How is evolution expressed sound-symbolically?
An analysis of the monster names of *Digital Monster*
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Introduction: Kawahara et al. (2018) offer an exhaustive analysis of Pokémon character names from the perspective of sound symbolism, in which particular sounds are associated with particular meanings (Hinton et al. 1994). Though some Pokémon characters evolve and their names change as a result, Kawahara et al. found that, as Pokémon characters evolve, the number of voiced obstruents in their names and their length in morae are more likely to increase in their names (e.g., *po-p-po* (3morae) → *pi-**j**yo-n* (3) → *pi-**j**yo-t-to* (4)). However, few studies since Kawahara et al. have examined how evolution is expressed sound-symbolically using a set of large corpus like names of Pokémon characters. The current study investigates whether the same trend found in Pokémon names is observed as well in the more than 700 monster names of a Japanese computer game named *Digital Monster* (aka *Dezimon*), in which each monster transforms into another form through evolution.

Analysis: The current analysis extracted 806 monster names from the official website of *Digital Monster* [1] and targets 708 of them. There are eight stages of evolution, each of which was encoded numerically. The current study applied (multiple) regression analysis, the dependent variables being evolutionary stages, and the numbers of voiced obstruents and morae being independent variables.

Results & Discussion: Table 1 indicates the average numbers of morae and of voiced obstruents at each evolutionary level. As Figures 1 and 2 show, the higher the evolutionary stage, the more likely the number of morae is to increase, and the more likely the number of voiced obstruents is to increase. Multiple regression analysis shows an interaction effect between morae and voiced obstruents ($t = -4.17$, $p < .001$), which means that the effects of morae and voiced obstruents are not independent of each other. We then conducted Spearman's correlation analysis to determine which effect pertains to the names of *Dezimon* characters. The results showed that the correlation between evolutionary level and the number of morae is moderate ($\rho = 0.38$, $p < .001$) whereas that between evolutionary levels and the number of voiced obstruents is very weak ($\rho = 0.16$, $p < .001$). It follows that evolution is expressed by increasing the number of morae in the monster names of *Dezimon*.

Fig.1: Mora

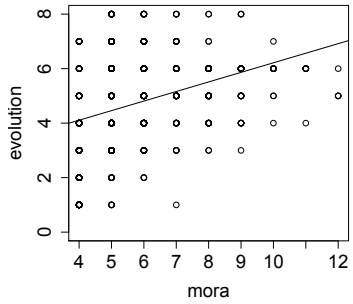

Fig.2: Voiced Obstruents

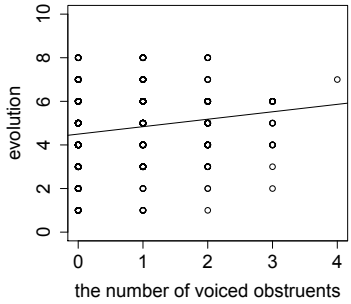

Table 1: Average numbers of mora and voiced obstruents at each evolution level

evolution	*N*	Mora	VdObs
1	34	4.21	0.26
2	36	4.33	0.31
3	84	4.98	0.62
4	150	5.77	0.83
5	142	6.29	0.80
6	164	6.79	1.04
7	66	5.48	0.58
8	32	6.09	0.88
ALL	708	-	-

References

Kawahara, Shigeto, Atsushi Noto, and Gakuji Kumagai. 2018. Sound symbolic patterns of Pokémon names. *Phonetica* 75(3): 219-244.
[1] https://www.b-boys.jp/series/digimon/