

## **Agentivity and stativity in experiencer verbs:**

### **Implications for a typology of verb classes**

#### **Abstract**

Experiencer-object verbs are known to deviate from the prototype of transitive verbs. Previous studies have shown that a subset of these verbs is stative and non-agentive and argue that this semantic peculiarity accounts for particular non-canonical syntactic properties. This article shows that the stativity/non-agentivity of experiencer verbs is subject to typological variation. The empirical evidence comes from an experimental study on speaker's intuitions, which shows that some experiencer-object verbs in German and Modern Greek differ from canonical transitive verbs in agentivity and stativity, while experiencer-object verbs in Turkish, Yucatec Maya, and Chinese display the semanto-syntactic properties of canonical transitive verbs.

*Keywords: argument structure, experiencer verbs, experimental study, verb classes*

#### **1. Introduction**

It is generally assumed that languages possess different classes of experiencer verbs, the main division being between experiencer-subject (henceforth ES) and experiencer-object (henceforth EO) verbs (see Belletti & Rizzi 1988, Croft 1993, Pesetsky 1995, Reinhart 2002, Landau 2010, etc.). These subclasses of the lexical inventory of verbs are claimed to show a particular linking behaviour that deviates from the behaviour of prototypical transitive verbs. The peculiarity of ES and EO verbs has been accounted for in terms of a difference in their constituent structure (e.g. Postal 1970, Belletti & Rizzi 1988) and/or in terms of a difference in the semantics, either concerning the event/causative structure or the role structure of the



- b. *I*                    *maría*                    <sup>?</sup>*(ton)*  
 DEF:NOM.SG.F Maria:NOM.SG.F            3SG.ACC.M  
*enðiaféri*        *ton*                    *pétro.*  
 interest:3PL    DEF:ACC.SG.M Peter:ACC.SG.M  
 ‘Maria interests Peter.’

The examples in (1) illustrate the interaction of lexical properties of the verb with clitic doubling in Modern Greek. Clitic doubling is the construction that contains a clitic pronoun that is co-referent with the object constituent. With canonical transitive verbs as in (1a), the availability of clitic doubling depends on the information structural properties of the object, i.e. it appears when the object constituent is part of the background of the utterance. However, with non-agentive verbs as shown in (1b) clitic doubling is obligatory according to some authors (see Anagnostopoulou 1999) or occurs in a wider range of contexts according to others (see Verhoeven 2008a, 2009a).<sup>1</sup>

Next to the non-agentive verbs introduced in (1b), there is another subclass of EO verbs that are characterized as ‘labile’ because they alternate between an agentive and a non-agentive reading. These verbs are illustrated in (2): example (2a) is ambiguous between an agentive and a non-agentive reading. In the non-agentive reading, clitic doubling has the same properties as in (1b), i.e., it is almost obligatory. Example (2b) illustrates the same verb with an inanimate subject, which excludes the agentive reading. As expected, clitic doubling is almost obligatory in this configuration as well.

- (2) a. *I*                    *maría*                    *(ton)*  
 DEF:NOM.SG.F Maria:NOM.SG.F            3SG.ACC.M

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<sup>1</sup> Hence, the question mark in (1b) indicates that this version of the example is possible but contextually restricted (see detailed discussion in Verhoeven 2008a, 2009a).

*enoxlí ton pétro.*  
 bother:3SG DEF:ACC.SG.M Peter:ACC.SG.M

‘Maria bothers Peter.’

b. *Ta épipla <sup>?</sup>(ton)*  
 DEF:NOM.PL.N furniture:NOM.PL.N 3SG.ACC.M

*enoxlún ton pétro.*  
 bother:3PL DEF:ACC.SG.M Peter:ACC.SG.M

‘The furniture bothers Peter.’ (Anagnostopoulou 1999:78/79)

Examples (1) and (2) show that there are two classes of EO verbs, namely non-agentive and labile, and that there is distributional evidence (from the obligatoriness of clitic doubling) that these verbs behave differently from canonical transitive verbs. Moreover, the data pattern shows that the observed syntactic phenomenon does not directly depend on the lexical distinction, i.e. it does not hold true that every verb that is member of the set of EO verbs in Greek triggers clitic doubling almost obligatorily. The crucial issue is the property of agentivity: clitic doubling is almost obligatory either with verbs that involve the property of non-agentivity as an inherent semantic property, as illustrated in (1b), or in the non-agentive occurrences of verbs that are underspecified with respect to agentivity, see (2b). In the same vein, Arad (1998a, 1998b) and Landau (2010) show that non-canonical object properties of experiencer objects such as restrictions in passivization and reflexivization, preposing of the experiencer object, islandhood with respect to extraction, and other so-called psych properties only apply to non-agentive readings of EO verbs, but not to the agentive variants.

Given the assumptions in the literature about the cross-linguistically attested properties of EO verbs, this article addresses the question whether these properties are

universal or subject to typological variation. It is clear that the phenomenon at issue depends on lexical specification, as already implied by the distinction between non-agentive EO verbs in (1b) and labile EO verbs in (2). It is also clear that the same concepts are not encoded through verbs with the same argument structure across languages: for instance English *like*, which is an ES verb, corresponds to German *gefallen*, which is an intransitive EO verb. The cross-linguistic question dealt with in this article is whether the lexical specification of the transitive EO verbs for non-agentivity/stativity is a cross-linguistic universal or whether it depends on global properties of the inventory of transitive verbs in the languages at issue.

In order to obtain reliable evidence about the semantic properties at issue, we designed an acceptability study. This study examines whether assumptions about the different semantics of verb classes may be empirically attested in speaker's intuitions about the felicity of the verbs at issue in particular contexts. We will focus on (non-)agentivity and stativity given that these factors are crucial in the current approaches to EO verbs. The empirical study was performed in five languages: German, Modern Greek, Chinese, Turkish, and Yucatec Maya. A comparison of the results in this sample provides evidence that languages differ with respect to the lexical specification of EO verbs for agentivity/stativity.

The structure of the article is as follows. Section 2 discusses some of the so-called psych properties of EO verbs and identifies their cross-linguistic relevance for verb class membership. Section 3 discusses the notions of agentivity and stativity and introduces the semantic tests used to identify these semantic properties. The experimental study and its results in the sample languages are reported in Sections 4 and 5. Section 6 discusses the experimental results and their implications for a

typology of experiential verb classes. Section 7 summarizes the main conclusions of this empirical study.

## 2. EO verbs in the sample languages

### 2.1. EO verb classes

Following the seminal work of Belletti & Rizzi 1988, three different classes of experiencer verbs are distinguished in the literature on the topic: ES verbs (*temere*-type, class I) and two classes of EO verbs, namely transitive EO verbs that have an accusative experiencer object (*preoccupare*-type, class II) and intransitive EO verbs that have a dative or oblique EO (*piacere*-type, class III). Landau (2010) argues for a number of languages (among them English, Hebrew, Finnish) that transitive EO verbs are heterogeneous as regards dynamicity. Some of these verbs (may) denote events (e.g. *scare, frighten, embarrass, amuse, surprise*) while others are purely stative (e.g. *depress, concern, interest, fascinate*). Stativity is inherent to intransitive EO verbs which include items such as *appeal to, occur to, matter to*. It is argued that the agentive/non-agentive contrast, illustrated in (2) only occurs with eventive verbs, i.e. with a subset of transitive EO verbs, while the intransitive EO verbs are necessarily non-agentive. There is thus a bipartite division within the classes of EO verbs according to the parameters agentivity (agentive vs. non-agentive) and dynamicity (eventive vs. stative) resulting in the semantic subclasses indicated in Table 1.

*Insert Table 1 about here*

It is generally argued that only non-agentive and stative transitive EO verbs and intransitive EO verbs display a special semanto-syntactic behaviour which

distinguishes them from canonical transitive and intransitive verbs respectively (see Arad 1998a, 1998b, Landau 2010). In Section 2.2, we discuss the existence of such so-called psych properties in our sample languages.

The notion of causativity is crucially related to event structure analysis and verbal semantics. Some accounts of experiencer verbs identify causativity as a central factor that determines the semanto-syntactic behaviour (including argument realization and linking properties) of experiencer verbs (see Grimshaw 1990, Croft 1993, Pesetsky 1995, Härtl 2001, for a critical discussion of such approaches see Kutscher 2009). As concerns the classification of EO verbs in Table 1, the eventive (dynamic) verbs can be interpreted as causative in the broad sense of the notion, i.e. bringing about a change (see e.g. the feature cause [ $\pm c$ ] in Reinhart 2002). Under this view, the stimulus argument of non-agentive causative EO verbs is an effector following a proposal in Holisky 1987 and Van Valin & Wilkins 1996. If the stimulus-effector argument is an animate (human) participant, the respective verbs can be interpreted as agentive.<sup>2</sup> In contrast, stative EO verbs (including the transitive ones) are non-causative and therefore their stimulus argument can never be interpreted as an agent.<sup>3</sup>

## 2.2. Psych properties

Transitive EO verbs have been shown to display a special semanto-syntactic behaviour that distinguishes them from canonical transitive verbs. Experiencer objects

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<sup>2</sup> Following Van Valin & Wilkins (1996: 309ff) the agentivity of a causing argument (i.e. an effector) is a pragmatic inference which is based on Holisky's (1987: 118–119) pragmatic principle: "You may interpret effectors and effector-themes which are human as agents (in the absence of any information to the contrary)."

<sup>3</sup> However, note that some authors (e.g. Arad 1998b, Pytkänen 2000, Van Valin & LaPolla 1997) assume the existence of causative states or stative causation. Following Arad 1998b, stative causation differs from the abovementioned case in that there is no change of (mental) state involved. Rather verbs as *concern*, *worry*, etc. encode the triggering of a concomitant state.

exhibit backward binding of anaphoric pronouns belonging to the putative subject argument (see Postal 1971, Belletti & Rizzi 1988, Pesetsky 1987, 1995). In (3), the possessive pronoun *his* which is part of the subject constituent can be interpreted as being bound by the object *every patient*, a property which is not available for canonical direct objects. Experiencer objects have been shown to constitute an island to extraction. In contrast to material belonging to canonical direct object constituents material belonging to experiencer object constituents (see *di cui* in (4)) cannot be extracted (see Belletti & Rizzi 1988).

(3) *His<sub>i</sub> health worried every patient<sub>i</sub>.* (Reinhart 2002, ex. 42)

(4) a. *il libro di cui molta gente disprezza l'autore*  
 the book of which many people despise the.author  
 'the book the author of which many people despise'

b. *\*il libro di cui molta gente disgusta l'autore*  
 the book of which many people disgust the.author  
 'the book the author of which many people disgust' (Belletti & Rizzi 1988, ex. 85)

Furthermore, EO verbs are often restricted in passivization (see example (6)), and for many S-before-O-languages, it has been shown that the experiencer object tends to occur in an earlier position than the stimulus subject. Further characteristics include non-canonical behaviour regarding nominalization (5a) and reflexivization (5b) (see for these and additional criteria Bayer 2004, Belletti & Rizzi 1988, Haspelmath 2001, Klein & Kutscher 2002, Landau 2010, Pesetsky 1995, Reinhart 2002 among others).

