Resultatives as an Equative Construction: Evidence from Japanese and Romanian, and Its Implication for English

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Abstract: In current studies of resultative constructions, there are broadly two basic subclasses: weak and strong resultatives. It has been said that there are weak resultatives in Japanese but no strong resultatives. However, even in Japanese, compound verbs and sentences with an equative relation marker *hodo* can be used to express the content close to English strong resultatives. Surprisingly, the patterns observed in Japanese resultatives find the corresponding ones in Romanian. Romanian (and Italian, with slight differences) also have weak resultatives but no strong resultatives. By adding the words *până* (*ce*), which roughly corresponds to "as far as/up to/until," some strong resultatives will be acceptable (Farkas 2009, 2016). This paper focuses on similar phenomena observed in these languages. First, we clarify the meaning of the Japanese equative expression *hodo,* "as far as/up to." Second, we will compare Japanese *hodo* and Romanian *până*. Careful observation of these cases reveals that at least some cases, which have been considered resultatives, should be treated as "equative constructions." This idea is further supported by the fact that the logical operator CAUSE used to represent the causality is not appropriate for constructions of our interest. We also propose that some English resultatives with an incomplete resultative state that works more as a degree modifier than a resulting state may be better analyzed as an equative construction.

Keywords: Compound Verbs, Construction Grammar, Equative Constructions, Hume's Regularity Theory of Causation, Lewis' Counterfactual Theory of Causation, Resultative Constructions

1. Introduction

English is rich in a variety of resultatives. The following factors can categorize the resultative constructions [8, 9, 12].

(1) Classification factors of the resultative constructions
 (i). Causative or non-causative?
 (ii). Whether the resultative phrase (RP) is an adjective phrase (AP) or a prepositional phrase (PP).
 (iii). Whether the RP is a property or a spatial
 (iv). Whether the verb is transitive or intransitive, and if the verb is transitive:
  (a) whether to subcategorize the object or not
  (b) whether it is a change-of-state transitive or not
 (v). Whether the RP's descriptive object (host) is an object or a subject

Among these factors, we will pick up three crucial factors (i), (iv), and (v) and look at some examples to see how these factors are intertwined.

(2) Causative
 a. John broke the vase into pieces.
 b. John hammered the metal flat.
 c. The professor talked us into a stupor.
 d. They drank the pub dry.
 e. John shouted himself hoarse.
(a: Dowty 1979 [5], b: Simpson 1983 [18], others: Goldberg & Jackendoff 2004 [8]).

These examples in (2) are causative because they bring about a resulting state (AP or PP) by the action depicted by the main clause. The resultative phrases are predicated of their objects. (2a) and (2b) are selected transitive, subcategorizing the objects. (2c, d, e) are unselected transitive resultatives, not subcategorizing the objects. A particular case of unselected transitive resultatives has a "fake reflexive," exemplified by (2e). The following is a list of non-causative resultatives.

(3) Non-causative
 a. He rode the same horse to victory.
 b. Bill followed the thief into the library.
 c. The trolly rumbled through the tunnel.

d. Bill floated into the cave.
e. The road zigzagged down the hill.
(a: Iwata 2020 [12], b-e: Jackendoff & Goldberg 2004 [8]).

These examples above encode telic motion by combining a manner of motion verb and point locating preposition. The resultative phrases in (3) are all predicated of their subjects. They are non-causative since, in each case, the subject's action does not contribute causatively to the final state or location. In this paper, we will focus on causative resultatives exemplified in (2) above, although we admit it is worth elaborating on the non-causative resultatives illustrated in (3). The reason for limiting the discussion to the causative resultatives is that this paper's central theme is to explore the causality of resultatives.

The structure of this paper is as follows: Chapter 2 classifies causative resultatives into two categories. We will call these types the verbal-causality-type (V-type) and the non-verbal-causality-type (NV-type), which broadly corresponds to the distinction between weak/strong resultatives advocated by Washio [22]. [1]

This distinction is based on the difference between cases where causality comes from the verb and cases where causality seems to come from somewhere else (construction itself/verbal type-shift). We then observe Japanese examples corresponding to the two categories. In section 3, we examine in detail the two types of resultative constructions in Japanese, especially various ways to express the NV-type resultatives. We introduce the expressions *hodo* and *made* that contribute to producing the equative constructions. In section 4, we examine the Romanian resultative constructions in detail, particularly the role of the phrase *până (ce)* (as far as / up to). In section 5, we examine the truth conditions of causality and state that the CAUSE function is inappropriate for some NV-type resultatives. Furthermore, in this chapter, we will define the semantics of *hodo* and *made* in Japanese resultative expressions. We apply this semantic analysis to account for the Romanian *până (ce)*. In section 6, we adopt a perspective on an equative construction analysis of Japanese and Romanian as a key concept to decipher the stark discrepancy between V-type and NV-type Englis resultatives. Finally, we end with the summary and a future outlook on the issue.

In the next section, we will start with the causative transitive resultatives.

2. English and Japanese Transitive Resultatives

2.1. English Change-of-State Transitive Resultatives (V-type)

Let us consider first some English examples of

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[1] As we will see below, in Washio [22], *weak* resultatives are, in a sense, very strong in having the logical operator deriving from the verb, which provides genuine causality. In contrast, his *strong* resultatives are, in a sense, very weak in that their complement clause works more or less as a degree modifier to the main clause. In our thesis, we are interested in the origin of the causality, so we dub his weak ones V-type and strong NV-type. cf. [16].

change-of-state transitive verbs, and then the Japanese counterparts. We call this class V- resultatives, as its CAUSE is of verb origin.

(4) resultatives with a change-of-state transitive verb
a. John broke the vase (into pieces).
b. Bill painted the wall (green).
c. Kate bent the iron bar (into a U).

They are acceptable without RP as in (4). Note that the events depicted in each (a) and (b) of the sentences below are the same event, and that having a consequential predicate does not shift the semantic feature of the verb from the process to a complete achievement type.

(5) a. John broke the vase in a flash.
   b. John broke the vase into pieces in a flash.
(6) a. Bill painted the wall in half an hour.
   b. Bill painted the wall green in half an hour.
(7) a. Kate bent the iron bar in a second.
   b. Kate bent the iron bar into a U in a second.

Adding RP does not cause a semantic shift in the verbs. In other words, these sentences intrinsically have a completion point without RP, and RP only supplements the completion point. From the above, it is plausible that the change-of-state transitive verbs conceptually include the completion of the state, expressed by [CAUSE NP BECOME P], and that the CAUSE is of verb origin. After all, the conceptual structure of the resultative expression with a change-of-state transitive verb is as follows.

(8) a. John broke the vase into pieces.
   John's action on the vase CAUSE [the vase BECOME BROKEN] + [adjunct into pieces].
b. Bill painted the wall green.
   Bill's action on the wall CAUSE [the wall BECOME PAINTED] + [adjunct green].
c. Kate bent the iron bar into a U.
   Kate's action on the iron CAUSE [the iron BECOME BENT] + [adjunct into a U].

(8a) indicates that John's action on the vase is the direct cause for the vase to be broken and that the sum of John's action and its result is identical to a completed action of breaking the vase. Unspecified John's action may be anything to break the vase, such as dropping the vase on the ground or throwing it at a wall. We conclude that this type of resultative expression with change-of-state transitive verbs is a case of verbal resultative expression.

2.2. Japanese (V-type) Resultatives

English V-type resultatives correspond precisely to the Japanese counterparts as in (9), whose standard form is [NP-TOP NP-ACC ni V-tense]. They also have change-of-state transitive verbs.

