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**Title:** „Effects of Response Modality and Task Instruction in Metacontrast Masking Studies: Implications for Theories of Visual Consciousness”

**Abstract:**

It has already been convincingly demonstrated that subliminally presented stimuli affect our behavior, however, it is still not that clear which processes are responsible for the effects of subliminal stimuli. The aim of the current thesis was to reveal what processes are really responsible for the priming effect in the case of metacontrast masking and what possible differences in prime processing could be obtained under different conditions. Obtained results were related to the Two-Streams Hypothesis and other current views on visual consciousness.

Previous results suggested that an influence of primes on hand-motor processes could be responsible for the subliminal priming effect. This interpretation is in line with the Two-Streams Hypothesis, which claims that there are two streams involved in visual processing. When a stimulus is processed along the ventral stream, it is fully perceived, and all its features are available for the report. However, when a stimulus is not strong enough (e.g., due to masking), it might be too weak to be processed along the ventral stream, but it may still be processed along the dorsal stream. Processing along the dorsal stream may trigger motoric actions but does not lead to awareness of the stimulus. Hence, the Two-Stream Hypothesis view seemed to explain previous findings on the subliminal priming effect. Nevertheless, if the explanation for the priming effect according to the Two-Streams Hypothesis is correct, then we should observe the priming effect only for motor responses. However, the subliminal priming effect was also observed when verbal responses were required. Another observation not in line with the Two-Streams Hypothesis was provided by an EEG study in which attentional-related brain activation was found next to motor-related activation. These findings challenge the view proposed by the Two-Streams Hypothesis as the priming effect cannot be explained by the processing of the subliminal prime along the dorsal stream.

Three experiments were conducted to test the effect of the subliminal prime in different task conditions (with different response modalities and different instructions):

In the first experiment, the detection threshold for visual stimuli in the prime localization task was determined when three different (manual, saccadic, and verbal) response modalities were employed. Our results revealed no differences in the thresholds between hand-motor and verbal responses, thus, they did not support the view presented by the Two-Streams Hypothesis.

In the second experiment, we tested whether the processing of the prime depends on the type of task. Using EEG, we compared prime processing between: the main task, the prime localization task, and the prime identification task when motor responses were required. Previous studies on subliminal priming implicitly assumed that processing of the prime in the main task and the prime task is similar. However, we showed that prime-related activation was larger in the main task than in prime tasks. As this result was opposite to what may be expected, we concluded that larger motor- and attentional-related brain activity observed in the main task than in prime tasks might indicate that the activity that was considered as prime-related (early lateralized readiness potential [LRP] and posterior contralateral negativity [PCN]) could reflect overlapping prime-related and target-related activity. Comparison between the two prime tasks (commonly used for measuring the awareness level), revealed better performance and larger motor-related brain activity in the prime localization task than in the prime identification task. Since indicating the location of the prime might rely more on the dorsal stream than identifying the prime, better performance and increased brain activity in the prime localization tasks might be explained in terms of the Two-Streams Hypothesis. However, the difference between prime tasks might also be explained in terms of the Theory of Micro-Consciousnesses which assumes that different features of the same prime are processed separately and become conscious at different times.

In the third experiment, we tested whether attentional-related activation is sufficient for the subliminal priming effect to occur. In the EEG study, we compared brain activation, which is considered as prime-related, between the main task, the prime localization task, and the prime identification task when verbal responses were required. We observed attentional-related activation without any motor-related brain activation. Nevertheless, the priming effect was still present. We concluded that attentional-related activity seems to be sufficient for the subliminal priming effect to occur, hence, motor pre-activation and processing along dorsal stream cannot be solely responsible for the subliminal priming effect.

Obtained results confirmed that the processing of the subliminal prime cannot be fully explained by the Two-Streams Hypothesis. Some results are in line with the Global Workspace Theory and the Theory of Micro-Consciousnesses, however, we found no clear support for any of the discussed views. The outcomes of the presented studies also emphasize the necessity of proposing more specific and more detailed theories of visual consciousness, which allow us to test them empirically.

**Keywords:** consciousness, subliminal processing, priming, masking, EEGe podprogowe, prymowanie, maskowanie, EEG