



Ancestor Effect

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Thinking about our genetic origin enhances intellectual performance

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Abstract.



The present research hypothesizes that thinking about one's genetic origin (i.e. ancestors) provides people with a positive psychological research that increases their intellectual performance. To test this line of reasoning, we manipulated whether participants thought about their ancestors or not (manipulation of ancestor salience), and measured their expected as well as actual intellectual performance in a variety of intelligence tasks. Four studies supported our assumptions: participants show higher expected (Study 1) and actual intellectual performance (Studies 2-4) when they are reminded about their ancestors. We also have initial evidence that this effect may be fueled by increased levels of perceived control¹ and promotion orientation². Theoretical and practical implications are discussed. It is certainly desirable to be well descended, the glory belongs to our ancestors. (Plutarch 46-120 AD)

When she was 3-years old, my mother lost her father in World War II. She told me that she would not stop searching for him, even though it was nearly certain that he had died on a Russian battlefield in 1942. All over the world, many people feel like my mother and seek ancestors who are missing or lost their lives in wars, natural disasters, terrorist attacks or technical mishaps. Similarly, people adopted in early childhood even try hard to find their biological parents. In Germany, there are even professional organizations and TV shows that help these (often desperate) children find their ancestors.

Why are people so keep on finding out information about their ancestors and relatives, even when they know that they are already dead? Why do people suffer when they do not know who were their ancestors, what happened to them and how they lived? Why do we collected pictures of our ancestors and pun them on the wall or spend huge amounts of money to retrace our genetic origins in the form of genealogical tables? The most plausible answer these these questions is that reminders and knowledge of our ancestors provide us with positive psychological resources, which are important for our successful psychological functioning and adjustment. We suggest that these resources consist of an enhanced feeling of control and motivation to approach problems which together should be reflected by increased intellectual

1 Perceived control (PC) can be defined as the belief that one sees he or she has control over their inside

state, behaviors and the place or people or things or feelings or activities surrounding a person. There are two important dimensions: (1) whether the object of control is in the past or the future and (2) whether the object of control is

over outcome, behavior, or process.[1]



2 A promotion orientation is concerned with the achievement of ideal self-goals (e.g., hope, wishes, and aspirations) and involves the eager pursuit of gains and successes. A prevention orientation entails striving to attain ought self-goals (e.g., duties, obligations, and responsibilities) and includes strategies aimed at vigilantly avoiding losses and failures.

performance. In short, we propose that reminders of our ancestors (and thus our genetic origin) may positively affect our intellectual abilities.

WHERE DO WE COME FROM AND WHERE DO WE GO?

PSYCHOLOGICAL EFFECTS OF ANCESTOR SALIENCE³

Human beings have two basic existential questions: where do we come from and where do we go? Social psychologists have conducted much research into the effects of thinking about the meaning of life; with particular focus on what happens when we consider the prospect of death (e.g. Etsner-Hershfield, Mikels, Sullivan, & Carstensen, 2008; Kosloff & Greenberg, 2009). Among other studies, this research has revealed that people counteract the fear inherent to mortality salience by investing in their culture and defending their own world views. For example, when people are reminded about the end of their lives, they show prosocial behavior towards in-group members (Jonas Schimel, Greenber, & Pyszczynski, 2002), increased in-group- favoritism (Fritsche & Jonas, 2005), bolstered self-esteem (Dechesne et al., 2003) and elevated perceptions of social consensus (Pyszczynski et al, 1996). The present research flips the coin and investigates the psychological effects of reminding people of their genetic origins - that is, reminding them about their ancestors.

