

DETERMINANTS OF THE ACTION IDENTIFICATION LEVEL AND ITS INFLUENCE ON SELF-CONTROL

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In this study, we first tested the hypothesis that the action identification level is affected by experimentally manipulated task competence. We found that high experienced task competence resulted in intermediate levels of action identification, whereas low task competence resulted in both low and high levels of action identification. Furthermore, as expected, we found that intermediate action identification levels enhanced self-control, defined here as longer persistence on an unattractive task. The hypotheses were tested by means of a word association task, which was assigned to 475 freshmen. The findings suggest that persistence on an unattractive task can be enhanced if the individual focuses on the task itself (defined as the instructions of the task), and not on its details or on the reason why he or she is engaged in the task.

Introduction

In daily life, people often engage in unattractive actions and persist on them. Moreover, when they do so without external pressure, these actions are considered as examples of "self-control". The literature on self-control often focuses on internal factors like goals and motivations to explain such choices and actions. In this paper, we suggest that in addition to these internal factors, also situational factors play a role in determining self-control choices and persistence. Our argument has two steps. In line with Ainslie (1992) and Rachlin (1995), we first suggest that the degree of generalisation of an actor's perspective on his or her action influences persistence. We explore how this degree of generalisation can be measured. Second, we explore how situational factors may influence the degree of generalisation of an action.

We start from Ainslie's (1992) and Rachlin's (1995) work on self-control. In what follows we define self-control as *choosing and maintaining an activity that is not the most attractive option* for the choosing person at that moment. For instance, a person who is on a diet may be offered a piece of pie. Although eating the piece of pie is more attractive than not eating it, the person often chooses not to take the pie.

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Rachlin (1995) explains this quite common choice by reinterpreting the conflict. According to him, the choice is not always between "taking" or "not taking the piece of pie", but is often seen as a choice between "going on with my diet" or "giving up on it". Of course, if modelled in this way, it is not so sure anymore that eating the pie is more attractive than not eating it. Self-control then refers to a more complex pattern of actions: "Going on with a diet" implies not only refusing this piece of pie, but also refers to a whole pattern of choices in the past and the future. The choice of not eating the piece of pie also saves past investments. So, a self-control choice follows from considering a pattern of actions over time, rather than one single choice between the immediate consumption of the pie or not.

Ainslie (1992), in a similar vein, suggests that a current choice can be a good predictor for an individual of his/her own future choices. Although one cigarette does not threaten health, the person knows that when (s)he chooses to smoke now, (s)he will probably do so again next time. Hence, the choosing person knows (or should know) that his or her decision to smoke this cigarette, would entail smoking more cigarettes in the future. In isolation, this cigarette has negligible consequences. By aggregating the consequences of the choices, however, the option to smoke this cigarette becomes less attractive, due to the bad long term consequences of this option and what it entails.

In sum, we agree with Ainslie (1992) and Rachlin (1995) that the complexity of the perspective of an action is a good predictor of self-control choices. However, this hypothesis may have its limits. Remember our example of the piece of pie. We can think of a way to describe the action of refusing the piece of pie that is even more general than "sticking to my diet". "Becoming thin" could be the reason why an individual wants to stick to a diet. Assume that the person considers the choice between eating the pie or not as a choice between "becoming thin" or "running the risk of becoming fat". We think that such a general identification level would help less to refuse the pie, because one piece of pie has a negligible influence on an individual's slenderness. From this reasoning, we conclude that for each task, there must be an "optimal" AIL somewhere between the lower, very specific levels of description, and the higher, rather vague and general levels.

An important question is then how complexity of a given action can be measured. For that purpose, we use the Action Identification Theory of Vallacher and Wegner (1985). They state that a particular behaviour can be defined at different levels. For example, a person refusing the piece of pie may perceive himself as "saying no", or as "refusing the piece of pie", or as "going on with my diet". Asking the simple question "what are you doing, according to you?" suffices to measure the perspective the person is taking at that moment.

People give very different identifications of similar behaviours in comparable situations, as Vallacher and Wegner (1985) reported. The most salient dimension

of such differences that concerns us here is the dimension "general - specific". Action description A is considered more general than action description B if it describes a reason for, or an effect of B. "Eating a piece of pie" can be described as "consuming calories" or as "rewarding myself". Both descriptions are more general than "eating a piece of pie", because "consuming calories" might be an effect of eating the pie, and "rewarding myself" might be a reason for eating it. Action description B is more specific than description A if it gives an answer to "how do you do A?". For instance: "How do you diet?" "By refusing pie" could be the answer. In what follows, we will refer to the level of generalisation of the action perspective an actor adopts as the "Action Identification Level" (AIL; Vallacher & Wegner, 1985, 1987).