(9) Japanese resultatives (corresponding to (4)).
a. Kenji-wa kabin-o konagona-ni kowashi-ta.
   Kenji-TOP vase-ACC pieces-into break-PAST
b. Taro-wa kabe-o midori-ni nut-ta.
   Taro-TOP wall-ACC green-in paint-PAST
c. Keiko wa bou-o uji-ni mage-ta
   Keiko-TOP bar-ACC U shape-in bend-PAST

Their function CAUSE derives from the verb meaning exactly like in English as in (10).

(10) a. Kenji's action on kabin CAUSE [kabin BECOME BROKEN] + [adjunct konogona-ni].
   b. Taro's action on kabe CAUSE [kabe BECOME PAINTED] + [adjunct midori-ni].
   c. Keiko's action on bou CAUSE [bou BECOME BENT] + [adjunct U ji-ni].

The meaning of [X CAUSE Y BECOME RP] implies that Y ends up in the RP state. This verbally derived CAUSE conforms to the definition of Hume's regularity theory of causality [11], which we will see in section 5. Next, let us turn to NV-type, i.e., the resultatives with a non-change-of-state verb. This type is dubbed so since its CAUSE is not of verb origin. From where then?

2.3. NV-type Resultatives

Let us look at some examples of NV-type resultatives, which have a non-change-of-state process verb.

(11) English NV-type resultatives
   a. Bill shook Lisa awake.
   b. Bill hammered the metal flat.
   c. The critics laughed the play off the stage.
   d. Dave drank the pub dry.
   e. We yelled ourselves hoarse.
   f. The professor talked us into a stupor.

The process verbs in (11), not inherently having an endpoint, do not include CAUSE as their meaning. (11a) and (11b) are transitive verbs, and the rest are intransitive. Unlike the case of V-type resultatives, it should be noted that this type of resultatives cannot find equivalent Japanese resultatives in the standard form [NP-TOP NP-ACC ~ni V-tense] corresponding to (11), which is shown in (12).

(12) a.*Bill-wa Lisa-o okoshi yusut-ta.
      Bill-TOP Lisa-ACC awake shake-PAST
   b.*Bill-wa kinzoku-otaira-ni tatai-ta.
      Bill-TOP Lisa-ACC flat-in hammer-PAST
   c.* Hihyoka-wa shibai-o butai-kara warat-ta
      The critics-TOP the play-ACC the stage-from laugh-PAST
   d.*Dave-wa sakaba-o kara-ni non-da
      Dave-TOP the pub-ACC empty-in drink-PAST
   e.*Watashitachi-wa zibun-o koegare-ni saken-da
      We-TOP ourselves-ACC hoarse-in cry-PAST
   f.*Kyoujyu-wa wareware-ni mukankaku-ni hanshi-ta
      The professor-TOP us ACC numb-in talk-PAST

Japanese unavailability of the NV-type resultatives in the standard form does not mean that this language cannot express the contents similar to the English NV-type resultatives. Although causality is undoubtedly involved in this type of English resultatives, we cannot attribute CAUSE to its verb since the verb here is a process verb without the inherent endpoint. Therefore, the question arises as to from where this causality derives. We will consider two possible solutions advocated for this problem.

2.4. Analysis of the NV-type Resultatives Based on the Construction Grammar

Goldberg and Jackendoff [8], pp. 538-39 describe the NV-type resultatives of English in their construction grammar. They argue that the argument structure of this type of resultatives does not come from the verb but from the construction itself. (13) shows the semantic structures of *John hammered the metal flat* and *Dave drank the pub dry*. The formula in (14) is an abstraction and generalization of the NV-type resultatives.

(13) a. John hammered the metal flat.
   c-sub: John CAUSE [the metal BECOME flat].
   MEANS (v-sub): John hammer the metal
   b. Dave drank the pub dry.
   c-sub: Dave CAUSE [the pub BECOME dry].
   MEANS (v-sub): Dave drink (alcoholics: implicit).
(14) Resultative construction principle: [8], p. 539
   Syntax: NP1 V NP2 AP3
   Semantics: c-sub: X1 CAUSE [Y2 BECOME RP3].
   MEANS: v-sub: [X1 V (Y2)].

The resultative construction consists of two substructures: the constructive substructure (c-sub) determines the argument structure X1 CAUSE [Y2 BECOME RP3], and the verb substructure (v-sub) only specifies the mode (=MEANS) by which the process goes on. In other words, supposedly, in strong resultatives, the causality does not come from the verb but the construction. However, there is a problem here. In (13a), John hammered the metal flat; the verb is transitive, but in (13b), Dave drank the pub dry; the verb drink does not subcategorize the object, the pub. It is doubtful that these verbs with different semantic features may be defined as v-sub, so they are related only to MEANS. Also, in (13a), the resulting state holds after all (the metal is flat), but in (13b), it is doubtful that the pub is dry. Furthermore, the semantic representation [CAUSE the pub BECOME dry] entails that the resulting state must be realized, which seems to lead to a semantic discrepancy. We will pursue these issues in section 5.

2.5. Kratzer [14] Analysis of the NV-type Resultatives

Besides the construction grammar approach, A. Kratzer [14] proposed a different way based on formal semantics to account for the meaning compositionality of the NV-type resultatives. A. Kratzer [14], p. 195, giving an example, John drank the teapot dry, says that this construction is causative but has no visible carrier of causality. Citing Bittner [2], A. Kratzer [14], p. 195, claims: 'this type of resultative construction should be called "concealed causatives."' To explain this hidden causality, she proposes the type shift of the verb from a process to an accomplishment, i.e., changing a process verb with no endpoint to an accomplishment verb with a consequential state. A. Kratzer [14], p. 198 provides the formula by which the previous example may be interpreted as follows:

(15) T (drink the teapot dry) = λe∃s [action (e) ∧ drink (e) ∧ state (s) ∧ empty (the teapot) (s) ∧ CAUSE (s) (e)].

It says that applying the type shift operation to drinking the

teapot dry renders it interpretable that with the act *e* of drinking, the state *s* which corresponds to the teapot being empty, the CAUSE function connects the action of drinking to the state of the teapot being empty. In short, this proposes to reinterpret the action verb drink, which has no endpoint, as an achievement verb. Applying the type-shift operation to interpret the action verb as an achievement verb seems compulsory. However, causality cannot be expected from the verb, so some means must be devised. This Kratzer-style proposal may be a necessary step to protect the compositionality of semantics. This approach also has a disadvantage in its formal treatment of CAUSE. The formula (15) implies the resultative state the teapot being empty holds; so far, so good for this example. However, talking about a sentence like *Dave drank the pub dry*, it is most unlikely that the resulting state holds, even though CAUSE imposes the completion of the resulting state.

While these suggestions above may be possible as a last resort, there may be a different perspective to examine the problem, which we discuss in section 6.

3. Japanese Resultatives Corresponding to English NV-type Resultatives

It has been claimed that there are no standard and fixed resultative constructions in Japanese, which are equivalent to the English NV-type resultatives. However, considering constructions with cause-and-effect implications, the Japanese language has expressions that are not precisely the same but have very close meanings to their English counterparts. First, let us look at the examples of English NV-type resultatives again.

(16) (= (11)).
a. Bill shook Lisa awake.
b. Bill hammered the metal flat.
c. The critics laughed the play off the stage.
d. Dave drank the pub dry.
e. We yelled ourselves hoarse.
f. The professor talked us into a stupor.

The Japanese result expressions in (17) does not entirely correspond to the meaning of the English sentences in (16), but represent a very close meaning.