We propose that hiking about our ancestors should mostly remind us about eventful and successful lives. Normally, our ancestors managed to overcome a multitude of personal and societal problems, such as severe illness, wars, loss of loved ones or severe economic declines. So, when we think about them, we are reminded that humans who are genetically similar to us can successfully overcome a multitude problems and adversities. In other words, because we are the successors of our ancestors and thus their genetic heritage, we tend to attribute successful problem-solving of our ancestors to our own problem-solving abilities. Moreover, reminding people about their ancestors should increase the cognitive accessibility of things they learned from them via intergenerational socialization processes. We learn things (e.g. norms, adages, blueprints) from our parents, who in turn learned from their parents and so on. This more or less trans-generational infinite regress ends in the present, and reminding people about their ancestors should increase the cognitive availability of a variety of helpful knowledge that stems from our ancestors. Hence, we



expect that thinking about one's ancestors provide individuals with increased abilities in problem-solving, which is reflected by increased levels of intellectual performance.

On an explorative level, we expected that the positive effect of ancestor salience on intellectual performance is driven by increased levels of perceived control and motivation to approach problems (promotion orientation, see Higgins, 1997). This line of argumentation is plausible from the perspective of different psychological disciplines. For example, family psychologists argue that the family is our first and most important source of socialization, which promotes control-related processes like constancy, intimacy and communication abilities (Schneewind, 1998). Also health psychologists added that family-based processes are important for mental

3 Salience - The quality of being particularly noticeable or important; prominence

health and well-being (Sanders, 2008), because they foster the development of coping and problem-solving strategies in the face of adversity and illness (Glynn et al., 1999; Toman, 1993).

Overview to the Present Research

The following studies tested whether reminding people about their ancestors increases their expected as well as actual intellectual performance. We tested on an explorative basis whether this expected effect is fueled by increased levels of experienced control and motivation to approach problems. To test this basic assumption, the present studies manipulated whether participants thought about their ancestors (high ancestor salience) or not (low ancestor salience), with both individuals' expected intellectual performance (Study 1) as well as their actual intellectual performance in different intelligence tasks (Studies 2-4) serving as the dependent variables. We predicted that reminding people about their ancestors would increase their expected and actual intellectual performance.

Study 1

The first study was designed to provide an initial test as to whether reminding people about their genetic origins (ancestor salience) results in increased academic performance expectations, and whether this effect is mediated by an increased sense of perceived control.

Method

Participants and Design



Eighty students at the University of Cologne, Germany, participated in context of a social psychology lecture (58 women and 22 men; $M = 24.46$, $SD = 3.31$ years). The study consisted of a one-factorial design with the following three independent conditions: (1) 'thinking about ancestors in the 15th century' (ancestor salience condition 1); (2) 'thinking about great-grand- parents' (ancestor salience condition 2) and (3) 'thinking about your last visit to a

supermarket' (control condition). Participants were randomly assigned to one of the experimental conditions.

Material and Procedure

Participants in the '15th century ancestors' condition receive the following instructions: 'Please imagine your ancestors in the 15th century, that is, your great-great-great-great-great- grandparents. Please imagine what they did at that time, how they lived, what their profession was and how many children they had, etc. Please also imagine what your ancestors from that time would tell you today, if you were still able to meet them. Please think about that until the experimenter gives you a sign'. Participants in the 'great-grandparents' condition received identical instructions, except with the term 'great-grandparents' replacing 'ancestors from the 15th century...'. Participants in the control condition were asked to think about their last supermarket visit, what they bought and how they felt about it. In all conditions, participants were given exactly 5 minutes to think about their assigned topic.

Afterwards, participants' intellectual performance expectation was measured by three items, answered on a scale from 0 to 10, with '10' indicating the highest level of performance expectation and '0' the lowest. The items were: 'How well do you think you will perform in the final social psychology exam'; 'How well do you think you will perform in your studies?' and 'Do you think you will reach your career goals?' ($\alpha = .57$). In addition, perceived control (a potential mediating factor) was measured via the item 'To what extent do you feel that you have your life under control?', also answered on a scale of 0 (not at all) to 10 (very much). Upon completing these items, the study was completed and the participants fully debriefed.

