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Hertie-Institut für klinische Hirnforschung

Press Release

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Wir bitten um Zusendung von Belegexemplaren.

Being Spoiled for Choice – What Happens in the Human Brain

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Tübingen, 1 October 2018 **– Who has not faced this situation? Having too many choices when shopping for a product creates a feeling that we call “being spoiled for choice.” Academic studies have proven for some time that consumers find a large selection of products attractive, but this makes it increasingly difficult for them to decide what to buy. A team centered on the Tübingen scientist, Dr. Axel Lindner, from the University Hospital for Psychiatry and Psychotherapy and the Hertie Institute for Clinical Brain Research has now discovered what takes place in our brains when we are “spoiled for choice.” The brain activity in particular areas was always strongest when people were confronted with the preferred mid-level number of options. If the number becomes too large, the cognitive effort involved in making a decision exceeds the benefits – brain activity declines and we face a “spoiled for choice” situation. The subjective impression of being “spoiled for choice” can therefore now be tangibly and objectively measured. Knowing about how the brain calculates the relationship between effort and benefit might not only be relevant to provide us with a better understanding of decision processes – e.g. during the next shopping trip – but also help to explain individual symptoms in neuropsychiatric disorders in a better way.**

The number of products that are available in our consumer-oriented society is increasing all the time. This seems on the surface to enable corporations to ideally satisfy the most varied needs of individuals. At the latest since the ground-breaking “jam study” published by Sheena Iyengar and Mark Lepper in 2000, we have known that consumers may find a large selection attractive (24 different sorts of jam), but when it comes to deciding what to buy, it is difficult for them to select one item. They often return home without any of the products in their bag at all. In fact, more people make a purchase if the number of options available is smaller (6 kinds of jam).

How does this “being spoiled for choice” situation develop and what causes it in neurobiological terms? Scientists suspect that the more options people face, the less they benefit from the larger selection – that is to say, the probability that an even better option exists will decrease. Conversely, the costs of making a decision increase progressively: People need more time and cannot take note of all the

options and the comparison process becomes more difficult. At some stage, the cognitive expenditure exceeds the benefits of having a greater number of options (the effort exceeds the benefits) and we experience that “spoiled for choice” sensation: We become demotivated, dissatisfied with our decision or end up not making a purchase at all.

Elena Reutskaja (IESE Business School in Barcelona) and Axel Lindner (University Hospital Tübingen, Clinic for Psychiatry and Psychotherapy and the Hertie-Institute for Clinical Brain Research, University of Tübingen) – working with cooperation partners at the California Institute of Technology (Colin Camerer and Richard Andersen) and at the Pompeu Fabra University in Barcelona (Rosemarie Nagel) – have investigated what takes place in a person’s brain when we are “spoiled for choice.” In their test persons not only worked for a monetary reward, but also received a photo product of their choice (e.g. a t-shirt or a beaker). Their task in the experiment involved selecting the picture that was to be immortalized on the photo product from a varying number of pictures. While the participants were making their decisions, their brain activity was measured using functional magnetic resonance imaging (fMRI).

The following results emerged: The test persons said that a small number of pictures (6 photos) was too low, but selecting one from 24 photos was too difficult. The ideal number of options was 12 photos for most of the participants.

The brain activity in the dorsal striatum and the anterior cingulate cortex – these are the brain areas involved in decision processes and “motivate” our motor acts and our thinking processes with their activity – reflected the preferred mid-level number of options: The brain activity in these areas was always highest when 12 photos were available for selection. If the number was too small or too large, the brain activity declined. If a very attractive photo was added to the selection to make things easier for the test person, the brain activity increased overall, but was still highest for the mid-level number of choices.

Reutskaja and Lindner suggest that the activity in the dorsal striatum and the anterior cingulate cortex reflects the difference between the increasingly small benefit of a progressively larger number of options and the upsurge in processing costs. If the number of options is too large, the effort transcends the benefits – brain activity declines and we are “spoiled for choice.” However, if the costs are reduced – for example, if a computer assists the test person in making their choice – the brain areas mentioned above reflect our preference for a large number of options; the brain activity was always greatest in this case if 24 photos were available for selection.

The experiments conducted by Reutskaja and Lindner provide some insight into how “being spoiled for choice” occurs in the brain and which factors play a role in this process. Their experiments will make it possible to better understand the processes that lead to “being spoiled for choice.” The subjective sensation of “being spoiled for choice” can be measured objectively. The reduction in motivation and in motor drive, as some healthy people experience when “being spoiled for choice,” are also observed in certain neuropsychiatric disorders. Knowing how the brain calculates the relationship between effort and benefit could therefore not only lead to a better understanding of

decision processes, e.g. during the next shopping trip, but also help to better explain individual symptoms in these diseases.

Title of the original publication

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"Choice overload reduces neural signatures of choice set value in dorsal striatum and anterior cingulate cortex"
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*The **Hertie-Institute for Clinical Brain Research (HIH)** was founded by the non-profit Hertie Foundation, the state of Baden-Württemberg, Eberhard Karls University and its Medical Faculty as well as the University Hospital Tübingen in 2001. The HIH deals with one of the most fascinating research fields at the current time: understanding the human brain. The crucial question is how particular disorders impair the way that this organ operates. The HIH establishes a bridge between fundamental research and clinical practice. The goal is to enable new and more effective strategies for diagnosis, treatment and prevention. 21 professors and about 380 employees are currently working at the Institute.*

*The **University Hospital Tübingen (UKT)** is one of the leading centers in German university medicine and contributes to the successful network of advanced medicine, research and teaching as one of 33 university hospitals in Germany. In conjunction with the non-profit Hertie Foundation and Eberhard Karls University, it founded the Hertie Institute for Clinical Brain Research (HIH) in 2001 with the goal of rapidly transferring the results of excellent neuroscientific research into clinical practice in order to treat neurological and neurodegenerative sicknesses. Website: www.medizin.uni-tuebingen.de*