(5) a. *\*the book's annoyance of Bill* (Pesetsky 1995, ex. 15)

b. *Gianni si teme / \*preoccupa.*  
 Gianni self fears worries



‘Gianni fears himself / worries himself.’ (Belletti & Rizzi 1988, ex. 10)

Accounts of EO verbs differ as to the weight and the status they attribute to the abovementioned features in constituting unique properties of this verb class. Thus, some authors relate certain behavioural properties to specific semantic features that EO verbs share with other verbs, arguing that they are not unique to EO verbs. For instance, Arad 1998a, 1998b argues that all characteristics of EO verbs can be related to their stativity, claiming thus that there is not special experience-specific syntactic behaviour. In contrast, Landau 2010 identifies so-called core psych properties (the exact structural effects being partly language specific) such as restrictions in passivization, reflexivization and extraction, while properties such as backward binding are judged as more marginal and not psych verb specific.

For German, there is an extended discussion about psych properties of EO verbs which is not only based on intuition data but supported by evidence from corpus studies and psycho- and neurolinguistic studies (see discussion about coding and behavioural subject properties in Bayer 2004, Bickel 2006, Haspelmath 2001, Klein & Kutscher 2002; (corpus) evidence for word order variation and preferences with EO verbs in Hoberg 1981, Lenerz 1977, Primus 2004; psycho- and neurolinguistic evidence in Bornkessel 2002, Bornkessel et al. 2003, Haupt et al. 2008, Scheepers et al. 2000, etc.). Syntactic tests (e.g. control in co- and subordination, participial relativization) show that experiencer objects in German do not behave like subjects, but that they do not behave like canonical transitive or intransitive objects either, for instance with respect to nominalization or permutation of the object together with the verb in the sentence initial position (Bayer 2004). Evidence from passivization shows that EO verbs in their non-agentive reading are restricted in the formation of a regular

processive passive (they only form an adjectival, stative passive) (6a), while the same verbs in their agentive reading may undergo regular passivization (6(b)).<sup>4</sup>

- (6) a. *Peter ist / \*<sup>2</sup>wird*  
 Peter COP.3.SG.NPST / AUX.PASS.3.SG.NPST  
*von den Möbel-n genervt.*  
 by DEF:DAT.PL furniture-DAT.PL bother:PASS.PTCP  
 ‘Peter is/is being bothered by the furniture.’
- b. *Peter ist / wird*  
 Peter COP.3SG.NPST / AUX.PASS.3SG.NPST  
*von Maria genervt.*  
 by Maria(DAT) bother:PASS.PTCP  
 ‘Peter is/is being bothered by Maria.’

As concerns word order preferences with EO verbs in German, Haupt et al. (2008:84) show on the basis of a single-item rating study (outbalancing the factors definiteness and animacy) an advantage for ‘dative O<sub>EXP</sub> < nominative S<sub>STIM</sub>’ and no overall word order preference for the arguments in accusative EO constructions, where both orderings (S<sub>STIM</sub> < O<sub>EXP</sub> and O<sub>EXP</sub> < S<sub>STIM</sub>) received nearly the same preference ratings. Thus, there is ample evidence that objects display non-canonical object properties in the non-agentive reading of dative and accusative EO verbs in German.

As regards Modern Greek, the study of Anagnostopoulou 1999 provides detailed evidence for psych-properties of dative/genitive marked experiencer objects as well as accusative experiencer objects in their occurrence with a non-agentive reading of the

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<sup>4</sup> See however evidence for dialectal variation with respect to the acceptability of a passive construction with non-agentive EO verbs in Klein & Kutscher 2002.

verb. Evidence from intuition and corpus data shows that clitic doubling is desemanticized/grammaticalized with non-agentive EO verbs in contrast to canonical transitive verbs and agentive EO verbs, where clitic doubling is pragmatically licensed (see example (2), Verhoeven 2008b, 2009a). For non-agentive (dative/genitive and accusative) experiencer verbs, it has been argued that both possible orders of the arguments, namely  $S_{STIM} \prec O_{EXP}$  and  $O_{EXP} \prec S_{STIM}$ , are considered as equally neutral (see Anagnostopoulou 1999: 69, 73). Evidence from language production shows that object preposing is significantly more frequent with non-agentive than with agentive accusative EO verbs (see Verhoeven 2009b). Given that passive formation in Modern Greek is subject to idiosyncrasy and lexicalization, it cannot supply clear syntactic evidence for psych-properties of EO verbs (see Verhoeven 2008b).

In contrast to German and Modern Greek, the other three languages of the study, Turkish, Chinese, and Yucatec Maya do not seem to display special psych-properties with their transitive EO verbs in the same way as German and Modern Greek do. Thus, passive formation is regular with Chinese and Yucatec Maya transitive EO verbs, as illustrated in (7) for Chinese (for Yucatec see Verhoeven 2007: 249).

- (7) a. *jǐngchá / hónglùdēng / shìgù*      *jīnù-le*      *xíng rén.*  
policeman / traffic.light / accident    enrage-PFV      pedestrian  
‘The policeman/traffic light/accident enraged the pedestrian.’
- b. *xíng rén*      *bèi*      *jǐngchá / hónglùdēng / shìgù*      *jīnù-le.*  
pedestrian    BEI    policeman / traffic.light / accident    enrage-PFV  
‘The pedestrian was enraged by the policeman/traffic light/accident.’

For Turkish, evidence from passivization is less clear. Elicitation with native speakers indicates that transitive EO verbs form a regular passive which is however

restricted in use (see also Verhoeven 2008b, Kutscher 2009). Generally, a sentence with an inanimate passive agent/stimulus (8c) is rejected more clearly than a sentence with an animate agent/stimulus (8b).<sup>5</sup>

- (8) a. *Öğretmen /iş delikanlı-yı sevin-dir-di.*  
 teacher / job boy-ACC be.happy-CAUS-PFV  
 ‘The teacher/ the job delighted the boy.’
- b. *Delikanlı öğretmen tarafından sevin-dir-il-di.*  
 boy teacher by be.happy-CAUS-PASS-PFV  
 ‘The boy was delighted by the teacher.’
- c. *Delikanlı iş tarafından sevin-dir-il-di.*  
 boy job by be.happy-CAUS-PASS-PFV  
 ‘The boy was delighted by the job.’

Most of the Turkish transitive EO verbs are causative forms of basic intransitive verbs taking the experiencer as their subject while the stimulus can be adjoined in an oblique case, either dative or ablative (see Kural 1996, Kutscher 2009). Such constructions using the basic intransitive verb are preferred to the passive constructions in (8b-c).

- (9) *Delikanlı öğretmen-e / iş-e sevin-di.*  
 boy teacher-DAT / job-DAT be.happy-PFV  
 ‘The boy was happy about the teacher/the job.’

Furthermore, none of the three languages displays a clear preference for preposing the experiencer object with transitive EO verbs. In Turkish, unmarked word order in canonical transitive clauses is SOV. This order may be influenced by information structure, in particular topical objects may precede subjects (Göksel & Kerslake 2005,

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<sup>5</sup> Note that there are also restrictions in the use of passives with canonical transitive verbs.

ch. 23.3). However, presented out of context, the SOV order qualifies as optimal with transitive EO verbs, independently of the animacy of the stimulus subject. Further evidence for the preference of the canonical word order with transitive EO verbs is provided by a production study reported in Verhoeven 2009c. In this experiment (based on a previous study reported in Ferreira 1994), native speakers were presented with a verb stem and two nouns and asked to construct a sentence spontaneously. The results of transitive EO verbs show the following pattern: when the stimulus subject was animate, speakers exclusively produced SOV sentences; when the stimulus subject was inanimate, speakers produced 4 OSV sentences out of total 99 (4.04%). On the basis of this data, we may speculate that animacy has an impact, but it is clear that there is a strong preference for the SOV order, independently of the animacy of the subject constituent.

In Chinese, the unmarked constituent order is SVO, however, objects may be placed sentence initially when they serve as sentence topics (Li & Thompson 1981: ch. 4, Chu 1998: ch. 7). When presented out of the blue, such utterances may invoke the intuition of non-acceptability, but utterances with these word order properties perfectly occur in naturalistic discourse. Indeed, experiencer objects may be placed sentence-initially, however, as with objects of canonical transitive verbs O < S order is not pragmatically 'neutral' but carries the pragmatics of object topicalization (see Verhoeven *forthc.*).

In Yucatec Maya, the structurally unmarked word order is VOS. However, this order occurs seldom in natural texts when both arguments are lexically realized (see Skopeteas & Verhoeven 2009 for details). In sentences with two lexical NPs, a construction topicalizing the subject in the sentence initial position is the most frequent pattern in a wide range of contexts, including the contextual condition in

which no presuppositions are involved. This applies to all kinds of transitive verbs including EO verbs. For a more comprehensive discussion of psych-properties of EO verbs discussing further evidence from additional tests see Verhoeven 2007 on Yucatec Maya and Verhoeven forthc. on Chinese.

### 2.3. Formation patterns of EO verbs

The languages of the sample display different types of EO verb formation. In German and Modern Greek, most transitive EO verbs are basic verbs taking the stimulus in subject function and the experiencer in direct object function. They are systematically related to derived intransitive experiencer-oriented verbs which accommodate the stimulus in an oblique syntactic role. Dependent on the language and the specific verb this is done by a passive-like operation as mediopassive formation in Modern Greek (see the schema STIM *enoxlí* ‘bothers’ EXP → EXP *enoxlíte apó* ‘is bothered by’ STIM), formation of a stative (adjectival) passive in German (see example (6)), or the deagentive/anticausative use of the reflexive pronoun in German (STIM *ärgert* ‘bothers’ EXP → EXP *ärgert sich über* ‘is bothered by’ STIM). For another subset of Modern Greek EO verbs, the argument structure may change through simple conversion (cf. *tromázo* ‘I frighten’ ~ *tromázo apó/me* ‘I am frightened of sth.’).

In Yucatec Maya (see the schema EXP *chi’chnak ti* ‘is angry at’ STIM → STIM *chi’chnakkunsik* ‘angers’ EXP) and Turkish (see (8) and (9)), the derivational pattern is the reverse. In the great majority of cases, the transitive EO verbs are derived by causativization from intransitive experiencer-oriented verbs or adjectives.

The Chinese EO verbs treated in this study are basic transitive verbs. In contrast to the German and Modern Greek EO verbs, they are not systematically related to intransitive experiencer-oriented verbs or adjectives. However some of them may be (marginally) construed in an anticausative construction with the experiencer as sole

participant and without overt marking of the verb (see Verhoeven forthc.). Furthermore, experiencer-oriented constructions may be formed by means of the passive coverb *bèi* (see (7b)) or the verb *shòudào* ‘get:reach’, which takes the ‘nominalized’ experience as object while the stimulus is encoded as possessor of the latter.

