1. **Introduction:** One important issue in the syntax-semantics interface is how and how much the syntactic representation reflects a semantic interpretation. To this end, this paper investigates the syntax and semantics of sentences that contain ‘measurable’ predicates, focusing on comparative deletion constructions in Japanese. I propose that a measurable predicate can be treated as a measure function from objects to degrees, developing a compositional semantics for measure phrases, degree constructions and comparative deletion constructions.

2. **Clausal Complement of yori(mo):** Primarily measurable predicates can be directly measured by measure phrases. The classifier kai counts the number of events. The adverbial measure phrase san-kai ‘three-times’ directly counts the number of sneezing events in (1a). Note also that san-kai can either precede or follow the accusative noun phrase kusyami-o ‘sneeze-ACC’. If a predicate is primarily measurable, the comparative construction in (1b) expresses the comparison between the number of sneezes Yuki did and the number of sneezes Eri did.

   Indirect measurable predicates are predicates that can be measured with respect to incremental themehood (Gunji and Hasida, 1998). The measure phrase san-bon ‘three-bottles’ in (2a) is derived from the incremental theme sake, because the classifier bon counts the number of bottles. The measurement of the drinking events in (2a) is homomorphic to the amount of the denotation of sake and thus the measure value associated with san-bon is the numeral 3 with the dimension of three-bottles. Since a measure phrase that measures the event is least restricted, san-bon can either precede or follow the accusative noun phrase sake-o (If a measure phrase is associated with an agentive subject, it cannot follow an accusative noun phrase. cf. Miyagawa, 1989). If an NP gap corresponds to an incremental theme, the comparative deletion construction is available as shown in (2b). (2b) expresses the comparison between the amount of sake Yuki drank and the amount of sake Eri drank.

   If a compared NP is not identical, it can remain intact, where the complement of yori(mo) is a full clausal structure that can stand alone as in (2c). If the compared NP is not an incremental theme but an agent, the comparison between the number of teachers who drank sake and the number of students who drank sake (or wine) is not possible as in (2d). (2d) expresses the amount of sake teachers drank exceeds the amount of sake (or wine) students drank. The measurability of the event can be confirmed by the question-answer pairs in (3-4). Dono kurai ‘how much’ asks the amount or the number of events. The primarily measure phrase san-kai in (3b) and the indirect measure phrase san-bon in (4b) can be an appropriate answer, respectively.

3. **Analysis:** A core assumption about gradable adjective meanings is that a semantic ontology of degree is required (Bartsch and Vennemann, 1972; 1973; Bhattacharyya and Takahashi, 2007; 2008; Bierwisch, 1989; Cresswell, 1977; Hackl, 2000; Heim, 1985; 2000; Kennedy, 1999; 2001; 2007; Kennedy and McNally, 2005; Schwarzschild and Wilkinson, 2005; Seuren, 1973; Stechow, 1984; Takahashi, 2006). Following Kennedy (1999), I treat a gradable adjective as a measure function from objects to degrees (Alternatively, it is also possible to assume that a gradable adjective denotes degree relations). I propose that a measurable predicate can be treated as a measure function (a kind of type-shifting rule): a function that measures the degree of the event an object participates in along a scalar dimension. I posit the measure of degree function \( \mu \) in (5) that takes an object and returns the degree that represents the amount or the number of the event. Like other measure functions, \( \mu \) must combine with some degree morpheme to denote a property of individuals. I posit the abstract verbal morpheme pos\( \omega \) and coupled with \( \mu \), the abstract morpheme returns (6), where the measurement based on \( \mu \) is true of an object \( x \) just in case the degree to which \( x \) possesses exceeds the standard of comparison associated with \( \mu \). The core assumption here is that measurable predicates can derive a degree that is saturated by measure phrases, degree expressions and the (abstract) comparative morpheme -er/more. Since a degree is derived from predicates, it can be saturated by adverbial measure phrases or the verbal suffix -sugiru ‘too’ (Nakanishi, 2006). Given the assumption that measure phrases denote degrees, measure phrases saturate the degree argument and denote properties of individuals. Since the abstract morpheme pos\( \omega \) denotes a partial ordering relation, the semantics of (1a) will be (7a). I posit a null degree operator that is adverbial in the yori(mo) clause (Grisham, 1987; Ishii, 1991; Izvorski, 1995; Seuren, 1973). The semantic function of the null degree operator is, coupled with a derived degree, denotes a degree that functions as a standard of comparison that is ordered with a reference value derived from the matrix clause. If the comparative clause denotes a definite description of a maximal degree, the comparative clause of (1b) will be (7b), where max expresses a maximality operator and Q is a function from properties to truth values. The ordering relation of this sentence is expressed in (7c). Finally, if a part of the meanings of (incremental theme) bare plurals is a function \( M \) from plural objects to amounts, the semantics of (2b) can be expressed as in (7d), where \( X \) expresses a variable over pluralities.
(1) a. Yuki-ga san-kai kusyami-o (san-kai) si-ta.
   Yuki-NOM three-times sneeze-ACC three-times do-PAST
   ‘Yuki sneezed three times.’