(17) a. Bill-wa Lisa-o yusuri-okoshi-ta
Bill-TOP Lisa-ACC shake-awaken-PAST
Bill shook Lisa awake
b. Bill-wa kinzoku-o tataki-nobashi-ta
Bill-TOP metal-ACC strike-flatten-PAST
Bill hammered the metal flat
c. Hihyoka-wa sono shibai-o warai-tobashi-ta
critic-TOP that play-ACC laugh-blow-PAST
d. Dave-wa sakaba-ga kara-ni-naru-hodo/?made non-da
Dave-TOP pub-NOM dry-NI-BECOME-HODO (MADE) drink-PAST
Dave drank the pub dry
e. Watashitachi-wa koe-ga kasureru-hodo/made saken-da
We-TOP voice-NOM hoarse-HODO (MADE) cry-PAST

We cried ourselves hoarse
f. Sensei-no-hanashi-wa wareware-ga mahi-suru-hodo/*made taikutsudat-ta
Professo-GEN-talk-TOP we-NOM numb-become-HODO /*MADE boring-PAST
The professor talked us into a stupor.

The examples (17a, b, c) are cases of compound verbs. (10d-f) use *hodo* or *made*, which means as far as/to the extent. The compound verbs and the *hodo*, the *made* expressions, can express resultative meaning differently.

First, the compound verb expression takes the form V1 + V2, and the second verbal factor, V2 includes the CAUSE, which allows the resultative interpretation. For example, "yusuri- okosu" can be represented as in (18).

(18) compound verb "yusuri-okosu"
(i). yusuri: shaking
(ii). okosu: awaken: λxλy [x CAUSE y BECOME AWAKE].
(iii). yusuri-okosu: λxλy [x CAUSE y BECOME AWAKE] by shaking y

Due to the CAUSE from V_2, the patient is in a resultative state. In resultative compound verbs, the resulting state must be realized, so (19) is ungrammatical.

(19)*Bill-wa Lisa-o yusuri-okoshita ga Lisa-wa oki-nakat-ta
Bill-TOP Lisa-ACC shaking-awaken-PAST but Lisa-TOP wake-NEG-PAST

Second, the meaning of the S_1 *hodo* S_2 construction is close to that of the English, *so... that* construction. In the S_1 *hodo* S_2, S_2 is the main clause, while S_1 represents the standard of the degree involved, and the content indicated by S_2 reaches that degree. S_1 can mean the result just as the English *so... that* construction, but its original meaning is a degree. So, this construction should be considered an equative rather than a resultative construction. Another characteristic of the construction with *hodo* is its implication of the resultative state. It implies that the state indicated by S1 is not realized in reality. This semantic property distinguishes *hodo* from *made*. This latter marker is precisely the same as the former in that it is close to that of the English *so that* construction, except that it indicates the resultative state does hold. Note that the English consequential expression "*Dave drank the pub dry*" indicates that Dave drank to the extent that they could say "the pub was empty" rather than consuming all the alcohol in the pub. The same is true for the Japanese counterpart "*Dave-wa sakaba-ga karani-naru-hodo non-da*," which most likely means that Dave's consuming alcohol at the pub is describable as the pub being dry. Unlike *hodo*, *made*, which has a similar function to *hodo*, clearly means that the second predicate is complete. See the examples below.

(20) a. Bill-wa Lisa-o yusuri-okoshi-ta (Compound verb: The resultative state is complete).
Bill-TOP Lisa-ACC shake-awaken-PAST
b. Bill-wa Lisa-ga okiru-HODO yusut-ta
Bill-TOP Lisa-NOM wake-HODO shake-PAST (The resultative state is incomplete).
c. Bill-wa Lisa-ga okiru-MADE yusut-ta
Bill-TOP Lisa-NOM wake-MADE shake-PAST (The

resultative state is complete).

The compound verb in (21a) and the expression with *made* in (21c) have almost the same meaning. In both cases, the resulting state has occurred. The *hodo*-construction should be chosen when the resulting state may not be complete. After all, there are three ways to express the meanings of the NV-type in Japanese.

In summary, Japanese does not have a fixed form to express the meanings of the NV-type resultatives where the CAUSE does not derive from the verb, but Japanese has alternatives to convey the resultative meanings similar to the English counterparts. Surprisingly, this pattern can be found in Romance languages, particularly Romanian, which we turn to in the next section.

4. Romance Languages' Resultative Constructions

Romance languages' resultative constructions (Romanian, Italian, etc.) are very similar to Japanese in their behavioral patterns. For instance, in (22), (23) below, Romanian has the V-type resultatives with accomplishment verbs, having the CAUSE deriving from the verb, but lacks the NV-type resultatives with non-change-of-state activity verbs.

(21) Romanian V-type resultatives
   a. Ion a vopsit gardul alb
    John has paint-PERF the fence-SG N white-SG N
    John has painted fence white
   b. Maria s- a vopsit roşcată blondă
    Maria REFL has dye-PERF red-SG F blonde-SG F
    Mary has dyed herself blonde
   c. Am tăiat hârtia rotundă
    have cut-PERF paper-SG F round-SG F
    have cut the paper round
   d. Copilul a spart geamul ţăndări
    the child has break-PERF the window splinters
    Child has broken windows into splinters
(22) examples intended to mean NV-type resultatives
   a. * Copilul a împins uşa deschisă
    the child has push-PERF door-SG F open-SG F
    The child has pushed door open
   b. * Ion a ciocănit firul plat
    John has hammer-PERF the metal-SG M flat-SG M
    John has hammered metal flat
   c. *Cutremurul l- a scuturat frezit
    earthequake CL3rd-SG M has shake-PERF awake
    The earthequake shook him awake
   d. *Dora si- a strigat raguşita
    Dora REFL has shout-PERF hoarse-SG F
    Dora shouted herself hoarse
   e. *Câinele l- a lătrat trezit
    the dog CL3rd-SG M has bark-PERF awake-SG M
    The dog barked him awake
   f. * Ei au băut ceainicut uscat
    they have drink-PERF teapot-SG N dry-SG M/N
They drank the teapot dry. (all examples: Farkas 2009).

Farkas [6], pp. 66-70, regarding this asymmetry between English and Romanian, presents a proposal, "the silent UP-TO hypothesis." She claims that English has a silent element, indicating an abstract path. This silent element renders an activity verb like *hammer* interpretable as an accomplishment having the endpoint represented by a predicate preceded by UP TO. For instance, "*John hammered the metal flat*" is interpretable as "*John hammered the metal* UP TO *(being) flat*." Romanian lacks such a covert element, so expressions with activity verbs cannot have a telic interpretation. However, she also argues that by adding *până (ce)*, which explicitly means UP-TO, these sentences with activity verbs can have telicity. In Italian, this function of rendering an atelic construction telic is shared by *fino a*, meaning UP-TO. Consider their correspondence to the Japanese equative marker *hodo* below.

