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論文の内容の要旨

Displacement is one of the defining features of human language. The term refers to the ability to talk about things that are remote in space or time (or both) from the context of the utterance (Hockett, 1960). However, it is not clear which aspects of displacement are unique to human language. Here, we consider displacement in the context of communication (We call this "displaced communication") to clarify what is truly unique to human language. The understanding of displacement is thought to contribute to the study of the origin and evolution of human language.

We classified displaced communication, and distinguished two kinds of displacement, displacement in a broad sense: displacement to tell what the receiver knows, from displacement in a narrow sense: displacement to tell what the receiver does not know. Displacement unique to human language is displacement in a narrow sense, and to realize this, different mechanisms are required. As such mechanisms, we focused on motivated meaning extension, which is to extend the meaning of existing signs based on similarity or proximity by metaphor or metonymy.

In previous research, we focused on the three kinds of studies, the study on the changes of symbol systems in laboratory experiments (Kirby et al, 2008; Fay et al, 2003), the study of metaphor and metonymy as cognitive processes (Lakoff & Johnson, 1980), and the study of pragmatics, especially the relevance theory (Sperbel & Wilson, 1986/95) or lexical pragmatics (Wilson & Wharton, 2009). Through these studies, we proposed three hypotheses related to the formation of displaced communication;

Hypothesis 1: motivated meaning extensions (metaphor and metonymy) are used more in displaced communication to tell what the receiver does not know

Hypothesis 2: motivated meaning extensions are understood through interactions based on mutual hypothesis formation. The qualitative changes of symbol system may occur in such processes.

Hypothesis 3: motivated meaning extensions are sometimes inhibited in the symbol system with strong

motivated form-meaning relations.

We designed an experimental framework for displaced communication based on graphical communication task (Fay et al, 2003) to examine the realization process of displacement in a narrow sense. Drawings function as an "iconic" symbol system because the outline of an object can be a symbol indicating that object. Communication through drawings enables us to observe what kinds of changes of symbol system occur during interaction from initial iconic system. We conducted graphical communication experiments to 18 pairs of Japanese native graduates. By comparing two kinds of drawing tasks each corresponds to displacement in a broad sense (Known task) and in a narrow sense (Unknown task), we examined the difference in use of motivated meaning extensions. Drawing tasks are composed of a noun and an adjective; **Known** task: A **familiar** combination of an adjective and a noun, and **Unknown** task: An **unfamiliar** combination of an adjective and a noun.

In the drawings, we observed two kinds of figurative expressions; **Alternative** Expression: Expressions that represent the feature of an absent object with another object that typically has the feature and **Bodily** Expression: Expressions that represent the feature of an absent object with motions and body parts that typically cause the feature. We also observed that Both alternative and bodily expressions were used together in one picture. Hence there are four types of expressions; Both Alternative and Bodily Expression, and Neither Alternative nor Bodily Expression.

The result of 2×2 ANOVA showed that Both Alternative and Bodily Expression are used more in the latter half of the Unknown task. Both Alternative and Bodily Expression seems to be effective to the receiver's understanding. The relationship between the number of correct noun and adjective suggested that the identification of noun serve to understand adjective. This seems to reflect the structure of conceptual metaphor (Lakoff & Johnson, 1980), in which the feature of the source concept is transferred to the target concept. In addition, we observed examples in which the receivers generated meanings through interactions based on mutual hypothesizing. The receiver formed a hypothesis about what the sender was trying to tell from the drawing. The sender guessed the receiver's understanding from the reply and tried to modify it by drawing a new picture. Through repetitions of these interactions, the receivers came to understand the senders' intentions.

We conducted graphical communication experiments to 5 pairs of deaf undergraduates, who use Japanese Sign Language in daily communication. Sign language is considered to have strong motivated form-meaning relations. We examined whether motivated meaning extensions are inhibited by tendency to use strong motivated form-meaning relations. Deaf participants tended to use Alternative expression more in Unknown task, and Bodily expression more in both tasks, compared to the results of (spoken) Japanese natives'. Deaf participants did not use Alternative expression in Known task. Alternative expression is considered to be a general strategy to tell what the receiver does not know, while Bodily expression seems to be affected by modality of communication. The same relationship between the number of correct noun and adjective was observed in deaf participants' result, which suggests the

structure of conceptual metaphor (Lakoff & Johnson, 1980). We also observed examples of interactions based on mutual hypothesizing, in which deaf participant could not identify a noun and an adjective by Alternative expression.

