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Predicting the Stock Market
An Associative Remote Viewing Study

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Abstract – Over the course of $n = 48$ valid trials we attempted to predict the binary (up vs. down) course of the German stock index DAX with the Associative Remote Viewing (ARV) method. 38 out of 48 predictions were correct which amounts to a highly significant hit rate of 79.16% ($p = 2.3 \times 10^{-5}$, binomial distribution, $B_{48}(1/2)$; $z = 3.897$; ES = 0.56). A post-hoc analysis indicated that the session quality depended on the volatility of the stock index: The viewer's perceptions were clearer and less ambivalent when the stock index also had a larger point difference at the end of the prediction period. Additionally, we tested the hypothesis whether feedback is a necessary requirement for predictions with ARV. Both conditions (feedback vs. no feedback) were independently significant and did not differ significantly from each other ($\chi^2 = 0.505$, $p = 0.477$). Therefore, we discuss potential features which might be necessary or limiting for successful predictions with ARV.

Keywords: Warcollier prize – Associative Remote Viewing – anomalous cognition – psi – precognition – mere intention principle – retro-causality – probabilistic future

Vorhersage des Börsenkurses: Eine Assoziative-Remote-Viewing-Studie

Zusammenfassung – In $n = 48$ validen Durchgängen haben wir versucht, den binären Kurs (steigt vs. fällt) des deutschen Aktienindex DAX mithilfe der Assoziativen Remote Viewing (ARV) Methode vorherzusagen. 38 von 48 Vorhersagen waren korrekt, was einem hochsignifikanten Ergebnis ($p = 2.3 \times 10^{-5}$, Binomialverteilung, $B_{48}(1/2)$; $z = 3.897$; ES = 0.56) mit einer Trefferquote von 79,16% entspricht. Eine Post-Hoc Analyse ergab, dass die Sitzungsqualität von der Volatilität des Aktienin-

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dex abhing: Die Wahrnehmungen des Viewers waren klarer und weniger ambivalent, wenn auch der Aktienindex am Ende des Vorhersagezeitraums einen größeren Punktunterschied aufwies. Außerdem haben wir die Hypothese getestet, ob Feedback eine notwendige Voraussetzung für Vorhersagen mit ARV ist. Beide Bedingungen (Feedback vs. kein Feedback) waren unabhängig voneinander signifikant und unterschieden sich nicht signifikant voneinander ($\chi^2 = 0.505$, $p = 0.477$). Folglich diskutieren wir potentielle Merkmale, die für erfolgreiche Vorhersagen mit ARV notwendig oder einschränkend sein könnten.

Schlüsselbegriffe: Warcollier Preis – Assoziatives Remote Viewing – anomale Kognition – Psi – Präkognition – Prinzip der bloßen Intention – Retrokausalität – probabilistische Zukunft

Introduction

The International Remote Viewing Association (IRVA), in partnership with IRIS-Psi & Applications (IRIS-PA), jointly sponsor "The Warcollier Prize", a financial grant of $3,000 USD in support of research in the field of remote viewing. In 2017 we won the price with a research proposal for a study, which we conducted during an internship of two investigators (Maximilian Müller, Laura Müller) at the Institute for Frontier Areas and Mental Health (IGPP) in Freiburg, Germany. The main research objectives were to determine the hit rate for predictions of the German stock index DAX (*Deutscher Aktienindex*) with Associative Remote Viewing (ARV),[2] to test the hypothesis whether feedback is a necessary requirement for predictions with ARV, and to explore factors which might influence the quality of the viewer's perceptions in ARV sessions. In addition, we wanted to identify a design for subsequent studies in the sense of a proof of principle study.

Remote Viewing or "Anomalous Cognition" is the term for faculties which make use of an anomalous information transfer generally referred to as Psi (Cardeña, 2018; May & Marwaha, 2014; Marwaha & May, 2019). Using Psi for real life applications, e. g. predicting the future of a financial market, is not a new research approach in the field of remote viewing. An overview of relevant ARV research is provided in Table 1. These studies were attempted to predict the binary future outcome (up or down course) of a financial market with ARV. In all reported studies the assumed probability under which a prediction is correct by chance is 50%. The achieved average hit rate is 80% (65 out of 81 correct predictions) which is a highly significant result ($p = 1.39 \times 10^{-8}$, binomial distribution). In total, the results clearly indicate that it is possible to significantly predict the future of a financial market above chance expectation.

2 ARV is a methodological approach to get complex information about present or future targets with the help of sensory associations using a remote viewing protocol. A more detailed description of the ARV process is presented in the methods section of this paper.

Study	Correct Predictions	Hit rate	p-value (binomial distribution)
Puthoff (1984)	21 out of 30	70 %	$p = 0.01$ **
Harary & Targ (1984)	9 out of 9	100 %	$p = 0.0019$ **
Targ et al. (1995)	6 out of 7	86 %	$p = 0.054$
Smith (2009) Exp. A	14 out of 17	82 %	$p = 0.005$ **
Smith (2009) Exp. C	8 out of 11	72 %	$p = 0.08$
Smith et al. (2014)	7 out of 7	100 %	$p = 0.0078$ **
Total	65 out of 81	80 %	$p = 1.39 \times 10^{-8}$ ***

Table 1: Overview of relevant ARV studies which tried to predict a financial market. Some studies are excluded (e. g. Smith, 2009, Exp. B or Kolodziejzyk, 2011) because they used a computer for target selection and/or the association process. Therefore, not all studies are comparable with each other and in Table 1 only those reported, which followed a Standard ARV approach.

