

Available online at www.sciencedirect.com



Consciousness and Cognition 16 (2007) 391-399

Consciousness and Cognition

www.elsevier.com/locate/concog

## Thought as action: Inner speech, self-monitoring, and auditory verbal hallucinations

Simon R. Jones \*, Charles Fernyhough

Department of Psychology, University of Durham, South Road, Durham, DH1 3LE, UK

Received 8 November 2005 Available online 7 February 2006

#### Abstract

Passivity experiences in schizophrenia are thought to be due to a failure in a neurocognitive action self-monitoring system (NASS). Drawing on the assumption that inner speech is a form of action, a recent model of auditory verbal hallucinations (AVHs) has proposed that AVHs can be explained by a failure in the NASS. In this article, we offer an alternative application of the NASS to AVHs, with separate mechanisms creating the emotion of self-as-agent and other-as-agent. We defend the assumption that inner speech can be considered as a form of action, and show how a number of previous criticisms of applying the NASS to AVHs can be refuted. This is achieved in part through taking a Vygotskian developmental perspective on inner speech. It is suggested that more research into the nature and development of inner speech is needed to further our understanding of AVHs.

© 2005 Elsevier Inc. All rights reserved.

Keywords: Agency; Auditory verbal hallucinations; Forward model; Inner speech; Vygotsky

#### 1. Introduction

The phenomenon of auditory verbal hallucinations (AVHs), where individuals report hearing speech in the absence of any external stimulation, continues to puzzle psychiatrists and psychologists. Schneider (1959) classified AVHs as a first-rank symptom of schizophrenia, reflecting the approximately 60–74% of those with schizophrenia who report experiencing them (Slade & Bentall, 1988; Wing, Cooper, & Sartorius, 1974). However, a movement has developed away from understanding AVHs as necessarily signifying pathology, and towards an acceptance that voice-hearing can be a part of normal experience (Johns & van Os, 2001). Furthermore, there do not seem to be radical differences in the structure and functions of AVHs between voice-hearers with a diagnosis of schizophrenia and those without (Leudar, Thomas, McNally, & Glinski, 1997). Whether in a clinical or non-clinical sample, one of the fundamental characteristics of AVHs is their alien quality. In this

<sup>\*</sup> Corresponding author. Fax: +44 1913 343241.

E-mail address: s.r.jones@durham.ac.uk (S.R. Jones).

article, we take a new look at the question of how it is possible that a self-generated cognition may come to be experienced as produced and performed by an agent other than the self.

#### 2. Explaining agency: Is it me?

Frith and colleagues (e.g., Frith, Blakemore, & Wolpert, 2000) have developed an elegant model of the passivity experiences, such as delusions of control, found in schizophrenia. This model attributes such experiences to deficits in a postulated neurocognitive action self-monitoring system (NASS), and has had its predictions supported by empirical research (e.g., Blakemore, Wolpert, & Frith, 1998). The NASS model is based on Miall and Wolpert's (1995) forward model which was developed to model systems in which, due to temporal constraints, it makes sense to base decisions on the predicted consequences of actions. Frith and colleagues' utilization of these ideas may be summarized as follows (adapted from Blakemore, 2003; Frith et al., 2000; see Fig. 1).

First, a representation is created of what motor command is needed to achieve a particular goal, based on the estimated current state of the system and the desired end-state. The motor command needed to achieve this goal is then issued. In parallel to this an efference copy of the motor command is also issued. The efference copy is used by the brain, in conjunction with knowledge of the current state of the system, to create a prediction of what will happen if this motor plan is executed. It is proposed that if the actual sensory feedback matches the predicted state then awareness of initiation of movement will remain based on the predicted state. In this scenario, awareness of performing a motor action is hence based on the predicted state, which is available before the movement is actually performed. This results in individuals being aware of the occurrence of their motor action around 50 to 100 ms before they have actually moved (Haggard, Newman, & Magno, 1999; Libet, Gleason, Wright, & Pearl, 1983). Thus in Fig. 1, awareness of motor actions (although not self-authorship) occurs at the time of predicted state generation, which temporally precedes actual performance of the action. If the action is self-produced then predicted sensory feedback should be cancelled out by reafference from the actual sensory feedback. If this occurs then there is perceptual sensory attenuation of the motor act, meaning that one does not feel or pay as much attention to the movement. If the actual movement does

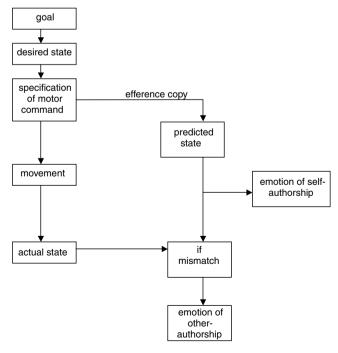


Fig. 1. Forward model of motor control (adapted from Frith et al., 2000).

# دريافت فورى ب متن كامل مقاله

### ISIArticles مرجع مقالات تخصصی ایران

- ✔ امكان دانلود نسخه تمام متن مقالات انگليسي
  - ✓ امكان دانلود نسخه ترجمه شده مقالات
    - ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
  - ✓ امكان دانلود رايگان ۲ صفحه اول هر مقاله
  - ✔ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
    - ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات