, 30.30% of the constructions reflect this transformational

[21] This term appears in 2010: "颇为哲学和诗学化的意念 [pō wéi zhé xué hé shī xué huà de yì niàn] (' A notion that is quite philosophical and poeticized.')" (*The Time Weekly*, 02/12/2010). In this example, the suffix -化 [huà] is used to form an adjective.

relationship. For example, the French morphological causative construction (15) represents a self-causative transformation of property. The event described by this construction is linked to a single participant, *the banking sector*. This construction is related to the derived verb *ubériser*[22] (< *Uber* (name of a company) +*-iser*). The construction (15) symbolizes a causal event in which the banking sector transforms itself to become (more) like Uber by exerting a force upon itself.

(15) *[…] le secteur de la banque a déjà largement* ***« ubérisé »***
[…] ART sector of ART bank AUX already widely **make_like_Uber.**PPST
avec l' arrivée d' acteurs très compétitifs sur Internet. (*L'express*, 05/04/2017)
with ART arrival of actor very competitive.PL on internet
'The banking sector has already been largely Uberized itself with the arrival of highly competitive online players.'

The Chinese morphological causative constructions are less productive to interpret the self-causative transformation of property than the French constructions. More precisely, in Chinese, 20.88% of the constructions schematize this causative transformation. Consider the Chinese morphological causative construction (16), which conceptualizes a self-causative transformation of property. This construction involves the derived verb 大规模化[23] [dà guī mó huà] (< 大规模 [dà guī mó] (n. 'large-scale') +-化 [huà]). The causal event represented by this construction has a single participant who is the referent of the subject of the derived verb, 企业 [qǐyè] (n. 'company'). The event symbolized by this construction is that the companies make themselves (more) massive by exerting a force on themselves.

(16) 在 产业 组织 结构 演进 的 过程
zài chǎnyè zǔzhī jiégòu yǎnjìn de guòchéng
at industry organisation structure development DET progress
中， 企业 **大规模化.** (*People's Daily*, 15/10/2020)
zhōng, qǐyè **dàguīmóhuà**
middle company **transform_on_a_grand_scale**
'During the evolution of the industry's organizational structure, the companies make themselves massive.'

[22] This verb appears in 2014: « Et il semble suffire de monter une application qui "uberise" ou "airbnbise" un secteur d'activité pour générer le buzz. ('And it seems enough to launch an app that makes a sector like Uber and Airbnb to create a buzz' » (*La Tribune*, 14/10/2014).

[23] This term appears in 2004: "大规模化物流服务 [dà guī mó huà wù liú fú wù] (' Large-scale logistics services')" (*Computer World*, 26/04/2004). In this example, the suffix -化[huà] is used to form an adjective.

4.2.3. Benefactive external-causative sub-construction

The causative morphological construction can illustrate a transformative benefactive relationship. In such constructions, the root of the derived verb refers to an argument, indicating the object that the patient receives or is endowed with.

When the morphological causative construction is used to refer to an event related to the benefactive external-causative transformation, the minimal represented event generally comprises three sub-events: one associated with the agent, one with the patient, and the third linked to the referent of the derived verb's root. The causal chain for this event can be described in Figure 3:

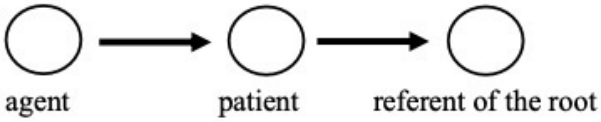


Figure 3. Causal chain of external-causative transformation of possession.

In this figure, the three black circles represent the participants involved in the transmission of force in the event: the agent, the patient, and the object that the patient receives or obtains. The right arrows illustrate the paths of the force transmission between these participants. The sub-events of a benefactive external-causative event representing a transformation can be described as follows: the agent first exerts a force on the patient; then, the patient exerts a force on the referent of the derived verb's root; finally, the patient receives the object, which is the referent of the derived verb's root. In this transformational relationship, even though the referent of the derived verb's root is involved in the transmission of force, it only acts as a bearer of the force, rather than an active transmitter of force.