Results and Discussion

Intellectual Performance Expectation

Following the analytic strategy of Rosenthal and Rosnow (1985) a priori contrasts⁴ were conducted. This revealed that participants who thought about their ancestors in the 15th century ($M = 7.03$, $SD = 1.20$; contrast weight: 1) and those who thought about their

great-grandparents ($M = 7.14$, $SD = 1.21$; contrast weight: 1) reported significantly higher academic performance expectations than participants in the control condition ($M = 6.40$, $SD = 1.17$; contrast weight: -2), $t(77) = 2.46$, $p = .02$, $d = 0.57$. As expected, no significant differences were found between participants who thought about their ancestors in the 15th century and those who thought about their great-grandparents, $t < 1$.

Perceived Control

An a priori contrast revealed that participants who thought about their ancestors in the 15th century ($M = 6.82$, $SD = 1.34$; contrast weight: 1) and their great-grandparents ($M = 6.71$, $SD = 1.64$; contrast weight: 1) reported marginally higher levels of general control than participants in the control group ($M = 6.13$, $SD = 1.88$; contrast weight: -2), $t(77) = 1.67$, $p = .099$, $d = 0.40$.

Bootstrap Meditation Analysis

We tested whether perceived general control mediates the impact of thinking about ancestors on academic performance expectation. We created a main contrast by collapsing participants from the two ancestor conditions into one group and comparing their performance expectations to those of the control group. To test this meditation hypothesis, a bootstrapping analysis based on

4 a priori comparison

any examination in which two or more quantities are compared in accordance with plans established prior to conducting a research study. For example, even before data are collected, a researcher might hypothesize that two groups given personal instruction would show better mean performance on a task compared to those who receive only written instruction. Thus, he or she could decide in advance to compare the combined personal instruction groups to the written instruction groups. Also called a priori contrast; planned comparison (or contrast).

1000 bootstraps was performed⁵ (Preacher & Hayes, 2004). Results showed a significant direct effect of ancestor salience on expected intellectual performances, $t = 2.49$, $p = .015$, which was reduced to marginal significance, $t = 1.82$, $p = .074$, when controlling for the mediator control, which still had a significant impact, $t = 4.43$, $p < .001$. Moreover, the indirect effect closely missed significance (LL 95 = -0.03; UL 95 = 0.54). Thus, the effect of ancestor salience on performance expectation was only partially mediated by perceived control.



Study 1 provided initial evidence that thinking about our concrete or abstract ancestors increases our performance expectations, and that this effect is partially explained by increased levels of perceived control. However, a mediation effect was also found for the reverse mediation, and thus the basic mediational finding for perceived control has to be treated with caution.

Study 2

The next study tests whether the effect of Study 1 can be extended beyond performance expectations into the realm of actual performance in an intelligence task. In addition, we employed a less obvious induction of ancestor salience and used a more extended measure of perceived control. It was expected that participants in the ancestor salience condition perform better in an intelligence task than those in the non-ancestor salience condition.

Method

Participants and Design

Thirty-five students of the University of Graz (Austria) participated in this experiment. Four participants had to be excluded because they discontinued working on the experimental material. This leaves 31 participants in the final sample (21 women, 10 men; $M = 22.42$, $SD = 3.38$ years). The study consisted of a one-factorial design with the two between-subject conditions ancestor salience versus non-ancestor salience. Participants were randomly assigned to one of the two experimental conditions.

Material and Procedure

Participation in the ancestor salience condition were asked to draw their own family tree (they were given 5 minutes for this task). In contrast, participants in the control condition were asked to remember their last shopping tour and write down a few sentences about that. Afterwards, participants worked on the intelligence task; we took the verbal intelligence subtask of the Wilde intelligence test 2 (WIT2; Kersting, Althoff & Jäger, 2008), where participants had to find a series of 25 verbal analogies. Participants were allowed to work 4 minutes on the intelligence items. As an indicator of promotion orientation we used the overall number of test items participants tried to solve (independent of whether they were solved correctly or not). Finally, we measured perceived control by the following items on a scale from 0 (not at all) to 10 (definitely); 'I have full control over my life'; 'I have full control over my professional career';

5 In statistics, bootstrapping is any test or metric that relies on random sampling with



replacement. Bootstrapping allows assigning measures of accuracy (defined in terms of bias, variance, confidence intervals, prediction error or some other such measure) to sample estimates.