The first empirical question of this paper is whether the AIL could be influenced by situational factors? The advantage of linking the concept of action identification level (AIL) to the self-control concept is that the literature suggests ways to influence it situationally, whereas self-control literature does not (or at least not that explicitly; Ainslie, 1992; Kuhl & Goshke, 1994; Rachlin, 1995). Vallacher and Wegner and their team repeatedly found that the AIL increases if the individual feels more competent at the task or is more familiar with it (Vallacher & Wegner, 1987). On the other hand, if the task is hindered in some way, the AIL decreases (Vallacher, Wegner & Frederick, 1987; Vallacher, Wegner, & Somoza, 1989; Wegner, Vallacher, Macomber, Woods & Arps, 1984). We want to elaborate on this finding by testing the hypothesis that AIL is related to persistence, and therefore to self-control.

In real life, however, performance feedback can appear in more forms than explicit verbal feedback, as is commonly used in experimental research (Vallacher & Wegner, 1985; 1989). Therefore, we want to test whether non-verbal feedback (the mere experience that one is good at a task) leads to higher AILs.

The second empirical question of this paper is about the influence of the AIL on persistence. In line with Rachlin (1995) and Ainslie (1992), we suggested earlier already that higher levels of AIL will result in more persistence, but we added that persistence will decrease again if the AIL goes beyond a certain intermediate level. We are not sure about which level can be regarded as the intermediate level where persistence will be maximal. However, we expect that the action identifications that refer to the task-instructions (see below) would come close to the intermediate level. Focusing on details of the task, as well as focusing on the reasons for doing the task would probably divert attention away from the instruction and hamper persistence on the task.

To summarise, we will test two hypotheses. First, is the AIL sensitive to implicit feedback (i.e., the feeling of competence)? We expect that higher levels of experienced competence will lead to higher AILs. And second, can behavioural persistence be predicted from the AIL? We expect that participants

identifying their action at an intermediate level will persist longer with an unpleasant task.

In order to test both hypotheses, we selected a word association task. It has been established long ago that it is much easier to associate new words with emotionally positive stimulus words than with emotionally negative stimulus words (Cramer, 1968). This means that we can experimentally manipulate the feeling of competence without changing the task. We expect that participants who receive positive stimulus words will feel more competent at the task, so they will be more likely to identify their action at a high level. We selected the words from Hermans and De Houwer (1994) and Van Loon-Vervoornt (1989). A priori, we assumed that all identifications referring to the task itself ("I'm associating" and synonyms of this identification) would be the target intermediate level. We selected this level as "the" intermediate level because it referred most directly to our instruction ("associate new words with the following words"). This level can be clearly distinguished, both from identifications that refer to the more specific HOW-TO of this action and from identifications that refer to the WHY or the EFFECT of this action.

We used a continued association task: This means that the person could associate with the stimulus words as long and as many words as (s)he wanted, before going on to the next stimulus word. Moreover, this type of association task also implies that participants were not allowed to associate words with self-generated words. Instead, they had to stick to the stimulus word. The free choice of turning to the next stimulus word allowed us to measure persistence. Remember, however, that persistence can only be considered as "self-control" when the person does not like the task. Hence, we needed a measure of subjective attractiveness of the association task.

Method

Participants

During a psychology class, 475 freshmen (267 women) with Dutch as their native language agreed to cooperate with a free association task in one mass session. Their ages ranged from 17 to 24.

Material

We relied on Hermans and De Houwer (1994) and Van Loon-Vervoornt (1989) to generate a subset of 22 stimulus words. By means of a pre-test, 16 words were selected out of these 22. Basic words are very comparable across