   b. Yuki-ga [Eri-ga (kusyami-o) si-ta yori(mo)] takusan kusyami-o si-ta.
   Yuki-NOM Eri-NOM sneeze-ACC do-PAST than more sneeze-ACC do-PAST
   ‘Yuki sneezed more than Eri did.’

(2) a. Yuki-ga san-bon sake-o (san-bon) non-da.
   Yuki-NOM three-cl sake-ACC three-cl drink-PAST
   ‘Yuki drank three bottles of sake.’

   b. Yuki-ga [Eri-ga sake-o non-da yori(mo)] takusan sake-o non-da.
   Yuki-NOM Eri-NOM sake-ACC drink-PAST than more sake-ACC drink-PAST
   ‘Yuki drank more sake than Eri did.’

   c. Yuki-ga [Eri-ga wain-o non-da yori(mo)] takusan sake-o non-da.
   Yuki-NOM Eri-NOM wine-ACC drink-PAST than more sake-ACC drink-PAST
   ‘Yuki drank more sake than Eri did wine.’

   d. Kyosi-ga [gakusei-ga sake-o (/wain-o) non-da yori(mo)] takusan
   teacher-NOM students-NOM sake-ACC /wine-ACC drink-PAST than more
   sake-o non-da.
   sake-ACC drink-PAST
   ‘*More teachers drank sake than students did (wine).’
   ‘Teachers drank more sake than students did (wine).’

(3) a. Dono kurai Yuki-ga kusyami-o si-ta no?
   how much Yuki-NOM sneeze-ACC do-PAST Q
   ‘How much did Yuki sneeze?’

   b. San-kai.
   three-cl
   ‘Three times.’

(4) a. Dono kurai Yuki-ga sake-o non-da no?
   how much Yuki-NOM sake-ACC drink-PAST Q
   ‘How much sake did Yuki drank?’

   b. San-bon.
   three-cl
   ‘Three bottles.’

(5) \( \mu = \lambda x.\mu(x) \)

(6) \( pos_v(\mu) = \lambda x.\mu(x) \succ S_\mu \)

(7) a. \( \mu\text{sneeze}(y) \geq \text{three times} \)

   b. \( \text{Deg}_C = \lambda \mu Q.\max\{d \mid Q(\lambda x.\mu(x) \geq d)\} \to \max\{d \mid \mu\text{sneeze}(e) \geq d\} \)

   c. \( \mu\text{sneeze}(y) \geq \max\{d \mid \mu\text{sneeze}(e) \geq d\} \)

   d. \( \exists X[sake(X) \land \text{drank}(y, X) \land M(X)] \geq \max\{n \mid \exists Y [sake(Y) \land \text{drank}(e, Y) \land M(Y)]\} \)

References
