様　式　Ｃ－１９、Ｆ－１９－１、Ｚ－１９　（共通）

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研究課題名（和文）An Exploratory Study of Enactment and Movement Based Pedagogy in a Foreign Language Context

研究課題名（英文）An Exploratory Study of Enactment and Movement Based Pedagogy in a Foreign Language Context

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研究成果の概要（和文）：　身体化された認知は、言語理解を含む認知が感覚運動系に根ざしていることを主張するものである。したがって、行動と結びついた言語学習は、学習成果を高める可能性がある。本研究プロジェクトでは、英語の句動詞を学習する際に、他人がその意味を演じる様子を見ながら学習すると、日本語のサポートを受けて学習した学生よりも統計的に優れていることが示された。第二の研究は、記憶課題前の身体運動が記憶保持に有効であることを示す理論に基づくものである。この研究プロジェクトでは、被験者内デザインを用いて、英語の句動詞を学習する前に歩くと、座って読んで学習する場合に比べて、長期記憶では学習効果が向上することが示された。

研究成果の学術的意義や社会的意義
この研究の学術的意義は、言語理解と身体的な動きの間に関連性があることを示す証拠を提供したことです。また、体を動かすことは身体の健康を増進するだけでなく、気分や記憶力を向上させる可能性があることを示している。

この研究の社会的意義は、学習者が座って座りっぱなしでいるときに学習するのが最適であるという仮定に挑戦している。むしろ、本研究の結果は、英語語彙の学習におけるジェスチャーの重要性を指摘し、学習前の動作が学習に最適な状態を作り出すことを示唆している。 要するに、学習前に身体を動かす機会を増やすことが重要

研究成果の概要（英文）：Embodied cognition has had a major impact in the fields of cognitive linguistics and education. It argues that cognition, including language comprehension, is grounded in the sensorimotor systems. Thus, learning language coupled with the action (i.e., gesture, enactment) has the potential to enhance the learning outcomes. Using a quasi-experimental design, this research project showed that when students learned English phrasal verbs accompanied by viewing others enact the meaning of them statistically outperformed students who learned them with L1 (Japanese) support. A second study was based on theories that show how physical movement (i.e., a simple bout of exercise) before a memory task facilities memory retention. Using a within-subjects design, this research project showed that walking before learning a set of English phrasal verbs improved the learning of them, compared to sitting and reading before learning them, for long-term memory, but not for short-term memory.

研究分野：外国語教育関連

キーワード：embodied learning　enactment　phrasal verbs　vocabulary learning

様　式　Ｃ－１９、Ｆ－１９－１、Ｚ－１９（共通）

１．研究開始当初の背景（Research Background)

Total Physical Response (TPR) (see Asher, 1966) developed as an innovative way to teach foreign languages in the 1960s and 1970s. However, it faded in popularity, as cognitive approaches to teaching began to dominate the field, which saw the body as irrelevant for language learning. However, over the last couple decades, theories of embodied cognition have become more prevalent and both theoretically and empirically show the importance of the body for learning. For example, recently researchers have empirically supported a TPR approach for teaching (Garcia et al., 2019). In addition, research from the foreign language classroom have also confirmed the benefit of movement as a way to facilitate the learning of vocabulary through the use of gestures (Macedonia, 2014; Morett, 2014).

This research project aimed to further this line of research. In all, two research experiments were conducted during this research project and both used English phrasal verbs (PV) as the test material within a foreign language context in order to examine the benefits of movement for learning. In one study (see Birdsell, 2021), the author tested three different teaching approaches to see if one had an advantage in facilitating the learning of the phrasal verbs. The author used the following three approaches to test this: (1) teaching the PVs through the use of L1 translation; (2) teaching the PVs with an image that represents the meaning of the PV; or (3) Teaching the PVs with a video of actors enacting the meaning of the PV. This experiment will be called Experiment 1: Enactment and the Learning of English Phrasal Verbs in the following sections of the report. In the second study (see Birdsell, under review), the author extended this notion of movement-based learning by examining the effect a single bout of exercise before a learning session had on learning the PVs. This is a growing area of research interest, however there are still few studies that have done this within a foreign language context (e.g., Schmidt-Kassow et al., 2014), so this study aimed to fill this gap. This will be called Experiment 2: Physical Movement Before Learning English Phrasal Verbs in the following sections of this report.

２．研究の目的（Research Purpose)

Experiment 1: Enactment and the Learning of English Phrasal Verbs

The following research questions were examined in this study.

1. RQ1: Did learners scores on the post- PV tests significantly improve from the pre-PV tests?
2. RQ2: Did learners scores from one group significantly improve more than the other groups?

Experiment 2: Physical Movement Before Learning English Phrasal Verbs

The following research questions were examined in this study.

1. RQ1: Does a short bout of physical exercise by Japanese university students before learning a set of English phrasal verbs enhance the learning of them; and
2. RQ2: Does physical exercise improve the overall mood of these students?