individuals in their meaning and emotional characteristics, they are short, and they are rather concrete and imaginable, which facilitates the association (Van Loon-Vervoom, 1989). Twelve judges rated the semantic differential dimensions "good-bad" and "strong-weak". The good-bad dimension was used to construct four categories. We used the strong-weak dimension only to avoid that the constructed categories would also differ on that dimension. The ratings on the good-bad dimension did not differ across judges (who each judged 22 words): $F(11,252) = 1.25, p > 0.20$. The judgements indicated that the neutral category was large, which led us to the construction of a positive-neutral and a negative-neutral category, each consisting of four words. The four different subsets of words with the English translations and the average ranks on the good-bad dimension were as follows (low average ranks mean high levels of positiveness): For the *neutral-positive category*: "hand" (hand, $M = 8.0$), "water" (water, $M = 7.1$), "appel" (apple, $M = 9.0$) and "paard" (horse, $M = 8.6$); *very positive words*: "bloem" (flower, $M = 4.3$), "kind" (child, $M = 3.6$), "huis" (house, $M = 3.8$), and "tuin" (garden, $M = 5.0$); *negative neutral words*: "auto" (car, $M = 14.9$), "rem" (brake, $M = 13.3$), "potlood" (pencil, $M = 13.3$), and "klok" (clock, $M = 12.6$); and the *very negative words* were "riool" (sewer, $M = 21.3$), "mes" (knife, $M = 18.2$), "bloed" (blood, $M = 17.8$), and "jeuk" (itch, $M = 19.0$). The average rank on the dimension strong-weak of these 16 words did not differ as a function of category: $F(3,188) = 1.46, p > 0.20$. Four words were dropped because they fell in between the four categories ("koord", string, $M = 16.0$; "tand", tooth, $M = 15.8$; "lamp", lamp, $M = 11.5$; "vogel", bird, $M = 9.4$), and two words were dropped because they led the four categories to be significantly different on the strong-weak dimension: $F(3,188) = 5.03, p < 0.002$ ("boom", tree, $M = 7.5$; "voet", foot, $M = 13.3$). We varied the order of the words within each of the four positiveness categories to avoid systematic order effects.

Procedure

Introduction. The participants received a booklet (one fourth of a standard page), a white sheet of paper and some questionnaires. The first page of the booklet gave the instructions. On the second page, the participants were asked to fill in their age and gender.

It was explained that during the association task, the digital clock of the windows 3.11 © would be projected on a large screen in front of the auditorium. Each time the participants went on to the next stimulus word, they had to fill in the time projected on the screen. As a reminder, on top of each leaflet, a box was printed with the words "time: ____ hours ____ minutes ____ seconds".

The third page was a filled in example. On top of the sheet, participants had to fill in the time projected on the screen. Under that frame, the instruction was

repeated shortly: "Write what comes up in your mind when you see the word ...". The six lines were shown with the stimulus word at the left side of each line to avoid continuous association (i.e., association with self-generated words). The participants were told that they could write more words on one line if they liked to. This information was repeated visually by means of an example. Before starting the association task, we mentioned that when they would receive the question "What are you doing, according to you?", they should give their interpretation of their action at that moment. On the fourth leaflet, a warming up neutral trigger ("tooth") was given to all participants.

Competence manipulation. Thereafter, six words were given. In the *positive condition*, the first four words were neutral-positive. The two following words were more extremely positive. In the *negative condition*, the first four words were neutral-negative. The two following words were more extremely negative. We varied the pair of very positive and negative words across participants to evaluate whether generalisation of the effect beyond one particular wordpair was warranted.

Measurement of the action identification level and persistence. On the next page, participants were asked "What are you doing according to you? Write down the first thing that comes up in your mind." In the second part of the task, the participants received two neutral-negative or positive words (the opposite dimension of the first six words), and two more extreme words. By shifting the emotional colour of the stimulus words, we intended to avoid that the attractiveness judgement of the task was based on the emotional colour. On the last page of the booklet, participants had to indicate on an 11-point scale from -5 to +5 how much they had enjoyed the association task. The final page was a semantic differential good-bad scale of the stimulus words to check the manipulation of word emotionality.

Results

Manipulation checks. The average number of generated words was higher in the positive condition ($M = 6.39$) than in the negative condition: ($M = 5.30$), $F(1, 471) = 20.11$, $p < 0.0001$. The manipulation also worked in the second part of the task (with the emotional colour of the words reversed): $M(\text{pos}) = 6.01$ vs. $M(\text{neg}) = 5.16$, $F(1, 469) = 17.81$, $p < 0.0001$.

The rated attractiveness did not differ across conditions: $M(\text{pos}) = 2.02$ vs. $M(\text{neg}) = 1.86$, $F(1, 471) = 1.11$, $p = 0.29$. Of course, proving that there is no difference is delicate, but considering sample-size, the difference seems too small to be worrying.

