International Journal of Language and Linguistics
2023; 11(5): 148-155
http://www.sciencepublishinggroup.com/j/ijll
doi: 10.11648/j.ijll.20231105.11
ISSN: 2330-0205 (Print); ISSN: 2330-0221 (Online)

A Review of Semantic Studies on the English and Chinese Progressive Operators

Mengjie Zhang

College of Foreign Languages, Henan University, Kaifeng, China

Email address:
Yisuoyanyu2807@163.com

To cite this article:
Mengjie Zhang. A Review of Semantic Studies on the English and Chinese Progressive Operators. *International Journal of Language and Linguistics*. Vol. 11, No. 5, 2023, pp. 148-155. doi: 10.11648/j.ijll.20231105.11

Received: August 18, 2023; **Accepted**: August 28, 2023; **Published**: September 6, 2023

Abstract: Recent years have seen a change in formal semantic studies of the English progressive operator from centering on deriving its truth from its non-progressive counterpart to a weaker assumption that the truth of the English progressive operator depends on the conditions available to make it true. It is found that Varasdi (2014), utilizing conditions, not only avoids yielding the truth of invalid propositions and the falsity of valid propositions, but also explains away the "imperfective paradox" and the indeterminacy of the English progressive operator, which makes it a desirable proposal to explain the semantics of the English progressive operator. In contrast, studies on the Chinese progressive operator mainly concentrate on its temporal meaning and have not considered its modal meaning, resulting in the lack of investigations of whether the Chinese progressive operator shows the "imperfective paradox" as well. Therefore, this paper focuses on reviewing previous studies on the semantics of the English and Chinese progressive operators in the field of formal semantics, based on which reflections on the problems of semantic analyses on the Chinese progressive operator are made and insights for future semantic studies on the Chinese progressive operator are pointed out. The suggestion is that future studies on the Chinese progressive operator are expected to check whether Varasdi's (2014) proposal is applicable to elaborate the semantics of the Chinese progressive operator to solve the problems of explaining the imperfective paradox and indeterminacy manifested in the Chinese progressive operator, on the on hand, and accommodating the semantic and distributional idiosyncrasies of the Chinese progressive operator, on the other.

Keywords: English Progressive Operator, Chinese Progressive Operator, Semantics, Reflections, Insights

1. Introduction

The semantics of the English progressive operator has been a long-standing topic in formal semantics. Most of the existing semantic analyses are centered on explaining the progressive reading of the English progressive operator modifying accomplishments. Consider the following examples, (1b) does not follow from (1a).

(1a) Mary was eating three apples.

(1b) Mary ate three apples.

The generalization is that the accomplishment in simple tense fails to entail the progressive form. The phenomenon is called the "imperfective paradox" (see [1]). To explain this phenomenon, scholars adopted two main theoretical approaches to analyze the English progressive operator: the interval-based analyses [1-2] and the event-based accounts [3-11] of the English progressive operator (cf. [13, 14]). This study offers an overview of the researches on the English progressive operator and summarizes the various problems suffered by each approach. In light of this, this study makes a brief introduction of semantic studies on the Chinese progressive operator. It is found that studies on the Chinese progressive operator, in contrast to that of the English progressive operator, dwell on its temporal meaning and semantic constraints [15-18]. Therefore, another aim of this study is to figure out the deficiencies of the present studies and offer insights for future studies on the Chinese progressive operator.

In the following part, section 2 looks at the interval-based and event-based analyses of the English progressive operator respectively and based on which the merits and demerits of each approach are discussed. Section 3 offers an overview of semantic studies on the Chinese progressive operator, summarizes the demerits of the existing studies and points the way for future research on the Chinese progressive operator. The last section concludes this study.

2. Semantic Studies of the English Progressive Operator

2.1. Interval-Based Analyses of the Progressive Operator

Since aspectual issues are essentially time-related phenomena, one of the prominent approaches to aspectual modification is to take aspectual operators as functions predicating over time. An intuitive way of characterizing the meaning of progressive progressive is to take it as a part of an interval at which the base predicate is instantiated. For instance, Bennett and Partee believe that the progressive form of an event description is true at an interval I if and only if it will continue beyond this interval and eventually complete at some larger interval [2]. However, the fact is that a progressive can be true even without the existence of a larger interval at which the corresponding non-progressive form of the sentence is true. Suppose that John was eating an apple at the interval I. Before finished eating the apple, he died because of a heart attack. The sentence John was eating an apple is well-formed even though there is no interval I' larger than I at which John ate up an apple. This suggests that a pure interval-based account of the progressive morphology cannot explain away the "imperfective paradox". Instead, a correct account of the progressive operator needs to factor into its modal attributes [1, 3, 4]. The modal account of the semantics of the progressive firstly appears in [1], in which Dowty clarifies explicitly that the progressive is not simply a temporal operator, but a kind of mixed-temporal-modal operator. He introduces the notion of 'inertial worlds' into the interval-based temporal analyses of the progressive to explain that the event encoded by the telic predicate in the scope of progressive can culminate at an interval in the inertial worlds rather than at an interval in the actual world. Inertia world are those "which are exactly like the given world up to the time in question and in which the future course of events after this time develops in ways most compatible with the past course of events" [19]. So the truth of a proposition φ in all of the possible inertia worlds for the actual world grantees the truth of the corresponding Prog (φ). The formulation of the semantics of the progressive operator is articulated in (2).