Interestingly, the behaviour in EO verb formation fits the overall or predominant valence orientation type as identified in Nichols et al. 2004 for German, Modern Greek and Chinese. While Modern Greek and German are predominantly detransitivizing Chinese displays a tendency towards transitivity/ambitransitivity. Yucatec Maya and Turkish were not part of the study in Nichols et al. 2004, however there is ample evidence that valence increase via causativization is a frequent process in both languages (see Kornfilt 1997, Göksel & Kerslake 2005, Verhoeven 2007).

### **3. Semantic properties and diagnostic tests**

#### **3.1. Agentivity**

It is widely accepted, that volitional involvement corresponds to control in a situation and this is a prerequisite for agenthood (e.g. Dowty 1991, Lehmann 1991, Van Valin & Wilkins 1996, Van Valin & LaPolla 1997, Primus 1999, 2002, etc.). Thus, with respect to EO verbs, the agentivity of the stimulus is understood as its control for the accomplishment of the verbal event. Agentivity is tested by evaluating the possibility of the stimulus’ volitional or intentional involvement in the event described.

A test that has been frequently used to test agentivity is the acceptability of modifying an event with adverbs indicating volitionality (*intentionally, on purpose*), (see e.g. Roeper 1987, Talmy 1976; cf. Klein & Kutscher 2002 for the use of corresponding semantic tests on agentivity/control of German EO verbs). This test

indicates whether an agentive reading of the verb at issue can be accommodated in a particular context or not. A positive result in this test does not necessarily imply that the verb at issue is interpreted as agentive in all contexts, but that it can occur in a context that supports the agentive interpretation.

A further test that has been used to examine volitional involvement in a situation is the imperative test. However, the implications of imperative formation for volitionality are not straightforward (see discussion in Dik 1978, Lehmann 1993, Klein & Kutscher 2002, etc.). Verbs with a controlling subject are expected to allow for imperative formation, but also non-agentive verbs may allow imperative constructions that do not express a command but rather a wish/desire of the speaker (cf. Germ. *Sei zufrieden!* or *Träum schön!*, Engl. *Be happy!* or *Dream nicely!*). Thus, the availability of imperative formation is not evidence that the verb at issue is agentive. Rather, the non-availability of imperative formation is evidence for lack of control.

### 3.2. Stativity

Stativity (vs. dynamicity) is one of the basic parameters for describing the inherent temporal properties of the verb. The stative-dynamic opposition refers to the question of whether or not there is a change inside the event described by the verb or at its margins. In this sense, properties are absolute states and can be distinguished from contingent states which do not have intrinsic boundaries, but can be located in time and allow for durational specification. A prototypical state, as opposed to a process, is described as involving no energy to go on or be kept going (see e.g., Comrie 1976, Lehmann 1991, Van Valin & LaPolla 1997).

A commonly used test to identify states is whether the verb at issue can appear in the progressive aspect or can be successfully combined with a progressivity indicating



element; if it does so, then it does not designate a state (see e.g. Vendler 1967, Van Valin & LaPolla 1997: 93ff). In those languages that do not possess grammaticalized means of expressing progressivity, a common strategy to identify stativity is a test frame involving the question *What is happening?* using a verb such as English *happen* that indicates that the question asks for an event. If the verb at issue can felicitously occur in an answer to that question, it is assumed to have a dynamic reading (cf. Van Valin & LaPolla 1997: 93).

#### **4. Method**

In order to test the semantic properties of the verb groups at issue we designed an experimental study that examines the acceptability of particular verbs in the sentential frames that are used as diagnostic tests for agentivity and stativity (see Section 3). Three standard diagnostic tests were implemented in this study: (a) the VOLITIONALITY TEST examines the compatibility of the verb with an adverb denoting the volitional involvement of the actor, e.g., the adverb *intentionally* in (10), (b) the IMPERATIVE TEST examines whether an order can be expressed by using the imperative<sup>6</sup> form or construction of the verb and provides further evidence for the possibility of an agent to have volitional control over the event, see (11), and (c) the STATIVITY TEST examines whether the verb can be used in a form or context that implies a dynamic internal temporal structure of the event. This latter test was differently implemented in the object languages, depending on the available aspectual categories. In those languages which display a grammaticalized expression of progressivity, the verbs were tested within the corresponding construction, see as an

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<sup>6</sup> The notion “imperative” is used here as a label for the form applied in the target languages to express a command (with agentive verbs); this may be a dedicated morphological imperative form or some other form or construction used for this purpose in the target languages.

illustration the Present Continuous tense in the English examples in (12). Otherwise, sentences involving the examined verbs were presented as answers to the question *What is happening?*, based on the assumption that this context presupposes an event answer. If the answer does not refer to an event but to a state, it is expected that the question-answer pair will not be felicitous (see Section 3.2).

Aim of this study is to show whether the classes of EO verbs show a different behaviour with respect to the three tests introduced above. Three classes of EO verbs are at issue: (a) transitive [ $\pm$ agentive] EO verbs (henceforth called ‘labile’ EO verbs), see (10b), (11b), and (12b), (b) transitive [ $-$ agentive] EO verbs, see (10c), (11c), and (12c), and (c) intransitive (dative) EO verbs, see (10d), (11d), and (12d). In order to estimate the agentivity/stativity of these verb classes, we added two control conditions: (d) a verb class that is known to be agentive and dynamic, namely canonical transitive verbs encoding events in which an agent affects a patient, see (10a), (11a), and (12a), and (e) a verb class that is known to be non-agentive and stative, namely transitive ES verbs, see (10e), (11e), and (12e).

The permutation of the three semantic tests with the five verb classes results in fifteen possibilities, which are illustrated in the examples (10) to (12). The sample sentences in these examples illustrate the tests in English. The exact form of each test in the object languages of this study is introduced and exemplified in Section 5.<sup>7</sup>

(10) Volitionality test

a. canonical

*The girl is pinching the boy intentionally.*

b. EO/tran/ $\pm$ ag

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<sup>7</sup> Note that the sentences presented in the experiments were not ambiguous as a result of ambiguous verb meanings (as is the case in the English translations in (10d), (11d), (12d) due to the fact that in addition to its experiential meaning *appeal* also has the non-experiential meaning ‘plead’).

*The girl scares the boy intentionally.*

- c. EO/tran/–ag

*The delegate concerns the voter intentionally.*

- d. EO/intr

*The tenant appeals to the estate agent intentionally.*

- e. ES

*The patient hates the doctor intentionally.*

(11) Imperative test

- a. canonical

*Pinch the boy!*

- b. EO/tran/±ag

*Scare the boy!*

- c. EO/tran/–ag

*Concern the voter!*

- d. EO/intr

*Appeal to the estate agent!*

- e. ES

*Hate the doctor!*

(12) Stativity test

- a. canonical

*The girl is pinching the boy.*

- b. EO/tran/±ag

*The girl is scaring the boy.*

- c. EO/tran/–ag

*The delegate is concerning the voter.*

d. EO/intr

*The tenant is appealing to the estate agent.*

e. ES

*The patient is hating the doctor.*

In order to obtain repeated observations for each experimental condition, we selected four different verbs for each verb group (the lexical material used for each language is given in Appendix II). For the canonical verbs, we selected four concepts which are typically encoded through transitive verbs, namely ‘kick’, ‘pinch’, ‘beat’, and ‘push’. The selection of the lexical material for experiencer verbs was based on a larger inventory of lexical items that was collected through elicitation with native speakers (based on the translational equivalents of 60 experiential concepts). An examination of the same concepts across languages would not make sense, since the lexicalization of the experiential concepts involves several aspects of variation that are crucial for the assumptions of the present empirical study. For instance, some concepts are not encoded through verbs of the same class across languages. Hence, the concept ‘hate’ which is used as an instance of the transitive ES verbs in German, Greek, Yucatec Maya, and Chinese, cannot be used as an instance of the same class in Turkish, since it is lexicalized through an intransitive verb taking the stimulus as an ablative-marked oblique object in this language, namely *nefret et-* ‘hate’. Furthermore, since the experiment deals with verb classes, concepts that are encoded through periphrastic constructions had to be excluded, as for instance periphrastic causative EO constructions in Chinese, e.g. *shǐ (gǎndào) jīngkǒng* (‘make (feel) frightened’) ‘frighten’. After excluding these items, we presented the remaining verbs of each class to the native speakers, asking them to determine those four verbs that

according to their intuition are more “basic” or “common” in everyday communication.

A particular problem arises with relation to the transitive EO verbs, since they are divided in two subclasses according to a semantic criterion, namely [ $\pm$ agentive] vs. [ $-$ agentive]. In order to distinguish among these two subclasses, we started from previous classifications in the literature,<sup>8</sup> and we examined a number of properties with a native speaker (compatibility with several adverbs including the abovementioned control tests, subordination under control verbs such as *attempt*, *conclude*, and combination with a means phrase *by means of*). Among the available verbs in each language, we selected those verbs that were showing the clearest contrast with respect to these properties. This procedure was successful in all object languages except for Chinese, in which the native speaker did not perceive any significant difference among the examined verb items. In this case, we did not have enough evidence to test the hypothesis of two subclasses of transitive EO verbs, hence this distinction could not be accounted for in this language.

The examined sentences contained each verb in combination with lexical NPs as arguments within the frame of the corresponding diagnostic test. The entire material was pseudo-randomized and copied in written questionnaires. Sixteen different randomizations were prepared that were presented to sixteen different speakers (see population statistics per language in Section 5).

The speakers were instructed to judge the well-formedness of each sentence and give their intuition in a 1-to-7 estimation scale (1: “bad”, 7: “good”). They were instructed to consider whether the sentence sounds like a “natural” or “odd”

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<sup>8</sup> For German see Härtl 2001, Klein & Kutscher 2002; for Modern Greek see Anagnostopoulou 1999, Kordoni 1999; for Turkish see Kural 1996, for Chinese see Cheung & Larson 2006; for Yucatec Maya see Verhoeven 2007.

expression according to their own spontaneous feeling and not according to the rules of the grammar, and to not examine “what” is said but “how” it is said.

## 5. Results

### 5.1. German

Example (13) illustrates the three experiments of the German part of the study giving an example for each of them. A full list of the verbal items used per verb group is given in Appendix II. As concerns the stativity test, we first implemented the *What is happening?* frame in a pilot version of the study. However, the results of this pilot experiment showed that the speakers were not sensitive to this test. Therefore we decided to implement the so-called *Rheinische Verlaufsform* (‘Rhineland continuous form’) as a progressive construction, which is part of the colloquial language of the northern part of the Rhine valley and less spread in other parts of Germany.

#### (13) Volitionality test

- a. *Das Mädchen ärgert den Jungen absichtlich.*

‘The girl annoys the boy intentionally.’

#### Imperative test

- b. *Ärgere den Jungen!*

‘Annoy the boy!’

#### Stativity test

- c. *Das Mädchen ist den Jungen am ärgern.*

‘The girl is annoying the boy.’