The order of the words on the good-bad dimension in the main study was exactly the same as the order derived from the rating of the twelve judgements

Table 1
Observed Action Identifications

AIL	Description of the subset and some typical examples	Proportion
HIGH	1. broad perspective of the experiment, purpose I'm helping you / this researcher I'm cooperating with this research	20.1%
	2. individual perspective of the participant I'm revealing my subconsciousness I'm doing a test on emotions	18.2%
	INTERMEDIATE I'm associating I'm brainstorming	21.4%
	1. mechanical parts of the task I'm writing down words	12.7%
LOW	2. how-to associate I'm looking for relations	12.5%
	3. the question "what are you doing" itself I'm reading this question	4.7%
	4. elementary acts I'm writing	3.8%
UNRELATED IDENTIFICATIONS	I'm bored, I'm loosing time	3.8%

in the pre-study. This suggested that the manipulation of positiveness succeeded.

Pre-analyses of the AIL. Table 1 shows that we found the three “levels” of action identification that we had expected. Within the high and the low categories, some finer categorisations could be made. In subsequent analyses, we merged the two high into one “high” level and the four low levels into one “low” level, and dropped the irrelevant identifications. This led to 443 usable action identifications. Using the four categories (High, Intermediate, Low, and Unrelated identifications), we found an interrater-reliability of 82.0%. However, most of the discrepancies were of the following type. The first rater categorised identifications that gave an answer to “how do you associate?” as low (see Table 1, Low, category 2), whereas the other rater put some of these identifications in the intermediate category. After solving this disagreement, 92.4% of the identifications were categorised the same way by both raters.

Hypothesis 1. We expected that in the positive condition, the participants would identify their action at a higher level than in the negative condition. We indeed found a significant effect of the experimentally manipulated competence (positive vs. negative stimulus words): $\chi^2(2, n=443) = 8.78, p = 0.012$. However, Table 2 shows that our hypothesis only held for the intermediate AIL, and not for the high AIL. The relative frequency of the intermediate AIL is significantly higher in the positive condition (29.0%) than in the negative condition (17.2%). This difference is significant with a $Z = 2.94, p < 0.002$. Contrary to our hypothesis, the high AIL was more likely to appear in the negative condition (45.1%) than in the positive condition (36.8%). This difference is marginally significant with a $Z = -1.77, p = 0.08$. The probability of a low AIL did not differ as a function of manipulated task competence (34.2% vs. 37.7%, $Z = -0.76, ns$.)

Table 2
*The Action Identification Level as a Function of
Manipulated Competence (proportions of the AILs within experimental conditions)*

Manipulated competence	Action identification level			
	Low	Intermediate	High	100%* =
Positive words first	34.2%	29.0%	36.8%	228
Negative words first	37.7%	17.2%	45.1%	215

* The identifications that are not related to this task are excluded.

We also tested whether the experienced competence at the task (i.e., the speed of word generation) predicted the AIL. In order to do so, we split the sample in three levels of produced words per time unit (in the first part of the task). We found a significant effect: $\chi^2(4, n = 435) = 13.03, p = 0.011$ (see Table 3). Again, the intermediate AIL (and not the high level) was more likely in the subgroup that generated the words the fastest (32.5%) than in both other groups that generated the words more slowly (19.5% and 16.2%). This difference is highly significant: $Z = 3.53, p < 0.0004$. The high level, on the other hand, was more likely in the both subgroups that generated more slowly (42.3% & 46.0%) than in the group with high experienced competence (35.1%). The difference is marginally significant: $Z = -1.87, p = 0.06$. The probability of a low AIL did not depend on task competence ($Z = -1.15, ns$). Moreover, for the three levels of action identification, there was no significant difference between both groups with a lower or moderate experienced competence at the task.

Table 3
*The Action Identification Level as a Function of
 Experienced Competence (proportions of the AILs within experimental conditions)*

Experienced task competence	Action identification level			
	Low	Intermediate	High	100%* =
High	32.5%	32.5%	35.1%	151
Moderate	38.2%	19.5%	42.3%	123
Low	37.9%	16.2%	46.0%	161

* The identifications that are not related to this task are excluded.