３．研究の方法（Research Methods)

Experiment 1: Enactment and the Learning of English Phrasal Verbs

As described by the author (see Birdsell, 2021), 80 students participated in this study. These participants were randomly assigned to 3 groups: the L1 translation group (N =26); the cognitive image group (N =26); and the enactment group (N =28).

A pretest-posttest design was used for the purpose of comparing groups and measuring changes from the PV teaching interventions. The material consisted of a 50-item PV-test. As for the teaching interventions, each group was presented the same set of PVs in the same order, but differed in their presentation approach. For example, students in the L1 translation group were presented the PVs accompanied with Japanese translations; the students in the cognitive image group were presented the PVs accompanied by simple diagrams/images that highlighted the meaning of them; and students in the enactment group were presented the PVs accompanied by videos of student(s) enacting the meaning of them.

Experiment 2: Physical Movement Before Learning English Phrasal Verbs

As described by the author (see Birdsell, under review), a total of 39 Japanese university students participated in this within-subject study. An English Phrasal Verb (PV) test was developed for this study to use as the dependent variable. In total, this test consisted of 40 items that were then further divided into two 20 item sets used as the material for the teaching interventions for the two conditions. Each set consisted of 7 verb stems (e.g., hand, break) that made up the 20 phrasal verb items (e.g., hand out, break down).

The participants came to the lab four separate times. In the first session, they participated in one pre-experimental evaluation session where they signed the consent form; were explained the purpose of the study; took the 40-item PV pretest, to measure their current knowledge of the phrasal verbs used in this study; and finally scheduled the next two sessions. During the next two sessions, they came to the lab in pairs, at a time they had chosen to either first walk on a treadmill, or to sit and read a book. So, half did the treadmill walking before the learning intervention for session 2 and the other half did the sitting/reading before it. Then for session 3, these roles were reversed. For the treadmill condition, participants walked at a moderate speed and for the sitting/reading condition, the participants sat in an adjoining room at a desk and read an English book. In both conditions, the participants did these activities for 20 minutes. Immediately afterwards, the paired participants sat together in the same room and completed a survey that measures positive and negative affect (called the PANAS). Next, they watched a 12-13 min PowerPoint video recording of the researcher presenting Set 1 (20-items) of PVs. Then, they took a PV test to measure short-term memory (STM). During the next session, the roles were reversed and they learned Set 2 (20-items) of the PVs. Finally, after one week, for the fourth session, all the participants took a delayed posttest consisting of the complete 40-item PVs to measure long-term memory (LTM) retention of the PVs (see Figure 1 for the schematic representation of the study design).

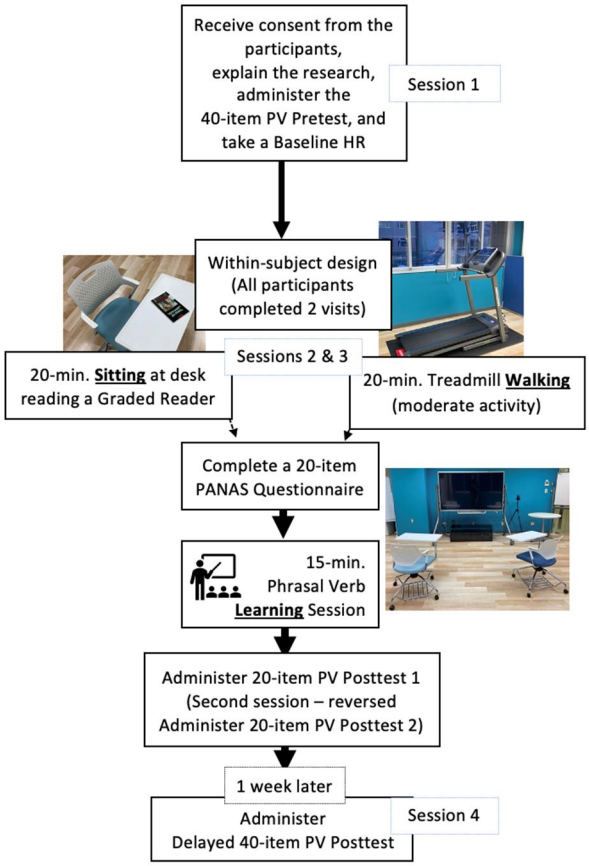

Figure 1 Schematic representation of the study design

４．研究成果 (Research Results)

Experiment 1: Enactment and the Learning of English Phrasal Verbs

As described by the author (see Birdsell, 2021), student participants statistically improved their PV knowledge through the pedagogical interventions based on differences in their pre-test (M = 18.33, SD = 5.17) and post-test score (M = 26.03, SD = 6.65, M difference = +7.70, SD = 5.74), $t(79) = 12.00$, p = .000 with a very large effect size (d = 1.34). This indicates that the participants in this study, as a single group, significantly improved their test scores, which answers RQ1.