Sixteen German native speakers, students at the University of Bremen, participated in the experiment (female: 11, age range: 19-26, average: 21.2), December 2008. Each speaker was presented each verb three times, each one within

the frame of the corresponding test (volitionality, imperative, stativity), pseudo-randomized in a written questionnaire. This study resulted in a data set of 20 (items)  $\times$  3 (tests)  $\times$  16 (speakers) = 960 judgments. This data set contains 4 (items)  $\times$  16 (speakers) = 64 observations for each experimental condition that is discussed in the following. One value was missing in the filled in questionnaires, i.e., the actual data set of valid observations relates to 959 judgments.

An analysis of variance on the entire data set revealed a significant main effect of diagnostic test ( $F_{2,14} = 61.5$ ,  $p < .001$ ), a significant main effect of verb type ( $F_{4,12} = 50.8$ ,  $p < .001$ ), and a significant interaction between both factors ( $F_{8,8} = 8.9$ ,  $p < .01$ ).<sup>9</sup> An observation of the descriptive data (means and standard errors) in Figure 1 suggests that the significant main effect of diagnostic test comes from the lower average judgments obtained through the stativity test.

*Insert Figure 1 about here*

In order to assess the influence of the verb groups on the acceptability of each test (volitionality, imperative, stativity), we carried out post-hoc Tukey tests. By means of these findings we determine the hierarchy between the obtained means as shown in Table 2: the obtained means are presented in groups, enclosed by parentheses that correspond to different levels of acceptability,  $\alpha$ ,  $\beta$ , and  $\gamma$  (the subscripts 1 to 5 indicate the hierarchy of the obtained scores in terms of means' differences).<sup>10</sup>

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<sup>9</sup> All analyses of variance reported in this article were carried out only on subjects.

<sup>10</sup> We assume that two means  $\alpha$  and  $\beta$ , whereby  $\alpha > \beta$ , reveal a difference between the corresponding verb groups whenever  $\alpha$  is significantly higher than  $\beta$  in terms of the post-hoc Tukey test (compare Keller & Alexopoulou 2001 for a similar approach on transforming scales of acceptability scores into hierarchies). A problem of this procedure is encountered in cases with three different means  $\alpha$ ,  $\beta$ , and  $\gamma$ ,

In the volitionality test, the post-hoc tests did not reveal any significant difference between canonical transitive verbs and labile EO verbs (EO/trns/±ag), and not between non-agentive transitive EO verbs (EO/trns/-ag), intransitive EO verbs (EO/intr), and transitive ES verbs (ES) either. All differences between the members of these two subgroups are confirmed by the Tukey tests ( $\alpha < .001$ ). In the imperative test, the difference between canonical verbs and labile EO verbs as well as the difference between intransitive EO verbs and ES verbs were not confirmed by the Tukey tests. Canonical verbs and labile EO verbs significantly differed from all means of the  $\beta$  and  $\gamma$  groups in Table 2, i.e., ES verbs, intransitive EO verbs, and non-agentive EO verbs (all obtained differences are below the  $\alpha < .001$  level). Moreover, the data from non-agentive EO verbs significantly differ from the data from ES verbs and intransitive EO verbs ( $\alpha < .001$  in both cases). Finally, the stativity test displays similar contrasts with the volitionality test: the means within group  $\alpha$  and within group  $\beta$  do not differ significantly. Labile EO verbs do not significantly differ from either canonical verbs or intransitive EO verbs, however intransitive EO verbs are significantly less acceptable than the canonical transitive verbs ( $\alpha < .01$ ). Since the means of labile EO verbs (2.64) is closer to the mean of canonical verbs (3.11) than to the mean of intransitive EO verbs (1.89), the intermediate category is grouped together with the higher score (see discussion in footnote 10).

*Insert Table 2 about here*

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such that  $\alpha > \beta > \gamma$ , whereby the difference  $\alpha > \gamma$  turns out to be significant but the smaller differences  $\alpha > \beta$  and  $\beta > \gamma$  are not confirmed by the Tukey test. The evidence for statistic significance implies that we have to distinguish between two different levels of acceptability for the means  $\alpha$  and  $\gamma$ , but it is not clear whether the intermediate mean  $\beta$  patterns with  $\alpha$  or with  $\gamma$ . In such cases, we adopt the convention to group  $\beta$  together with the closest mean ( $\alpha$  or  $\gamma$ ).



The results in Table 2 confirm our expectations: all three tests gave a significant difference between the control conditions, namely the canonical verbs on the one hand and the ES and intransitive EO verbs on the other. Labile EO verbs pattern with the canonical transitive verbs in all tests while the non-agentive transitive EO verbs generally group with the intransitive EO verbs and the ES verbs. A comment seems to be in order as regards the results of the imperative test. In this test, the acceptability means for the intransitive EO verbs and the ES verbs (group  $\beta$ ) significantly differ from the mean of the canonical transitive verbs (group  $\alpha$ ). The important point for our considerations is that the non-agentive transitive EO verbs reach a lower level of acceptability. The difference between this verb group and the ES and intransitive EO verbs is not expected and reveals differences that are beyond the scope of this article. We speculate that ES and intransitive EO verbs allow for the formation of an imperative expressing the desire of the speaker, which is not possible for non-agentive transitive EO verbs.

## 5.2. Modern Greek

Example (14) illustrates the three experiments of the Modern Greek part of the study giving an example for each of them (see a full list of the verbal items in Appendix II). The group of the dative experiencer verbs included only one item since there are no further clear cases of experiencer verbs in this class.<sup>11</sup> Modern Greek does not have either a progressive tense or periphrastic means for the expression of progressivity. Hence, we tested stativity by means of answers to an event question, as illustrated in (14c) (see discussion in Section 3.2).

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<sup>11</sup> There are some verbs with a similar constituent structure, e.g., *miázo* ‘resemble’, *teriázo* ‘match’, but these do not encode an experiential situation.

(14) a. Volitionality test

*o*                      *iðioktítis*              *enoxlí*  
DEF:NOM.SG.M              owner:NOM.SG.M      annoy:3SG  
*ton*                      *éniko*                      *epítiðes.*  
DEF:ACC.SG.M              dweller:ACC.SG.M      intentionally  
‘The owner annoys the dweller intentionally.’

b. Imperative test

*se*              *parakaló*              *xári,*  
2.SG.ACC      please:1SG              Charis:VOC.SG.M  
*enóxlise*              *ton*                      *máριο!*  
annoy:PFV.IMP:2.SG      DEF:ACC.SG.M      Marios:ACC.SG.M  
‘Please Charis, annoy Marios!’

c. Stativity test

*ti*                      *jínete?*  
what:NOM.SG.N              happen:3SG  
*aftó*                      *pu*              *jínete*              *íne*              *óti*  
this:NOM.SG.N              that              happen:3SG              be:3SG              that  
*o*                      *iðioktítis*              *enoxlí*  
DEF:NOM.SG.M              owner:NOM.SG.M      annoy:3SG  
*ton*                      *éniko.*  
DEF:ACC.SG.M              dweller:ACC.SG.M  
‘What happens? What happens is that the owner annoys the dweller.’

Sixteen native speakers of Modern Greek, students at the University of Athens, participated in the experiment (female: 6, age range: 19-33, average: 25.7), August 2007. Each speaker was presented each verb three times, each one within the frame of

the corresponding test (volitionality, imperative, stativity), pseudo-randomized in a written questionnaire. This study resulted in a data set of 17 (items)  $\times$  3 (tests)  $\times$  16 (speakers) = 816 judgments. This data set contains 4 (items)  $\times$  16 (speakers) = 64 observations for each experimental condition with the exception of the EO/intr verbs for which we examined a single verb, i.e., we obtained 16 judgments for this condition. 3 values were missing in the questionnaires (all three in the canonical verbs of the volitionality test), i.e., the actual data set of valid observations relates to 813 judgments.

An analysis of variance on the entire data set revealed a significant main effect of verb type ( $F_{4,12} = 60.6, p < .001$ ), no significant main effect of diagnostic test and a significant interaction between both factors ( $F_{8,8} = 5.3, p < .05$ ).

*Insert Figure 2 about here*

Post-hoc Tukey tests do not confirm the obtained differences between canonical and labile EO verbs in the volitionality, the imperative, and the stativity tests. In the volitionality test, non-agentive EO verbs are significantly lower than labile verbs ( $\alpha < .001$ ), while non-agentive EO verbs, ES verbs, and intransitive EO verbs do not significantly differ from each other. The imperative test revealed a significant difference between labile and non-agentive EO verbs ( $\alpha < .001$ ), no significant difference between non-agentive EO verbs and ES verbs, but a significant difference of the latter to intransitive EO verbs ( $\alpha < .001$ ). The stativity test revealed a different pattern: the only verb group that significantly differs from the others is the group of non-agentive EO verbs ( $\alpha < .01$  comparing to the closest mean, i.e., the canonical verbs).

*Insert Table 3 about here*

As is visible from Table 3, the results from the volitionality test and the imperative test in Modern Greek are similar to the results obtained in German and thus fully expected. The reason for the three-partitioned results in the imperative test has been discussed for German in Section 5.1 and equally applies here. However, the stativity test does not produce the expected outcome. Since the means of the control conditions do not significantly differ from each other (canonical verbs vs. ES/intransitive EO verbs), the interpretation of this data pattern is not obvious. In general, we hypothesize that the stativity test at issue, i.e., examination of contextual felicity in the context of event questions did not induce the expected reaction.

### 5.3. Turkish

Example (15) presents examples of each of the three experiments of the Turkish part of the study. The group of dative experiencer verbs is rather small in Turkish (see also Kutscher 2009: 210f), so that it was not possible to identify more than three items when the experiment was carried out. Some further items such as *cesaret ver-* ‘encourage’, *korku ver-* ‘frighten’ also take a dative marked experiencer but given that they are complex expressions based on the verb *ver-* ‘give’ the stimulus may be interpreted as agentive so that they do not meet the necessary conditions for this verb group in our experimental study.

In order to observe the impact of stativity in Turkish, we tested the acceptability of the verbs in a copular construction using the form *-mAk-tA* (-INF-LOC) ‘be in the act of’ (see (15c)). Following Kornfilt (1997: 357ff) the construction expresses

progressivity with dynamic verbs, but is “either ungrammatical or quite infelicitous” with stative verbs.

(15) Volitionality test

- a. *Kız çocuğu bilerek kız-dır-ıyor.*  
girl child:ACC intentionally be.angry-CAUS-IPFV  
‘The girl annoys the boy intentionally.’

Imperative test

- b. *Çocuğu kız-dır!*  
child:ACC be.angry-CAUS  
‘Annoy the boy!’

Stativity test

- c. *Kız çocuğu kız-dır-makta.*  
girl child:ACC be.angry-CAUS-IPFV/PROG  
‘The girl is annoying the boy.’ (lit. ‘The girl is in the act of annoying the boy.’)

Sixteen native speakers of Turkish, residents of Germany, participated in the experiment (female: 7, age range: 18-57, average: 36.7), May 2008. Each speaker was presented each verb three times, each one within the frame of the corresponding test (volitionality, imperative, stativity), pseudo-randomized in a written questionnaire. This study resulted in a data set of 19 (verbs) × 3 (tests) × 16 (speakers) = 912 judgments (all obtained judgments were valid tokens for our analysis). This data set contains 4 (verbs) × 16 (speakers) = 64 observations for each experimental condition that is discussed in the following, except for the EO/intr verbs for which we collected 3 (verbs) × 16 (speakers) = 48 observations due to the lack of further lexical items.

