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子ども発達研究部門

子ども発達研究部門の報告は2つの部分からなる。

I. 陳省仁の研究活動と成果

A. 本年度の研究の一つは23組の乳幼児とその母親を対象者とした子どもの泣きやぐずりと養育者の反応に関する縦断的研究でした。研究対象者の定期的行動観察及び養育者に対する面接を通して、健常の乳幼児のほとんどの養育者は子どもの泣きやぐずりで表された親子間の様々な不満や葛藤とその解決を子どもの発達にとって重要な意味をもつ過程と捉え、養育者は忍耐と子どもの行動の再解釈を含む様々な工夫をしていることが明らかになった。また、乳幼児の泣き・ぐずりを親子関係における「反発性」の視点で捉えるだけでは充分ではなく、「扱いにくい」といわれる乳幼児の養育者特に虐待行動傾向のリスクがある場合、乳幼児の泣きやぐずりは子どもの「最後の手段である」、つまり「泣きは子どものSOSだ」という認識及び具体的な対応の技法の習得への援助が必要と強調した。

論文：

陳省仁・星信子 (2009). 反発性という視点から見た子どもの泣き・ぐずり行動の発達の意義. *乳幼児医学・心理学研究*, **18(2)**: 75-84.

B. もう一つの研究は前号に報告した陳と第2部門学外研究員星詳子の共同研究の継続である。収集されたデータの再分析及びデータ解釈のための理論づけの強化を行った。英語で作成した論文は目下投稿中である。英文の要約で報告する。

Neuropsychological mechanisms of eye movements accompanying thinking

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Introduction

Shifting gaze during difficult cognitive activities, such as thinking, is a very common phenomenon in our daily life, while its underlying neuropsychological mechanisms remain controversial. Previous studies on adults subjects have indicated that in gaze-shifting the attention is disengaged from processing the incoming information from the environment, thus making concentration on cognitive tasks easier. Further studies on children have suggested that a developmental approach to this phenomenon might shed some lights on its mechanisms. To specify the difference between children and adults in this process, we compared the eye movement performance of children with that of the adults by using an eye-tracking system and also employed near-infrared spectroscopy to examine the neural basis of the gaze shift.

Methods

Nineteen adults (8 women, 11 men, ranging in age from 22-29 years) and 30 children (15 girls, 15 boys, ranging in age from 5-13 years) participated in measurements of eye movements by an eye-tracking system (Voxer, Nac, Japan). Thirteen adults (7 women, 6 men, ranging in age from 21-29 years) participated in NIRS measurements (OMM3000, Shimadzu, Japan). For adults, 11 mental tasks, such as verbal fluency task and visuospatial imagery task, were used to elicit gaze shift. For children, 25 questions mainly consisting of riddles were used. Sub-

jects sat on a chair and were instructed to see the fixation point on the wall 4 m in front of them while listening to a question which was presented verbally by an experimenter from behind them. A field camera was placed about 10 cm behind the subject's shoulder. In NIRS measurements, subjects were instructed to look at the video camera in front of them while listening to the questions. Eye movements were recorded simultaneously with NIRS measurements. A total of 24 areas in the bilateral lateral frontal regions were recorded? measured by NIRS, and changes in oxygenated Hb (oxy-Hb), an indicator of changes in rCBF, were analyzed in an event-related design.

The camera coordinate system space (CCSS, 480 by 640 pixels) was created by imposing the view image taken by a field camera, standing 390 cm in front of a blank screen, onto the eye marks (eye positions) display image. A circle occupying the whole CCSS was divided into 8 equal radial areas encompassing a 45 degree angle at the center of the circle. The direction of every gaze-shift was decided by setting the initial fixation point at the center and reading out the direction of the new gaze. The number of gazed point, defined by eye marks staying within an area of 50 pixels for more than 0.1 second, was counted for each of the 8 areas. The area with the largest number of gazed points was designated as the subject's direction of gaze-shift.

Results

Directions of gaze shift differed across individuals, but were consistent within individuals irrespective of type of questions in 15 of the 19 subjects, including 4 subjects who did not shift their gaze during all the trials. For the remaining 4 subjects, their directions of gaze

shift varied according to the question type but were limited to one or two areas in each task. When subjects could not easily produce answers, their gaze shift frequency increased. The subjects with distinct directionality of gaze-shift moved their eyes within the individual, unique areas; however, directions of each individual eye movement from one gazed point to another were not necessarily the same as those of the resulted gaze-shift directionality. Twelve of the 19 subjects had also participated in a previous study 6 months earlier in which questions asked were similar in type to the present one. These subjects showed the same patterns of gaze-shift as observed in the previous study.