'I have control over adversities.:' 'I have control over my own success.' ($\alpha = .59$). The debriefing procedure was similar to the previous studies.

Results and Discussion

Performance in an Intelligence Task

Participants in the ancestor salience condition ($M = 16.44$, $SD = 2.28$) answered marginal significantly more items correctly than the control group ($M = 14.00$, $SD = 4.444$), $t(29) = 1.94$, $p = .062$, $d = 0.69$.

Promotion Orientation

Analyses for the number of overall completed items revealed that participants in the ancestor salience condition ($M = 20.94$, $SD = 3.07$) tried to solve significantly more items than those in the control group. ($M = 17.60$, $SD = 4.36$), $t(29) = 2.48$, $p = .019$, $d = 0.89$.

Perceived Control

An independent sample t-test revealed that participants in the ancestor salience condition ($M = 6.91$, $SD = 1.38$) reported significantly higher levels of experienced control than participants in the control group ($M = 5.45$, $SD = 2.20$), $t(29) = 2.22$, $p = .034$, $d = 0.80$. Since perceived control did not significantly correlate with the overall intelligence performance index ($r = .25$, $p = .18$), no further mediational analyses were performed. We also measured perceived control in the following Studies 3 and 4, but never found any significant effects. Thus, in order to save space, we do not report results on perceived control in those studies.

Bootstrap Mediational Analysis

We tested whether the effect of ancestor salience on actual intelligence performance is mediated by promotion orientation (i.e. the numbers of overall solved items). To test this mediation hypothesis, a bootstrapping analysis based on 1000 bootstraps was performed (Preacher & Hayes, 2004). Results showed a nearly significant direct effect of ancestor salience on intelligence performance, $t = 1.94$, $p = .06$, which was reduced to non-significance, $t < 1$, $p = .83$, when controlling for the mediator promotion orientation, which still had a significant impact, $t = 5.42$, $p < .001$. Moreover, the indirect effect was significant (LL 95 = 4.37; UL 95 = -0.31; $p < .05$).



In sum, Study 2 provided evidence that ancestor salience increases actual intellectual performance in individuals. As in Study 1, participants in the ancestor salience condition reported significantly higher levels of perceived control than participants in the non-ancestor salience control condition. However, no direct mediation was found for perceived control. Instead, we found a significant mediation for promotion orientation. That is, participants in the ancestor salience condition solved more items correctly, because they overall approach more items.

Study 3

The next study was designed to test whether the effect of ancestor salience on actual intellectual performance occurs both when (a) participants think about abstract ancestor (i.e. ancestor who did long before they were born) and (b) concrete ancestors (such as parents or grandparents). Therefore, we constructed two experimental conditions, where participants were asked to write a short essay about either (a) ancestors who lived in the 15th century or (b) ancestors who are still alive. These two conditions were contrasted to a control conditions where participants were asked to think about a close friend in order to rule out the possibility that the ancestor effect is just due to participants thinking about people they may be particularly inclined to lie. In sum, we expected that participants who thought about deceased (experimental group 1) or living (experimental group 2) ancestors would perform better in an intelligence task than participants who thought about close friends (control group).

Method

Participants and Design

Forty-one students at the University of Graz (Austria) participated during a social psychology lecture for course credit. Two participants had to be excluded from further analyses; one did not write an essay about his or her ancestors and another had substantial language difficulties. This leaves a final sample of 39 participants (28 women and 11 men; ages ranging from 19 to 47; $M = 22.51$, $SD = 5.33$). The study consisted of a one-factorial design with the following three conditions: (1) 'thinking about ancestors who lived in the 15th century'; (2) 'thinking about ancestors who are still alive' and (3) 'thinking about friends'. Conditions 1 and 2 reflect high ancestor salience, whereas condition 3 reflects low ancestor salience. Participants were randomly assigned to one of the three experimental conditions.