(23) a. John beat Paul (UP TO) dead ⇒ There is a hidden UP TO in English.
   b.*Ion l- a bătut pe Paul mort ⇒ Romanian has no hidden UP TO
    John CL3rd-SG M has beat-PERF Paul dead
   c. Ion l- a bătut pe Paul până ce a murit ⇒grammatical with *până ce*
    John CL3rd-SG M has beat-PERF Paul UP-TO has die-PERF
   d.*Givanni ha battuto Paul morto. ⇒Italian has no hidden UP-TO,
    John has beat-PERF Paul dead
   e. Giovanni ha battuto Paul fino alla sua morte ⇒grammatical with *fino a* (up to).
    John has beat-PERF Paul UP-TO his death
   f.*John-wa Paul-wo shi-ni tatai-ta ⇒Japanese has no hidden UP-TO
    John-TOP Paul-ACC dead-NI beat-PAST
   g. John-wa Paul-o shinu-hodo tatai-ta⇒grammatical with *hodo* (Paul was not dead).
    John-TOP Paul-ACC dead-HODO beat-PAST
   h. John-wa Paul-o shinu-made tatai-ta⇒grammatical with *made* (Paul was dead).
    John-TOP Paul-ACC dead-MADE beat-PAST

As the examples above show, Japanese *hodo,* Romanian *până (ce)*, and Italian *fino a* have similar functions. However, the latter two indicate a path leading to the resultative state or location; Japanese Hodo works the head of a degree clause indicating a certain degree on the scale related to the context. Consider Romanian sentences with *până*.

(24) a. Ion l- a bătut pe Paul până ce a murit.
    John CL3rd-SG M has beat-PERF Paul UP-TO has die-PERF
    John beated Paul to death.
   b. Cutremurul a scuturat oraşul până la trezire.
    Earthquake has shake-PERF town until at wakening
    The earthquake shook the town awake.
   c. Paznicui i- a înfometat pe prizonieri până la moarte.
    Guard CL.3PL.M ACC has starve-PERF prisoners until at death

The guard starved the prisoners to death.[2]

In (24a) *până ce* is accompanied by AUX+VP (a murit). In (24b, c), *până* is the head of the path phrase, further accompanied by a prepositional phrase (la trezire, la moarte). The element *până* cannot be placed before an adjective. Concerning the status of these sentences with *până*, Farkas (2013) says, "it is not problematic to build constructions like (254 b) in Romanian, as the morphologically complex PP can be attached to any verb to denote the resulting state of the subject or the internal argument. Nevertheless, as the resulting structures have sentence-final adjuncts, they are not those true or strong resultatives that are (almost wholly) absent in this language. (Farkas 2013: 262).

This UP-TO hypothesis is meaningful to our discussion. However, it is not clear which English resultatives have this UP-TO element concealed in their meaning structure. Furthermore, the fact that Japanese and Romanian resultative expressions have a covert element corresponding to this UP-TO does not suffice to assume that there should be a concealed factor in English. We will return to this issue in section 6.

5. The Truth Conditions of Resultative Statements

5.1. Meaning of CAUSE [1, 4, 10]

Even if the semantic structure of the N-type resultative sentence, such as *John broke the vase into pieces*, is correctly represented by the lexical conceptual structure [X ACT ON Y CAUSE [Y BECOME Z]], the semantics of the CAUSE operator is left unexplained. In order to provide the truth condition for this proposition, we need to clarify what the CAUSE indicates. We will consider the two leading theories of causality; Hume's regularity theory and Lewis's counterfactual dependence theory.

(25) Hume's regularity theory of Causation [17], p. 131.

  c causes *e* iff

  i.   c is spatiotemporally contiguous to *e*;
  ii. *e* succeeds c in time; and
  iii. all events of type C (events that are like *c*) are regularly followed by events of type E (events like *e*).

If there are two spatially and temporally adjacent events, *c*, and e, "*c* causes *e*" holds when *c* precedes *e*, and all events C similar to *c* are accompanied by E similar to *e*. Applying this

idea to *John broke the vase into pieces* (and the corresponding expression in Japanese).

(26) Hume's regularity theory adapted to the V-type resultative

John broke the vase into pieces.

‖ [C John ACT ON vase] CAUSE [e vase BECOME broken + adjunct into pieces] ‖ = 1 iff

  (i).   John's action on the vase is spatiotemporally adjacent to the event that the vase is broken. ✓
  (ii). The former precedes the latter. ✓
  (iii). Actions similar to John's actions against the vase are most likely to lead to the destruction of the vase. ✓ (✓: tenable).

The V-type resultatives having their CAUSE deriving from the verb seem to be grasped by Hume's regularity theory of causality. Causality involved in Japanese V-type resultatives can be deciphered the same way. Let us see now how the NV-type resultatives can be treated.

(27) = (16).

  a. Bill shook Lisa awake.
  b. Bill hammered the metal flat.
  c. The critics laughed the play off the stage.
  d. Dave drank the pub dry.
  e. We yelled ourselves hoarse.
  f. The professor talked us into a stupor.

NV-type resultatives above can be divided into two groups, those with complete resulting states (27a, b, c) and those with incomplete resulting states (27 d, e, f). For discrimination, we call the first group NV-C, the latter NV-INC type. For instance, in (27a), Lisa finally was awake by Bill's shaking; in (27d), it is inconceivable that the pub became literally dry. The phrase *pub dry* functions as just an extent indicating how much Dave drank.

Consider how Hume's theory and Lewis's theory can work for these two groups of NV-type English resultatives.

(28) Hume's regularity theory of Causation adapted to NV-C type

Bill shook Lisa awake.

‖ [c Bill SHAKING] CAUSE [e LISA BECOME awake] ‖ = 1 iff

  (i).   Bill's action is spatiotemporally adjacent to the event that Lisa became awake. ✓ (✓: tenable).
  (ii). The former precedes the latter. ✓
  (iii). Actions similar to Bill's action may lead to the state of Lisa being awake next time. x (x: untenable).

(29) Hume's regularity theory of Causation adapted to NV-INC type

  Dave drank the pub dry.

‖ [c Dave DRINKING] CAUSE [e the pub BECOME dry] ‖ = 1 iff

  (i).   Dave's action is spatiotemporally adjacent to the event that the pub is dry. ✓
  (ii). The former precedes the latter. ✓
  (iii). Actions similar to Dave's action now may lead to the state of the pub being dry next time. x

The conditions of adjacency and precedence are satisfied

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2 Emma Tămâianu-Morita pointed out (personal communication, June 20, 2022), "even in this case (24 a), the grammatical *significatum* of the construction with *până ce* is in fact just a temporal one, totally equivalent with *până când* (until he died), and we can only identify it as "resultative" from a referential point of view, based on our knowledge of the world." Her remark reminds me of another Japanese equative marker MADE, which is usually used as a temporal marker indicating "until" but it also works as a degree marker to make an equative construction. She also argues 'examples like (24b, c) are treated in traditional Romanian grammar as "*complement circumstanţial consecutiv*." This "*complement circumstanţial consecutiv*" is usually a noun preceded by a preposition, most commonly *până*. I think the term "*consecutive*" (showing the consequence of…) is quite telling, in the sense that it shows the loose nature of the relationship between the events/states - not so specifically a result, though it might be an actual result in some cases.'

for both (28) and (29). Nevertheless, a similar act of shaking or drinking does not always cause *Lisa to be awake* or *a pub to be dry*. Furthermore, the resulting state must also be complete in this logical description. However, (29) does not entail "the pub is dry." Hume's theory, after all, cannot grasp the causality generally involved in both subgroups of NV-type resultatives.

Let us look at Lewis's theory of virtual reality causality, which is defined in (30):

(30) Lewis's counterfactual theory of causation [15].

Let *c* and *e* be actual events, and C and E be the corresponding propositions.

e depends causally on *c* iff

(i). C $\square \rightarrow$ E (if *c* were to occur, then *e* would occur).

(ii). ~ C $\square \rightarrow$ ~ E (if $\square$ *c* had not occurred, then *e* would not have occurred) ($\rightarrow$: counterfactual conditional).

If the event has happened, then the condition (i) above is satisfied, so all we need to do is to check whether (ii) is tenable. We are applying this to the previous examples.

(31) Lewis's counterfactual theory of Causation adapted to NV-C type

Bill shook Lisa awake.

