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Head of Press, Easter 2014

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## **Press Release – 18.06.2014**

### **“I’m playing the right notes, but not necessarily in the right order”**

#### **Autism and Talent Forum at the Cambridge Union**

On Wednesday, 18<sup>th</sup> June – the Cambridge Union welcomed the Autism Research Trust in a joint event entitled ‘Autism and the Rubik’s Cube; Creating Order from Chaos’. Over an hour, the Union chamber played host to some spectacular and moving talent, demonstrating the key links between music, the Rubik’s Cube and autism due to the key balance between repetition and variety.

Welcoming the assembled crowd, Professor Simon Baron-Cohen noted that whilst the link between the Rubik’s cube and autism has not yet been proven, it is a vital area of research, before handing over to a video on the topic of the Rubik’s Cube. Noting that there are over 43 quintillion possible combinations, this short clip used this as an explanation as to why the cube has been a topic of fascination for mathematicians the world over, from its humble origins in Hungary during the Cold War.

Professor Simon Baron-Cohen linked the fascination with patterns found in those with autism to the patterns and beauty of a Rubik’s cube, presenting Erno Rubik, the inventor of the Rubik’s Cube. Erno noted that despite the tumult of our shared history, human behaviour remains consistent, which has always been a topic of fascination. Turning to the behaviour of those with autism, Erno noted the battle of finding order in chaos, and the emotional stability that such a discovery can find for the brain – which is the struggle that those with autism face. The cube, he noted, was a key example of this; it allows physical interaction to create order. The origins of his invention lay with his desire to create “useful things” by modifying our surroundings to best serve our needs – before turning to his desire to teach. The cube was thus the result of the mixing of his desire to teach, with his valuing of creating order – but in turn, he pointed out that the cube taught him that individuals were much cleverer than they think!

Simon at this point handed over to Cambridge undergraduate, Jon Adlam, a ‘cuber’ who is able to solve a Rubik’s cube in 12.5 seconds and is ranked the fifth fastest cube solver in his homeland of New Zealand. Demonstrating the Petrus method, where the user builds blocks of 1x1x2 squares of the same colour within the cube before using an array of learned algorithms to finish it off. The next step, he noted, was to learn the ‘mainstream’ CFOP method used by most speed cubers. Whilst this allows cubers to reach times of 20 to 30 seconds in solving, truly advanced cubers must then learn to work out the movements they make on the cube several moves in advance of doing them. After being handed a scrambled cube, Jon impressed the assembled crowd with a solve time of 17 seconds, whilst simultaneously being recorded for a Today program feature to add further pressure.

Professor Sir Timothy Gowers was then given the floor to explain the special history between the Rubik’s cube and the world of mathematics. Timothy noted that a general theme of cube solving is that each move of a cube is very simple, but in conjunction they are incredibly complex. With a repertoire of moves, you can make the solving of a cube simpler and simpler. A cube can also be modelled using sequences of 1s and 0s, which he noted was the same as how a computer program functions (using multiple simple moves to create complex results). Thus the solving of a Rubik’s cube is the same as solving a mathematical problem, using a repertoire of moves to create simple steps to resolve complex problems. Ending on a note of encouragement, he advised that learning these algorithms yourself can be a key way of learning towards being a mathematician.



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Having now discussed the history and mathematical relevance of the Rubik's cube, Simon then handed over to Jon Adams, who has Asperger's Syndrome. Jon noted that the cube has a certain natural beauty to it, through the finding of order whilst maintaining elements of mystery. The cube, he pointed out, was infuriating in a similar way to how the rest of the world infuriates an individual with autism. It is the rest of the world that creates chaos, in the same way a Rubik's Cube does. Jon noted that he has problems with some numbers over others, or some colours over others, his synaesthesia giving him empathy with certain objects, thus leading to him not wanting to disrupt the beauty he feels an unsolved cube displays.

Simon then welcomed the final pair of speakers, Derek Paravicini, a blind pianist with 'classic autism', and his mentor Professor Adam Ockelford, the author of Music, Language and Autism and the Director of the Applied Music Research Centre at the University of Roehampton. Having given some thought to this linking of Rubik's cube, music and autism. Opening by showing the Morecombe and Wise sketch "I'm playing the right notes, but not necessarily in the right order" – Adam noted that music is concerned with different combinations and permutations, as indeed is cube solving. One cube face has 10 million possible arrangements (an entire cube has approximately 48 quintillion) and 8 notes using one octave has roughly 400 million arrangements – but the brain can grasp the principles underlying both the cube and music, because they are underpinned by basic rules we learn through exposure to them. The balance between repetition and variety is vital in both cube solving and music, at which point Adam handed over to see such balance in action with 'The Rubik's Cube Blues'.

In this unique performance, 1 cube's separate colours represented 6 different notes, and a second represented 6 different ones. By randomly rolling the cube, Derek was presented with 6 random notes to create the notes of a melody. In an incredibly impressive display, Derek improvised a remarkable piece of jazz music using those notes – thus creating music through the balance of repetition and variety so vital to both music and cubing. In a further display of this balance, Derek then performed Flight of the Bumblebees, but with the added twist of audience members giving Derek a random note to begin on (selecting A sharp).

Elaborating on the link between language and autism following a question from the floor, Simon noted the obsession individuals with autism can develop due to the attention to detail they display, collecting word as objects. Derek noted that despite the way we traditionally learn language, he noted that the 'autistic brain' possibly learns words as music.

On the issue of development of autistic children, Jon pointed out that learning self-resilience is the most important part of an autistic child's life, especially considering the way in which society can treat those with autism. Closing, the outgoing President thanked Professor Simon Baron-Cohen for organizing such a spectacular event.

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**By Oliver Mosley**  
Head of Press

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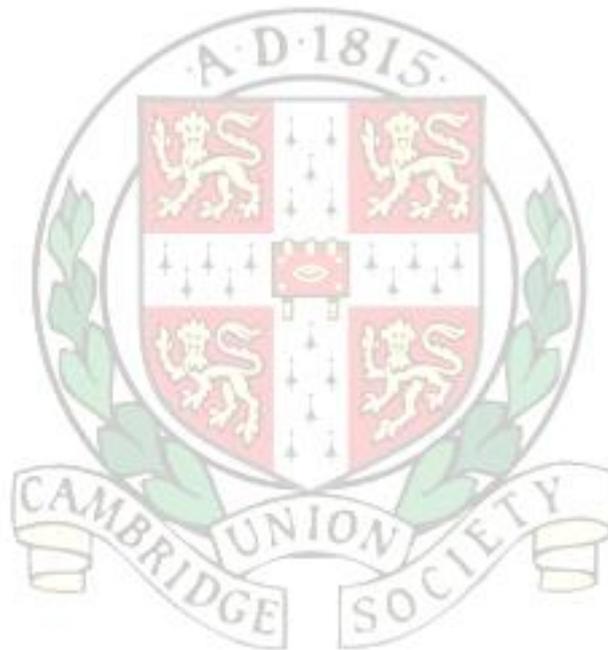
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### Notes to Editors

- Autism is a lifelong developmental disability that affects how a person communicates with, and relates to, other people. It also affects how they make sense of the world around them. It is a spectrum condition, which means that while all people with autism share certain difficulties, their condition will affect them in different ways.
- The Autism Research Trust (ART) funds research at the Autism Research Centre at Cambridge University (see [www.autismresearchcentre.com](http://www.autismresearchcentre.com)), focusing on 3 over-arching programs:
  - Identifying the causes of autism
  - Early detection and diagnosis to give children the best possible start
  - Evaluating specific interventions to support people with autism throughout their lives



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