In order to discover which specific posttest scores for the different teaching approaches differed, a post hoc comparison using ANCOVA with Bonferroni indicated that the mean score for the enactment group (MD = 6.781, SD = 1.534, p < .000) was significantly different than the L1 translation group, but not the cognitive image group (MD = 1.929, SD = 1.381) (see Birdsell, 2021 for more details). In addition, the mean score for the cognitive image group (MD = 4.852, SD = 1.479, p = .005) was significantly different than the L1 translation group. Taken together and to answer RQ2, these results suggest that the enactment and cognitive image groups outperformed the L1 translation group on the PV posttest. However, the cognitive image and enactment groups did not show any difference.

Experiment 2: Physical Movement Before Learning English Phrasal Verbs

A paired samples *t*-test was conducted to analyze the difference between the two conditions, sedentary and exercise, had on both short and long-term memory. Results show that exercise does not improve short-term memory, but has a small-to-medium

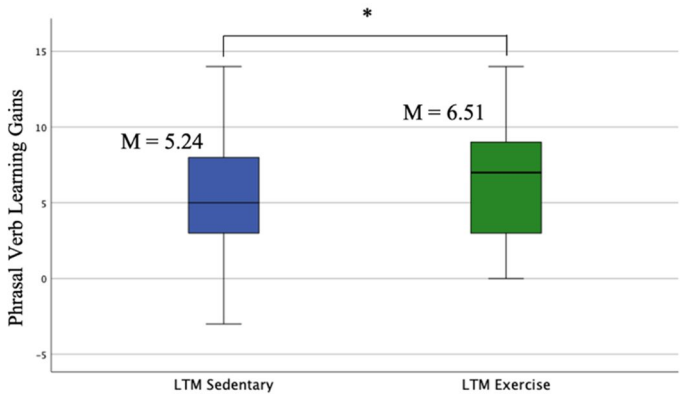

Figure 2. Boxplot of learning gains for LTM in

positive effect on long-term memory $t(36) = 2.24$, $p = .032$, $d = 0.37$, 95% CI [0.12, 2.42] (see Figure 2).

Moreover, exercise had a strong positive effect on mood $t(36) = 6.51$, $p = 0.00$, $d = 1.01$, 95% CI [7.08, 14.05]. In sum, this study supports the view that exercise enhances the encoding of new information into long-term memory and improves the wellbeing of the individual.

In conclusion, these two experiments shed some light on the importance of movement and the body for learning foreign language vocabulary and this includes both watching people enact the meaning of the vocabulary or actually doing exercise before the learning intervention. Moreover, the second study also emphasizes the importance of movement as a way to enhance one's mood. In short, more research needs to be done to examine the benefits that movement has on memory and language learning as well as well-being. Doing this research could have important implications for schools and educational establishments, as it challenges traditional sedentary ways of learning.

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５．主な発表論文等

〔雑誌論文〕　計1件（うち査読付論文　1件／うち国際共著　1件／うちオープンアクセス　1件）

１．著者名 Brian J Birdsell	４．巻 2020.1
２．論文標題 Enhancing phrasal verb learning: A quasi-experimental study of different approaches	５．発行年 2021年
３．雑誌名 Communities of teachers & learners	６．最初と最後の頁 244-251
掲載論文のDOI（デジタルオブジェクト識別子） 10.37546/JALTPCP2020-30	査読の有無 有
オープンアクセス オープンアクセスとしている（また、その予定である）	国際共著 該当する

〔学会発表〕　計5件（うち招待講演　0件／うち国際学会　4件）

１．発表者名 Brian J Birdsell
２．発表標題 A Review of Research in Embodied Cognition for Language Instructors: Movement for Enhancing Foreign Language Vocabulary Learning
３．学会等名 18th Annual CamTESOL Conference（国際学会）
４．発表年 2022年

１．発表者名 Brian J. Birdsell
２．発表標題 Phrasal Verbs: Exploring an Embodied Approach
３．学会等名 JALT2020: 46th Annual International Conference on Language Teaching and Learning & Educational Materials Exhibition（国際学会）
４．発表年 2020年

１．発表者名 Brian J. Birdsell
２．発表標題 Teaching Phrasal Verbs Using Image Schemas, Embodied Cognition, & Collocations
３．学会等名 17th Annual CamTESOL Conference (Actions and Innovations in Teaching and Learning)（国際学会）
４．発表年 2021年

１．発表者名 Brian J. Birdsell
２．発表標題 A Review of Language Learning and Physical Enactment: From Total Physical Response to Embodied Learning
３．学会等名 2020 JALT Hokkaido Language Teaching Conference
４．発表年 2020年

１．発表者名 Brian J. Birdsell
２．発表標題 The Effect of Treadmill Walking on Verbal Short- and Long-Term Memory
３．学会等名 JALT2022 Learning from Students, Educating Teachers: Research and Practice（国際学会）
４．発表年 2022年

〔図書〕　計0件

〔産業財産権〕

〔その他〕

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６．研究組織

	氏名 （ローマ字氏名） （研究者番号）	所属研究機関・部局・職 （機関番号）	備考

７．科研費を使用して開催した国際研究集会

〔国際研究集会〕　計0件

８．本研究に関連して実施した国際共同研究の実施状況

共同研究相手国	相手方研究機関