‖ [$_c$ Bill SHAKING] CAUSE [$_e$ LISA BECOME awake] ‖

= 1 iff

(ii) If ~ [$_c$ Bill SHAKING] $\square \rightarrow$ ~ [$_e$ LISA BECOME awake] ‖ holds true.

(31ii), "If Bill had not shaken Lisa, she would not have become awake" seems to be justifiable.

(32) Lewis's counterfactual theory of Causation adapted to NV-INC type

Dave drank the pub dry.

‖ [c Dave DRINKING] CAUSE [e pub BECOME dry] ‖ = 1 iff

(ii) If ~ [$_c$ Dave drinking] $\square \rightarrow$ ~ [$_e$ pub BECOME dry] holds.

(32ii)"if Dave had not drunk, the pub would not have become dry" is unjustifiable. Even if Dave had not drunk at the pub, other customers might have drunk. Therefore, condition (ii) is not tenable. Furthermore, this formula with CAUSE cannot adequately capture the meaning of (27d) as it is inconceivable that the pub was dry.

After all, in the formulation with CAUSE to represent the semantics of NV-INC type constructions, both Hume's regularity theory and Lewis's counterfactual dependence theory fail to capture the meaning of the original sentence adequately.

The tentative conclusions are summarized in the following table:

Table 1. The typology of English causative resultatives.

type	Example	RP complete	Hume's theory	Lewis's theory
V	John broke the vase into pieces	✓	✓	✓
NV-C	Bill shook Lisa awake	✓	X	✓
NV-INC	Dace drank the pub dry	X	X	X

Note that there is a stark discrepancy between the NV-INC type and the others. What does it imply? We will examine the issue in section 6 after proposing a new way to look at the Japanese NV-resultatives.

5.2. Some Japanese NV-resultatives as Equative Construction

Recall the following two facts discussed above. First, although there are no valid NV-type resultative constructions in Japanese and Romanian, the expressions with *hodo* and *până* can express the contents close to the meanings of the English NV-type resultatives. Second, Lewis and Hume's theories of causality cannot capture the logical operator CAUSE, which appears in the English NV-INC-type resultatives. Considering these facts, we will apply a different perspective to the semantics of the Japanese sentences with *hodo* and Romanian with *până*, corresponding to English NV-INC-type resultative constructions. As mentioned in the previous section, we propose considering these expressions with resultative implications as equative constructions, not as resultative constructions. In other words, in the case of expressions with Japanese S$_1$ *hodo* S$_2$, [S$_1$ *hodo*] works as a modifier clause, and S$_2$ works as the main clause, in which [S$_1$ *hodo*] indicates a degree at a particular scale, and S$_2$'s corresponding degree is equal to (or more than) that degree.

5.2.1. Semantics of HODO Operator

For the time being, we concentrate on the semantics of HODO (capitalized as the logical operator), and then move on to semantic comparison with MADE. Consider some Japanese sentences with *hodo*, corresponding to English NV-INC type.

(33) a. Dave-wa sakaba-ga kara-ni-naru-hodo non-da
Dave-TOP pub-NOM dry-NI- BECOME-HODO drink-PAST
Dave drank the pub dry

b. Taro-wa koe-ga kareru-hodo saken-da
Taro-TOP voice-NOM become-hoarse-HODO cry-PAST
Taro cried himself hoarse

c. Sensei-no-hanashi-wa wareware-ga mahi-suru-hodo taikutsudat-ta
Professo-GEN-talk-TOP we-NOM numb-become-HODO boring-PAST
The professor talked us into a stupor.

These sentences with *hodo* have process verbs with no endpoints. We investigate how these sentences yield a resultative-like interpretation. We dub *hodo* appearing in these resultative-like constructions as Res-HODO (resultative-HODO). As for the semantic analysis of the Japanese equative marker, Tanaka [19] and Tanaka et al. [20, 21] argue that there are three different but interrelated types of HODO. First, let us see each of these cases and then compare them with the Res-HODO.

(34) Three kinds of HODO [19], p. 290.

   (i). as-HODO   Taro-wa   Jiro   hodo   se-ga
    takaku-nai/*takai

   Taro-TOP Jiro-HODO height-NOM tall-NEG/ *tall

   Taro isn't as tall as Jiro.

   (ii). so-HODO   Taro-wa   baskettobooru   sensyu-ni
    nareru-hodo se-ga takai/taku-nai

   Taro-TOP basketball player-DAT become-HODO
   height-NOM tall/tall-NEG

   Taro is/isn't so tall that he could become a basketball
   player.

   (iii). amazingly-HODO

   Taro-wa odoroku-hodo se-ga takai/*takaku-nai

   Taro-TOP surprise-HODO height-NOM tall/tall-NEG

   Taro is/isn't surprisingly tall.

(34 i) presents HODO as an NPI, (34ii) is a polarity insensitive use of HODO, and (34iii) presents HODO as a PPI, which is contrasted with an NPI and a polarity insensitive use of the same marker. The amazingly-HODO has a function of denoting extreme degrees. Comparing the Res-HODO with these three types of HODO, we see that the Res-HODO shares four important semantic properties with the amazingly-HODO as is sequentially shown in (35), (36), (37), and (38).

(35) PPI-hood

(i) Amazingly-HODO: Taro-wa odoroku-hodo se-ga takai/*takaku-nai

Taro-TOP surprise-HODO height-NOM tall/*tall-NEG

(ii) Res-HODO: Dave-wa sakaba-ga kara-ni-naru-hodo non-da/*noma-nakat-ta

Dave-TOP   pub-NOM   dry-NI-BECOME-HODO drink-PAST/drink-NEG-PAST

As we see above, the amazingly-HODO and Res HODO are both PPIs but attaching the contrastive marker WA renders them acceptable as NPIs, as shown in (36) below.

(36) NPI-hood with the Contrastive WA

(i) Amazingly-HODO: Taro-wa odoroku-hodo-wa se-ga takaku-nai/*takai

Taro-TOP surprise-HODO-WA height-NOM tall-NEG /*tall

(ii) Res-HODO: Dave-wa sakaba-ga kara-ni-naru-hodo-wa noma-nakat-ta/*non-da

Dave-TOP pub-NOM dry-NI-BECOME-HODO drink-PAST/drink-NEG-PAST

These two types of HODO evoke a set of alternatives, and for both of them, the original proposition is higher in the degree than the other alternatives, but its probability is lower than theirs. For instance, hearing the expression *sakaba-ga-karaninaru-hodo nonda,* a set of alternative expressions come to the hearer's mind: { *kanari nonda* (drink reasonable amount), *fudanyori-nonda* (drink more than usual)…}. However, the original phrase *sakaba-ga-karaninaru-hodo nonda* has a higher degree than the alternatives.

(37) alternative phrases and their ordering

   (i). amazingly-HODO:

    a. Taro-wa odoroku-hodo se-ga takai

    Taro-TOP surprise-HODO height-NOM tall

    alternatives:

   {kanari se-ga takai (reasonably tall), hyoujyun-yori
   se-ga takai (taller than the standard)...}

   b. Taro-wa kanari se-ga takai ga, odoroku-hodo
   de-wa-nai.

   Taro-TOP   reasonably   height-NOM   tall   but
   surprise-HODO de-WA-NEG

   Taro is reasonably tall but not surprisingly tall

   c. *Taro-wa odoroku-hodo se-ga takai ga kanari se-ga
   taku-nai.

   Taro-TOP   reasonably   height-NOM   tall   but
   surprise-HODO de-wa-NEG

   Taro is surprisingly tall but not reasonably tall

   (ii). Res-HODO

   a. Dave-wa sakaba-ga kara-ni-naru-hodo non-da
   Dave-TOP   pub-NOM   dry-NI-BECOME-HODO
   drink-PAST

   alternatives: {sokosoko nomu (drink moderately),
   kanari nomu (drink a fair amount)… }

   b. Dave-wa   kanari   non-da   ga,   sakaba-ga
   kara-ni-naru-hodo de-wa-nai

   Dave-TOP a fair amount drink-PAST but pub
   dry-ni become-HODO de-WA-NEG

   c. *Dave-wa sakaba-ga kara-ni-naru-hodo non-da ga,
   kanari de-wa-nai

   Dave-TOP   pub-NOM   dry-ni   become-HODO
   drink-PAST but a fair amount de-WA-NEG

Another exciting feature common to these two types is the feasibility of S_1HODO content.

(38) The feasibility of the content of S_1 HODO

   (i). Amazingly-HODO

   a. Taro-wa Guinness-ni noru-hodo kashikoi

   Taro-TOP Guinness-in appear-HODO intelligent

   Taro is so intelligent that he may appear in Guinness

   b. It is unlikely that he appears in Guinness

   (ii). Res-HODO

   a. Dave-wa sakaba-ga kara-ni naru-hodo non-da
   Dave-TOP   pub-NOM   dry-ni   become-HODO
   drink-PAST

   b. It is unlikely that the pub became dry in the end.

For both cases, the feasibility of the content of S_1 HODO is substantially zero. These facts above convince us that these two HODOs are very close.

5.2.2. Semantics of Res-HODO

Consider now how to stipulate the meaning of Res-HODO. First, note that ordinary process verbs have a degree of a related scale.

(39) walk too much, talk too much, drink too much, cry too much [13].

In most cases, adverbials modify the amount of action, for example, in case of *walk too much,* the adverbial phrase refers to the culminative amount of walking. However, as we will see below, some process verbs can be related to a set of degrees which is not the amount of action. As an illustration of analysis of Res-HODO, we use (31b) "*Taro-wa koe-ga kareru-hodo saken-da* (=Taro cried himself hoarse)." An explication of the intuition behind analysis is that Res-HODO

like (31b) conveys the meaning paraphrased as in (40):

(40) Taro cried even to the extent that he (his voice) became hoarse.

(40) makes a comparison of changes on two different planes. It correlates the relationship between the (cumulative) amount of Taro's crying and the state of his voice. As Taro continues to cry, his voice changes to jarring, husky, and hoarse. The amount of crying corresponds to the degree, which in turn corresponds to the state of voice quality. These two factors are related, as shown in the following figure:
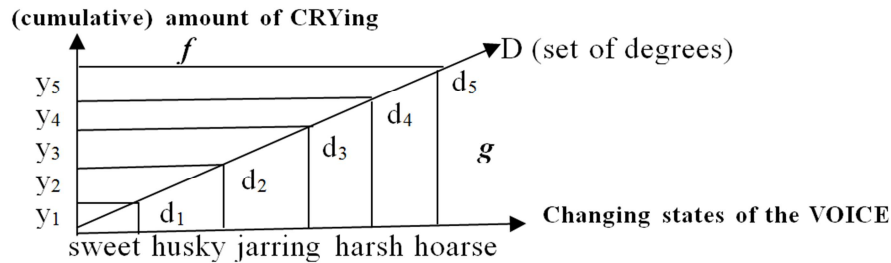

Figure 1. *Correlation between two changes on two different planes- crying and state of voice at w'.*

The vertical axis represents the strength or cumulative amount of crying, depending on the context. If a person shouts at the top of his voice only once and his voice becomes hoarse, the strength of crying matters. When one's voice becomes hoarse as one continues to cry, the cumulative amount of crying matters. We assume two functions, f and g, between variables on two different planes. The function f maps the amount of crying onto degrees. Then, another function, g, takes the degree and returns the corresponding state of the voice. For instance, the amount of a person's crying a_5 is mapped on d_5 by the agency of the function f; the function g takes this degree and relates it to the state of voice hoarse. Variables on two dimensions can be mediated and correlated by the set of degrees, to be more specific, by the two functions. [3] The amazingly-HODO deals with one dimension (height, for example), but the Res-HODO is defined on two dimensions. This is a stark difference between the two.

The Res HODO works as a comparative standard, and its degree d* can be defined as (41).

(41) ‖PRO's voice-become-hoarse-hodo‖

= λ d*. if PRO cries at d* degree at w', then his/her voice can be hoarse at w'.

= λ d*. sufficient-for-PRO's voice-to-be-hoarse-by-crying (d*).

(41) says that there is a certain degree of crying which is enough for people's voice to be hoarse. Note that the degree standard is defined not for a specific occasion but for general cases. Therefore, it does not matter whether the resulting state really holds or not. Crucially, the semantic property of the degree of the comparative standard has a higher position on the scale than those of alternatives, which is defined below.

(42) $\forall d \in C$ [d ≠ min (‖p-hodo‖) → d ≤ min (‖p-hodo‖)], where C is a contextually assigned comparison class with a specific dimension.

(42) says that for all degrees of comparison class, it is smaller than the minimum of the degree of the S_1 HODO.

Another important issue is about presupposition of the Res HODO. Since the Res HODO has the covert *even* as in (40), it induces a set of alternatives, and the original proposition must be more informative and less likely than the others. This is what Res HODO presupposes. Concerning this presupposition, Chierchia (2006, 2013) argues that any linguistic expression with a focusing effect and evoking a set of alternatives (ex. any, ever, every, *hodo*) must be checked by EXH (exhaustification function); otherwise, the sentence with that expression arises a contradiction and is judged as ungrammatical. Res HODO, including the notion of *even*, must be checked by $EXHE_E$ defined below.

(43) $EXHE_E = \lambda p. p \wedge \forall q \in ALT$ (p) [p <μ q], where p <μ q means that p is less likely than q with respect to some contextually relevant probability measure μ [3], p. 148.

(43) says that a proposition p holds, and for all q, which is a member of the p's alternatives, p is less likely than q. Applying (31b) to $EXHE_E$, the result is felicitous.

(44) $EXHE_E$(‖31b‖)= ‖31b‖ holds $\wedge \forall q \in ALT$ (‖31b‖) [‖31b‖<_μ q].

Since (33b) has a higher degree on the scale of the voice's changing state and implies its probability of occurrence is lower than any other alternative.

Following the discussion above, we can now show the semantics of Res HODO of (33b), then other examples in (33).

(45) p: Taro-wa koe-ga kareru-hodo saken-da
Taro-TOP voice-NOM become-hoarse-HODO cry-PAST

(i). Assuming *f, g* at w'
‖p‖$^{f,g,w'}$= 1 iff ∃d*[sufficient-for-PRO's voice-to-be-hoarse-by-crying (d*) $\wedge f$ (amount-of-cry (taro))≥d*] holds true at w'

(ii). [$\forall \in$d C [d ≠ min (‖ koe-ga-kareru-HODO ‖) → d ≤ min (‖koe-ga-kareru-HODO ‖)].

(iii). EXHE (p) does not create a contradiction.

The truth condition above says that (i) at w', there is a degree d* which is mapped to the voice state of being *hoarse* and Taro's cumulative amount of crying reaches or surpasses d*, (ii) a set of degrees of p-HODO is higher than other possibilities, and (iii) EXHE (p) is felicitous. Note that in (45), the CAUSE function does not appear. This truth condition does not entail that the resulting state described by

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3 Mathematically, two functions constitute a composite function *f*∘*g*, and note that *f*∘*g*(y_5)= hoarse, which clarifies the direct relation between the two variables.

