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Epistemology of Space and Time: Analysis of Conceptual Metaphors in English and Japanese

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1. Framework

This study adopts the cognitive semantic theory of metaphor, originated and developed by Lakoff and Johnson. In this theory, metaphor is defined as conceptual mapping from the source domain onto the target domain, and the image-schematic structure of the source domain is said to be preserved in metaphorical mappings, as seen in the following descriptions.

The definition of "metaphor" by Lakoff (1993a : 28) :

Metaphor is the basic mechanism by which abstract concepts are understood in terms of more concrete concepts. Metaphors are conceptual mappings from structures in one conceptual domain (the source domain) to structures in another domain (the target domain).

The Invariance Principle :

Metaphorical mappings preserve the cognitive topology (that is, the image-

schema structure) of the source domain, in a way consistent with the inherent structure of the target domain. Lakoff (1993b: 215)

The Invariance Principle implies that the target domain structures are not totally constructed by the mapping of the source domain structures, but they have their own inherent structures which can restrict the mapping itself. The image schema of the source domain, however, is said to be mapped onto the target domain, therefore there should be some kind of unidirectional mapping from the source domain onto the target domain.

The concept of image schema is taken from Johnson's. Since Johnson does not give a short definition, his descriptions are combined into the following working definition of my own.

Working Definition of "Image Schema":

A recurrent, dynamic pattern, shape, and regularity of our perceptual interactions and motor programs that gives coherence and structure to our experience, consisting of a small number of parts and relations by virtue of which it can structure indefinitely many perceptions, images and events.

It is presupposed that the Path Schema (an image schema which consists of a source, a goal, and a sequence of contiguous locations connecting the source and the goal) is the one preserved in the TIME AS MOTION metaphor. The Path Schema includes nothing other than these elements, nor any information about lexicalization (whether each element of the concept is lexically expressed or not).

The structure of the source domain (spatial motion) is analyzed in terms of Talmy's (1985) Motion Event Frame, and the constraints on the mapping from spatial motion to time are specified in relation to this frame.

2. Constraints on the Motion-Time Mapping

Preceding studies have shown that both English and Japanese have the TIME AS MOTION metaphor, which maps the concept of spatial motion onto passing of time, and that there are two sub-metaphors: the TIME IS A MOVING OBJECT metaphor and the TIME IS A LINE ALONG WHICH OBSERVERS MOVE metaphor in both languages. The former is the metaphor which conceptualizes time as something that moves and humans as observers of the motion of time; the latter is the metaphor which conceptualizes humans as moving objects and time as some landscape where humans move. English examples are : "*The time will come* when ....." (TIME IS A MOVING OBJECT), "*We are approaching* the end of the year." (TIME IS A LINE ALONG WHICH OBSERVERS MOVE), and so forth. These submetaphors and their examples are discussed by Lakoff and Johnson (1980), Johnson (1987), Lakoff (1993b), Yamanashi (1995), Yamaguchi (1995), Shinohara (1996), and others. It has been also claimed that, in this metaphor, what is mapped is the Path Schema.

The new finding by this study is:

(a) The fact that some source-domain structures other than the Path Schema are also mapped in the TIME IS A MOVING OBJECT metaphor.
(b) The mapping of these extra-image-schematic structures is restricted (that is, they are partial mappings).
(c) The restrictions are summarized as four constraints, which are discussed in sections 2.1-2.4.

These partial mappings are seen in the mappings of specific information concerning the elements of the Motion Event Frame (Talmy (1985) with a slight revision of my own). The Motion Event Frame consists of the following elements.

Motion Event Frame

1. The Central Elements

(i) Figure (the moving object)

(ii) Ground (the reference-object with respect to which the motion is conceptualized)

(iii) Path (the course followed or site occupied by the figure object with respect to the Ground object)

(iv) Motion

2. The Non-Central Elements

(v) Manner (the way in which the Figure moves)

(vi) Cause, Circumstance, and Resultant State

When the source domain structures other than the elements of the Path Schema (source, goal, and contiguous locations connecting the source and the goal) are examined, some of them are found to be preserved in the target domain, while others are not preserved. These partial mappings are analyzed in this study as the following four constraints.

