Table 1: The pros and cons of neuroscientific methods for design studies.

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| **Neuroscientific method** | **Parameters measured with this method** | **Temporal resolution (accuracy in time)** | **Spatial resolution (accuracy of locating active brain areas)** | **Pros for design studies** | **Cons for design studies** |
| fMRI  (functional magnetic resonance imaging) | BOLD-signal (blood-oxygenation-level-dependent signal), changes in blood flow after increased neuronal activity | Block design studies: several seconds to minutes  Event-related studies: hundreds of milliseconds | From several millimeters to sub-millimeter accuracy | Some fMRI study protocols are quite well suited for design studies | Equipment cannot be removed from the laboratory; sequence of activities is difficult to study |
| EEG  (electro­encephalo­­graphy) | Electric potentials from scalp, directly resulting from neuronal activity | Less than a millisecond | Problematic due to distortion of electric potentials, less than 1 cm in good conditions | Portable instruments, natural environments, some EEG study protocols are quite well suited for design studies, measurements of several hours are practically possible | Location of brain activity is difficult to determine |
| MEG  (magneto­encephalo­graphy) | Magnetic fields outside the head, directly resulting from neuronal activity | Less than a millisecond | Less problematic than EEG, in good conditions clearly less than 1 cm | Some MEG study protocols are quite well suited for design studies, long tradition of well-controlled experiments stemming from EEG, optimal time-space-resolution | Equipment cannot be removed from the laboratory; location of brain activity is quite difficult to determine |
| MRI  (magnetic resonance imaging) | Structures of the brain (structural MRI), neural tracts (DTI, diffusion tensor imaging) | No accuracy in time | Less than 1 mm | Good for studies comparing groups of people | Equipment cannot be removed from the laboratory |
| PET  (positron emission tomography) | Structural image of concentration of metabolically active tracer, usually oxygen | Contrast of two conditions: no accuracy in time | Less than 1 cm | Good for comparing groups of people or natural tasks | Radioactive tracer is injected into participants; equipment cannot be removed from the laboratory |
| NIRS  (near-infra-red spectroscopy) | Diffusion and absorption of near-infra-red light in tissues, depending on hemodynamic and electromagnetic changes in brain tissue | hemodynamic NIRS: hundreds of milliseconds, electromagnetic NIRS: millisecond (according to some researchers) | Theoretically less than 1 cm | Portable instruments, natural environments, some NIRS study protocols are quite well suited for design studies, measurements of several hours are practically possible | Difficulties in determining the location of brain activity, not many groups yet using NIRS for cognitive studies |