An analysis of variance on the entire data set revealed a significant main effect of verb type ( $F_{4,12}=27.26, p < .001$ ). The three experiments differ with respect to the data pattern of the ES verbs, however the analysis of variance on the overall data did not reveal either a significant main effect of experiment or of the interaction between experiment and verb type.

*Insert Figure 3 about here*

Post-hoc Tukey tests on the Turkish data reveal that the means' differences between canonical verbs, labile and non-agentive transitive EO verbs are not significant in all three diagnostic tests. In the volitionality test, non-agentive transitive EO verbs are significantly more acceptable than intransitive EO verbs ( $\alpha < .001$ ), and the latter do not significantly differ from ES verbs. In the imperative test, intransitive EO verbs differ significantly from non-agentive EO verbs ( $\alpha < .01$ ), and do not differ significantly from ES verbs. ES verbs do not significantly differ from either labile EO verbs or intransitive EO verbs, but their mean (4.11) is closer to the mean of the higher category (4.58) than to the mean of the lower category (3.29) hence they are grouped with the former category. In the stativity test, the only significant contrast is between the intransitive EO verbs and the canonical, labile and ES verbs (all differences below  $\alpha < .01$ ). Non-agentive intransitive EO verbs (mean: 4.67) do not significantly differ from either intransitive EO verbs (3.52) or experiencer subject verbs (5.14), hence they are classified with the higher level  $\alpha$  on the basis of the means' differences (see footnote 10).

*Insert Table 4 about here*

The experimental results for Turkish in Table 4 show that the language differs from German and Modern Greek as concerns the semantic property of agentivity in the transitive EO verbs. Both the labile transitive EO verbs and the alleged non-agentive transitive EO verbs pattern with the canonical transitive verbs as regards their acceptability in the volitionality test and the imperative test. In the imperative test, it turns out that ES verbs are quite acceptable due to reasons that are out of consideration in this article (compare German in Section 5.1).

The Turkish stativity test does not produce the expected outcome. The obtained means suggest that only the intransitive EO verbs but not the ES verbs are stative. A possible explanation for the high acceptability of the ES verbs in the *-mAktA* construction is that the subjects gave an ingressive interpretation to the verbs. Konfilt (1997: 358) mentions such a possibility as marginally acceptable. However, lacking further decisive evidence, we have to draw the same conclusion from the results of this test as we did in the parallel case for Modern Greek (see Section 5.2), namely that the subjects were not sensitive to the test and that the obtained difference may not be triggered by the semantic feature of stativity vs. dynamicity.

#### 5.4. Yucatec Maya

The three diagnostic tests in Yucatec Maya are illustrated in (16). The volitionality test had to be adapted since there is no ‘idiomatic’ adverbial expression of volitionality in the language. Instead, we chose another test frame, which tests control by subordinating the verbs at issue under the matrix verb *pat- u báah* (dare- A.3 self) ‘dare, attempts, exert’, which presupposes control of the matrix actor over the verbal event described in the subordinated clause (see (16a), Lehmann 1993, Verhoeven 2007).

Yucatec Maya has a progressive marker (*táan* ‘PROG’) which is appropriate for the stativity test (see (16c’)). However, stative predicates cannot occur with an aspectual marker. Thus, those experiential concepts which are lexicalized as stative predicates (i.e. *sùuk* ‘be accustomed’, *k’abéet* ‘necessary, need’, *yàakumah* ‘love’, *p’èek* ‘dislike, hate’, and *k’áhool* ‘know’, see list in Appendix II) cannot be presented with the progressive marker. In order to obtain an estimation of stativity, we presented all verbs in the context of an event question (see (16c)). Answers containing a verb were formed with the progressive marker (see (16c’)), while answers containing a stative predicate were formed without this marker (see (16c’’)).

Finally, the imperative test had to be adjusted to the structural facts of Yucatec Maya. Among the intransitive EO verbs there are two, namely *sùuktal* ‘become accustomed’ and *k’abéettal* ‘become necessary, need’ which do not form an imperative due to their membership in the class of inchoative intransitive verbs. Furthermore the imperative forms of the intransitive EO verbs *tu’b* ‘get forgotten, escape’ and *k’a’h* ‘cross one’s mind’ are homophonous with the first person singular completive form of the verbs so that the respective sentences could not be presented without ambiguity. In order to implement the test for the intransitive EO verbs we chose the hortative forms of these verbs which imply control of the verbs’ main argument similar to the imperative forms (see (16b’’)).

(16) Volitionality

- a. *Le x-ch’úuppal-o’ t-u pat-ah u báah*  
 DEF F-girl-D2 PFV-A.3 dare-CMPL A.3 self  
*u chi’chnak-kuns le xibpal-o’.*  
 A.3 cross-FACT(SUBJ) DEF boy-D2

‘The girl tried to bother the boy.’



Imperative test

b. *Chi'chnak-kuns le xibpal-o'!*

CROSS-FACT(SUBJ) DEF boy-D2

'Bother the boy!'

b'. *Ko'x k'a'h-al ti' le x-ch'úuppal-o'!*

let's.go occur.to-INCMPL LOC DEF F-girl-D2

lit.: 'Let's cross the girl's mind!'

Stativity test

c. *Ba'x táan u y-úuch-ul?*

what PROG A.3 0-happen-INCMPL

'What is happening?'

c'. *Le x-ch'úuppal-o' táan u chi'chnak-kuns-ik le xibpal-o'.*

DEF F-girl-D2 PROG A.3 CROSS-FACT-INCMPL DEF boy-D2

'The girl is bothering the boy.'

c''. *Le h-k'oha'n-o' u p'èek le ah ts'àak-o'.*

DEF M-sick-D2 A.3 hate DEF master cure-D2

'The ill person hates the doctor.'

Sixteen Yucatec Maya native speakers, all bilingual in Spanish but speaking Maya in their everyday communication, residents of the Yaxley and Felipe Carrillo Puerto in Quintana Roo (Mexico), participated in the experiment (female: 5, age range: 17-59, average: 38.9), March 2008. Each speaker was presented each verb three times, each one within the frame of the corresponding test (volitionality, imperative, stativity), pseudo-randomized in a written questionnaire. This study resulted in a data set of 20 (verbs) × 3 (tests) × 16 (speakers) = 960 judgments (64 observations for each experimental condition). 17 values distributed in different conditions (up to 3 values

in a single condition) were missing in total, i.e., the actual data set relates to 943 valid judgments.

An analysis of variance on the entire data set revealed a significant main effect of verb type ( $F_{4,12} = 37.01, p < .001$ ), no significant main effect of diagnostic test, and a significant interaction effect ( $F_{8,8} = 5.59, p < .05$ ). The descriptive data in Figure 4 suggests that the significant interaction relates to the difference in the data pattern of the stativity test, in particular with respect to the reaction to the EO/intr verbs.

*Insert Figure 4 about here*

Post-hoc Tukey tests show that the acceptability of the intransitive EO verbs in the volitionality test is significantly lower than the acceptability of labile EO verbs ( $\alpha < .05$ ) and of canonical verbs ( $\alpha < .02$ ). Non-agentive EO verbs and ES verbs do not significantly differ from any other category. Since the means of these categories (EO/trns/-ag: 6.02; ES: 5.84) are closer to the higher level (EO/trns/ $\pm$ ag: 6.20) than to the lower level (EO/intr: 4.95), they are grouped together with the higher scores. In the imperative test, the differences of the intransitive EO verbs to all other categories and only these are significant (all differences below the  $\alpha < .001$  level). In the stativity test, all differences did not reach significance.

*Insert Table 5 about here*

The experimental results in Table 5 show that this language differs from German and Modern Greek and patterns with Turkish as concerns the agentivity of the transitive EO verbs. Both the labile transitive EO verbs and the alleged non-agentive

transitive EO verbs group with the canonical transitive verbs as regards their acceptability in the volitionality test and the imperative test and they differ from the intransitive EO verbs. Note that in both tests ES verbs also belong to the same group since they receive high acceptability ratings in both tests, too. For the imperative test the reason discussed for German in Section 5.1 may account for this behaviour. However, the volitionality test clearly indicates that the Yucatec Mayan ES verbs can indeed accommodate an agentive reading. This is supported by other control tests reported in Verhoeven (2007: 231ff) and applies to the transitivized versions of the basic stative predicates *yàakumah* ‘love’, *p’èek* ‘dislike, hate’, and *k’áhóol* ‘know’ which themselves are non-agentive.<sup>12</sup>

As regards the stativity test in Yucatec Maya, it does not produce any significant distinctions between the verb classes so that we have to conclude that the subjects were not sensitive to the test.

## 5.5. Chinese

As explained in Section 4, the Chinese part of the parallel study is reduced in comparison to the other languages for language internal reasons. First, in Chinese there are no intransitive EO verbs, i.e. verbs displaying an argument structure parallel to the intransitive (dative) EO verbs in the other languages. Thus, this part of the parallel study could not be carried out in Chinese. Furthermore, by means of the abovementioned control tests in elicitation, no EO verbs with reduced agentivity could be identified. All EO verbs were judged as equally good in the mentioned tests (see also data in Verhoeven forthc.). Therefore, it was not possible to group the Chinese EO verbs into one agentive and one non-agentive group. As a consequence,

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<sup>12</sup> Note that the chosen test frame only allows to test verbs since stative predicates cannot occur in subordinate clauses.

the Chinese part of the study distinguishes between three verb groups, namely transitive EO verbs, canonical transitive verbs and ES verbs. Each of the three tests carried out with these verbs is illustrated in (17). Stativity is tested by means of the combination of the verbs with the progressive marker *zài* ‘PROG’, which occurs in our examples in combination with the adverb *zhèng* in *zhèng-zài* ‘just-PROG’ (17c). According to Li & Thompson (1981: 218), only activity verbs can be combined with *zài* to indicate the duration of the event denoted by the verb. This analysis is generally supported by the corpus evidence presented in Xiao & McEnery 2004: 209.<sup>13</sup>

(17) Volitionality test

- a. *nǚhái gùyì-de rěnnǎo nánhái.*  
 girl intention-ADVR annoy boy  
 ‘The girl annoys the boy intentionally.’

Imperative test

- b. *rěnnǎo zhè nánhái!*  
 annoy this boy  
 ‘Annoy the boy!’

Stativity test

- c. *nǚhái zhèng-zài rěnnǎo-zhe nánhái.*  
 girl just-PROG annoy-DUR boy  
 ‘The girl is annoying the boy.’