(2) PROG (φ) is true at an interval I and world w iff there is an interval I' such that I is a nonfinal subinterval of I', and for all w' ∈ Inr (<I,W>), φ is true at I' and W [19].

As can be seen, there are two ingredients in the above characterization: one is about the part relation between intervals and the other is the modal ingredient introduced by the Inr (abbreviated from inertia world) function that assigns each interval-world pair to a set of interval-world pair in inertia worlds. Although the event in the denotation of the base predicate in the scope of the progressive operator might not be instantiated in the interval I, but it can instantiate in the corresponding I' in the inertia world. For the event of John's eating an apple, it can complete in the inertia world although it stops in the actual world. Therefore, the "imperfective paradox" is thus avoided in [19].

Compared with the non-modal analyses of the progressive operator, it is a big step forward to take into consideration of how a progressive sentence is related to its non-progressive form in a set of possible worlds instead of the actual world. But as observed by many scholars, the definition of inertia world results in wrong predictions when there are factors precluding the culmination of the event in the denotation of the base predicate in the actual world (see also [3, 20]). Consider the following example adapted from [5].

(3) Max was crossing the street when he was hit by a bus.

Suppose the bus was extraordinarily fast and just few meters away from Max. The bus would definitely hit Max if everything developed in their normal courses in the given situation. The result would be that Max cannot make it to the other side of the street in every inertia world. Following this line of thought, Dowty's analysis would render (3) false. However, (3) is apparently a grammatical sentence in English.

Moreover, Dowty's analysis is also problematic because it predicts some progressive sentences, whose non-progressive counterparts have no chance of becoming true, to be false, but those progressive sentences are actually acceptable. Consider the following example adapted from [11].

(4) The architect was building a cathedral and he knew that he could not possibly complete it [11].

Based on Dowty's analysis, (4) is expected to be false because there is no inertia world in which the completion of the cathedral is possible. Nevertheless, (4) is a well-formed sentence in English. It follows that Dowty's analysis is too strict to predict the truth conditions of progressive sentences.

2.2. Event-Based Analyses of the Progressive Operator

Concerning the eventuality-based analyses of the progressive operator, what first comes to mind is that the progressive operator, on par with it being a partitive operator over intervals, is a partitive operator over eventualities. Further, because progressive predicates and stative predicates share the cumulative property [21-22], another natural way to characterize the semantics of progressive operator, whose input predicates are typically eventive and dynamic, is to take it as a function from eventive predicates to stative predicates. Both those two approaches depict the progressive in terms of its non-progressive counterparts or characterize Prog [φ] in terms of φ. They, as in the case of interval-based analyses, inevitably run into problems when the non-progressive counterparts of progressive sentences have no chance of becoming true. Therefore, based on the assumption that the semantics of the progressive is not characterized with reference to its non-progressive counterpart, eventuality-based studies of the progressive operator also include those taking the progressive operator as event-primitive operators and those considering the progressive operator as sustainable indicative operator. Section 2.2.1 discusses studies of the progressive operator as an an eventuality-partitive operator, and Section 2.2.2 explores those treating the progressive operator as an event-stativizing operator. Section 2.2.3 and section 2.2.4 survey some representative accounts taking the progressive operator as an event-primitive operator and as a

sustainable-indicative operator respectively.

2.2.1. The Progressive Operator as the Event-Partitive Operator

As we have said before, an intuitive way of characterizing the semantics of the progressive morphology is to treat it as a partitive operator over intervals. Along a similar line of thought, the progressive operator is also taken as a partitive operator over eventualities, which is motivated by the merelogoical view on events and entities [23-27]. Given that a pure interval-based account of the progressive operator cannot explain the "imperfective paradox", a pure event-based analysis follows suit because it falls short in taking into consideration cases where the eventuality denoted by the non-progressive form of the base predicate is impossible to be instantiated. Hence eventuality-based account of the progressive needs to factor into modality as well.