In French, 3.28% of the morphological causative constructions represent the benefactive external-causative transformation. For example, the sentence (17) represents this relationship of transformation. The event symbolized by this construction has three participants: *we* (our capacity metonymically refers to the fact that the agent of the action to APIser is the referent of us), *our system* and *API*. This morphological causative construction is linked to the verb APIser[24](< API (acronym. 'application programming interface' + *-iser*). The sub-events conceptualized by this construction are as follows: we exert a force on our system; then, the system transmits the force to the API; finally, our system has the API.

[24] This verb appears in 2014: « Tout ceci a été possible car nous avons progressivement "APIsé" nos systèmes d'information. ('All of this was made possible because we gradually "API-ized" our information systems.') » (*IT for Business*, 01/03/2014).

(17) *Cela est très lié à notre capacité de pouvoir **APIser** notre*
DEM be very relied on our ability to can **make_have_API** our
Système […]. (*IT for Business*, 13/12/2021)
system
'This is very much relied on our ability to make our own API systems.'

In Chinese, 6.76% of the morphological causative constructions represent the benefactive external-causative transformation. Concerning the construction (18), it symbolizes this relationship. This construction is related to the verb WIFI 化[25] (＜WIFI (n."wi-fi")＋-化 [huà]). The participants in the event represented by this construction include 喜茶 [xǐ chá] (name of a Chinese company), 全部门店 [quán bù mén diàn] (n. 'all shops'), and *Wifi*. The sub-events symbolized by this construction are as follows: XiCha exerts a force on all shops; then, all shops exert a force on Wi-Fi; finally, all shops have Wi-Fi.

(18) 喜茶 将 全部 门店 **WIFI 化.** (*Sina Weibo*, 23/03/2020)
xǐchá jiāng quánbù méndiàn **WIFIhuà**
XiCha POM all shop **make_have_WI-FI**
'XiCha makes all shops have Wifi.'

4.2.4. Benefactive self-causative sub-construction

When the morphological causative construction symbolizes an event linked to the benefactive self-causative transformation, the minimal represented event involves two participants: the agent (who also serves as the patient), and the argument associated with the referent of the derived verb's root. The causal chain for this event can be illustrated in Figure 4:

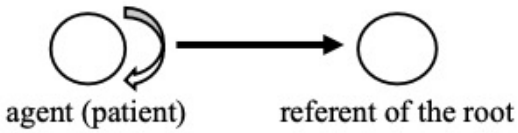


Figure 4. Causal chain of self-causative transformation of possession.

In Figure 4, the two black circles refer to the participants involved in the transmission of force in the event. The arrows illustrate the paths of force transmission between these participants. A benefactive self-causative event can be described as follows: the agent applies a force to himself, thereby causing himself to receive the object which is denoted by the root of the verb.

In French, the morphological causative constructions associated with the suffix *-iser* rarely present the relationship of the benefactive self-causative transformation. Only 0.36%

[25] This verb appears in 2014: "全日本 wifi 化 [quán rì běn wifihuà] (' All of Japan has become equipped with Wi-Fi.')" (*Phoenix Technology*, 11/09/2014).

of the constructions conceptualize this relationship. We take the French morphological causative construction (19) as an example. This construction is related to the derived verb *mend-iser*[26] (< MEND (acronym. *Movement for the Emancipation of the Niger Delta*) + *-iser*). The event described by this construction is linked to two participants, *Nigeria* and *MEND*. The sentence (19) is a reflexive construction, with the reflexive personal pronoun completing the function of the object of the verb. The agent is the co-referent of the object of the verb. This construction conceptualizes an event referring to that Nigeria must make itself have a movement for the Emancipation of the Niger Delta by exerting a force on itself.

(19) *Le Nigeria devait se **"mend-iser".*** (*AFP Infos Mondiales*, 24/07/2009)
ART Nigeria must.PST REFL **make_have_MEND**
'Nigeria should make itself have a Movement for the Emancipation of the Niger Delta.'

