



# Insight Titanium Research

Interdisciplinary Artificial Intelligent Quotient Testing  
Enhancement Procedure

by Marc Ruef and Marisa Tschopp  
February 2018

scip ag  
Badenerstrasse 623  
8048 Zürich  
Switzerland  
[www.scip.ch](http://www.scip.ch)

)SCIP(



Traditional IQ tests in the field of psychology tend to look at results very isolated: They group by gender, age or cultural background for example. The modern IQ evaluation of human psychology takes the average result as starting point to calculate the IQ values. This makes it very hard to compare results between different test questionnaires and/or testing groups.

The A-IQ testing methodology was developed to overcome this limitation. Results between different products and test processing at different times should be comparable. This backward-comparability required some structural and mathematical optimization right from the start. It was required to establish a normalized weighting.

This introduced the possibility to improve and enhance the questionnaire and still remain able to compare to earlier versions. Adding new questions is very simple and can happen in a very modular way (without influencing or introducing complex dependencies). This is done with a certain level of an audit trail which allows solid tracking of changes.

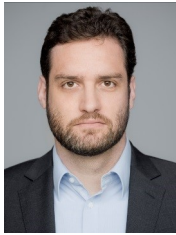
The improvement of the questionnaire is important to keep up with the latest developments in the fast pacing field of AI. But it is also important because the social and psychological perception of such solutions is also changing that fast. The requirements and demands of users is changing and improving with every iteration of new products.

The questionnaire will be enhanced on a regular basis to reflect these growing and reshaping demands. This will conclude into a new version of the questionnaire which will be available for analysts.

As the A-IQ testing methodology gains popularity, vendors of AI products will try to adapt the questionnaire to "emulate" understanding. This should allow them to score higher during the testing even though the products are not able to behave properly from an intelligent point of view.

To prevent this cheating effect a "dynamic test generation" is proposed where sentence structure and data points might vary (e.g. "What is 2 times 3?" → "Calculate 3 times 2"). Punctual improvement and enhancement of the questionnaire will help increase overall quality of the testing methodology.

## About the Authors



**Marc Ruef** is Head of Research and Member of the Board at scip ag. His focus is on conducting research in the broad field of cybersecurity, including computer and network security, vulnerability assessment and penetration testing. As an entrepreneur and expert in information technology he has extensive expertise in the development, application and capabilities of artificial intelligence (AI) solutions with specific interest on language and reasoning capabilities, taking security related, business and societal implications into account. Marc has published various best-selling books, more than 400 white papers and media articles, is teaching at several higher education institutions and is a frequent speaker at conferences and workshops in the public and private sector worldwide.



**Marisa Tschopp** is a researcher at scip ag. Her focus is on conducting research about AI-based systems from a humanities perspective, with a wide range of questions related to psychological phenomena, governance and ethical implications. As an organizational psychologist she has experience in social and educational institutions with specific passion for digital teaching-learning trends. She published various papers and conference contributions on the topics of leadership, creativity and innovation and has been teaching in several higher education institutions in Germany and Switzerland. Marisa holds a Master's degree in Psychology of Excellence in Business and Education from the Ludwig-Maximilians-University of Munich, Germany as well as a BA business degree, focusing on market and consumer psychology.

## Mission: Know the Future

The Titanium Research Team is the highly independent for-profit research department which explores essential issues and innovations in the field of emerging technologies. We pursue an interdisciplinary approach comprising technical and non-technical considerations to guarantee the preparation of our customers in the best possible way.

Our research endeavors include a range of projects tapping into various activities such as knowledge building, education, training, consulting and technical & non-technical development. Topics include a broad range of fields like blockchain technologies, drones, smart weapons, robotics and artificial intelligence, autonomous vehicles, and many more, all examined through an interdisciplinary lens to measure social-psychological impact, ethical implications, and additionally, to forecast future development for the public good. We want to build knowledge, strengthen collaboration between research, industry, policy makers and users in order to explore and comprehend the nature of digitalization and emerging technologies.

scip ag is a Swiss company providing consulting services in the field of cybersecurity. Security is our business. <https://www.scip.ch/en/>