Recall that Dowty integrates the inertia world into the partitive-interval-based analysis of the progressive operator to argue that the ongoing event [1], if cannot culminate in the actual world, will culminate at the inertia world. But Dowty's account may lead to wrong predictions when there are factors precluding the culmination of the described event at the actual world. One way to modify Dowty's account is to preclude all the factors that interfere with or interrupt the culmination of event encoded by the base predicate. This is what Landman intends to do with the assumption that the progressive is a partitive operator over eventualities [3]. Landman characterizes the semantics of the progressive in terms of the exclusion of all the obstacles and interference of the described event. For example, Landman argues, regarding Vlach's example in (3), that Max would have crossed the street if he had not been hit by the bus. Formally speaking, Landman believes there exists a closest possible world in which Max will not be hit and the event of crossing the road culminates in that possible world. However, this approach is not flawless either.

Firstly, the existential account of the progressive operator fails in dealing with the multiple-choice paradox associated with the progressive [6] or the indeterminacy of the progressive [7-8]. Consider the following scenario recast from Bonomi in [6]. Mingming was driving from Nanjing either to Shanghai or to Yangzhou, but he had not decided yet which city to go. Before arriving at either city, Mingming firstly needed to go through Wuxi. But unfortunately, he died in a car accident before arriving at Wuxi. Under such a circumstance, what are the truth values for the following sentences?

(5) Mingming is driving to Shanghai.

(6) Mingming is driving to Yangzhou.

(7) Mingming is driving to Shanghai or Yangzhou.

Intuitively, only the last sentence is true in the given situation because we never know which city Mingming was going to. If the line of Landman's thought is followed, there should exist an event of Mingming's driving to Shanghai or Yangzhou. But apparently, one cannot only arrive at two different places simultaneously.

Secondly, the existential approach cannot explain progressive sentences whose simple counterpart has no culmination at all. In Landman's analysis, (8) would be necessarily false because there exists no possible world in which the architect's building of the cathedral culminates. But the fact is that (8) is frequently used to depict an ongoing activity of building a cathedral that may take two or three hundred years to complete or even can never be completed at all.

(8) The architect was building a cathedral that was hardly finished by humans.

Hence, Landman's account in [3] is error in predicting a set of valid propositions to be false. Regarding the indeterminacy of the progressive operator, Bonomi proposes to incorporate the idea of mereological part-of relation with the contextual information to cope with the problem of multiple-choice paradox [6]. In his view, an ongoing event in the world w has a set of possible developments in different contexts, only some of which can become the truth, and others end up being false. Contextual information reduces possible outcomes of an ongoing event. That is, the contextual information determines which type of events the current ongoing event will be a mereological part of. But contextual information itself is insufficient to determine possible developments of the ongoing event. It is the stereotypical frame that defines the course of the development of event. Now consider the following example cited from Bonomi [6]. Suppose that e represents an event of Tom's writing formulas on the blackboard, and the contextual information includes propositions like Tom is a professor of logic and is quite familiar with all the premises and notions needed for proving the complete theorem, etc. Then the stereotypical development of e leads to the event of Tom's proving the complete theorem. It follows that the contextual information, including information of the world that is relevant for the development of the event and also the conversational background that makes the information relevant, determines whether the ongoing event at the topic time is a mereological part of the event encoded by the progressive modified predicate. It is the building block for deriving the truth condition of the progressive sentence in question. Likewise, the the idea concerning the indeterminacy of Mingming's driving outlined above, is that the fact in this scenario determines the event in question is a mereological subpart of the undetermined event of going to either Shanghai or Naijing. However, a day later, all the other optional continuation of the foregoing partial event is no longer relevant since it has become the fact that Mingming had went to Shanghai.

Bonomi [6] is insightful in pointing out the mereological relation between the ongoing event and its alternative outcome and explaining how exactly the stereotypical framework works. But his formulation is still problematic in accounting for why the progressive form of sentences, in which the described eventualities are impossible to instantiate, are well-formed. Consider the example of building the cathedral again, which is revised from (8). Suppose that the contextual information includes propositions like the architect has excellent building skills, he has the intention of building a

cathedral and he knows that it is impossible to finish building the cathedral he wants to build because of the lack of materials and workforce. Apparently, the ongoing cathedral-building event is a mereological part of the event of building the cathedral he intends to build. However, the stereotypical development of the ongoing event is that it will stop in the near future given that the architect was suffering from a resources shortage.

(9) The architect was building a cathedral, and he knew that it was almost impossible for him to complete it.

Although Bonomi [6] predicts (9) to be false, it is a well-formed sentence. So Bonomi [6] is insufficient in yielding the falsity of a set of valid propositions as invalid.