Compared to French, Chinese morphological causative constructions are more productive in conceptualizing the benefactive self-causative transformation. In particular, 7.06% of the constructions in our corpus represent this relationship. We take the Chinese morphological causative construction (20) as an example. This morphological causative construction is related to the derived verb 奢侈品化[27] [shē chǐ pǐn huà] (<奢侈品 [shē chǐ pǐn] (n. 'luxuries') +-化 [huà]). The participants in the event represented by this construction are the referents of the subject of this sentence, 大商场 [dà shāng chǎng] (n. 'department stores'), and of the derived verb's root 奢侈品 [shē chǐ pǐn] (n. 'luxuries'). The event represented by this sentence is that by exerting a force on themselves, department stores make themselves have luxury goods as commodities.

(20) 中国 的 大 商场， 正在 **奢侈品化.** (*People's Daily*, 17/06/2022)
zhōngguó de dà shāngchǎng， zhèngzài **shēchǐpǐnhuà**
China DET large shopping_mall PROG **make_have_luxuries**
'Department stores in China are gradually transforming, characterized by having luxury goods as merchandise.'

4.2.5. External-causative sub-construction of means

The morphological causative construction can also refer to a transformation of means. In such constructions, the root of the verb refers to a tool which the agent uses to achieve an event.

When the morphological causative construction represents an event linked to the external-causative transformation of means, the minimal symbolized event comprises three

[26] This verb appears in 2009: the first instantiation of this verb is in example (19).

[27] This verb appears in 2016: "传统出版奢侈品化 [chuán tǒng chū bǎn shē chǐ pǐn huà] ('Traditional publishing is becoming a luxury')" (*China publishing & media journal*, 13/09/2016).

sub-events: in addition to those associated with the agent and the patient, the third sub-event is linked to the argument to which the root of the derived verb refers. The causal chain for this minimal event can be schematized by the Figure 5:

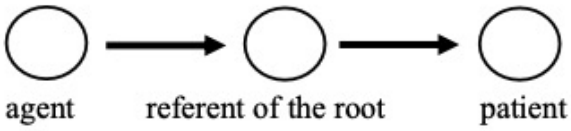


Figure 5. Causal chain of external-causative transformation of means.

In this figure, the three black circles represent the participants involved in the transmission of force in the event: the agent, the instrument (to which is referred by the root of the derived verb) and the patient. The two right arrows represent the paths of force transmission between these participants. An external-causative event representing a transformation of means determines a transformation in the agent's use of the tool for interacting with the patient. That is a transformation from the active/inactive use to the inactive/active use of a tool.

We shall point out that the event linked to a transformational relationship of means is totally different from the one of possession (Subsection 4.2.3). In the latter event, the force initiated by the agent acts directly on the patient. However, in the former event, the force initiated by the agent first interacts with the symbolized instrument, causing a change of its state; then this force is transmitted to the patient, causing a transformation of the patient's state.

In French, the external-causative sub-construction of means is more productive than the benefactive external-causative sub-construction. In our corpus, 14.24% of the sentences are the instantiations of the external-causative sub-construction of means. We consider again the French example (1) (which is copied in (21)).

(21) *Toutes les associations de lutte contre la violence routière seraient*
All ART.PL association-PL of fight again ART.SG road violence be-COND.PRS
en revanche plus inspirées de prendre davantage à leur compte ces
on_the_other_hand more inspired to take more for A.POSS ownership A.DEM
*réseaux-là pour « **facebookiser** » leur croisade[…]* (*La Provence*, 09/06/2014)
networks-those to **publish_on_Facebook** A.POSS crusade
'All associations combating road violence would, however, be better inspired to take more ownership of these networks to leverage Facebook in their crusade and contribute to further reducing the number of road fatalities.'

This example is an instantiation of the external-causative sub-construction of means. The event symbolized by this sentence has three participants: *all the associations*, *Facebook*, and *their crusade*. This construction denotes a transformation by means of a tool for publishing

their crusade, which is transformed from not using to actively using Facebook. More precisely, the sub-events conceptualized by this construction are as follows: all the associations exert a force on Facebook, Facebook acts on the crusade, and the crusade is published on Facebook. In other words, instead of acting directly on the patient in the sentence, *their crusade*, the force initiated by *all the associations* exerted firstly on *Facebook*, causing it to change state. This then allows the patient, *their crusade*, to be published on Facebook. In this represented causal scenario, Facebook plays the role of a tool.