2.1 The Front-Back Constraint

Spatial orientation of motion (one aspect of the Path of motion in the central elements of the Motion Event Frame) is one of the extra-image-schematic structures, since the Path Schema includes no information about it. The spatial orientations which can be mapped onto time are basically restricted to front and back. Other spatial orientations such as up-down, right-left, north-south, and others are rejected in motion-time mappings, except in some idiomatic expressions using up-down orientation. This constraint is found both in English and Japanese, as seen in the following examples (asterisk indicates that it is an incorrect, inappropriate use).

(e.g. 1) a. John died ten days *before* [after /**to the right of* /**to the left of* /**to the south of* /**above* /**below*] his wedding.

b. John wa kekkonshiki no tooka *mae* [*ato* / **migi* / **hidari* /**minami* /**ue* / **shita*] ni shinda. (=(1a))

The spatial orientation (front-back) and the temporal orientation (future-past) are mapped in terms of two reference points: the observer and the time. There are four logically possible patterns of Future/Past assignment to the Front-Back slots for the two reference points.

Fig. 1. Four patterns of Future-Past assignment to the Front-Back axis.

	Observer		Time	
	Front	Back	Front	Back
(a)	Future	Past	Past	Future
(b)	Past	Future	Past	Future
(c)	Past	Future	Future	Past
(d)	Future	Past	Future	Past

These four patterns can be regarded as typological parameters of the structure of time concept in human languages, if every one of the four has at least one language which has the assignment pattern (though this study does not deal with this typological question).

It is clear from existing examples that English and Japanese select the same parameter (a) above. That is, the observer is facing the future and the time is facing the past. These are illustrated by the following examples. (Japanese has the same kind of pairs.)

(e. g. 2) a. In the weeks *ahead of* us ..... (future)
b. That's all *behind us* now. (past)
c. Coming up in the weeks *ahead*.... (future)
d. For some time *back* ..... (past)

(e. g. 3) a. In the *following* weeks .... (future)
b. In the *preceding* weeks ..... (past)
c. John left *behind* schedule. (future)
d. Paul came *ahead of* schedule. (past)

(Lakoff and Johnson 1980: 41-2, Lakoff 1990: 56, Yamaguchi 1995: 205, Shinohara's italics)

Apparently contradictory expressions like 'We are looking *forward* to the *following* weeks' or 'San nen *mae* o *furikaeru* (three years front ACC look-back)' can be explained in terms of these dual reference points and parameters of assignment of orientation. (There can be other languages which select (b), (c), or (d). Malagasy is a candidate for (b).)

2.2 The Straight Path Constraint

The shape of the path of motion is also an extra-image-schematic structure. The use of nonstraight paths is restricted to a considerable extent both in English and Japanese, though this is not an absolute constraint. Cyclic time is possible in both languages, but the application of cyclic (nonstraight) paths is not free. It seems that the cyclic path is available only when some repetitious experience is involved.

(e. g. 4) a. Time *passed* [**zigzagged / *circled*] by.
b. Toki ga *sugite* [**dakooshite / *mawatte*] itta. (=(4a))

Neutral expressions of time (including no repetitious experience) are thus restricted to straight motion.

(e.g.5) a. Leap year [*3:17 PM / *the end of the world] came around.
b. Uruudoshi[*gogo 3-ji 17-fun / *sekai no owari] ga megutte kita. (= (5a))

Time expressions which imply some repetitious experience allow nonstraight motion, but otherwise it is inappropriate to use verbs of nonstraight motion in this kind of expressions.

The restriction of the use of cyclic path in the motion-time metaphor to repetitious experiences may be because the concept of cyclic time is motivated by our repetitious experiences, especially those of natural phenomena.

2.3 Restriction on Manner Information

Manners of motion are another kind of extra-image-schematic information. These are not totally excluded from the mappings, but are restricted in a consistent way. Since English and Japanese differ in their dominant conflation patterns (English is a"Motion+Manner"-type language, while Japanese is a "Motion+Path"-type language according to Talmy's (1985) typology), English has a far greater number of"Motion+Manner Verbs"than Japanese. That is, English has a dominant set of motion verbs which conflate the concept of"motion"itself and that of "manner" (the way in which the object moves), while Japanese has a dominant set of motion verbs which conflate the concept of"motion" and that of"path." By analyzing 168 English Motion+Manner Verbs and 13 Japanese Motion+Manner Verbs plus 64 Japanese compound verbs of [Motion+Manner Verb] + [Motion+Path Verb] type, some common characteristics of the Motion+Manner Verbs which are compatible with time metaphors were found. The verbs examined

are listed at the end of this paper.