Hypothesis 2. We expected that the intermediate level of AI would enhance persistence for participants who did not like the task ($n = 160$, rated attractiveness < 2), but not for the participants who liked the task ($n = 315$). In order to measure actual persistence, we corrected for the duration of writing. We cannot consider the writing time as an genuine part of the time that the individual attempts to stick with the (unpleasant) task, so writing duration confounds the actual persistence measure. Moreover, writing down a word takes about 3 seconds, people on average produce 6 words, and associating with one word takes about 40 seconds on average. This means that our participants spent about half of the association task period writing down words (18 out of 40 sec.). It is only during the remaining 22 sec. that the person permanently faces the choice whether (s)he will persist associating with this stimulus-word or turn to the next word. In order to deal with this problem, we transformed the duration with the following correction formula:

$$Tp = Tt - 3.5 \text{ sec} \times n$$

with Tp being time persisted searching for words related to a stimulus word, Tt the total time being involved with a stimulus word, and n the number of words associated with this word. We evaluated the correlation between the number of generated words and time spent with several corrections (going from 2 to 4 seconds, based on raw estimations). We selected the correction where this correlation approached zero. This correction makes sure that the corrected time spent measures persistence and not competence at the task (because it is unrelated to number of generated words). For example, an individual who is searching words for one minute but only finds 1 word, receives a persistence score of 56.5 sec., whereas someone who is searching for one minute and finds 10 words, receives a persistence score of 25 seconds.

In order to test the influence of the AIL on persistence, we ran an (unbalanced) ANOVA with corrected time spent at the second part of the task (thus, the part of the association task after the AIL-question) as the dependent variable and

AIL as the first independent variable (with three levels High, Intermediate and Low) and perceived attractiveness of the task as the second independent variable (high vs. low). Note that the time spent on the first part of the task cannot be considered to be a measure of persistence dependent on the action identification level, because the manipulation of competence reaches its full effect only immediately before the measurement of the action identification level (more specifically, after the fifth and the sixth stimulus word, which were the most extreme on the good-bad dimension). Again, we dropped the 32 participants with irrelevant action identifications. Furthermore, 12 more observations were not usable because there were no measures for task attractiveness or persistence available. Thus, 431 observations were used to test this hypothesis. The main effect of AIL was not significant: $F(2,425) = 0.27$, $p > 0.50$. The main effect of attractiveness was not significant either: $F(1,425) = 0.41$, $p > 0.50$. As expected, the interaction between attractiveness and action identification level was significant: $F(2,425) = 4.52$, $p = 0.011$. Table 4 shows the (corrected) time spent in each cell. In the unattractive condition, the participants identifying at the intermediate level, persisted on average longer than the participants identifying at the low and the high level. This planned contrast between the intermediate level and both other levels proved significant in the unattractive condition: $F(1,425) = 4.01$, $p = 0.02$ (one-tailed), but not in the total sample: $F(1,425) = 0.27$, $p > 0.50$. In addition, there was no difference between low and high levels of action identification in the unattractive condition. In the attractive condition, the effect went in the opposite direction, but the a posteriori contrast between the intermediate AIL on the one hand and the high and low AIL on the other hand did not reach significance according to Sheffé's procedure.

Table 4
*Time Spent (corrected for writing time) at the Second Part of the Task
as a Function of AIL (in seconds)*

		Action identification level		
		Low	Intermediate	High
task is	Time spent (sec)	19.8	26.0	20.4
unattractive	n and Sd	57, 10.4	20, 24.1	65, 10.8
task is	Time spent (sec)	22.8	18.4	22.3
attractive	n and Sd	99, 13.1	77, 9.9	113, 11.0
unattractive only				
sub-sample 1	Time spent (n)	19.4 (34)	26.2 (10)	20.8 (39)
sub-sample 2	Time spent (n)	20.4 (23)	25.8 (10)	20.0 (26)

In order to evaluate the reliability of the planned contrast between the intermediate AIL and both the low and the high AIL, we split the sample in two parts according to the assigned word order. Order is unrelated to persistence, and hence the split can be considered as a random split. The lower part of table 4 shows that the effect was maintained. In both sub-samples, the planned contrast (within the unattractive condition) between the intermediate AIL on the one hand, and both the low and high AILs on the other hand approached significance: $F(1,212) = 2.27$, $p = 0.065$ in sub-sample 1 and $F(1,207) = 1.72$, $p = 0.10$ in sub-sample 2 (both tests one-tailed).

Discussion

The first purpose of this study was to evaluate how experienced task competence affects the AIL. We find that higher levels of task competence do not result in high AIL, but rather in more frequent occurrences of an intermediate AIL. In contrast, high AILs seem to be more frequent if task competence is moderate or low. Apparently, the relation between task competence and AIL is curvilinear rather than linear. Still, we can conclude that the AIL is not only sensitive to verbal success and failure feedback but also to non-verbal feedback.