Analogously, in Chinese, the external-causative sub-construction of means is also productive. In our corpus, there are 16.18% of the sentences which instantiate this sub-construction. For example, the Chinese morphological causative construction (22) presents an extremal-causative transformation of means. This construction is related to the derived verb 窗口化 [chuāng kǒu huà](＜窗口 (n. 'window') + -化 [huà])[28]. This construction denotes a transformation by means of a tool to deal with volunteer services in Shanghai, which is transformed from not using to actively using the service window. The event symbolized by this construction has three participants: 上海 [shànghǎi] (n. Shanghai), 窗口 [chuāngkǒu] (n. 'window'), and 志愿服务 [zhìyuànfúwù] (n. 'volunteer services'). The sub-events described by this construction are as follows: Shanghai exerts a force at the counters, the counters exert a force on the volunteer services, and the volunteer services transform its state to become e.g. (more) accessible.

(22) 上海 […] 让 志愿 服务 **窗口化**. (*People's Daily*, 28/06/2012)
shànghǎi […] rang zhìyuàn fúwù **chuāngkǒuhuà .**
ShangHai […] POM volunteer service **transform_to_use_window**
'Shanghai transforms to use service windows for the volunteer services.'

4.2.6. Self-causative sub-construction of means

When the morphological causative construction designates an event linked to a self-causative transformation of means, the minimal represented event involves two participants: the agent (which is also the patient) and the instrument, which is symbolized by the root of the derived verb. The causal chain for this minimal event can be schematized as in Figure 6:

[28] This verb appears in 2001: "立案庭实现窗口化服务 [lì àn tíng shí xiàn chuāng kǒu huà fú wù] ('The case registration office has implemented window-based services.')" (*People's Court Daily*, 15/11/2001).

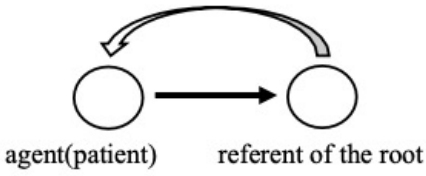


Figure 6. Causal chain of self-causative transformation of means.

In Figure 6, the two black circles refer to the participants involved in the transmission of force in the event. The two arrows indicate the paths of the force transmission between these participants. The event linked to a self-causative transformation of means can be described as follows: the agent applies a force to a (new) tool, thereby causing himself to transform his state.

In our corpus for the French, there are 1.50% of the sentences which instantiate the morphological self-causative sub-construction of means. The French sentence (23) is an example. This sentence is related to the verb *googliser* [29] (＜Google (name of a company)＋ *-iser*). The event represented by this sentence has two participants: *the customers* and Google. The sub-events described by this statement are that: the customers exert a force on Google, Google then exerts a force on the customers, allowing them to know things. In other words, the sentence (23) reflects the transformation of the means used to know things, from non-use to active use of Google.

(23) *Les clients* ***« google-isent »*** *tout de suite pour savoir des choses.*
ART customer-PL **use_Google** immediately for know ART Thing.PL
'Customers immediately use Google to let themselves know things.' (*La Voix du Nord*, 30/10/2012).

Similarly to the French data, instances of the morphological self-causative sub-construction of means are also rare in our Chinese corpus. Especially, only 2.06% of the sentences are associated with this type of morphological causative sub-construction.

(24) 从	木马病毒	的	编写,	传播	到	出售	[…]
cóng	mùmǎbìngdú	de	biānxiě,	chuánbō	dào	chūshòu	[…]
from	Trojan_virus	DET	redact	diffusion	to	sale	[…]

整个	病毒	产业	已	完全	互联网化。
zhěnggè	bìngdú	chǎnyè	yǐ	wánquán	**hùliánwǎnghuà**
whole	virus	industry	already	totally	**use_the_Internet**

[29] This verb appears in 2004: « L'univers "googlisé", peuplé de stars, de sportifs, de vaniteux et d'obsédés (du sexe ou des complots) est moutonnier ('The "Googlized" universe, filled with stars, athletes, narcissists, and obsessives (about sex or conspiracies), is sheep-like.') » (*Libération*, 19/08/2004).