From these results, Hypothesis 1: motivated meaning extensions (metaphor and metonymy) are used in displaced communication to tell what the receiver does not know was supported. Alternative expression is considered to be a kind of conceptual metaphor, which is a cognitive mechanism to understand an abstract object in terms of more concrete object. Bodily expression is considered to be a kind of metonymy, which play a role in directing one's attention to a target, in the combination with Alternative expression.

Hypothesis 2 is also suggested to supported, motivated meaning extensions were understood through interactions based on mutual hypothesizing. The qualitative changes from motivated iconic system to figurative system with metaphor and metonymy occur in the process.

In Known task, deaf participants' did not use Alternative expression and used Alternative expression in Unknown task, but could not identify the task. This result seems to partly support Hypothesis 3: motivated meaning extensions are inhibited in the symbol system with strong motivated form-meaning relations. However, we need more samples and data to clarify Hypothesis 3.

Keywords: displacement, communication, meaning extension, mutual hypothesizing, change of symbol system

論文審査の結果の要旨

人間の言語は動物のコミュニケーションにはない様々な特質がある．その中でも，超越性＝会話の場から時間的・空間的に(またはその両方で)離れた事象，過去・未来・架空の状況について話すことができるという性質は，知識を表現し伝える上で重要な言語の設計特徴である．進化言語学では，合成性の成立や記号システムの創発といった言語の重要な特徴については研究が進んできたが，超越性が実際にどのようなもので，それはいかにして成立したのかという点についてはまだ理解が進んでいるとは言えない．

本論文は，超越性がどういった点で人間言語に特有であるのかを示し，その成立メカニズムを明らかにすることを目的とした．知識科学の文脈において超越性を考えると，ただ超越的な表現をするだけではなく，それが他者に理解されるというコミュニケーションの場で考察する必要がある．そのような分析を行った結果，人間の言語コミュニケーションに特徴的な超越性とは，受け手が知らない対象を伝える超越的コミュニケーションであり，記号によってこれを実現するには，記号形式と記号内容の新しい関係を作る記号拡張が不可欠であることを示した．

そこで，言語が記号システムである点に焦点を当て，伝える対象を受け手が知っている場合と知らない場合で，記号の使い方がどう異なるかを検討する実験を行った．実験は，近年発達している実験記号論の枠組みにのっとり，参加者2人が描画により与えられた課題を伝えるというものである．自然言語を

用いることなくコミュニケーション課題を行わせることで，記号を用いる能力が発揮されて課題達成に至るプロセスを分析できる．日本語母語話者を参加者とした実験の分析の結果，受け手が知らない対象を伝えるコミュニケーションでは，類似性に基づいた意味拡張（メタファー的推論）により記号関係の脱接地をさせ，随伴性に基づいた意味拡張（メトニミー的推論）により新しい記号関係へ収束させるという有契的記号拡張の使用が有効な方略であることを明らかにした．そして，超越性の成立にいたる過程で，記号は類像的なシステムから比喩的なシステムへと質的に変化することを示した．さらに，ろう者を参加者とした実験を通じて，有契的対応付けが強い手話を日常的に用いる場合，有契的意味拡張が阻害されることがあることも示した．以上の結果を考察し，超越性を成り立たせる能力は心の理論と有契性を利用した記号拡張の推論であり，このような能力は言語特有ではないため，超越性は生物進化というより社会的相互作用における学習と有契的意味拡張を通じた文化進化によって成立した可能性が高いことを示唆した．

　以上，本論文では，実験記号論の枠組みを用いた描画コミュニケーション実験により，他者が知らない知識を伝えられる超越性という人間言語の特性の成立メカニズムを示し，それが文化進化で成立した可能性を示唆するという言語進化についても新たな知見を与えた．このように，本研究は高い学術的意義があり知識科学への貢献が大きいため，博士（知識科学）の学位論文として十分価値あるものと認めた．