Verbs which are used without the sense of inappropriateness in the TIME IS A MOVING OBJECT metaphor are:

English: flow, fly, crawl, creep, dash, hurry, march, run, rush, sneak, roll, slide, slip, glide

Japanese: nagareru (flow), ? hashiri-saru (run-leave), tobi-saru (fly-leave), nagare-saru (flow-leave), kake-nukeru (run through), shinobi-yoru (sneak-approach)

These verbs imply either of the aspects (a) saliently high or low speed, (b) motion which is unnoticeable to the observer, (c) motion with regular rhythm, (d) invariable, smooth motion, as shown in Fig. 2 (English) and 3. (Japanese).

Thus:

Positive Factors concerning manners of motion are;

(a) speed (saliently high or saliently low)

(b) unnoticeable motion

(c) invariable motion

(d) regular rhythm

There are also some negative factors for Motion+Manner Verbs in the TIME IS A MOVING OBJECT metaphor. See Fig. 4.

Fig. 2.

	speed	unnoticeable motion	regular rhythm	invariable motion
flow	-	-	-	+
fly	+h	-	-	+-
crawl	+l	+-	-	-
creep	+l	+	-	-
dash	+h	-	-	-
hurry	+h	-	-	-
march	-	-	+	-
run	+h	-	-	-
rush	+h	-	-	-
sneak	+l	+	-	-
roll	-	-	+-	+
slide	-	+	-	+
slip	-	+	-	-
glide	-	+	-	+

[+] indicates that the verb has the implication, [-] indicates otherwise. [+-] indicates that both cases are possible depending on context. [+h] means "high speed" and [+l] means "low speed."

Fig. 3.

	speed	unnoticeable motion	regular rhythm	invariable motion
nagareru	-	-	-	+
?hashiri-saru	+h	-	-	-
tobi-saru	+h	-	-	-
nagare-saru	-	-	-	+
kake-nukeru	+h	-	-	-
shinobi-yoru	+l	+	-	-

(As for representation, see Fig. 2.)

As seen in Fig. 4, implication of "limb motion" functions as a negative factor if the verb has none of the positive factors (swim, shuffle, walk, skip, and

Fig. 4.

	limb motion	instrument	speed	unnoticeable motion	regular rhythm	invariable motion
fly	+	-	+h	-	-	+-
crawl	+	-	+l	+-	-	-
run	+	-	+h	-	-	-
*swim	+	-	-	-	-	-
*shuffle	+	-	-	-	-	-
*walk	+	-	-	-	-	-
*skip	+	-	-	-	-	-
*limp	+	-	-	-	-	-
*cruize	-	+	-	-	-	-
*canoe	-	+	-	-	-	-
*jet	-	+	+h	-	-	-
*rocket	-	+	+h	-	-	-

(As for representation, see Fig. 2.)

limp in Fig. 4), while if the verb has one or more positive factors, the verb is an appropriate one in this metaphor (fly, crawl, and run in Fig. 4). By contrast, implication of "instrument" is an absolute negative factor, since implication of a positive factor does not save the verb if it has "instrument" aspect (jet and rocket in Fig. 4). Likewise, some other absolute negative factors are detected by examining other motion verbs: "sound emission" (e. g., bang, gurgle, rattle and others), "up-down or random motion" (e. g., climb, prowl and others), "specific circumstance of motion" (e. g., swim, wade, plow and others), "plural figures" (e. g., troop). Expressions like 'Time *climbed* on,' 'Time *helicoptered* away,' 'Time *wriggled* on,' 'Time *rattled* by,' or 'Time *swam* by' are far less appropriate (or even inappropriate) because these verbs have negative factors.

Among these negative factors, only "limb motion" becomes ineffective by the implication of one or more positive factors. The other five are always effective as negative factors.

Thus:

The negative factors conditioning the use of Motion+Manner Verbs in the TIME IS A MOVING OBJECT metaphor are;

(a) up-down or random (non-front-back) motion
(b) implication of the type of instrument used
(c) implication of sound emission
(d) salient motion of limbs or body-internal motion
(e) implication of specified circumstances of motion
(f) motion of plural figures.