Res-HODO eventually happens for Taro. Therefore, (45) captures a particular sense of causality between Taro's crying and his voice becoming hoarse not as a resultative but as an equative relation. We should also note that as for the difference between amazingly-HODO and Res-HODO, the former is concerned with only one plane and the latter, two planes. The Res-HODO works as the standard of comparison between changes on the two different planes by the intervention of two functions: f and g.

In the same vein, we present semantics of other examples in (33), omitting the conditions (ii) (iii) for simplicity:

(46) other Res-HODO sentences

a. q: Dave-wa sakaba-ga kara-ni-naru-hodo non-da
   Dave-TOP   pub-NOM   dry-NI- BECOME-HODO drink-PAST
   Dave drank the pub dry
   (i) Assuming f, g at w'
   $\|q\|^{f,g,w'} = 1$ iff $\exists d^*[$ sufficient-for-a-pub-to-be-dry(d*) $\wedge$ f[cumulative-amount-of-drink(Dave)]$\geq$d*] holds true at w'

b. r: Sensei-no-hanashi-wa wareware-ga mahi-suru-hodo taikutsu-dat-ta
   Professo-GEN-talk-TOP we-NOM stuporous-become-HODO boring-be-PAST
   The professor talked us into a stupor
   (i) Assuming f, g at w'
   $\|r\|^{f,g,w'} = 1$ iff $\exists d^*[$sufficient-for-PRO-to-be-stuporous-by-being-bored(d*) $\wedge$ f [cumulative-amount-of-boredom (professor's talk)]$\geq$d*] holds true at w'

As an additional explanation to (46b), the Japanese Res-HODO sentence does not precisely correspond to the corresponding sentence in English. The latter is because it does not mention the boredom of the professor's story. However, to interpret this English sentence in Japanese, it is necessary to infer some negative aspects of his story from the context, i.e., "boredom." Japanese Res HODO is meaningless without clarifying how the audience will be stubborn. Therefore, unlike the other two examples, it focuses on the cumulative amount of boredom in his story, not the culmination of his story. The audience may be tired, numb, and even stubborn if the story is boring.

6. Discussion and Conclusion

6.1. Discussion

6.1.1. Semantics of Res-MADE

In this last section, we suggest solutions to some crucial issues. As we have seen above, Res-HODO does not entail that the state depicted by the Res-HODO happens. Unlike Res-HODO, Res-MADE always implies the state takes place in the end. Unlike Res-HODO, the semantics of Res-MADE must contain the condition of completion of the resulting state. Consider the following:

(47) a. p': Taro-wa koe-ga kareru-made saken-da
   Taro-TOP   voice-NOM   become-hoarse-MADE cry-PAST

Taro cried himself hoarse
b. Assuming f, g at w'
   $\|p'\|^{f,g,w'} = 1$ iff $\exists d^*[$sufficient-for-PRO's voice-to-be-hoarse-by-crying (d*) $\wedge$ f (amount-of-cry (taro))$\geq$d* $\wedge$ hoarse (Taro's voice)] holds true at w'

Adding the condition of completion of the state (47b) indicates that Taro's voice is hoarse. This formulation seems pertinent to the analysis of Romanian *până*, to which we turn next. A we have seen above, Romanian has the V-type resultatives with accomplishment verbs, having the CAUSE deriving from the verb, but lacks the NV-type resultatives with non-change-of-state activity verbs. However, by adding *până (ce)*, which explicitly means UP-TO, these sentences with activity verbs can have telicity. Consider the examples again:

(48) = (24).

a. Ion l- a bătut pe Paul până ce a murit.
   John CL3$_{rd}$-SG M has beat-PERF Paul UP-TO has die-PERF
   John beat Paul to death.

b. Cutremurul a scuturat oraşul până la trezire.
   Earthquake has shake-PERF town until at wakening
   The earthquake shook the town awake.

c. Paznicui i- a înfometat pe prizonieri până la moarte.
   Guard CL.3PL.M ACC has starve-PERF prisoners until at death.
   The guard starved the prisoners to death.

According to Farkas [7], p. 262, building telic constructions in Romanian is not problematic since *până* can be attached to any verb to denote the resulting state. Emma Tămâianu-Morita pointed out (personal communication, June 20, 2022) that the resulting states really happened in these sentences. For (48a), Paul died because of being beaten; (48b), people were woken up; and (48c), the guard starved the prisoners until they were dead. Observing these facts, we think Romanian *până* is closer to MADE than HODO. In this respect, Romanian does not have a distinction corresponding to that of NV-C and NV-INC subtypes since their RPs always hold. Taking this fact into consideration, (48b) can be represented as in the following:

(49) a. s: Cutremurul a scuturat oraşul până la trezire.
   the earthquake has shake-PERF town until at wakening
   The earthquake shook the town awake.

b. Assuming f, g at w'
   $\|s'\|^{f,g,w'} = 1$ iff $\exists d^*[$sufficient-for-PRO-to-be-awake-by-shaking (d*) $\wedge$ f (amount-of-shake (the earthquake))$\geq$d* $\wedge$ awake (the town)] holds true at w'

(49b) indicates that there is a degree d*, sufficient for people to be awake, and the strength of the earthquake reaches and surpasses the degree, and the town becomes awake. (49b) is an equative interpretation. The two expressions *până* and *made* are very similar in meaning.[4]

6.1.2. Some Implications for English NV-type Resultatives
Consider the following table again.

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4 However, *până* seems to have a clearer characteristic as a temporal expression rather than a degree quantifier.

Table 2. *The typology of English causative resultatives.*

type	Example	RP complete	Hume's theory	Lewis's theory
V	John broke the vase into pieces	yes	yes	yes
NV-C	Bill shook Lisa awake	yes	no	yes
NV-INC	Dace drank the pub dry	no	no	no

It is worth reiterating that the point drawn from the table is that there is a stark contrast between the strong-INC and the others. Examine the following examples of strong-INT resultatives:

(50) a. Dave drank the pub dry.

b. We yelled ourselves hoarse.

c. The professor talked us into a stupor.

The combinations of the second predicate and their subject: [the pub-dry], [ourselves-hoarse], and [us-into-a-stupor] seem to work more as the degree modifiers for the main clauses rather than resulting states. For instance, *Dave drank the pub dry* is paraphrasable as Dave drank to the extent that the pub dry. Considering these two facts: (i) there is a clear semantic difference between the strong-INC and the others (see table 2 above); (ii) the second predicates work as the degree modifiers; it should be justified to consider that the strong-INC type as an equative construction and to represent their truth conditions in the same way as Japanese Res-Hodo:

(51) a. We yelled ourselves hoarse.

b. Assuming *f, g* at w'

$\|p\|^{f,g,w'} = 1$ iff $\exists d^*$[sufficient-for-PRO's-voice-to-be-hoarse-by-crying $(d^*) \wedge f$ (amount-of-cry (we))$\geq d^*$] holds true at w'

This way, we can avoid using CAUSE even for some English NV-INC-type resultatives. However, as for the NV-C-type resultatives, they have a complete resultative state, and its CAUSE, even though how it derives is still unclear, does not produce any semantic gap like NV-INC type resultatives. Therefore, it's no reason to represent them with the Res-HODO.

6.2. The Conclusion

We have discussed critical semantic aspects of Japanese, Romanian, and English causative resultative expressions. The discussion so far can be summarized in the three tables below.