Sixteen native speakers of Mandarin Chinese, residents of Kunming and students at the University of Yunnan, participated in the experiment (female: 6, age range: 19-30, average: 23.1) in April 2008. Each speaker was presented each verb three times,

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<sup>13</sup> The corpus data analyzed in Xiao & McEnery 2004 show that states may marginally occur with *zài* ‘PROG’. For a more detailed discussion of the construction of EO verbs with *zhèng-zài* see Verhoeven forthc.

each one within the frame of the corresponding test (volitionality, imperative, stativity), pseudo-randomized in a written questionnaire. This study resulted in a data set of  $12 \text{ (verbs)} \times 3 \text{ (tests)} \times 16 \text{ (speakers)} = 576$  judgments. This data set contains  $4 \text{ (verbs)} \times 16 \text{ (speakers)} = 64$  observations for each experimental condition. A single judgment was missing in a written questionnaire, i.e. the data reported in the following refer to a data set of 575 judgments.

An analysis of variance was carried out on the entire data set obtained by the Mandarin Chinese speakers. This analysis revealed a significant main effect of verb type ( $F_{2,14} = 25.4, p < .001$ ), a significant main effect of diagnostic test ( $F_{2,14} = 17.86, p < .001$ ), and a significant interaction effect ( $F_{4,12} = 14.45, p < .002$ ). The question is how to explain these effects. We observe in Figure 5, that the stativity test induced generally lower judgments, which accounts for the main effect of diagnostic test. The imperative test induced a different data pattern from the other tests, in particular with respect to the acceptability of ES verbs in the corresponding frame. The means' difference that we may descriptively observe in Figure 5 accounts for the statistical finding that verb type significantly interacts with the type of test.

*Insert Figure 5 about here*

Post-hoc Tukey tests on the means' differences show that the only significant differences in this data set are obtained in the volitionality experiment: ES verbs are significantly less acceptable than canonical transitive verbs and labile EO verbs ( $\alpha < .001$  in both cases), while the latter categories do not significantly differ from each other.

*Insert Table 6 about here*

The experimental results in Table 6 suggest that Chinese patterns with Turkish and Yucatec Maya as concerns the agentivity of the transitive EO verbs. Transitive EO verbs group with the canonical transitive verbs and differ from the ES verbs as regards their acceptability in the volitionality test. In the imperative test, ES verbs received high acceptability ratings, supposedly for the reasons discussed before (see Section 5.1), so that the results of this part of the test are not decisive in identifying agentivity. The stativity test also failed to produce significant distinctions between the three verb groups. However, we can descriptively observe in Figure 5 that the acceptability of the transitive EO verbs is more similar to that of the canonical transitive verbs than to that of the ES verbs.

## **6. Typology of experiential classes**

In our empirical study we pursued the question of whether the lexical specification of the transitive EO verbs for non-agentivity/stativity is a cross-linguistic universal as is often implicitly assumed in works on experiencer verbs. For this purpose, we applied two diagnostic tests for agentivity (combination with volitionality indicating adverbs; imperative formation) and a test for stativity (progressive/eventive constructions) with different verb groups. In order to estimate the agentivity/stativity of EO verbs, we used two control conditions: (a) verbs that by hypothesis are agentive and dynamic, namely canonical transitive verbs (such as *kick*, *pinch*, *beat*, *push*), (b) verbs that by hypothesis are non-agentive and stative, namely ES verbs (such as *love*, *hate*, *like*, *know*) and intransitive EO verbs (such as *appeal to*, *occur to*, *matter to*). The former verbs were expected to obtain high acceptability ratings in all tests (combination with volitionality adverbs; imperative; progressive). The verbs of the latter groups were

expected to obtain low acceptability in the same tests. Speakers' intuitions largely confirmed these hypotheses with a few exceptions that were discussed in the previous section. In some languages (Chinese, Yucatec Maya, Turkish), ES verbs received a relatively high acceptability rate in the imperative test which was explained by the nature of the test, since imperatives can also be used to express the desire of the speaker (see Section 3.1). Furthermore, in some languages the subjects did not seem to be sensitive to the stativity test (see results for Yucatec Maya, Modern Greek, Turkish (to some degree)). Apart from these limitations, the collected data provided us with a positive and a negative baseline that indicate the acceptability of  $\pm$ agentive and  $\pm$ stative verbs in our diagnostic tests. Having established these two baselines, we can now estimate the properties of the target verb group(s).

The aim of this study was to evaluate agentivity and stativity in the transitive EO verbs of the sample languages. It should be tested if they are uniform across languages with respect to the mentioned semantic parameters. The motivation for this comparison was that the object languages differ with respect to the properties of EO verbs (see Section 2.2). Transitive EO verbs in German and Modern Greek display a number of non-canonical object properties while this does not hold true for the corresponding verbs in Turkish, Yucatec Maya, and Chinese. The experimental study was expected to show whether the transitive EO verbs pattern with canonical transitive verbs or with ES and intransitive EO verbs in the three diagnostic tests at issue. Based on the observations in Section 2.2, the cross-linguistic prediction was that the former empirical situation would apply to all transitive EO verbs in Turkish, Yucatec Maya, and Chinese, as well as to those transitive EO verbs in German and

Modern Greek that can accommodate an agentive eventive reading,<sup>14</sup> while the latter empirical situation would apply to the verbs with non-canonical object properties in German and Modern Greek.

In line with our cross-linguistic prediction, the results of the experimental study provide evidence that the sample languages split in two groups regarding the semantic properties of their transitive EO verbs. German and Modern Greek distinguish between two types of transitive EO verbs. The judgments for the labile EO verbs (such as *amuse*, *scare*, *surprise*, *frighten*) reach the positive baseline (canonical transitive verbs) in the volitionality test, the imperative test and the stativity test. By contrast, the judgments for the non-agentive transitive EO verbs (such as *interest*, *concern*, *depress*, *fascinate*) are closer to the negative baseline (ES verbs and/or the intransitive EO verbs) in all three tests (with the exception of the stativity test in Greek, in which the negative baseline was not established, see discussion in Section 5.2). The judgments in both agentivity tests suggest that the labile EO verbs may accommodate an agentive reading similar to the canonical transitive verbs while the non-agentive transitive EO verbs do not allow for an agentive interpretation, similar to the intransitive EO verbs and the ES verbs. The results of the stativity test suggest that the labile EO verbs may be interpreted as dynamic, similar to the canonical transitive verbs while the non-agentive transitive EO verbs receive a stative interpretation similar to the intransitive EO verbs and the ES verbs.

For the remaining languages of the sample Turkish, Chinese, and Yucatec Maya, the results of the study suggest that they possess one uniform class of transitive EO verbs. In Turkish and Yucatec Maya, there was no significant difference between the

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<sup>14</sup> The occurrence of these verbs in contexts that test dynamicity and agentivity is expected to be acceptable as far as an agentive eventive reading is possible. The possibility of an alternative (non-agentive) reading is not expected to reduce the acceptability of these examples.



labile EO verbs and the alleged non-agentive transitive EO verbs in any of the diagnostic tests. Acceptability ratings of both transitive EO verb groups do not significantly differ from the positive baseline (canonical transitive verbs) in the agentivity tests. Likewise, in the stativity test both groups of transitive EO verbs do not significantly differ from the positive baseline (canonical transitive verbs) but differ from the negative baseline whenever it is empirically established (the exception is the stativity test in Yucatec Maya, see Section 5.4). For Chinese, a distinction within the inventory of EO verbs could not be detected in elicitation. However, the transitive EO verbs that were empirically examined show the behaviour of the positive baseline (canonical transitive verbs) in the sole test that gave significant differences (volitionality test). In sum, the presented evidence from the two agentivity tests indicates that all transitive EO verbs in Turkish, Yucatec Maya and Chinese may accommodate an agentive reading similar to the canonical transitive verbs. This is in line with the predominant derivational pattern of transitive EO verbs in Turkish and Yucatec Maya which are mostly overtly derived by causativization from basic experiencer-oriented intransitive verbs (cf. Section 2.3). Given that these verbs are overtly causative, they always provide for the accommodation of an animate causer that is interpreted as an actor (see Section 2.1).

Based on the differences in semanto-syntactic properties of the EO verbs in the sample languages, we may distinguish two language types. The first type is instantiated in German and Modern Greek and illustrated in Table 1. These languages possess two classes of transitive EO verbs: (a) labile verbs may accommodate an agentive reading if the stimulus role is taken by a human and thus possibly controlling entity, otherwise they are interpreted as non-agentive; these verbs may also accommodate a dynamic reading, (b) non-agentive verbs that cannot accommodate an

agentive reading (irrespective of the animacy of the stimulus) and are necessarily interpreted as stative. Languages of this type display a further type of EO verb, namely intransitive EO verbs which encode the experiencer in an oblique case and are stative. Table 7, repeated here from Table 1, represents the classification of the EO verbs in this language type.

*Insert Table 7 about here*

A second type of language, represented by Turkish, Yucatec Maya, and Chinese displays a uniform class of transitive EO verbs, which correspond to the labile EO verbs of language type 1. These EO verbs may receive either an agentive or a non-agentive interpretation depending on the type of stimulus and the context. They are open to a dynamic (eventive) interpretation. These languages may be further divided according to the criterion, whether they possess a class of intransitive EO verbs (which are supposed to be stative) or not. Table 8 represents the first subtype instantiated by Turkish and Yucatec Maya and Table 9 represents the second subtype instantiated by Chinese.

*Insert Table 8 and Table 9 about here*

## **7. Conclusion**

The methodological contribution of this article is that it reports the results of an experiment based on standard diagnostic tests for agentivity and stativity. These diagnostic tests have been long used in linguistic literature in order to identify semantic properties of particular verbs. In the study reported in this article, these tests

are implemented in a repeated-observations design and carried out with verbs of different verb classes in five different languages. A first observation of the reported data is that tests that are based on the acceptability of particular sentence frames, such as the combination with particular adverbs, the formation of imperatives or the use in constructions expressing progressive aspect have a stronger impact on speaker's intuition than tests that are based on the contextual felicity and hence require the consideration of presuppositions in discourse, such as the felicity in the context of an event question.

A second methodological implication of the present study relates to the possibility of carrying out the same diagnostic test across languages. We have seen that already in a small sample of five languages, it is almost illusory to implement some standard semantic tests in a way that is reliably identical across languages. For instance, we have been able to carry out a stativity test by means of a construction expressing progressive aspect in German, but there was no corresponding construction for testing the same concept in Modern Greek (hence we examined the felicity in the context of event questions), while the progressive marker in Yucatec Maya combines only with a subset of the predicates at issue due to grammatical reasons. In the framework of our cross-linguistic comparison, the only comparable fact is the evidence for significant differences among the verb groups at issue. What we are actually observing is whether particular verb groups pattern together or not in different constructional environments. It is obvious that this interpretation does not imply that the sentential frames in the individual languages are strictly synonymous.

The results of the experimental study provide systematic evidence that the agentivity and stativity of transitive EO verbs is subject to typological variation. Speakers' intuitions show that the heterogeneity of transitive EO verbs is special to

languages like German and Modern Greek, but is not confirmed for Yucatec Maya, Turkish, and Chinese. Transitive EO verbs in the latter languages are more or less systematically ambiguous as to an agentive vs. non-agentive reading of transitive EO verbs. This is in line with the analysis that transitive experiencer objects in these languages behave like the objects of canonical transitive verbs, i.e. they do not show syntactic reflexes of a prominent experiencer with this type of EO verbs.