While English has at least 14 Motion+Manner Verbs which are often used in the TIME IS A MOVING OBJECT metaphor, Japanese has only 6 Motion+Manner Verbs which can be used for the TIME IS A MOVING OBJECT metaphor. They are 'nagareru (flow),' 'hashiri-saru (run-leave),' 'tobi-saru (fly-leave),' 'nagare-saru (flow-leave),' 'kake-nukeru (run-go through),' and 'shinobi-yoru (hide-approach).' Except 'nagareru,' all of them are compound verbs which are formed by [Motion+Manner Verb]+[Motion+Path Verb]. The above positive and negative factors, however, seem to be common in English and Japanese.

The major difference between English and Japanese concerning this metaphor is seen in the pattern of expressing manners of motion. The striking difference is that English allows the Motion+Manner Verbs which have one or more positive factors but not negative factors (except limb motion) to be used in single forms, in most cases accompanied by Path expressions such as 'by,' 'on,' or 'away,' while Japanese allows only one single verb ('nagareru' (flow)) and requires other Motion+Manner verbs such as 'tobu (fly),' 'hashiru / kakeru (run),' 'hau (crawl / creep),' 'suberu (glide / slide)' or 'korogaru (roll)' to be accompanied by a

Motion+Path Verb or by a simile marker 'yooni (as if)' plus Motion+Path Verb like 'sugiru (pass)' or 'sugite iku (pass go).' This difference seems to be due to the difference in lexicalization patterns between English and Japanese. Verbs like 'fly,' 'run,' 'crawl,' or 'creep' (and the counterparts in Japanese) basically denote an action, which prototypically implies change of place (these are called "Motion-Propelling Action Verbs" by Kageyama (1997)). In these verbs, Manner information is attributed to the action itself, not to the motion. In order to denote change of place, these English verbs requires, in most cases, Path information expressed mostly by adverbs or prepositional phrases, since English is "Motion+Manner"-type language. Bycontrast, since Japanese is a "Motion+Path"-type language, it does not regularly use Path expressions outside the verbs; that is, basic Path information is conflated in verbs. Thus, when temporal motion is expressed by a Motion-Propelling Action Verb in Japanese, the Path information is attached to the expression by the use of a compound verb or by attaching 'yooni (as if)' and a Motion+Path Verb.

In spite of this difference, it is clear that English and Japanese share the fundamental constraints on motion-time mappings. The difference is seen only in the patterns of lexical realization, which are consistent with the major patterns of lexicalization of the Motion Event Frame.

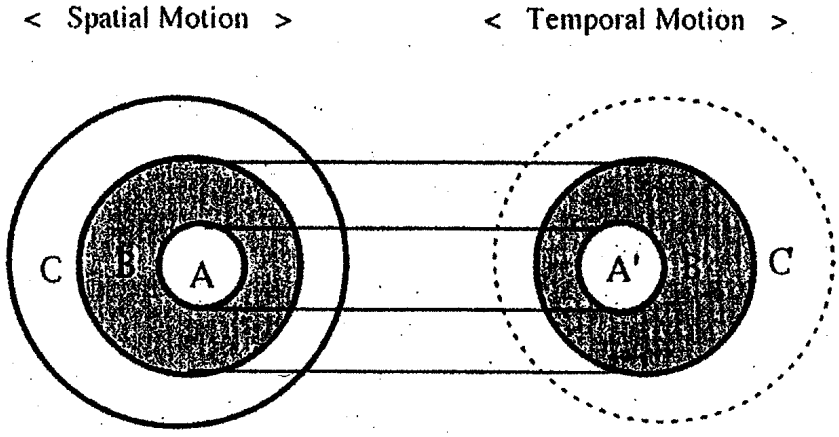
2.4 Exclusion of Cause, Circumstance, and Resultant State

The sixth elements of the Motion Event Frame (Cause, Circumstance, and Resultant State) are consistently excluded from motion-time mappings both in English and Japanese. Thus, the expressions lik 'Time blew off' (meaning 'Time passed quickly'), 'Time *wore wings* to the past' (meaning 'Time flew away'), 'The examination day stuck to next Wednesday' (meaning 'The examination day came as near as next Wednesday'), and so on are rejected.