2.2.2. The Progressive Operator as the Event-Stativizing Operator

The stative nature of progressive predicates has long been analyzed in semantic characterizations of the progressive operator. Concerning the question of how the progressive aspectual morphology derives stative predicates from its modified eventive predicates, scholars assume that the progressive operator performs a stativizing function [5, 8, 9-10]. This section will explore two representative analyses taking the progressive operator as the stativizing operator. Parsons [10] gives a basic eventuality-based description of the opposition between the progressive and the perfective operators. It is proposed that the progressive operator introduces the Hold operator and the perfective operator brings in the Cul operator. He proposes that a progressive sentence is true if and only if there exists a corresponding state for the ongoing event in the denotation of the modified predicate holding at the corresponding interval. This is equivalent to saying that the progressive operator changes its modified eventive predicate into stative predicate. His idea of the progressive operator is illustrated by the following example.

(10) Mary was drawing a circle.

[[10]] = ∃x[cricle (x) &∃e∃t[t<now& Drawing (e)& Age (e)= Mary & The (e)=x &hold (in-Prog (e,t))]

The above formula says that the progressive sentence is true if the in-progress state of Mary's drawing a circle derived from the base predicate holds at a past temporal interval t that is existentially quantified over.

Given that the input eventive predicate is derived as a corresponding in-progress state in Parson's analysis, it is expected that the outputs of a progressive accomplishment and a progressive activity are both in-progress states without distinctions. However, while a progressive accomplishment cannot entail its non-progressive counterpart, a progressive activity can. As shown in (11), the progressive form of the activity predicate entails the non-progressive counterpart.

(11a) Mary was eating apples.

(11b) Mary ate apples.

It follows that Parson fails to explain the "imperfective paradox". Further, the stativizing in Parsons' accounts does not take into consideration the modal ingredients of the progressive operator, and is apparently insufficient to explain the progressive operator that is, in essence, an operator with mixed temporal and modal properties.

Then we are in the position to see how modal ingredients are incorporated the stativizing point of view to account for the semantics of the progressive operator in Asher [7]. Inspired by Dowty [1], Asher argues that the ongoing eventuality denoted by Prog(φ) is coerced as an ongoing state. He employs normalcy-based inference to characterize the relation between Prog(φ) and the ongoing state. In classic logic, the supersets of the premises entail the truth of the conclusion. On the contrary, the conclusion is defeasible when contradictory information is added to the premises in daily inference. Asher considers this as the best illuminating mechanism in characterizing the "imperfective paradox". The simplex non-progressive sentence is the defeasible entailment of the progressive sentence. For the sentence "Mary was crossing the street", the defeasible entailment is that "Mary crossed the road". Apart from this, this default inference is constrained by the perspective that selects a subset of the information about the ongoing state. Given a particular situation s, a perspective π on s is a selectional function that selects certain properties or attributes from all the attributes and properties s has at the evaluation world w. The motivation to factor in perspective is to clarify which kinds of information or characteristics of the given state s normally lead to the instantiation of the event e in Prog (φ), especially in cases where the given states bring about conflicting characteristics, illustrated in Vlach's example repeated in (12).

(12) Max was crossing the street when he was hit by a bus.

In this scenario, many different perspectives can be taken on the state of Max's crossing the street. Apparently, from the perspective of the speaker's view, Max is truly engaged in the event of crossing the street. On the other hand, one could say truly a bus is running toward him when his or her perspective is focused on the bus. The above sentence is well-formed because different perspectives play a role in evaluating the truth condition of progressives.

Asher's account aims to overcome the problems of Dowty's analysis by replacing inertia world with a more complex modal structure capturing normality reasoning and factoring in perspective to restrict the range of information used for normality reasoning. For a progressive sentence whose base predicate is impossible to instantiate like the scenario of the architect's building the cathedral illustrated above, the explanation in Asher [7] follows the following way.

(13) When someone is building a cathedral, he or she typically builds the cathedral eventually from his or her perspective.

But this approach cannot explain the feasibility of all progressive sentences whose base predicate is impossible to instantiate. For instance, following the thought in Asher [7], the following sentence is supposed to be true from the perspective of Samantha because she is not aware of her crossing a minefield.

(14) Samantha was crossing a minefield when she was blown up [7].

Likewise, (15) is also supposed to be true because

Samantha, from her own perspective, is not aware of the barrier in the middle of the road.

(15) *Samantha was crossing the bridge when she knocked the barrier in between.

But it turns out that (15) is false under such a circumstance. It is unclear why the same
mechanism leads to different truth value of the parallel sentences in (14) and (15). Therefore, Asher's explanation incurs the error of predicting the validity of a set of invalid propositions.

In light of these above troubles, Szabó argues that all those accounts, based on the entailment relation between the progressive and its non-progressive counterpart, are insufficient not for the neglect of perspectives, but for their basic assumption [11, 28]. This leads to not only the account of progressive as the primitive whose truth value is independent of its non-progressive counterpart [11, 28], but also the information-based analysis of the progressive [12], to which we will turn in section 2.2.3 and section2.2.4 respectively.