However, because of the different experimental setups and uneven number of trials in the reported studies, it is unclear which factors might influence the hit rate and which hit rate is possible with a specific experimental setup. At first sight, it seems that the studies with less than ten trials (Harary & Targ, 1984; Targ et al., 1995 and Smith et al., 2014) were more successful than the studies with more trials. Statistically, there is a negative correlation between the number of trials and the hit rate (*Spearman's Rho* = -.81, $p = 0.13$), which means that the more ARV trials are conducted in a study, the lower the hit rate. However, this correlation is not significant because of the small number ($n = 6$) of studies. There are hardly any studies which conducted a reasonable amount of qualitative trials to determine a baseline hit rate for predictions in the long term.

For our study we decided beforehand to conduct 50 trials with one viewer per prediction in order to have a representative number of trials for statistical analysis. Furthermore, we expected that a qualitative approach with monitored one-to-one sessions would produce significant results, although we did not use a group of viewers for one prediction as for example in the study of Smith et al. (2014). Our first hypothesis (H_1) is that Associative Remote Viewing is an applicable method to predict the future of a stock index significantly above chance expectation.

Despite the fact that the reported studies in Table 1 differ in several aspects from each other (e. g. number of viewers for one prediction), they share one idea: the importance of feedback for the viewer. Usually, feedback depends on the actual course of the financial market and is presented after the prediction period. In a predefined feedback event the viewer is shown only the correct target-stimulus, which had to be described during the session. This presentation closes

the feedback loop between the session and the feedback event. For instance, Smith et al. (2014) believe that feedback was a crucial aspect in their experiment and an essential factor for their achieved results. Targ et al. (1995) see the feedback as the putative source of the psi information and propose it as part of a guideline for successful ARV experiments.

However, it has not been systematically tested yet, whether feedback is necessary for the ARV process or enhances the precognitive ability of the viewer. We propose that feedback is not a necessary requirement because in any other remote viewing experiment with presently existing targets, feedback seems not to be necessary for the viewer to receive the desired target information (Targ et al., 1985; May et al., 1989). It is more likely that the intention is the driving force in the remote viewing process which is discussed as an important aspect in any experiment involving RV (McMoneagle & May, 2004). That is why we hypothesize a mere-intention principle: It means in essence that the mere intention is sufficient to let the viewer receive the desired target information. As operationalization, one half of the conducted trials in this study are designed as feedback sessions (intention on the feedback) and the other half as non-feedback sessions (intention on the outcome-association). If intention was the essential factor, the hit rate should not differ in both conditions. Consequently, our second hypothesis (H_2) regarding the feedback is that the ARV hit rate does not significantly differ in both conditions (feedback vs. non-feedback).

Besides the feedback issue there are several other aspects which play a role in the ARV process: target selection, judging, viewer performance (especially displacement[3]) and the probabilistic future. When a miss occurs (a prediction was wrong), then all these aspects could be potential causes for the miss. Some aspects are controllable, yet others are not. Target selection and judging are subject to human influence and can be controlled through knowledge about the specific characteristics of remote viewing. For example, one could select easily distinguishable target stimuli to simplify the judging and choose a reliable judging method for optimal information utilization. Viewer performance is partly controllable through the experience of the viewer (e. g. dealing with mental noise and analytical overlays), but effects like displacement are not enough understood to control them. It may be possible to compensate suboptimal target selection, judging, viewer performance and even displacement with a consensus approach (using a group of viewers for one prediction). If procedures are conducted correctly, one could expect high hit rates like in study of Smith et al. (2014).

However, there is one aspect which is not clearly proven, but could be a non-controllable, non-compensable factor in the ARV-process: the probabilistic future. It is rather a philosophi-

3 Displacement is defined as the "occasional tendency of viewers to perceive and describe the wrong associated target" (Smith, 2012: 12).

cal question whether the future is deterministic or probabilistic in its nature,[4] but if it is probabilistic then it should be considered in the experimental reflections about ARV and achievable hit rates. This would mean that some events are not certain at the time of the session and a clear session indicating a rising DAX can be a true prediction before the prediction period ends, but can also become a false prediction over the course of time. In case a prediction becomes false at some point in time because of events that happened, which in turn changed the course of the market, the prediction would result in a miss. Afterwards it would not be possible to determine whether the cause for the miss was displacement or a result of the probabilistic nature of the future. We propose that the future is probabilistic as an additional explanation for distorted viewer perception and failed predictions with ARV.

We do not have a concrete operationalization for this hypothesis. Therefore, this assumption is not tested in this study. However, in contrast to the studies in Table 1 we shortened the time for one prediction to one hour because a shorter timeframe would eventually reduce the probability for distorting events to happen during the prediction period and result in a higher hit rate. Typically, ARV studies try to predict the financial market for complete days (e. g. Smith et al., 2014) because this is more profitable than predictions and investments on an hourly basis. This study aims to provide insights into the ARV process and is not designed to produce a significant financial gain at the end. Nevertheless, we invest a small amount of money in each prediction to avoid generalization doubts of the results and to keep the motivation high. In the end, we want to give a clear statement about feasibility and variables of the ARV process for following studies.

Methods

Participants

In total, $n = 15$ viewers took part in the study (11 female). They were recruited in the area of Freiburg (Germany) depending on their previous remote viewing performance in a former study (Müller & Wittmann, 2017). The participation was voluntary and all signed an informed consent form. The viewers were tested over a time frame of four weeks in accordance with an agreed time schedule. Over the course of the study the majority of subjects functioned more than once as viewers and became increasingly experienced. For each conducted trial, which took approximately 30 to 50 minutes time, a participant received 10€ subject fee.

4 A deterministic future is a future in which everything is certain and already predetermined in the present. A probabilistic future is a future in which everything is open for change until something truly happens in the present.