3. Conclusion

In motion-time mappings, the aspects of spatial motion such as orientation (front-back, up-down, right-left, north-south, etc.), the shape of the path (straight, curve, circular, zigzag, etc.), and manners of motion ('run,' 'fly,' 'creep,' 'wiggle,' etc.) are only partially mapped. The same constraints are found in English and Japanese. Since these constraints concerns extra-image-schematic structures of the source domain, it is concluded that the partial mappings are seen outside the image schema in the TIME IS A MOVING OBJECT metaphor. The Path Schema is preserved, since these constraints do not affect the mappings of this image schema.

Fig. 5.



In Fig. 5,

A→A' : The Path Schema is completely mapped.

B→B' : The part of the conceptual structure of spatial motion which is allowed by the constraints is mapped.

C→C' : The rest of the conceptual structure of spatial motion (rejected by the constraints) is not mapped.

Rejection of mapping seems to be caused by the structure of the target domain concept (the concept of passing of time) and our basic experiences.

(i) The Front-Back Constraint seems to be motivated by our experience of basic direction of motion. Our asymmetrical body with inherent front and back, and our bodily structure designed to move in the direction of the front, mark the front-back axis as the most basic, important one for human beings. The front-back axis is the only purely one-dimensional direction, and this one-dimensional nature accords with the one-dimensionality of time.

(ii) The Straight Path Constraint seems to come from the equivalent nature of time with the ordinal structure of events or our mental process of dealing with perception, cognition, or memory. If we can assume that the conceptual structure of time emerges from the ordinal structure inherent in our mental process and the consequent ordinal recognition of events, it is understood that the structure of time is most naturally represented as one-dimensional structure.

(iii) The positive and the negative factors concerning the TIME IS A MOVING OBJECT metaphor are also understood as motivated by the structure of the concept of time. Speed (high or low) and unnoticeable motion (our unawareness of the passing of time) are our subjective feelings about time projected onto the motion of time. The other two of the positive factors are the result of our concept of time that time is passing constantly, incessantly, or invariably in always the same manner. The negative factors, which must not be mapped onto time, can also be explained in terms of the conceptual structure of time. "Up-down or random motion" is excluded by the Front-Back constraint, and the other negative factors ("instrument used," "sound emission," "salient bodily motion," "specified circumstance," and "plural figure") are also explained by the conceptual structure of time, which we

assume to lack such elements.

(iv) Exclusion of Cause, Circumstance and Resultant State is also motivated conceptually. These elements are rejected because our concept of time tells us that there can be no agent acting on the motion of time and thus causing time to move, that time is engaged in no other activities than motion itself, and that time undergoes no durative change of state caused by its motion.

Thus, the constraints are experientially, cognitively, or conceptually motivated. They are not arbitrary conventions with no relation to human experience. These motivated constraints suggest that some part of the conceptual structure of time may be universal to human beings. As clarified in this paper, English and Japanese have striking similarities in the structure of the TIME AS MOTION metaphor. Considering that English and Japanese are genetically and areally remote to a considerable degree, and that they differ in their dominant lexicalization patterns of motion events, these similarities must be attributed to the universal structure of human conceptualization of time, that is, the universal structure of the space-time metaphor. Yet the fact that English and Japanese differ in some part suggests that the space-time metaphor, when expressed in language, can be affected and constrained by the grammatical and lexico-semantic structure of the language.

To summarize in plain words, we conceptualize time as something similar to spatial motion, something that is structured in terms of the structure of spatial motion, but not all of the aspects of spatial motion are mapped onto the concept of time. The structure of the concept of time plays an important role in restricting this mapping. This study discussed some of the constraints on this partial mappings, whereby some aspects of the relationship between the concept of spatial motion and that of time were clarified.

Appendix

Motion verbs examined in this study.

Asterisk indicates that it is inappropriate to use the verb in expressions like"Time _____ by (away, on, etc.)." Question marks indicate that the use of the verb is not totally inappropriate but it is somewhat strange ot it needs some special context (judged by two to five native speakers).