The present study has implications for a typology of EO verb classes. The languages investigated split in two main types regarding the structure of their inventories of EO verbs. Type 1 is represented by German and Modern Greek in our sample. These languages distinguish between a class of labile transitive EO verbs, which are compatible with an agentive dynamic reading, and another class of transitive non-agentive EO verbs which are stative. It should be noted that the non-canonical properties of experiencer objects apply to non-agentive EO verbs. Type 2 is represented by Turkish, Yucatec Maya, and Chinese in our sample. These languages possess a homogeneous class of transitive EO verbs which are similar to canonical transitive verbs and can always accommodate an agentive reading. In accordance with the main derivational pattern in Yucatec Maya and Turkish (EO verbs are causativized forms of intransitive ES verbs), EO verbs share the agentivity properties of canonical transitive verbs in these languages. This is also in line with the constructional properties of EO verbs in type 2 languages, namely that the experiencer object does not deviate from the properties of canonical direct objects in these languages.

We have empirically verified that experiential verb classes are not semantically and structurally homogeneous across languages. This typological finding has crucial implications for our assumptions about argument structure. It indicates that non-

canonical object properties of EO verbs do not constitute a cross-linguistic constant that could be accounted for through language-independent asymmetries with reference to the semantic properties of experiencer objects. Crucially, the properties of transitive EO verbs depend on properties of the inventory of transitive verbs in the languages at issue, which are subject to language variation. Universal preferences related to the animacy or (non-)agentivity of the arguments at issue probably determine that experiencer objects are privileged candidates for non-canonical object properties but it is open to the evolution of a particular grammar whether the language at issue will select this typological option.

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## Abbreviations

A person marker set A, ACC accusative, ADVR adverbializer, AOR aorist, AUX auxiliary, CAUS causative, CMPL completive, COP copula, D deictic, DAT dative, DEF definite, DUR durative, F feminine, FACT factitive, IMP imperative, INCMPL incomplete, IPFV imperfective, LOC locative, M masculine, MEDPASS mediopassive, N neuter, NEG negation, NOM nominative, NPST nonpast, PASS passive, PFV perfective, PL plural, PROG progressive, PTCP participle, SG singular, SUBJ subjunctive, TOP topic, VOC vocative

## Appendix I. Experimental results

			Mean	SD <sup>a</sup>	SE
German	Volitionality	canonical	6.48	0.97	0.24
		EO/tran/±ag	6.05	1.01	0.25
		EO/tran/–ag	3.14	0.97	0.24
		EO/intr	4.11	1.27	0.32
		ES	3.22	1.43	0.36
	Imperative	canonical	6.28	0.79	0.20
		EO/tran/±ag	6.59	0.46	0.11
		EO/tran/–ag	3.14	0.72	0.18
		EO/intr	4.75	0.90	0.23

		ES	4.48	1.02	0.26
	Stativity	canonical	3.11	1.24	0.31
		EO/tran/±ag	2.64	1.02	0.25
		EO/tran/−ag	1.63	0.77	0.19
		EO/intr	1.89	0.87	0.22
		ES	1.41	0.43	0.11
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Greek	Volitionality	canonical	5.27	1.56	0.39
		EO/tran/±ag	5.14	1.30	0.33
		EO/tran/−ag	2.91	1.49	0.37
		EO/intr	1.25	0.58	0.14
		ES	1.92	1.27	0.32
	Imperative	canonical	4.92	1.23	0.31
		EO/tran/±ag	4.63	1.06	0.26
		EO/tran/−ag	2.59	1.23	0.31
		EO/intr	1.13	0.50	0.13
		ES	2.70	1.20	0.30
	Stativity	canonical	5.53	1.04	0.26
		EO/tran/±ag	5.94	1.01	0.25
		EO/tran/−ag	4.28	1.44	0.36
		EO/intr	6.25	1.00	0.25
		ES	5.59	1.03	0.26
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Turkish	Volitionality	canonical	5.56	0.99	0.25
		EO/tran/±ag	5.28	0.99	0.25
		EO/tran/−ag	4.98	0.80	0.20
		EO/intr	3.44	1.11	0.28

		ES	2.63	1.30	0.33
	Imperative	canonical	4.70	1.34	0.34
		EO/tran/±ag	4.58	1.46	0.36
		EO/tran/−ag	5.06	0.90	0.22
		EO/intr	3.29	1.51	0.38
		ES	4.11	1.50	0.38
	Stativity	canonical	5.16	1.37	0.34
		EO/tran/±ag	5.20	1.18	0.29
		EO/tran/−ag	4.67	1.31	0.33
		EO/intr	3.52	1.04	0.26
		ES	5.14	1.47	0.37
Y. Maya	Volitionality	canonical	6.27	1.15	0.29
		EO/tran/±ag	6.20	1.11	0.28
		EO/tran/−ag	6.02	1.15	0.29
		EO/intr	4.95	1.30	0.33
		ES	5.84	1.11	0.28
	Imperative	canonical	6.83	0.32	0.08
		EO/tran/±ag	6.47	0.52	0.13
		EO/tran/−ag	6.53	0.57	0.14
		EO/intr	5.06	0.98	0.24
		ES	6.28	0.86	0.22
	Stativity	canonical	6.38	1.19	0.30
		EO/tran/±ag	6.63	0.62	0.16
		EO/tran/−ag	6.36	0.81	0.20
		EO/intr	6.06	1.41	0.35



		ES	6.28	0.93	0.23
Chinese	Volitionality	canonical	4.92	1.14	0.28
		EO/tran/±ag	4.33	1.43	0.36
		ES	2.31	0.99	0.25
	Imperative	canonical	5.08	1.51	0.38
		EO/tran/±ag	4.23	1.78	0.45
		ES	5.28	1.27	0.32
	Stativity	canonical	3.81	1.38	0.35
		EO/tran/±ag	3.61	1.77	0.44
		ES	2.58	1.17	0.29

<sup>a</sup> SD: Standard deviation, SE: Standard error of the means

## Appendix II. Lexical material

language	group	verbs
German	canonical	<i>treten</i> ‘kick’, <i>zwicken</i> ‘pinch’, <i>schlagen</i> ‘beat’, <i>schubsen</i> ‘push’
	EO/tran/±ag	<i>ärgern</i> ‘annoy’, <i>amüsieren</i> ‘amuse’, <i>enttäuschen</i> ‘disappoint’, <i>überraschen</i> ‘surprise’
	EO/tran/–ag	<i>wundern</i> ‘astonish’, <i>interessieren</i> ‘concern’, <i>freuen</i> ‘give pleasure’, <i>ekeln</i> ‘disgust’
	EO/intr	<i>gefallen</i> ‘please’, <i>nahegehen</i> ‘affect’, <i>missfallen</i> ‘displease’, <i>imponieren</i> ‘impress’
	ES	<i>mögen</i> ‘like’, <i>hassen</i> ‘hate’, <i>kennen</i> ‘know’, <i>schätzen</i> ‘appreciate’
Greek	canonical	<i>klotsáo</i> ‘kick’, <i>tsibáo</i> ‘pinch’, <i>xtipáo</i> ‘beat’, <i>spróxno</i> ‘push’
	EO/tran/±ag	<i>enθaríno</i> ‘encourage’, <i>prokaló</i> ‘provoke’, <i>kseyeláo</i> ‘fiddle’, <i>enoxló</i> ‘bother’

	EO/tran/–ag	<i>enðiaféro</i> ‘interest, concern’, <i>provlímatízo</i> ‘puzzle’, <i>yoitévo</i> ‘captivate, charm’, <i>siginó</i> ‘touch, affect’
	EO/intr	<i>aréso</i> ‘please’
	ES	<i>a yapó</i> ‘like’, <i>misó</i> ‘hate’, <i>latrévo</i> ‘adore’, <i>θavmázo</i> ‘admire’
Turkish	canonical	<i>tekmele-</i> ‘kick’, <i>cimcikle-</i> ‘pinch’, <i>döv-</i> ‘beat’, <i>hırpala-</i> ‘push’
	EO/tran/±ag	<i>sars-</i> ‘shock, distress’, <i>kızdır-</i> ‘anger, annoy’, <i>üz-</i> ‘sadden’, <i>ürküt-</i> ‘scare’
	EO/tran/–ag	<i>sevindir-</i> ‘please, delight’, <i>eğlendir-</i> ‘amuse’, <i>etkile-</i> ‘impress’, <i>tiksindir-</i> ‘disgust’
	EO/intr	<i>görün-</i> ‘seem, appear (to)’, <i>dokun-</i> ‘touch’, <i>itici gel-</i> ‘be disgusting to’
	ES	<i>beğen-</i> ‘like’, <i>sev-</i> ‘love’, <i>tanı-</i> ‘know’, <i>anla-</i> ‘understand’
Y. Maya	canonical	<i>kóochek’t</i> ‘kick’, <i>xéep</i> ‘pinch’, <i>hats</i> ‘beat’, <i>léench’int</i> ‘push’
	EO/tran/±ag	<i>hets’kuns</i> ‘appease’, <i>chi’chnakkuns</i> ‘disturb, bother’, <i>sahbes</i> ‘frighten’, <i>ki’makkuns óol</i> ‘delight’
	EO/tran/–ag	<i>ma’óolkint</i> ‘make listless’, <i>pòochkins</i> ‘make desirous’, <i>su’lakkunt</i> ‘shame, embarrass’, <i>wi’hkuns</i> ‘make hungry/appetite’
	EO/intr	<i>tu’b</i> ‘get forgotten, escape’, <i>k’a’h</i> ‘cross one’s mind’, <i>sùuk(tal)</i> ‘be/ become accustomed’, <i>k’abéet(tal)</i> ‘be/become necessary, need’
	ES	<i>yàakumah/yàakunt</i> ‘love’, <i>p’èek(t)</i> ‘dislike, hate’, <i>k’ahóol(t)</i> ‘know’, <i>ts’úibóolt</i> ‘wish, desire’
Chinese	canonical	<i>tī</i> ‘kick’, <i>qiā</i> ‘pinch’, <i>dǎ</i> ‘beat’, <i>tuī</i> ‘push’
	EO/tran/±ag	<i>xīyǐn</i> ‘attract, fascinate’, <i>gǎndòng</i> ‘move, touch’, <i>rěnnǎo</i> ‘anger, annoy’, <i>jīnù</i> ‘enrage’
	ES	<i>xǐhuān</i> ‘like’, <i>tǎoyàn</i> ‘hate’, <i>rènshí</i> ‘know’, <i>zūnzhòng</i> ‘respect, appreciate’

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*Table 1. Classification of EO verbs*

	agentive	non-agentive
eventive	transitive	transitive
stative	–	transitive; intransitive