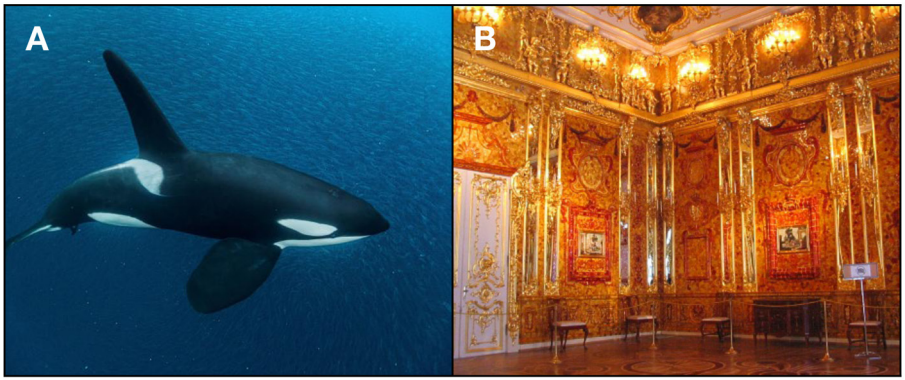

Fig. 1: Example target pair (Picture A: orca whale - associated with a rising DAX and Picture B: amber room - associated with a falling DAX). The targets differ in multiple categories: colors, shapes, smells, tastes, temperature, surrounding, meaning, etc.

Stimulus material

The stimulus material consisted of target pairs, which were chosen on the basis of maximal distinguishability. In other words, the pictures had to differ from each other in different categories as much as possible. To achieve this, the pictures were subjectively selected regarding possible perceptions and perspectives a viewer could have for a particular target. The selection was based on prior experience with RV and according to dominant visually analyzable features (colors, movement, artifacts or nature) but also other associated features from other senses (smells, tastes, temperature). An example of an optimal target pair for ARV is shown in Figure 1. The two target-pictures for each prediction were each randomly associated either with a rising or falling stock index (DAX) in the near future (maximal one hour from the end of an individual session). Every target pair was used only once for each viewer. From our perspective, a good target-pair selection is fundamentally important to simplify the judging and to optimize the process.

Data collection

For data collection we used the standard Coordinate Remote Viewing (CRV) – protocol stages 1-4 (Smith, 1986) in an Associative Remote Viewing (ARV) design. ARV is a methodological approach to get complex information about present or future targets with the help of sensory associations using a remote viewing protocol. Sensory packages (e. g. pictures of target sites) are usually associated with two or more possible outcomes in the future. This approach is used

because RV itself is a non-analytical ability which makes it hard to perceive analytical information (e. g. numbers) directly.

To get information about a target, a monitor guides a viewer through the CRV protocol in a so-called RV session which is essentially a guided introspection. The sessions were not conducted double-blinded. That means the monitors always knew both pictures before and during the sessions. However, the viewer was blind towards the targets to avoid additional analytical distortion during the session. This is done because we understand the monitor and viewer as a team, while the monitor tries to neutrally guide the viewer through the session and can ask detailed questions about the target without pushing the information flow in one direction. In contrast, the viewer provides information about the target without logical reasoning of his own perceptions.

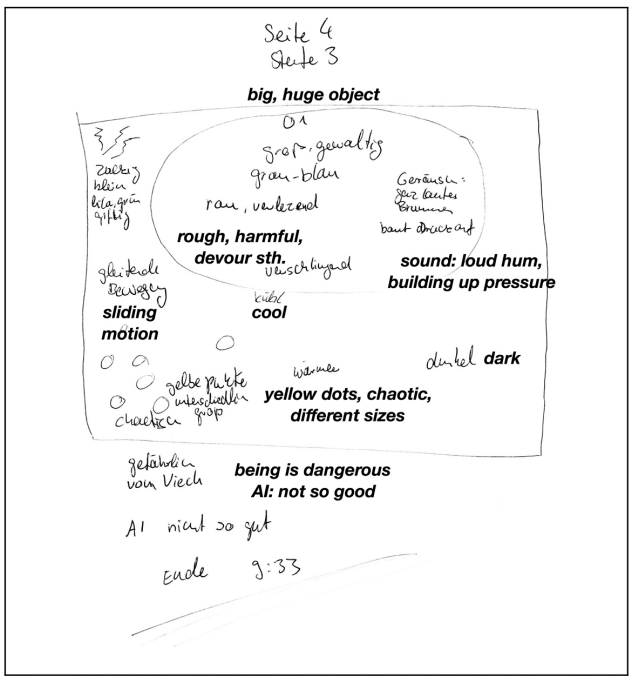

Fig. 2: Example of a session transcript corresponding to the target pair in Fig. 1. Translated impressions are shown in bold and italics. The viewer unambiguously described Picture A (orca whale) which was associated with a rising DAX. This trial resulted in a correct prediction.

The design is appropriate for this ARV study because both, the monitor and the viewer, are blind towards the volatile course of the stock market in the future in every session. A possible conscious manipulation of the session by the monitor would be counterproductive for the prediction decision but would not invalidate the results in this design. In general, designs which have dependent variables in the future (predictions of the future) are more resistant to manipulation and do not require extensive control measures in contrast to other Psi experiments. As a result of this qualitative data collection, a transcript (written and drawn descriptions of the viewer; example see Fig. 2) is created which can be used for further analysis.