The comparison of English and Japanese causative resultative expressions are summarized in table 3:

Table 3. *The typology of English/Japanese causative resultative expressions.*

Type	Examples	Origin of CAUSE	RP complete	Type of construction
Weak	(E) Bill painted the wall green. (J) Kenji-wa kabin-o konagona-ni kowashi-ta Kenji-TOP vase-ACC pieces-into break-PAST 'Kenji broke the vase into pieces.'	Lexical	✓	Resultative
strong-C	(E) Bill hammered the metal flat. (J) Bill-wa Lisa-o yusuri-okoshi-ta Bill-TOP Lisa-ACC shake-awaken-PAST 'Bill shook Lisa awake.'	Construction? Lexical (compound verbs)	✓ ✓	Resultative
strong-INC	(E) The professor talked us into a stupor. (J) Dave-wa sakaba-ga kara-ni-naru-hodo non-da Dave-TOP pub-NOM dry-NI- BECOME-HODO drink-PAST 'Dave drank the pub dry.'	Cause: not involved	X X	Equative

✓ : tenable, X: untenable

English and Japanese causative resultative expressions can be classified into three types: weak, strong-C and strong-INC. The first two can be judged as equative constructions rather than resultative constructions since these two types seem not to involve the logical operator CAUSE, not having a complete RP, and their second pairs of the subject-predicate work more as a degree modifier.

Now examine the typology of Romanian counterparts:

Table 4. *The typology of Romanian causative resultative expressions.*

Type	Examples	Origin of CAUSE	RP complete	Type of construction
V	Copilul a spart geamul ţăndări the child has break-PERF the window splinters 'Child has broken windows into splinters.'	Lexical	✓	Resultative
NV	a. Ion l- a bătut pe Paul până ce a murit. (până ce) John CL3$_{rd}$-SG M has beat-PERF Paul UP-TO has die-PERF 'John beat Paul to death.' b. Cutremurul a scuturat oraşul până la trezire. (până la) Earthquake has shake-PERF town until at wakening 'The earthquake shook the town awake	No CA USE	✓ ✓	Equative

✓ : tenable, X: untenable

We can enumerate the results above in five points: first, these languages have the V-type resultative constructions in common. The causality involved in this type is of verb origin. Second, although there are no valid NV-type resultative constructions in Japanese and Romanian, the expressions with *hodo* and *până* can express the contents close to the meanings of the English

NV-type resultatives. Third, the English NV-type resultatives are distinguished between the NV-C and NV-INC subgroups. The logical operator CAUSE, which the NV-INC type supposedly contains, cannot be captured by the theories of Lewis and Hume. Fourth, we have proposed an idea to consider these Japanese and Romanian expressions with causal-resultative implications as equative rather than resultative constructions. However, Romanian *până* constructions retain a temporal significance more than Japanese *hodo*. To be more specific, we explained the meaning of the NV-INC-type constructions of these languages as follows: we devise a way to describe a degree corresponding to an extreme state, and the subject reaches or surpasses the degree, which, in turn, explicates a causal relationship between the action and the state. This method does not draw on CAUSE to explain a causality between an action and the resultative state. Finally, since English NV-INC-type resultatives behave similarly to Japanese Res-HODO sentences, they both have an RP that does not come to completion and works more as a degree modifier than a resultative state. Therefore, we can analyze English NV-INC type resultatives, similarly to Japanese Res-HODO semantics, as an equative construction. In short, we conclude that some resultatives, unlike the existing theories, are equative constructions.

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References

[1] Beebee, H. & Hitchcook, C. & Menzies, P. 2009: *The Oxford Handbook of Causation*. Oxford, UK: Oxford University Press.

[2] Bittner, M. 1999: 'Concealed Causatives,' *Natural Language Semantics* 7, 1-78. http://dx.doi.org/10.1023/A:1008313608525

[3] Chierchia, G. 2013: Logic in Grammar: Polarity, free choice, and intervention. Oxford, UK: Oxford University Press.

[4] Collins, J., Hall, N. & Paul, L. A. 2004: Counterfactuals and Causation: History, Problems, and Prospects. In J. Collins, N. Hall, & L. A. Paul (Eds.), *Causation and Counterfactuals* (pp. 1-57). Cambridge, MA: MIT Press.

[5] Dowty, D. R. 1979: *Word Meaning and Montague Grammar*. Boston, MA: Reidel Publishing Company.

[6] Farkas, I-A. 2009: 'Some difference between English and Romanian resultatives constructions,' *BWPL*.

[7] Farkas, I-A. 2013: Resultative constructions in English and Romanian: A comparative analysis ISBN: 978-973-595-616-5.

[8] Goldberg, A. E. & Jackendoff, R. 2004: 'The English Resultative as a Family of Constructions,' *Language*, 80: 532-568. http://dx.doi.org/10.1353/lan.2004.0129

[9] Hamamoto, H. 2022: 'English and Japanese Resultatives,' International Journal of English and Cultural Studies, vol. 5 no. 1 44-58.

[10] Hume, D. 2000a/1739: *A Treatise of Human Nature*. D. E. Norton, & M. J. Norton (Eds.) *Oxford Philosophical Texts*. New York, NY: Oxford University Press.

[11] Hume, D. 2000b/1748: *An Enquiry concerning Human Understanding*. D. E. Norton, & M. J. Norton (Eds.) *Oxford Philosophical Texts*. New York, NY: Oxford University Press.

[12] Iwata, S. 2019: *English Resultatives A force-recipient account*. Amsterdam: John Benjamins.

[13] Kennedy, C. & McNally, L. 2005: Scale structure, degree modification, and the semantics of gradable predicates. *Language*, vol. 81, no. 2, 345-81. http://dx.doi.org/10.1353/lan.2005.0071

[14] Kratzer, A. 2005: 'Building resultatives,' In Maienborn, C. & Wollstein-Leisen, A. (Eds.) *Events in syntax, semantics, and discourse* (pp. 177-212). Berlin: Niemeyer. http://dx.doi.org/10.1515/9783110913798.177

[15] Lewis, D. 1973: *Counterfactuals*. Cambridge, Mass: Harvard University Press.

[16] Li, C. 2014: A Three-Way Distinction of English Resultatives and Its implication for Resultative Typology, *Concentric: Studies in Linguistics* 40. 2: 1-28.

[17] Psillos, S. 2009: Regularity Theories. In Helen, B. Hitchcook, C. & Menzies, P. (Eds.) *The Oxford Handbook of Causation*. New York, NY: Oxford University Press.

[18] Simpson, J. 1983: 'Resultatives,' In Levin, L. Rappaport, M. & A. Zaenen (Eds.) *Papers in Lexical-Functional Grammar* (pp. 143-157). Bloomington: Indiana University Press.

[19] Tanaka, E. 2022: 'Amazing-HODO,' In Gotzner, N. and Sauerland(eds.) *Measuremnts, Numerals and Scales*, Parlgrave Studies in Pragmatics, Language and Cognition.

[20] Tanaka, E. Mizutani, K. and Solt, S. 2019: 'Existential semantics in equatives in Japanese and German,' In *Proceedings of the 22nd Amsterdam Colloquium*. 377-386.

[21] Tanaka, E. Mizutani, K. and Solt, S. 2020: 'Equative *hodo* and the polarity effects of existential semantics,' *New Frontiers in Artificial Intelligence: JSAI-AI International Workshops, JURISIN, AI-Biz, LENLS, Kansei-AI yokohama*, Japan.

[22] Washio, R. 1997: 'Resultatives, compositionality and language variation,' *Journal of East Asia Linguistics,* 6: 1-49. http://dx.doi.org/10.1023/A:1008257704110