> 'The entire virus industry, from the creation and spread of Trojans to their sale, now operates entirely through the Internet.' (*Quotidien du Sud*, 22/11/2008)

For example, the Chinese morphological causative construction (24) presents a self-causative transformation of means. This construction is related to the derived verb 互联网化 [hùliánwǎnghuà] (＜互联网 [hùliánwǎng] (n. 'internet') + -化 [huà])[30]. The event represented by this sentence has two participants: the entire virus industry and the Internet. The sub-events described by this statement are that: the virus industry exerts a force on the Internet, Internet then exerts a force on the virus industry, allowing the creation, the spread and the sale of the virus industry to become more rapid and insidious in its operations. In other words, the sentence (24) reflects the transformation of the means used to treat the virus industry, from non-use to active use of the Internet.

5. Conclusions

In this paper, we studied and compared the polysemy of morphological causative constructions associated with the suffixed *-iser* in French and -化 [huà] in Chinese, two typologically distinct languages. Based on the theory of Cognitive Construction Grammar (Goldberg, 1995) and the Causal Event Structure (Croft, 2012), this research analyzed the causative relationships represented by these constructions in each language. It reveals that, despite their typological differences, these constructions in these two languages can represent similar causative relationships by using the comparable dynamic strategies between arguments. Compared to approaches focusing on the lexical semantic-syntactic characteristics, these frameworks emphasize the semantic-syntactic rules within the constructions. By applying these two theoretical models, we discovered how the morphological causative constructions convey causality, offering a more accurate reflection of linguistic realities. Based on qualitative and quantitative analysis of corpora related to neologisms, we studied the morphological causative sub-constructions in both languages. As demonstrated in section 4, the polysemy of morphological causative constructions can be attributed to the diversity of causal chains connecting the participants in conceptualized events. Our corpus analysis of French and Chinese reveals that this polysemy can be seen in two main dimensions: the diversity of directions of force transmission between the participants and the diversity of transformational results from the transmission of force between these participants.

[30] This term appears in 2000: "其实, 未来所有的经济都将互联网化 [wèi lái suǒ yǒu de jīng jì dōu jiāng hù lián wǎng huà] ('In fact, all economies will be processed through the internet in the future.')" (*Guangming Daily*, 05/04/2000).

First, in morphological causative constructions, the representation of the direction of force transmission refers to the relation between the agent and the patient in the causative event. When the agent is also the patient, the morphological causative construction represents the self-causative relation. In this case, the force initiated by the causer acts upon the causer itself, leading to a change of its own state. When the agent is different to the patient, such construction represents the external-causative event, where the force is consistently transmitted to external participants, resulting in changes in those participants. French and Chinese can represent these two causative relations. Furthermore, both languages prefer to express the external-causative relationship. More precisely, this relationship accounts for 67.85% of occurrences in French and 70% in Chinese.

Second, in morphological causative constructions, the representation of the transformational results is linked to the role and position of the referent of the verb base within the causal chain. Despite their typological differences, constructions associated with the suffixes *-iser* and -化 [huà] convey similar types of transformational results, by using the comparable dynamic strategies among the arguments within the overall construction. According to the quantitative analysis, the causative transformations of property are the most frequently represented in the constructions in both languages. In such constructions, the adjectival or nominal root indicates a new property without playing an active role in force transmission. In other cases, the nominal base may designate an active participant, either as the beneficiary of the causer or as an instrument used in force transmission. The causative transformations of means are more regular than the benefactive causative transformations in both French and Chinese.

By highlighting the ability of morphological causative constructions in French and Chinese to express diverse causal relationships, we illustrate the productivity of constructions associated with the suffixes *-iser* and -化 [huà] in expressing causative relations. Furthermore, the corpus data for both languages confirms this productivity and emphasizes the importance of the morphological mechanism in representing these relationships. This is particularly notable in Chinese, where the morphological causative constructions, although not as ancient as the analytical causative constructions inherited from Classical Chinese, have experienced increased productivity since the 2000s.

This evolution raises stimulating questions: why does this morphological mechanism become more productive? Does it possess specific advantages over analytical or lexical causative mechanisms? If so, are these advantages related to principles of linguistic economy or other structural factors? These questions open a door to deepen our understanding of the linguistic dynamics in the expression of causality.

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