1. List of Motion+Manner Verbs (English) (168)

(a) Verbs of Motion by spontaneous (internal) cause

?amble, ?bowl, *burst, ?canter, *clamber, *climb, crawl, creep, dash, *flit, fly, ?gallop, ?hasten, *hike, ?hobble, *hop, hurry, ?inch, *jog, *jump, ??lag, *leap, *limp, ?lumber, ?lurch, march, ?mosey, ?nip, ?pad, *parade, *plod, *plow, *pop, *prowl, ??race, *ramble, *roam, *rove, run, rush, ??saunter, *scramble, ??scud, ?scurry, *scuffle, ?scuttle, ??shamble, ??shuffle, *skim, *skip, *slouch, sneak, *soar, speed, ??stagger, *stalk, *stray, ?stride, *stroll, *strut, *stumble, *swagger, ?sweep, *swim, ??tear, ?tiptoe, *toil, *toddle, *totter, *tramp, *trek, *troop, ?trot, *trudge, *vault, *waddle, *wade, *walk, *wander, ?zip

(b) Verbs of Motion by unconscious (external) cause

*bounce, *bound, *coil, ??drift, *float, flow, glide, *meander, ??revolve, roll, slide, slip, slither, *swing, *tumble, *whirl, *wind

(c) Verbs of Motion with the type of instrument used

*cruise, *drive, *fly (by plane), *ride, *row, ??sail

Verbs derived from nouns of instruments

*bicycle, *bike, *boat, *bus, *cab, *canoe, *chariot, *cycle, *dogsled, *ferry,

*helicopter, *jeep, *jet, *oar, *paddle, *pedal, *raft, *rocket, *skate, *ski, *sled, *sleigh, *taxi, *yacht

(d) Verbs of sound emission

*babble, *bang, *beat, *beep, *burr, ??buzz, *chatter, *clash, *clatter, *hiss, *gurgle, *rattle, ??roar, *rumble, *screech, *shriek, *splash, *thump, *whistle, ??zoom

(e) Verbs of dancing

*boogie, *dance, *jig, *jive, *polka, *rumba, *samba, *tango, *waltz

(f) Verbs of bodyinternal motion

*buck, *fidget, *kick, *rock, *teeter, *twitch, *waggle, *wiggle, *wobble, *wriggle

2. List of Motion+Manner Verbs (Japanese) (14 single verbs and 63 compound verbs)

(I) Single Motion+Manner Verbs

*aruku (walk), *hashiru (run), *haneru (leap), *hau (crawl), *kakeru (run), *moguru (dive), *oyogu (swim), *tobu (fly), *tobu (jump), *chiru (scatter), *korogaru (roll), nagareru (flow), *suberu (slide), *mau (dance),

(II) Compound Verbs : [V1 (Manner)+V2 (Path)]

*aruki-mawaru (walk around), *ayumi-deru (walk out), *ayumi-saru (walk-leave), *hai-agaru (crawl up), *hai-deru (crawl out), *hai-mawaru (crawl around), *hai-modoru (crawl back), *hai-oriru (crawl down), *hane-agaru (leap up), *hane-mawaru (leap around), *hane-modoru (leap back), *hashiri-deru (run out), *hashiri-komu (run into), *hashiri-mawaru (run around), *hashiri-oriru (run down), ?hashiri-saru (run-leave), *kake-agaru (run up), *kake-komu (run into), *kake-mawaru (run around), *kake-meguru (run around), *kake-modoru (run back),

*kake-noboru(run up), kake-nukeru (run through), *kake-oriru (run down), *korogari-deru(roll out), *korogari-komu(roll into), *koroge-mawaru (roll around), *korogari-modoru(roll back), *korogari-nukeru(roll through), *korogari-ochiru(roll-fall), *korogari-oriru(roll down), *korogari-saru(roll-leave), *mai-agaru(dance up), *mai-komu(dance into), *mai-modoru(dance back), *mai-ochiru (dance-fall), *mai-oriru (dance down), *suberi-komu(slide into), *nagare-deru (flow out), *nagare-komu (flow into), *nagare-kudaru (flow down), *nagare-ochiru(flow-fall), nagare-saru(flow-leave), *nagare-tsuku(flow-arrive), *nige-dasu (sneak away), *oyogi-mawaru (swim around), *oyogi-saru (swim-leave), *oyogi-tsuku (swim-arrive), shinobi-yoru (sneak-approach), *suberi-deru(slide out), *suberi-komu(slide into), *suberi-ochiru(slide-fall), *suberi-oriru(slide down), *tobi-agaru(junp up), *tobi-dasu(jump out), *tobi-deru(jump out), *tobi-koeru(jump over), *tobi-komu(jump into), *tobi-mawaru(jump/fly around), *tobi-oriru(jump down), tobi-saru(fly away)

(Ⅲ) Compound Verbs: [V1(Manner)+ V2(Manner)]

*mai-chiru(dance-scatter), *mai-tobu(dance-fly)

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