2.2.3. The Progressive Operator as the Event-Primitive Operator

Abandoning the traditional enterprise that the semantics of the progressive should be analyzed in terms of its non-perfective correlates, Szabó [11, 28] argues that we can define the semantics of the progressive based on the assumption that Perf (φ) is defined in terms of Prog (φ) if the analysis of the semantics of Prog (φ) in terms of φ runs into problems. He employs the notion of target state and causation to characterize the semantics of the progressive. The scenario of Mary's crossing the road is taken as an example for illustration. The progression of the event of Mary' crossing the street causes the state of Mary's being across the road, and the latter is followed by the event of Mary's having crossed the road. The relevant event and state are shown in (16)-(18).

(16) Mary crossed the street.

(17) Mary was crossing the street.

(18) Mary was across the street.

As we can see, the target state of the progression of Mary's crossing the street in (16) is the state in the denotation of (17). Only temporally after this state, the perfective form of the predicate is true. For a telic predicate φ, its progressive form is true just in case its perfective form is true of some event, and its encoded target is true of some state. Then Prog (φ) is true for events between the event and the state.

The innovation of this account is that it reverses the foundation of the interval-based and modal-based accounts of the semantics of the progressive. Instead of assuming that Prog (φ) entails Perf (φ), this study suggests that the semantics of Prog (φ) is deduced from Perf (φ). That is, the semantics of Prog (φ) relies on φ itself rather than on Perf (φ). This analysis sheds light on the later indication-based explanation of the progressive to explain the progressive with the quantification of predicates instead of worlds. Nevertheless, this study is theoretical-centered, and it articulates no formalization of the composition of the semantics of the progressive.

2.2.4. The Progressive Operator as the Sustainable-Indicative Operator

To cope with the problems of the standard modal analyses of the progressive operator, Varasdi [12] suggests that the semantics of the perfective entails its progressive counterpart and not the other way around. According to his analysis, conditions making the progressive true are among the necessary conditions for the culmination of its non-progressive counterpart. He further classifies the set of conditions for the truth of the progressive operator into indicative conditions concerning specific properties that indicate possible outcomes of the sentence in question based on the contextual information and sustaining conditions, guaranteeing the progression of the event toward the indicated outcome.

Concerning the indicative conditions, two components play a role. Firstly, Varasdi [12], adapting from Asher [7], argues that the perspective on an eventuality corresponds to a set of possible worlds in which the eventuality has a group of fixed characteristics or properties. This set of characteristics or properties is called facet. Some characteristics and properties in the facet of the ongoing event are indicative for its development into various types of eventualities within a family set. Secondly, the relevant set of possible developments of the ongoing event is restricted by the context in which the progressive sentence is uttered. There are a set of possible outcomes for the ongoing event in question, and only one of them is what the ongoing event will develop into. Let us consider Varasdi's phone-dialling example to explain this idea clearer. Suppose that Tom is a criminal and he and his accomplices Mary, John and Leo were settled down in different rooms of a hotel. The phone number of Tom's room is 3958, Mary's 3279 and Leo's 2421. What is unfortunate is that criminals of the opposite side broke into Tom's room and wounded Tom lethally. Before he died, Tom tried to make a call to a friend for help. If Tom dialled the numbers 2 and 4, then the following sentence is supposed to be true in this context.

(19) Tom was dialling Leo's phone number (when he died).

(Adapted from Varasdi [12])

The perspective on the current state is based on the event of Tom's dialling the numbers 2 and 4 in sequential order. To verify the truth value of (19), we do not concern whether the currently ongoing event with those attributes would lead to the completion of the event of Tom's dialling Leo. Instead, we are only concerned that the properties of the current situation indicate the event of Tom's dialling Leo rather than Tom's dialling Mary and Tom's dialling John. Further, the context here restricts the range of phone numbers Leo dialled in the set {3958, 3279, 2421}. That is to say, the context restricts Tom's dialling to Mary, Tom, or John, but not anyone else. Therefore, the facet that Tom dialled 2 and 4 is indicative, within the set of contextually restricted options, of the event of Tom dialling 2421.

Concerning the sustaining condition for the truth of the progressive, their presence is necessarily required for the ongoing event in question to develop toward the indicated

outcome. Consider the above scenario again. Suppose that if Tom dialled 2 and 4, his heart would stop because of the loss of blood. Under such circumstances, (20) is no longer to be true.

(20) Tom is calling Leo.

We know that Tom's being alive is the necessary condition for the event of Tom's calling Leo in this particular context. In contrast, Tom's death interferes with the calling event and falsifies the truth of (20). Therefore, Varasdi argues that sustainable conditions must be present to sustain the development of the described event toward the indicated culmination.