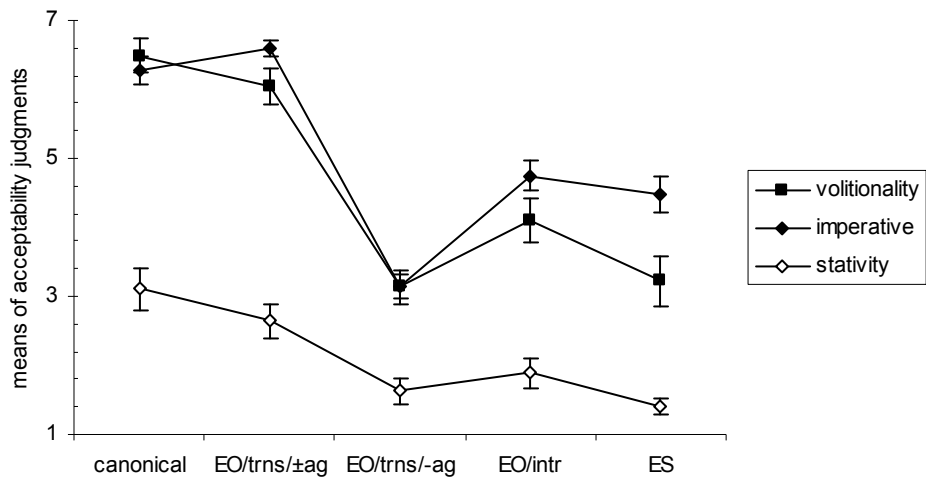


Figure 1. Experimental results in German

Table 2. Verb-group contrasts in German

	Canonical	EO/trns/ $\pm$ ag	EO/intr	ES	EO/trns/-ag
Volitionality	( $\alpha_1$ )	$\alpha_2$ ) >	( $\beta_3$ )	$\beta_4$	$\beta_5$ )
Imperative	( $\alpha_2$ )	$\alpha_1$ ) >	( $\beta_3$ )	$\beta_4$ ) >	$\gamma_5$
Stativity	( $\alpha_1$ )	$\alpha_2$ ) >	( $\beta_3$ )	$\beta_5$	$\beta_4$ )

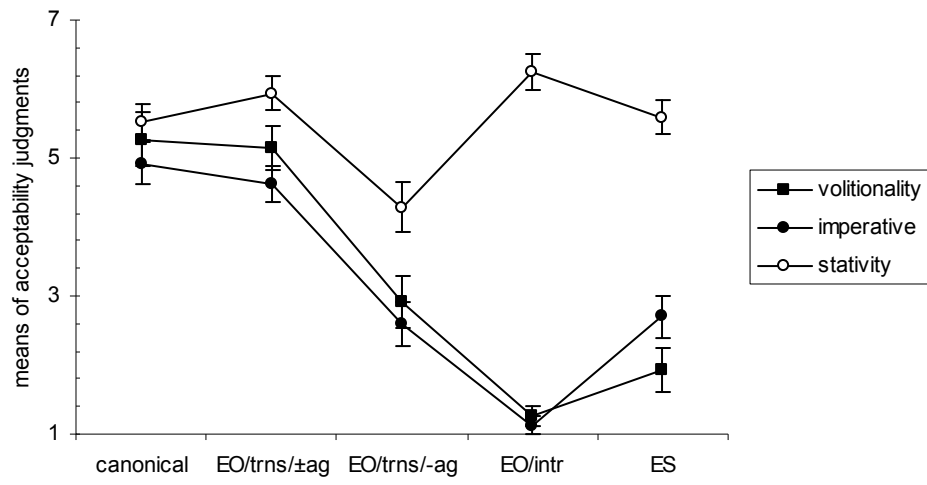


Figure 2. Experimental results in Modern Greek

*Table 3. Verb-group contrasts in Modern Greek*

	Canonical	EO/trns/±ag	EO/trns/-ag	ES	EO/intr
Volitionality	( $\alpha_1$	$\alpha_2$ ) >	( $\beta_3$	$\beta_4$	$\beta_5$ )
Imperative	( $\alpha_1$	$\alpha_2$ ) >	( $\beta_4$	$\beta_3$ ) >	$\gamma_5$
	Canonical	EO/trns/±ag	EO/intr	ES	EO/trns/-ag
Stativity	( $\alpha_4$	$\alpha_2$	$\alpha_1$	$\alpha_3$ ) >	$\beta_5$

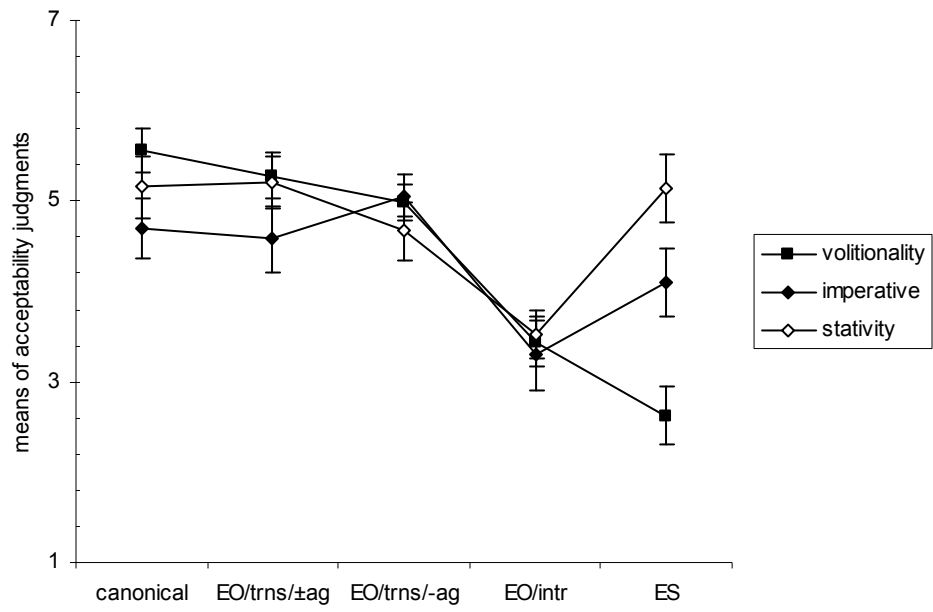


Figure 3. Experimental results in Turkish

Table 4. *Verb-group contrasts in Turkish*

	Canonical	EO/trns/±ag	EO/trns/-ag	ES	EO/intr	
Volitionality	( $\alpha_1$ )	$\alpha_2$	$\alpha_3$ )	>	( $\beta_5$   $\beta_4$ )	
Imperative	( $\alpha_2$ )	$\alpha_3$	$\alpha_1$	$\alpha_4$ )	>	$\beta_5$
Stativity	( $\alpha_2$ )	$\alpha_1$	$\alpha_4$	$\alpha_3$ )	>	$\beta_5$

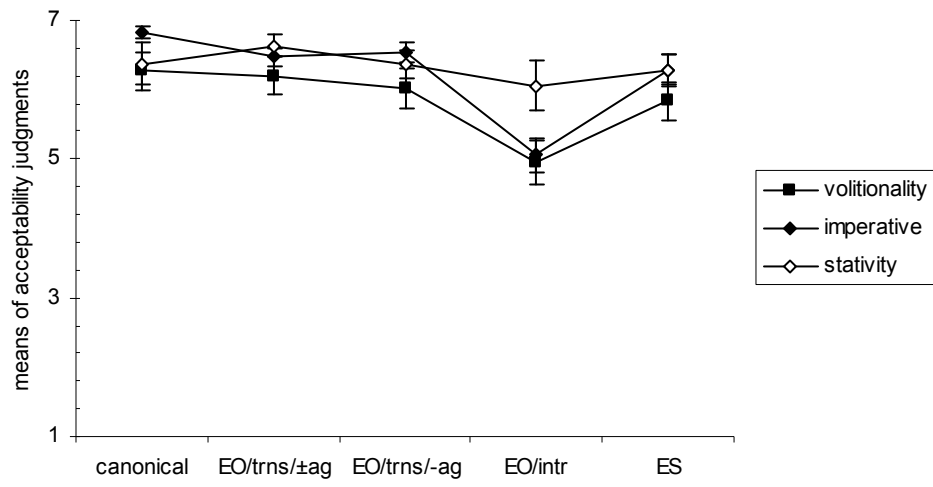


Figure 4. Experimental results in Yucatec Maya



Table 5. *Verb-group contrasts in Yucatec Maya*

	Canonical	EO/trns/±ag	EO/trns/-ag	ES		EO/intr
Volitionality	( $\alpha_1$	$\alpha_2$	$\alpha_3$	$\alpha_4$ )	>	$\beta_1$
Imperative	( $\alpha_1$	$\alpha_3$	$\alpha_2$	$\alpha_4$ )	>	$\beta_1$
Stativity	( $\alpha_2$	$\alpha_1$	$\alpha_3$	$\alpha_4$		$\alpha_5$ )

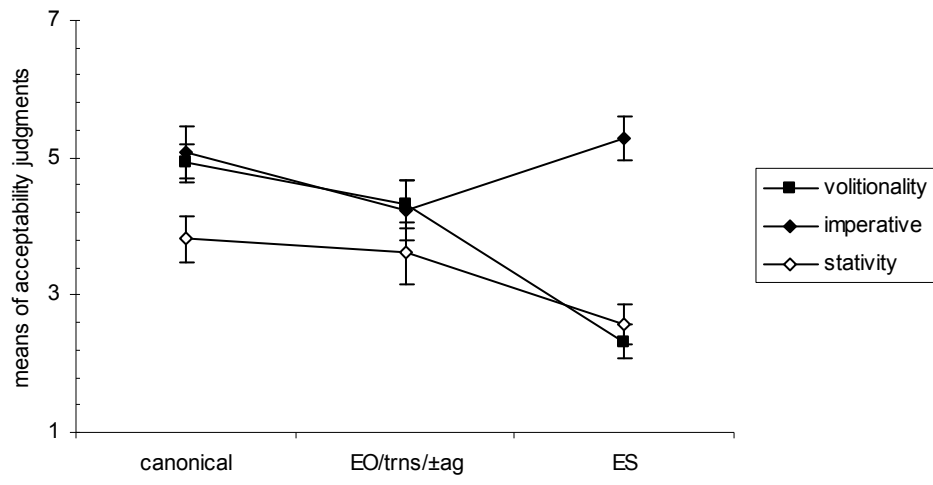


Figure 5. Experimental results in Chinese

*Table 6. Verb-group contrasts in Chinese*

	canonical	EO/trns/±ag	ES
Volitionality	( $\alpha_1$	$\alpha_2$ ) >	$\beta_3$
Imperative	( $\alpha_2$	$\alpha_3$	$\alpha_1$ )
Stativity	( $\alpha_1$	$\alpha_2$	$\alpha_3$ )

*Table 7. Classification of EO verbs: Language type 1*

	agentive	non-agentive
eventive	transitive	transitive
stative	–	transitive; intransitive

*Table 8. Classification of EO verbs: Language type 2a*

	agentive	non-agentive
eventive	transitive	transitive
stative	–	intransitive

*Table 9. Classification of EO verbs: Language type 2b*

	agentive	non-agentive
eventive	transitive	transitive
stative	–	–