Next, our interpretation of the first hypothesis in terms of task competence is supported by the fact that the influence of task competence on AIL is obtained twice. More specifically, regardless of whether manipulated or measured task competence is included in the analyses, intermediate levels are more likely in conditions with high task competence than in conditions with lower task competence.

The second purpose of this study was to evaluate the role of the AIL in persistence on unattractive tasks. As expected, we find that individuals who do not like the task persist longer on the task if they adopt an intermediate AIL, more specifically, if they focus on the instructions of the task. At the same time, AIL seems to have no effect on persistence for individuals who like the task. This interaction between attractiveness and AIL suggests that AIL does indeed play a role in self-control. Adopting an intermediate AIL increases persistence, which means that the intermediate AIL could be called the "optimal AIL".

The findings in connection with both hypotheses support our interpretation of the intermediate AIL as the optimal AIL. That is, an individual seems more likely to adopt an optimal AIL if he or she experiences high task competence. At the same time, an optimal AIL supports self-control. Let us stress, however, that this does not mean that our measure of persistence can be reduced to mere competence: Task competence was removed from the variable "time spent". Apparently then, the results of this study suggest that adopting an intermediate AIL (regardless of competence) enhances persistence.

The finding that persistence does not increase when the AIL increases from moderate to high, is not in line with Rachlin's (1995) hypothesis on self-control. Why do our participants persist less when they have a broad perspective on their action (i.e., a high AIL) than when they have an intermediate perspective? A high AIL may damage performance because focusing on the reason for an action diverts attention from the action itself. For instance, a student may jeopardise her chances to pass the exams if she keeps thinking about the reason why she sits at her desk (i.e., adopting a high AIL), because her attention is distracted from the things she should learn. In addition, if the focus is not on the action but on the reason for doing it, the action itself may become replaceable, or may seem arbitrary. For instance, a person willing "to help science" should not necessarily associate as many words as she can. She also may generate strange words to please the researcher. We acknowledge, however, that the previous discussion only applies when tasks require a high degree of concentration. Boring tasks which do not require high concentration levels (e.g., visiting a sick relative) may perhaps benefit from a high AIL. In these cases, a high AIL (e.g., "I am doing this to please him") may be comforting to the person involved in the unattractive tasks, and may indeed motivate him or her to stay a bit longer.

A possible objection to our procedure might be that task competence was confounded with emotionality of the words. In that case, positive words may have favoured a positive emotion, which may have led to an intermediate AIL. First, this objection only affects the interpretation of the first hypothesis, and not the interpretation of the influence of AIL on persistence. Second, in a way, perceived task competence has been used to boost positive emotions. More specifically, task competence cannot be dissociated from emotion: Weiner (1992) reported that high levels of task competence result in high levels of self-esteem. We anticipated this confound, but with the task at hand, emotionality and difficulty of words are interrelated so strongly that they cannot be dissociated (Cramer, 1968). However, we think that this confound is not important in our study. In previous research, performance feedback was used to manipulate perceived competence (Vallacher & Wegner, 1985), and we think that explicit feedback affects self-esteem even more than implicit feedback. Moreover, the fact that objective measures of performance (experienced task competence) predicted AIL even better than manipulated task competence, suggests that the effect of competence on AIL is not due to emotionality induced by the words. Therefore, we are confident that the possible additional influence of word colour itself on AIL was negligible compared to the influence of experienced task competence.

The major weakness of this study is the rough measure of time spent. The noise in our data due to differential writing speed, word length, time spent writing down time itself, and errors during reading the clock, cannot be ruled

out. This noise was anticipated, and therefore we increased the power by applying a larger number of participants. In a way, the noise reinforces the finding that intermediate levels of AIL result in higher persistence on the task, certainly because it was found to hold in two sub-samples. Another weakness was the relative attractiveness of the association task. Too many participants enjoyed the task, leaving fewer participants to test the self-control hypothesis. In order to tackle both problems, we are running new experiments which use sharper time measures and less attractive tasks.

To conclude, this study shows that the AIL is sensitive to experienced task competence and that it could well play an important role in the explanation of persistence. Apparently, the intermediate AIL, which we call "optimal" and which directs attention on the instructions of the task itself, is the most adaptive one: It is most likely if experienced task competence is high, and it leads to higher persistence if the task is perceived as unattractive. If the finding proves reliable, future research should focus on methods to induce this optimal AIL.

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