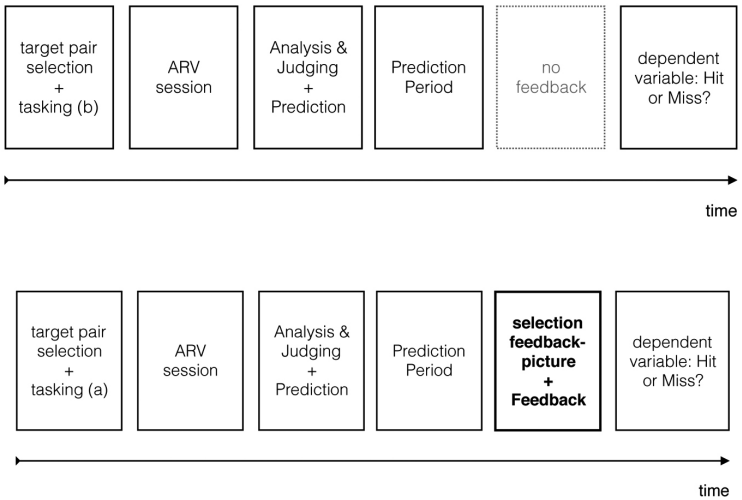

Fig. 3: Timeline for one trial in each condition (feedback manipulation). (a) precognition task with intention on the feedback; (b) precognition task with intention on the outcome of the prediction period and without feedback.

Experimental Procedure

After the participant had arrived at the institute, she/he was first instructed to relax for five minutes (mere silence or meditation according to their own experience). Then one of the two monitors (MM or LM) conducted a remote viewing session in an ARV design with the subject as viewer to get information about the target. The task[5] (coded by a random target reference number / coordinates) for the viewers was either (a) to describe the picture which was shown to them in a predefined feedback event after the prediction period or (b) to describe the picture which was associated with the correct outcome of the DAX in the future without getting feedback (see Fig. 3).

These conditions are linked to two different perspectives on how the process of ARV is understood. Perspective A: precognition (with intention on the feedback) is based on the

5 Tasking is the act in which a person (so-called tasker) associates the target-stimuli with the possible outcomes of the prediction event and defines the target (task for the viewer). In this process, the tasker mentally interlinks or entangles the outcomes with the associations and assigns a random target reference number to the target. This number is the later starting point for the viewer to receive information during the ARV session. The tasking should be done with complete concentration on the association process because any other thought a tasker associates with the target could lead to distorted perceptions for the viewer.

notion that the viewer describes his own entangled impressions of the feedback picture when she/he sees it during the feedback event. The feedback picture itself is chosen after the prediction period and therefore depends on the actual course of the stock market. Perspective B: precognition (with intention on the outcome) is based on the notion that the viewer "downloads" the information which is associated with the actual outcome of the stock market in the future. This perspective proposes a connection between the viewer's unconscious mind and the target at the time of the session (like in any other RV session). Therefore, all relevant information about the stock market is integrated and can be accessed by the viewer during the ARV session and through the associated target pictures.

One half of the sessions were designed with feedback and the other half without feedback (independent variable). Thus, we were able to control whether a direct feedback for the viewer is necessary for the experimental outcome or not, as one of our hypothesis. In the feedback condition, the viewers received an email after the prediction period with only the correct picture. In contrast, the viewers in the no feedback condition never saw any of the pictures.

The sessions took on average 35 minutes and were conducted shortly before a prediction period began. The length of a prediction period was always exactly one hour. Start and end time of the prediction period were predefined during the tasking for a respective session. One session was used for one prediction of the stock market.

After the session, the responsible monitor analyzed and judged the transcript and then decided which picture had been described by the viewer. An undecided outcome was not possible in our two-answer paradigm (up, down), which means that the judge had to make a decision. The judging did not follow a specific protocol but was rather a prima facie matching assessment (Smith, 2009). Prima facie (literally "at first appearance") matching is a subjective way to evaluate qualitative RV data. Due to the fact that qualitative or non-numerical data cannot be analyzed statistically or mathematically, unintentional biases and misinterpretation are always involved in judging RV data. Therefore, the judge tries to compare the session results with the two target pictures as neutral as possible with a holistic perspective on the viewers' perceptions. In other words, the session results are analyzed as a whole without focusing too much on single information, but rather pattern recognition. In addition, the monitor judged the session whether it was a clear or an ambivalent description (confidence rating on a binary scale with 1 = high confidence and 0 = low confidence).

The association with the pictures referring to the up or down course of the stock market made a prediction by implication possible because a description of a specific picture theoretically implies a rising or falling stock index in the future. The actual prediction (up or down) was recorded and sent to a third person (MW) not involved in the actual trial. The third person had the task to maintain a list with all predictions over the course of the study for controlling

purposes. The actual prediction was based only on the results of the session, no other conventionally accessible information (e. g. news about the index) were used.

In addition, a small investment was taken in a contract-for-difference (CFD) format with a trading program. CFD trading allows the investor to put money in up and down markets which is suitable for an ARV study. Furthermore, it is possible to scale the gain/loss range as required. For instance, six active contracts would result in approximately 6€ win or loss for each point difference of the stock index depending on the predicted direction that the index moves. The use of leverages allows the trader to scale the CFDs up to several tens per point difference, which is profitable, if the prediction is correct. CFDs are a very risky form of trading because one can lose the investment capital all at once. Therefore, and because this was an exploratory study, we decided to use only one contract per one point difference of the stock market, which is the smallest possible option with a small gain/loss range. After the prediction period, the trade was terminated, money collected, and the change of the stock market regarding hit or miss recorded (dependent variable).

Results

Hit Rate

In total, we conducted 50 short, 1-hour predictions of the German stock index DAX. Two trials were invalid because the DAX did neither increase nor decrease after exactly one hour which means that the start and end value were equal for the respective prediction intervals and a result for our two-answer paradigm (up or down) could not be made. Therefore, the statistical analyses are applied for 48 valid trials.