The analysis is advantageous in the following aspects. Firstly, this account can avoid the problem of the "imperfective paradox". Varasdi [12] assumes that the truth condition of the progressive operator requires the necessary conditions for the completion of its described event. Still, the presence of the necessary conditions for the completion of the event guarantees its completion neither in the actual world nor in the modal (counterfactual) world. The truth condition of the progressive operator is weaker than requiring the completion of the described event. Therefore, the "imperfective paradox" is not induced any longer.

Secondly, unlike Landman [3], Varasdi [12] does not characterize the semantics of the progressive in terms of existential quantification and thus can explain the indeterminacy of the progressive. As we have discussed above, Varasdi assumes that there are a set of possible outcomes for the ongoing event based on the facet chosen by the perspective, which is further restricted by the context information. Regarding the previous example of Mingming's deriving in (7), the contextual information available at that particular situation restricts the outcomes of Mingming's deriving event to culminate in Shanghai or Yangzhou rather than in cities like Wuxi or Nanjing. Therefore, Varasdi [12] correctly captures the truth of (7) and also explains away why there are two possible destinations.

Thirdly, it can avoid the problem of predicting the valid progressive sentence as invalid. For the example of cathedral-building in (4), Varasdi's assumption is that the facet the perspective selects at the context of (4) is indicative of what the architect is doing to develop into his building of a cathedral, as opposed to building a tower or a bridge. The facet might be the size and the shape of what the architect has built. Further, the sustainable conditions include that the architect is willing to be involved in the building and that the building materials, like stones, are placed in the right positions. Building a cathedral is not easy, and it requires a variety of extreme conditions to be met, although it is not necessarily impossible to complete. (4) conveys the architect's belief that the possible worlds in which he is capable of sustaining those extreme conditions are inaccessible from the actual world. The truth condition of (4) is thus derived when the thought in Moens [8] is followed.

Fourthly, this analysis does not incur the problem of predicating the invalid progressive sentence as valid. Consider once more the example of crossing street with a barrier, as repeated in (15). Intuitively speaking, if Samantha could cross the street, she should have some superpower or enormous energy. But she usually does not have that kind of power and energy. That is to say, the necessary conditions are not available for Samantha to cross the street. Given that the theory in Varasdi [12] relies on the availability of a set of necessary conditions of the described event denoted by a progressive sentence, it correctly predicts (15) to be false.

2.3. Interim Summary

As discussed above, all previous studies on the semantics of the progressive sentence, guided by the underlying assumption that the semantics of PROG (φ) is derived with reference to φ, suffer from various problems. To make it more explicit and more apparent, we summarize the basic operations and demerits of those studies as follows.

Table 1. *Basic operations and demerits of semantic analyses of the progressive operator with reference to its non-progressive counterpart.*

Studies	Assumptions	demerits
[2]	PROG as interval-partitive operator	Failing to explain imperfective paradox
[1]	PROG as interval-partitive operator+inertia world	Yielding falsity of valid progressive sentence
[23]	PROG as eventuality-partitive operator	Failing to explain imperfective paradox
[3]	PROG as eventuality-partitive operator + exclusion of interference	Failing to explain the indeterminacy of progressive sentences
[6]	PROG as eventuality-partitiveoperator + contextual information +stereotypical development	Yielding falsity of valid progressive sentence
[10]	PROG as stativizing operator by positing Hold operator	Involving no modality
[7]	PROG as stativizing operator + perspective + default inference	Yielding truth of invalid progressive sentence

In light of those problems, scholars like Szabó and Varasdi argue that all the preceding accounts are insufficient because their primary assumption is on the wrong track. Szabó [11, 28] and Varasdi [12] believe that the truth condition of the progressive operator is not dependent on the completion of the ongoing event in the actual or possible worlds. Instead, it is obtained by referring to the conditions necessary to complete the ongoing event. Although Szabó [11, 28] is only theoretical-oriented, Varasdi [12], viewing the progressive operator as the sustainable-indicative operator, is desirable.

3. Semantic Studies on the Chinese Progressive Operator

3.1. Two Representative Semantic Studies on the Chinese Progressive Operator

Compared with semantic studies on the English progressive

operator, the amount of semantic studies on the Chinese progressive operator is much smaller. One possible reason for such a small amount is that it is yet to be decided which morpheme instantiates the progressive aspect. Some Some scholars assume that -zhe is the only progressive marker in Mandarin Chinese [29] while other scholars propose that both zai and -zhe are progressive markers [30-31]. Authors like Guo propose that zai and zheng zai are also progressive or imperfective markers [32] while writers like Chen also taks ne as phonological markers instantiating the progressive function [33]. To identify which morphology is the Chinese progressive operator is beyond the scope of this study. Here, we just follow the generally accepted proposal taking zai as the typical progressive operator in Mandarin Chinese. What follows is an introduction of two representative studies of the semantic studies on zai.