Unlike adults, all younger children (5-7 years of age) moved their eyes outside of the ccss, thus resulting in no directionality. In contrast, four of six 10-year old children tended to move their eyes within the camera coordinate system, but their directions of gaze-shift varied according to the type of questions. When they could not produce answer easily, their eyemovements went outside of the camera coordinate system like those of the younger children. The remaining two 10 year-old children showed adult-like patterns of gaze-shift: they showed task-independent directionality of gaze-shift. Four 11-year-old and two 13-year-old children showed the adult patterns.

Gaze-shift was observed to be accompanied by increases in oxy-Hb in the lateral prefrontal cortex and/or the lower premotor cortex unilaterally or bilaterally in all the 13 subjects, although localization of activated brain areas varied with each subject.

Conclusions

The present results do not support the recent

idea that the primary function of gaze-shift is to disengage the attention away from the environment. Here, we propose an alternative interpretation that gaze-shift is a behavior to orient our attention to, and locate the imaginary cognitive space (5, 6) and to facilitate cognitive operations in that space. Our results concerning gaze-shift-related activation of the lateral PFC and the lower premotor cortex support this interpretation. Adults are expected to know how to get access to their individual cognitive space and how to operate within it through their live experiences, while children do not seem to be able to locate this space easily nor how to effectively operate within it until 10 years of age. It is suggested that because of the relative lack of ability in accessing this space, younger children move their heads or bodies in stead of their eyes, thus resulting in their eye marks darting outside of the camera coordinate system. Our data also suggest that 10-year-old seems to be a critical period for the development of thinking-related eye movements.

II. 佐藤公治の研究活動とその成果

・幼児の共同遊びの生成過程に関する研究

佐藤はこれまで当研究センターの附属施設で実験保育を行ってきている通称「北大幼稚園」の子どもたちの共同遊びについて、学部・大学院生も加わって継続的に観察・資料収集を行ってきたが、新しい視点からの再分析を行っている。昨年秋に刊行した『保育の中の発達の姿』では取り上げることが出来なかった問題についての基礎作業を行っている。2010年3月で「北大幼稚園」は閉園になるが、今後ともこれまでの継続的な観察研究で集められた膨大な資料の分析と研究のまとめを引き続き行っていく。「北大幼稚園」とは別の複数のフィールドで幼児の遊びと行動発達について学部生が中心になって進めているが、今後大学院レ

ベルでの研究として発展させていく。

・ヴィゴツキーの発達理論と思想についての再検討

近年、ヴィゴツキーについては、研究の再評価と共に、彼の研究について言及される機会も多くなっているが、彼が心理学の問題として何を指そうとしたのか、その思想の根幹に関わるような議論が正しく行われているのか疑問を持つような研究があるのも事実である。ヴィゴツキーが心理学研究として目指そうと位置づけた問題に意識研究がある。この意識と人格の問題、あるいは内的経験の問題を議論することの必要性を次の研究活動の中で行った。ヴィゴツキー学会第11回大会における研究報告「身体とことば——「ヴィゴツキー遊び論」とその課題——」、日本心理学会第73回大会・ワークショップ：ヴィゴツキーシンポにおける指定討論、ワードマップ『社会・文化・活動の心理学』分担章：ヴィゴツキー言語研究の視座(新曜社、印刷中)。

・表現行為としての芸術の可能性

幼児の描画活動を含めて広く人間の芸術表現の問題を表現と意味生成の行為として位置づける立場から実践的、理論的考察をここ数年継続して行っている。以下はその研究成果。佐藤公治・他(2009)「アートの教育の可能性を拓く」、『教育心理学フォーラム・レポート』FR・2008・04、1-72ページ(日本教育心理学会)。佐藤公治・長橋聡(2009)「幼児の描画にみる内在的表現行為」、北海道大学大学院教育学院紀要第107号、1-23ページ。Kimi haru Sato (2010) Emotional experience and immanent expressive activity in human minds. *RCCCD Annual Report*, 30. (印刷中)。

現在、プロの画家の制作過程の分析を通して創造的表現活動を明らかにする研究を進行中。

・身体と運動表現について

わざの修得と型の役割についての研究を新たに進めている。現在は文献研究を中心にした先行研

究の整理を行っているが、実際のわざ修得過程の研究を行う予定。

身体・運動の再形成と学習という具体的、実践的な問題に取り組んでいる理学療法の分野の研究者との共同研究を行っている。特に認知運動療法

研究会と共同で幼児の脳性まひ児当の治療・学習にヴィゴツキー理論の応用可能性を検討することを開始している。

(陳 省仁・佐藤公治)