38 out of 48 predictions were correct which amounts to a highly significant result ($p = 2.3 \times 10^{-5}$, binomial distribution, $B_{48}(1/2)$; $z = 3.897$), reflecting the hit ratio of 79.16%. The z-score divided through the square root of n = 48 trials corresponds to an effect size (ES) of 0.56. In contrast, a true random number generator (RNG; random.org) was not able to predict the stock index significantly (24 out of 48, binomial distribution, $B_{48}(1/2)$, is $p = 0.11$; $z = 0$).

It could be argued that a binomial test is not appropriate for the stochastic process that underlies the stock market, i. e. the probability for the hit rate should be constant. This requirement is typically given, for example, when tossing a coin (50% hit rate). The rate of the stock market going 'up' and 'down' in the 48 valid trials amounted to 22 up and 26 down trials. It should be noted that even volatile fluctuations of a financial market, having an erratic rising/falling course over time, do not change the probability of the null hypothesis. A prediction depends on the prediction method (random assignment of two target stimuli to stock market out-

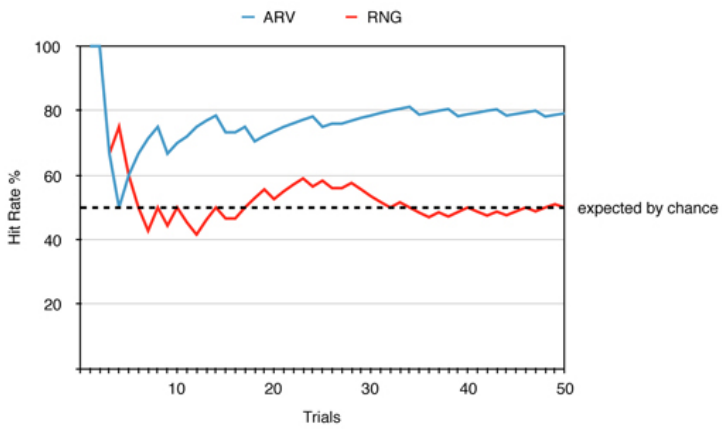

Fig. 4: Hit rate with ARV over 50 trials in contrast to predictions with a random number generator (expected by chance). The two invalid trials (trial 16 and trial 27) are shown in this illustration, but have no influence on the overall hit rate.

comes) and not on the probability characteristics of the financial market itself.

Nonetheless, we additionally calculated a Chi-Square test for the comparison of the frequency of correct predictions across the two prediction methods (human ARV vs. RNG) to account for a possible violation of the assumptions to calculate a binomial test. The difference is significant ($\chi^2 = 8.926$, $p = 0.003$; see Fig. 4). Consequently, our main hypothesis (H_1) can be accepted that the ARV method used in our study predicted the near future of a stock index above chance level.

Monetary Gain

Regarding the fact that this was an exploratory study and we invested only a small amount of money in a contract-for-difference format, the accumulated monetary gain through the predictions was relatively low (237€). The profit out of those 48 trials is not significantly higher than the profit the RNG would have produced: The average profit per trial for the ARV predictions is 4.93€ and for the RNG predictions 1.60€ ($t = 0.722$, $p = 0.472$).

We discovered that the average DAX point difference for the hits ($n = 38$) is 13.89 points and for the misses ($n = 10$) 29.1 points. This difference is significant ($t = 2.603$, $p = 0.023$) which means that we lost more money for the 10 wrong predictions than we gained for 38 correct predictions. Financially spoken, we lost on average 29.10€ for a wrong prediction and gained on average 13.89€ for a correct prediction which is a highly significant difference ($t = -7.361$, $p < 0.001$).

Feedback Manipulation

One of our research goals was to test whether feedback is a necessary requirement for the ARV process. We hypothesized that feedback is not a necessary requirement and both conditions (feedback vs. no feedback) should not significantly differ from each other. Our data suggests that feedback is not necessary. 24 out of 48 trials were sessions with a feedback for the viewers, the other half was without feedback. Both conditions were independently significant: In the feedback condition the viewers succeeded 20 times and failed only 4 times ($\chi^2 = 10.667$, $p = 0.001$). In the non-feedback condition, the viewers succeeded 18 times and failed only 6 times ($\chi^2 = 6.000$, $p = 0.014$). A Chi-Square test for the frequency of hits and misses shows that there is no significant difference between both conditions ($\chi^2 = 0.505$, $p = 0.477$). As a consequence, our hypothesis (H_2) that feedback is not a necessary requirement for predictions with ARV can be accepted. A viewer can significantly describe an associated target without personally seeing the picture anytime in the future.

Confidence Ratings

Furthermore, we compared the judge's (MM, LM on their individual trials) confidence rating (1 = high confidence vs. 0 = low confidence) with the hit ratio and DAX point difference for each session ($n = 48$) because this can give us a clue about the dynamics and dependence of Anomalous Cognition of the predicted object (the stock index). The judge's confidence always depends on the session quality, hence the viewer's perceptions. If only one of the two pictures is described, the judge's confidence is high. If the viewer's perceptions were mixed (features of both targets can be found), the judge would rate the session more ambivalent. We found that there is no connection between the judge's confidence rating and the hit rate ($t = 0.118$, $p = 0.907$) which means that even a clear perception of a target and a high confidence not necessarily mean that the prediction is going to be a hit. However, we found an effect for the DAX point difference. For ambivalently rated sessions ($n = 20$) the DAX point difference is on average 10.55 and for clearly rated sessions ($n = 28$) 21.71; this amounts to a significant difference ($t = 2.914$, $p = 0.006$). Consequently, one could argue that the viewer's perception is clearer and less ambivalent when the stock index also has a clearer outcome at the end of the prediction period. Therefore, the quality of Anomalous Cognition as the underlying construct depends on the prediction object (DAX) irrespective of whether it is a hit or not.