Smith [15] assumes that progressive zai has the distributional restriction of co-occurring with only dynamic predicates. The semantics of progressive zai concerns dynamic stages of nonstative verbal constellations. To be specific, she argues that zai, compatible with activities and selmefactive but not achievements, signals the internal duration of the situation in the denotation of the modified durative predicates. The semantics of the progressive zai is shown as follows.

(21) The progressive zai

I…… F

///////[+stage] [15]

In the above configuration, I and F represent the initial and final endpoints of a situation. The stage property is to show that dynamic events have successive stages, which indicates that progressive zai is compatible only with dynamic eventive predicates. The semantics of progressive zai is to present the internal constituency of a dynamic event with its initial and final endpoints excluded.

Influenced by Klein's theories of the imperfective operator, Lin [16-18] also makes an analysis of the semantics of progressive zai in terms of the temporal interval-inclusion relation. He assumes that progressive zai cannot occur with achievement predicates. This syntactic restriction is made explicit in the lexical entry of zai given in Lin [17].

(22) $[[\text{zai}]] = \lambda p_{<i,t>} \lambda t_{\text{Top}} \exists t$ [P (t) & $t_{\text{Top}} \subseteq$ Instage(t, P)& Dynamic (p) & Durartive (p)] [17]

As can be seen, P is the predicate modified by progressive zai and it is featured by dynamicity and durativity. Progressive zai takes in a predicate and the topic time and returns the relation between the topic time and the event time. That is, the topic time is included in the inner stage of the event time. The inner stage for a telic predicate is defined as its event time minus the last point while that for an atelic predicate is just the temporal interval for that predicate. Consequently, (22) says that the development of P event includes the topic time, suggesting that progressive zai focuses on the inner stage of a situation.

3.2. Reflections on and Suggestions for Studies on Chinese Progressive Operator

As we can see, the two above semantic analyses of progressive zai mainly focus on representing its semantic restrictions instead of checking whether progressive zai is sensitive to the "imperfective paradox". The result is that no modality has been incorporated into the semantics of progressive zai. However, as outlined above, the progressive category is generally assumed to be a mixture of time and modality. Further semantic studies are expected to dwell on the issue of the "imperfective paradox" manifested in progressive zai.

Furthermore, as a semantic category, the progressive has a semantic core that should be shared by all its instantiations in different languages. Based on the overview of the studies on the English progressive, this study argues that the semantic core of the progressive operators in different languages is the set of indicative conditions and sustaining conditions. There is no doubt that a particular progressive operator in a particular language would have some semantic idiosyncrasies. Nevertheless, the semantic core should be present in the semantic analyses of the progressive operator, be it the English progressive operator or the Chinese progressive operator. Future studies should explore how to formalize the semantics of progressive zai while accommodating the semantic and distributional features.

4. Conclusion

This study gives a comprehensive review of studies on the semantics of the English progressive operator. It is found that the key assumptions have begun to shift from depending the truth condition of the progressive on the corresponding non-progressive to depending the truth condition of the progressive on conditions for its truth. It is found that Varasdi [12] can avoid bringing about false positives and false negatives and explain away the "imperfective paradox" and the indeterminacy of the progressive operator, which makes it a desirable proposal to explain the semantics of the English progressive operator.

Compared with studies on the English progressive operators, studies on the Chinese progressive operator mainly focus on its semantic constraints and temporal meaning without tackling the basic question of whether the Chinese progressive operator shows the "imperfective paradox". Hence, previous studies involve no modality in accounting for the Chinese progressive operator, let alone take into consideration whether the Chinese progressive operator also shows indeterminacy and whether the present proposals would give rise to truth of invalid propositions or falsity of valid propositions.

The implication is that future studies on the Chinese progressive operator are expected to check whether the proposal in Varasdi [12] is applicable to account for the semantics of the Chinese progressive operator with the aim of solving these problems outlined above, on the one hand, and accommodating the semantic and distributional idiosyncrasies of Chinese progressive operator, on the other.

References

[1] Dowty, D. (1977). Toward a semantic analysis of verb aspect and the English 'imperfective' progressive. *Linguistics & Philosophy*, 1 (1), 45-77.

[2] Bennett, M., & Partee, B. H. (1972). Toward the logic of tense and aspect in English. Technical Report at System Development Corporation.

[3] Landman, F. (1992). The progressive. *Natural Language Semantics*, 1 (1), 1–32.

[4] Portner, P. (1998). The progressive in modal semantics. *Language*, 7 (4), 760-787.