Material and Procedure



Participants were instructed either to write a short essay about (a) ancestors who lived in the 15th century; (b) ancestors who are still alive or (c) good friends. People were instructed to think hard about these people and to write down everything that came to mind about them. Afterwards, they worked on 16 items taken from the WIT for conclusive thinking (Kersting et al. 2008), where they had to correctly recognize geometric figure and mirror images. Participants worked for exactly 3 minutes on this task. Afterwards, the experiment was over and all participants were fully debriefed.

Results and Discussion

Performance in an Intelligence Task

A priori contrasts (Rosenthal & Rosnow, 1985) revealed that participants who thought about ancestors in the 15th century ($M = 13.93$, $SD = 2.46$; contrast weight: 1) and ancestors who are still alive ($M = 11.45$, $SD = 4.84$; contrast weight: 1) solved significantly more intelligence items correctly than those who thought about close friends ($M = 9.86$, $SD = 4.31$; contrast weight: -2), $t(36) = 2.16$, $p = .038$, $d = 0.59$. No significant difference occurred between the two ancestor

salience conditions, $t < 1.57$, $p > .12$. No significant difference was found for the number of approach items, $t < 1.27$.

In conclusion, participants who thought about ancestors - be they dead or alive - were more successful in an actual intelligence task than participants who thought about a close friend. This finding also rules out the alternative explanation that the ancestor effect is merely due to thinking about people we like.

Study 4

In a final study, we test whether the ancestor salience effect still holds or not even when individuals have more negative associations with their ancestors (e.g. because they had negative experiences with their ancestors, or their ancestors suffered from severe personal and/or societal conditions). In addition, we tested whether the ancestor effect can be alternatively explained by processes of mere self-affirmation (see Steele, 1988). Therefore, we asked participants in four independent conditions either to think about positive versus negative aspects of their ancestors (ancestor salience conditions) or positive versus negative aspects of themselves (self-salience conditions). As in the previous studies, we expected increased intellectual performance when participants are reminded about their ancestors.

Method

Participants and Design

Eighty-eight students of the University of Graz participated in this experiment. We had to exclude one outlier of more than 3 SD (worse performance than average) in the employed intellectual performance task, one participant with substantial language problems and four participants who did not follow the essay writing instruction correctly. This leaves 82 participants in the final sample (50 women, 32 men; ages ranging from 18 to 66 years; $M = 24.19$, $SD = 7.48$). The study consisted of a 2 (salience: ancestor vs. self) x 2 (direction: positive vs. negative) between subject design. Participants were randomly assigned to one of the four experimental conditions.

Material and Procedure

The experimental context was similar to the previous three studies. Participants in the ancestor salience condition were asked to write either a short essay about attributes of their ancestors (high ancestor salience) or about attributes of themselves (low ancestor salience control condition). This factor was fully crossed with the direct factor: half of the participants should write about positive attributes (of their ancestors or themselves, respectively); the other half wrote about negative attributes. A similar procedure to induce self-affirmation (i.e. writing about an own positive value) was used by Sherman and Cohen (2006). Participants were given 5 minutes to complete this task. Finally, participants worked on a subtask of the WIT with 15 items for conclusive thinking, where they had to complete letter rows (Kersting et al., 2008). Participants were given 4 minutes for this task. As dependent variable we used the number of correctly completed items. The debriefing procedure was similar to the previous studies.