Discussion

Hit rate considerations

The research objectives of this study were (1) to determine the hit rate for predictions of the German stock index DAX with ARV, (2) to test the hypothesis whether feedback is a necessary requirement for predictions with ARV, and (3) to explore factors which might influence the quality of the viewer's perceptions in ARV sessions. In addition, we wanted to identify a design for following studies in the sense of a proof of principle study. Below we discuss these objectives and associated results.

Over the course of 48 valid trials we attempted to predict the binary (up vs. down) course of the German stock index (DAX) with the ARV method. In total, 38 out 48 trials were predicted correctly which amounts to a significant hit rate of 79.16%. This result is in alignment with earlier studies (e. g. Targ et al., 1995; Smith et al. 2014) and confirms the hypothesis that ARV is an applicable method to predict the future of a financial market above chance expectation.

Due to our experimental design and the temporal characteristics of the dependent variable, it is reasonable to assume that the result is attributable to the ARV method and therefore can be considered a Psi effect. In other RV experiments, the main criticism often refers to a non-Psi based information transfer which allows other and more conventional explanations for an observed effect (Marks, 2000). For instance, cues in the experimental design (e. g. through non-verbal communication) which are not controlled by randomization and double-blinded conditions, can easily invalidate an experiment. In ARV experiments the dependent variable (hit rate; whether a prediction is a hit or miss) hinges on the volatile future of the stock market which is hardly predictable by anyone because there are too many influencing variables. Furthermore, the prediction decision is based on a random assignment of two target stimuli to the stock market outcomes and must be declared in advance of the prediction period and the actual event.

As a consequence, ARV designs with dependent variables in the future are more resistant to criticism because nobody precisely knows the outcome of the future until it actually happens. Therefore, nobody can consciously or unconsciously manipulate the prediction decision and the result becomes a valid indicator for a Psi effect. It may be criticized that it is also possible to predict the stock market with specific economic knowledge about the market. In our study, however, the predictions were only based on the RV data and no other accessible information about the stock market were used. It should also be considered that we tried to predict the stock market on an hourly basis, which is even more difficult by conventional means because

of the high volatility of the market across a given day. Generally, if the ARV method is properly conducted, it has the potential to become a probed and tested paradigm for the research field and can convincingly prove that Psi effects are robust and replicable.

It seems that our result is not limited to one specific financial market (e. g. the German stock index DAX), because Targ et al. (1995) successfully predicted the silver price and Smith et al. (2014) the Dow Jones Industrial Average (DJIA). However, this result should not be generalized for various other types of future predictions because it is not clear whether and to what extent other future events are actually predictable. Furthermore, it seems very unlikely to achieve a hundred-percent hit rate like in the study of Smith et al. (2014) in the long term. Our results show that there is an error variance with ARV predictions. Nevertheless, a relatively high hit rate (in comparison with random guessing) of nearly 80% seems achievable.

Potential factors which might influence the hit rate of future predictions with ARV are now being discussed. From our perspective, the most fundamental stage of the ARV process is the target stimuli selection. A good selection ensures a simplified judging process whereas a poor selection complicates the judging especially when the viewer performance is poor. If the target stimuli are not selected on the basis of maximal distinguishability, it increases the probability that the judge makes a wrong prediction decision because of the overall ambivalence of his associations. In addition, the targets should be equally interesting since the viewer tends to sometimes describe the target with the most fascinating aspect rather than the correct target. A possible reason for this displacement effect might be that the viewer becomes subconsciously attracted to a specific aspect which outshines everything else (Smith, 2012). More specifically, May and Marwaha (2014) found that high changes in entropy in a target (e. g. an exploding bomb) are more salient for the viewer than no or only small changes in a target (e. g. a tree in a park). In sum, maximal distinguishable and equally exciting targets are essential prerequisites for an ARV trial and have an impact on the overall hit rate.

Another factor is the data collection method because it is the basis for every prediction decision. In this study we decided to follow a qualitative approach with monitored one-to-one sessions for each trial. The viewers were selected and had experience with the Coordinate Remote Viewing (CRV) protocol (Smith, 1986). The monitors also had experience and guided the viewers through the protocol while the monitors knew the two target pictures in each session. We believe that this combination enhanced the data collection and session quality (particularly viewer performance) because the monitor had the chance to ask detailed questions regarding the two target-pictures during the session which simplified the subsequent judging. Due to the fact that the monitor also functioned as the later judge, it was possible to integrate multiple roles into one session. From our perspective, the RV team consisting of viewer and monitor could

be the key element in the ARV process for improving the session output.[6] In contrast, Smith et al. (2014) used a quantitative approach with up to ten inexperienced viewers for one prediction and short solo sessions. Both approaches produced significant results and one should not be considered as generally better than the other. In sum, the data collection has an impact on the prediction decision and can be enhanced by using a qualitative or quantitative approach depending on available human resources.

As mentioned above, the judging builds upon the data collection method and is the stage in which the prediction decision is taken. Successful judging requires an experienced judge and a judging method like the prima facie matching assessment (Smith, 2009). Furthermore, a rating method to collect information about the confidence of a remote viewing session (regarding the correspondence with the target-stimuli) should be used for later calculations. It is not yet clear whether personal confidence can be a reliable indicator for trial success. Kolodziejzyk (2012) found a positive correlation between confidence scores and hit rates. However, our data do not support this finding because we did not find a connection between the judge's confidence rating and the hit rate ($t = 0.118$, $p = 0.907$). We only used a binary scale (1 = high confidence vs. 0 = low confidence) and thus lost some more detailed information. For further studies we suggest a broader correspondence rating scale (e. g. 0-5) which differentiates stronger between a clear and an ambivalent session. It would be possible then to substantially increase insights into the issue whether the confidence rating of an individual is an indicator for the outcome or not. In sum, judging is an important but easily controllable factor in the ARV process which could produce a bias if not conducted properly.