[5] Vlach, F. (1981). The semantics of the progressive. In P. Tedeschi & A. Zaenen (Eds.), *Syntax and Semantic*s (Vol. 14, pp. 271-292). New York: Academic Press.

[6] Bonomi, A. (1997). Aspect, quantification and when-clauses in Italian. *Linguistics and Philosophy*, 20 (5), 469–514.

[7] Asher, N. (1992). A default, truth conditional semantics for the progressive. *Linguistics and Philosophy*, 15 (5), 463-508.

[8] Moens, M., & Steedman, M. (1988). Temporal ontology and temporal reference. *Computational Linguistics*, 14 (2), 15-28.

[9] De Swart, H. (1998). Aspect shift and coercion. *Natural Language and Linguistic Theory*, 16 (2), 347-385.

[10] Parsons, T. (1990). *Events in the Semantics of English*. Cambridge: MIT Press.

[11] Szabó, Z. G. (2004). On the progressive and the perfective. *Nous*, 38 (1), 29-59.

[12] Varasdi, K. (2014). Making progressives: necessary conditions are sufficient. *Journal of Semantics*, 31 (2), 179-207.

[13] Portner, P. (2020). Perfect and Progressive. In L. Matthewson, M. Cécile, R. Hotze, & Z. Ede (Eds.), *The Blackwell Companion to Semantics*. New Jersey: John Wiley.

[14] Zucchi, S. (2020). Progressive: The Imperfective Paradox. In D. Gutzmann, L. Matthewson, C. Meier, H. Rullman, & T. E. Zimmermann, *The Wiley Blackwell Companion to Semantics* (pp. 1-32). Wiley Blackwell.

[15] Smith, C. S. (1991/1997). The Parameter of Aspect (2nd ed.). Dordrecht: Kluwer.

[16] Lin, J.-W. (2003). Temporal reference in Mandarin Chinese. *Journal of East Asian Linguistics*, 12 (3), 259–311.

[17] Lin, J.-W. (2006). Time in a language without tense: the case of Chinese. *Journal of Semantics*, 23 (1), 1–53.

[18] Lin, J.-W. (2010). A tenseless analysis of Mandarin Chinese revisited: A response to Sybesma 2007. *Linguistic Inquiry*, 41 (2), 305–329.

[19] Dowty, D. (1979). *Word Meaning and Montague Grammar: The Semantics of verbs and times in Generative Semantics and in Montague's PTQ*. Dordrecht: Reidel.

[20] Filip, H. (1999). *Aspect, Eventuality Types, and Noun Phrase Semantics*. New York: Routledge, Taylor and Francis.

[21] Deo, A. (2009). Unifying the imperfective and the progressive: partitions as quantificational domains. *Linguistics & Philosophy*, 32 (5), 475-521.

[22] Deo, A. (2020). Imperfective. In L. Matthewson, C. Meier, H. Rullman, & E. Zimmermann (Eds.), Blackwell Companion to Semantics. New York: Wiley Blackwell.

[23] Bach, E. (1986). The algebra of events. *Linguistics and Philosophy*, 23 (9), 5-16.

[24] Krifka, M. (1992). Thematic relations as links between nominal reference and temporal constitution. In I. A. Sag & A. Szabolcsi (Eds.), *Lexical Matters* (pp. 29-53). Stanford, CA: CSLI Publication.

[25] Champollion, L. (2020) Distributivity, Collectivity, and Cumulativity. In L. Matthewson, C. Meier, H. Rullman, & E. Zimmermann (Eds.), Blackwell Companion to Semantics. New York: Wiley Blackwell.

[26] Dotlačil, J. & A., Brasoveanu. 2021. The representation and processing of distributivity and collectivity: Ambiguity vs. underspecification. *Glossa: A Journal of General Linguistics,* 6 (1), 1–22.

[27] Glass, L. (2021) The lexical and formal semantics of distributivity. *Glossa: A Journal of General Linguistics*, 6 (1), 27.

[28] Szabó, Z. G. (2008). Things in progress. *Philosophical Perspectives*, 22, 499–525.

[29] Chao, Y. (1968). *A Grammar of Spoken Chinese*. Berkeley: University of California Press.

[30] Li, C., & Thompson, S. (1981). *Mandarin Chinese: A Functional Reference Grammar*. Berkeley: University of California Press.

[31] Zhu, L. & W. Wang. (2022). Temporal and spatial differences between the concepts and functions of the English and Chinese progressives. *Foreign Language Research*, (02), 100-111.

[32] Guo, F. (1998). A study on semantic features of adverbials zai and zheng. *Language Teaching and Linguistic Studies,* (2), 35-47.

[33] Chen, Q. 2005. The Chinese progressive and imperfective operators. *Studies on Chinese as a Foreign Language*, (1), 23-34.