Results and Discussion

Performance in an intelligence Task

A 2 (ancestor salience) x 2 (positivity) factorial ANOVA revealed a significant main effect for ancestor salience, $F(1,78) = 4.12$, $p = .046$, $\eta^2 = 0.05$, indicating that participants in the ancestor salience condition ($M = 9.62$, $SD = 2.30$) performed better in the intelligence task than participants in the control group ($M = 8.45$, $SD = 2.88$). No further main effects or interactions were observed, all $F_s < 1$. Participants in the ancestor salience condition ($M = 11.62$, $SD = 2.24$) approached marginally more test items than those in the self-salience condition ($M = 10.73$, $SD = 2.63$), $F(1,78) = 2.76$, $p = .10$, $\eta^2 = 0.03$.



In sum, Study 4 again replicated the ancestor effect of the previous studies: participants who were reminded about their ancestors performed better in an intelligence task than participants without an ancestor salience cue. This effect occurred independent of whether participants thought about positive or negative aspects of their ancestors. Study 4 also showed that the ancestor effect is unlikely to be due to mere self-affirmation, since self-salience led to significantly lower intellectual performance than ancestor salience.

General Discussion

The present research began with the question: Why are people so keen to learn about their genetic origins? We argued that reminding people about their ancestors provides a positive psychological resource to them, which increases intellectual performance. Study 1 revealed that thinking about ancestors increases individuals' expected intellectual performance, whereas increased sense of control partially mediated this effect. Study 2 replicated this effect on the behavioral level. Participants who thought about their ancestors performed better in an actual intelligence task than participants who thought about their last shopping tour. This effect was mediated by increased levels of promotion orientation, but also by increased levels of perceived control. Studies 3 and 4 replicated this behavioral effect with different manipulations of ancestor salience as well as different intelligence tasks. Studies 3 and 4 also clarified that the ancestor effect does not depend on whether participants ever met their ancestors or not, whether participants think about positive or negative aspects of their ancestors, or whether participants have the possibility of self-affirmation.

Implications and Limitations

Most important, the present research shows thinking about our genetic origin can have substantial psychological effects on intellectual performance, promotion orientation and the experience of control. After a great amount of research has been concerned about the psychological effects of thinking about where we go at the end of our lives (i.e. mortality salience and terror management), the present studies are a starting point for the opposite perspective; that is, the psychological effects of thinking about our genetic origin and where we come from. It would be a fruitful endeavor for future research to investigate whether ancestor salience also affects other psychological processes, such as creativity, self-regulation, social skills, or the choice of coping strategies.

The present research has also important practical implications for the psychology of intellectual performance. We showed that an easy reminder about our ancestors can significantly increase intellectual performance. Hence, whenever people are in a situation where intellectual performance is extraordinarily important, for example, in exams or jobs interviews, they have an easy technique to increase their success. Future research should



investigate to what extent this effect can be used to overcome performance anxiety or other forms of performance blockades.

The main limitation of the present research is that there is only partial evidence for the assumed underlying psychological processes based on perceived control and promotion orientation. In Study 1, we only found partial mediation for control as well as a significant reverse mediation. However, if we combine Studies 1 and 2 on an explorative basis (i.e. z-transformation and combination of control scales and performance measures), the ancestor effect is significantly mediated by different levels of perceived control (LL 99 = 0.01; UL 99 = 0.46; $p < .01$ for the indirect effect based on 1000 bootstraps). Moreover, we only found reliable mediation for promotion orientation in Study 2; but not in Studies 3 and 4 (although the effects were mostly into the right direction). Explorative analyses where we combined z-transformed values of promotion orientation and intellectual performance of Studies 2, 3 and 4 revealed a significant mediation (LL 95 = 0.07, UL 95 = 0.53; $p < .05$, for the indirect effect based on 1000 bootstraps). Taken together, these results make us confident that perceived control and promotion orientation together play a crucial role in explaining the ancestor effect. In sum, since the present studies have been designed as a starting point for a new effect, the detection of the underlying psychological mechanism had a more explorative character. Therefore, in future research (a) more standardized and extended measures for perceived control should be employed and (b) further potential underlying psychological processes should be tested, which may additionally be located in processes of social identity, family, cohesion, self-regulation or norm activation elicited by increased ancestor salience.