The overall ARV hit rate for future predictions is primarily influenced by target selection, data collection and judging. These factors are mainly controllable and it would be simple to conduct a replicable ARV experiment, if the necessary experience and human resources were available. Below we discuss whether and to what extent the intention, especially on feedback, plays a role in the ARV process (feedback considerations). After this we hypothesize another factor which might have an influence on the hit rate, namely probabilistic future considerations.

Feedback considerations

The second research objective was to test the hypothesis whether feedback is a necessary requirement for predictions with ARV. In this study, we found no difference between the feedback

6 As already mentioned above, the fact that the monitor knew the target stimuli does not invalidate a trial because the actual outcome of the stock market course in the future is inaccessible at the time of the session for anyone. Furthermore, the task for the RV team is not guessing an outcome, but rather professionally working together to achieve a positive outcome.

condition and the non-feedback condition ($\chi^2 = 0.505$, $p = 0.477$). This result is in alignment with other studies which tested the feedback hypothesis (May et al., 2014). It means that feedback is not necessarily a requirement for ARV, nor the putative source of the Psi information as suggested by Targ et al. (1995). It is possible for a viewer to correctly predict the future course of a financial market without receiving a personal feedback in form of a visual presentation of the target-stimulus. Taking this into consideration, questions arise what the source of the Psi information actually is and if there are any differences between the tasking types (intention on the feedback vs. intention on the outcome).

The first question concerning the source of the Psi information actually cannot be conclusively answered. When we understand remote viewing as an interview process (Buchanan, 2017), meaning that the viewer interviews his subconscious mind and simply reports what it says, then one could say that some or all aspects of subconscious processes are the source of the Psi information. We assume that a more convincing explanation is at the present time not possible without relying on speculations. However, because we were able to show that feedback is not a necessary requirement for ARV predictions, it seems reasonable to conclude that something else is responsible for the Psi effect. Derived from our observations that the non-feedback condition with intention on the outcome also produced significant results, we propose that intention is the essential element in the ARV process.

According to the mere intention principle, mere intention is sufficient to let the viewer receive the desired target information. Under this assumption it becomes irrelevant whether the intention is on the outcome or on the feedback event. In both conditions the viewer reports the desired target information which is associated with the actual course of the financial market in the future. During the tasking of the outcome condition the person who conducts the tasking defines the task for the viewer and associates the target stimuli with the potential outcomes (up or down). In other words, he focusses on the intention that the viewer should describe the correctly associated target. In the feedback condition the tasker focusses on the intention that the viewer should describe the feedback, but in essence this implicitly means that the viewer should describe the correctly associated target like in the first condition. Both conditions are equal regarding the desired target information. Therefore, one could assume that it is the same precognitive process in both conditions because the information transfer depends on the intention (explicit or implicit) of the person who creates the task for the session. In sum, feedback seems not to be a crucial element for predictions with ARV, however, it is more likely that intention is the driving force which therefore should be as simple and clear as possible to let the viewer receive the desired target information (following the mere intention principle).

Probabilistic future considerations

The third research objective was to explore factors which might influence the quality of the viewer's perceptions in ARV sessions. Besides the above-mentioned finding that feedback seems not be an enhancing factor for the viewer's perceptions, we found a significant difference between the judge's confidence (clear vs. ambivalent session) and the DAX point difference ($t = 2.914$, $p = 0.006$). The confidence of the judge primarily depends on the perception of the viewer and therefore one could argue that the viewer's perception is clearer and less ambivalent when the stock index also has a clearer outcome at the end of the prediction period. It can happen that a future event predicted at present changes over the course of the delay due to unforeseen influences. This could be an indicator for a phenomenon called "retro-causality" because the effect (alteration of viewer perception) precedes its cause (volatility of the future DAX course) in time. If the viewer's perception was altered by the stock index in the future, it would support the assumption that the actual future event is to some extent variable and not completely clear at the time of the session.

A possible explanation for this finding is the consideration of a probabilistic future which could be the most determining factor for future predictions. Following this thought, during an ARV session the viewer would not describe the actual outcome in the future (through the associated target stimuli), but rather the most probable outcome from his position in time at the time of the session.[7] Consequently, the actual outcome in the future can change over time and a prediction which indicates the most probable outcome at only one point in time, can become a wrong prediction when probabilities change after the session. For instance, at the time of the session the viewer describes the picture which is associated with a rising stock market. After the session an event happens (e. g. an influential person impulsively releases economic information) which was not clear at the time of the session, but influences the volatile stock market to such an extent that the stock market has a falling course in the prediction period. The prediction would become a miss and it would not be possible to determine whether the cause for the miss was the viewer's performance or some probabilistic event that changed the course of the market after the session.

If these assumptions were true and the future is indeed probabilistic and only partially predictable, this should be taken into consideration regarding achievable hit rates with ARV. An opportunity to test this hypothesis is a comparison experiment in which the hit rate of ARV for targets existing at the present moment is identified. All other variables in the ARV process

7 Because of the mere intention principle, it is reasonable to assume that the viewer automatically describes the most probable outcome rather than another outcome, if not specified during the tasking. In general, if an intention does not match a real target, the viewer tends to describe the target which matches the intention to the greatest amount.

(target selection, data collection method, judging, etc.) should be kept constant to ensure that the observed error variance (misses) can definitely not be explained by the probabilistic future. The new hypothesis would be that the hit rate of ARV with binary outcomes with targets existing at the present moment is significantly higher than the hit rate of ARV with binary outcomes in the future. If the results were positive according to this hypothesis, the probabilistic future would be an additional factor for predictions with ARV leading to more misses. As we can show here, a relatively high hit rate is nevertheless achievable.

Conclusion

This proof of principle study was designed to provide insights into the ARV process. We were able to show that ARV is an applicable method to predict a binary future outcome above chance level replicating earlier findings (e. g. Targ et. al, 1995; Smith et al., 2014), that feedback seems not to be a necessary requirement for the process, and that there are many factors including the probabilistic future which might have an impact on the overall hit rate. The next step should be to replicate these findings in form of a project with greater investment of human and monetary resources. In addition, the focus should be on process-oriented research (e.g. testing the hypothesis whether the future is probabilistic in nature) to provide more insights into the ARV process and to expand our understanding about time, Anomalous Cognition and the fundamental principles of nature. Empirical evidence actually has accumulated concerning the veridicality of different types of precognition (Cardeña, 2018; Mossbridge & Radin, 2018; Marwaha & May, 2019; Tressoldi, 2011). Showing success rates of precognitive abilities in practical applications such as winning on the stock market would be a strong argument in favor of the veridicality of the psi hypothesis.

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Appendix: Conducted trials with date, prediction, time of the prediction period, corresponding DAX point values and the actual outcome

Trial	Date	Prediction	Time Start (GMT+2)	DAX Start	Time End (GMT+2)	DAX End	DAX Point Difference	Outcome
1	15.08.17	down	09:00	12209	10:00	12199	-10	Hit
2	15.08.17	down	10:30	12201	11:30	12193	-8	Hit
3	15.08.17	down	14:30	12198	15:30	12221	23	Miss
4	15.08.17	up	16:00	12199	17:00	12175	-24	Miss
5	15.08.17	up	17:30	12178	18:30	12180	2	Hit
6	16.08.17	up	12:30	12279	13:30	12280	1	Hit
7	16.08.17	down	14:00	12281	15:00	12277	-4	Hit
8	17.08.17	up	09:30	12245	10:30	12250	5	Hit
9	17.08.17	up	10:30	12245	11:30	12217	-28	Miss
10	17.08.17	down	12:00	12245	13:00	12239	-6	Hit
11	18.08.17	down	14:00	12163	15:00	12156	-7	Hit
12	21.08.17	down	08:30	12126	09:30	12116	-10	Hit
13	21.08.17	down	09:30	12116	10:30	12104	-12	Hit
14	21.08.17	down	14:00	12128	15:00	12108	-20	Hit
15	21.08.17	up	15:30	12096	16:30	12042	-54	Miss
16	22.08.17	up	09:30	12144	10:30	12144	0	invalid Trial
17	22.08.17	up	11:00	12145	12:00	12146	1	Hit
18	22.08.17	down	14:00	12152	15:00	12203	51	Miss
19	23.08.17	down	09:30	12261	10:30	12218	-43	Hit
20	23.08.17	up	12:00	12221	13:00	12226	5	Hit
21	23.08.17	up	15:00	12189	16:00	12206	17	Hit
22	24.08.17	down	09:00	12195	10:00	12172	-23	Hit
23	24.08.17	up	11:00	12210	12:00	12217	7	Hit
24	24.08.17	up	13:30	12219	14:30	12229	10	Hit
25	24.08.17	up	15:00	12239	16:00	12202	-37	Miss
26	28.08.17	down	09:00	12101	10:00	12073	-28	Hit
27	28.08.17	up	11:00	12100	12:00	12100	0	invalid Trial
28	28.08.17	down	12:00	12104	13:00	12100	-4	Hit

Trial	Date	Predic-tion	Time Start (GMT+2)	DAX Start	Time End (GMT+2)	DAX End	DAX Point Diffe-rence	Outcome
29	28.08.17	up	14:00	12147	15:00	12156	9	Hit
30	29.08.17	down	09:30	11978	10:30	11922	-56	Hit
31	29.08.17	up	11:00	11897	12:00	11919	22	Hit
32	29.08.17	up	15:00	11897	16:00	11921	24	Hit
33	29.08.17	up	16:00	11921	17:00	11945	24	Hit
34	30.08.17	up	08:00	12015	09:00	12026	11	Hit
35	30.08.17	up	11:00	12008	12:00	11992	-16	Miss
36	30.08.17	down	11:30	12007	12:30	11999	-8	Hit
37	30.08.17	down	14:00	12011	15:00	12009	-2	Hit
38	31.08.17	up	09:30	12050	10:30	12072	22	Hit
39	31.08.17	down	11:00	12068	12:00	12075	7	Miss
40	31.08.17	down	12:00	12075	13:00	12067	-8	Hit
41	31.08.17	up	14:00	12072	15:00	12082	10	Hit
42	31.08.17	up	15:00	12082	16:00	12089	7	Hit
43	05.09.17	up	09:30	12152	10:30	12182	30	Hit
44	05.09.17	up	11:00	12204	12:00	12198	-6	Miss
45	05.09.17	down	12:00	12198	13:00	12154	-44	Hit
46	06.09.17	up	9:30	12091	10:30	12092	1	Hit
47	06.09.17	down	11:30	12109	12:30	12106	-3	Hit
48	06.09.17	down	14:30	12199	15:30	12244	45	Miss
49	06.09.17	down	15:30	12244	16:30	12225	-19	Hit
50	07.09.17	down	09:00	12290	10:00	12285	-5	Hit