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# RESEARCH ARTICLE

## THE INFLUENCE OF EXPERIENCE ON RISK AVERSION

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## ABSTRACT

The present field study will get an answer to the question, which influence has the experience on the risk aversion of decision maker. How and to which extent a risk-averse decision maker will use his experience to make a decision influences the decision result. Therefore examines the study the influence of experience on the decision-making behaviour of decision makers in the management of small and medium-sized enterprises (SMEs) by complex and risk-encumbered investment decisions. The study can be shown, that decision makers use different forms of experiences and that increasing experience influences the risk aversion of the decision makers. It can be also shown, that chances and risks of a decision are evaluated independently by decision makers. The study shows also the relationship between subjective experience and risk aversion. To improve the quality of risk assessment, it will be propose to use a combination of methods for a more objective risk assessment.

***Key words:*** Experience, Risk Aversion, Complex Decisions, Risk-Averse Decision Makers, Decision Behaviour.

## INTRODUCTION

In an increasingly complex business environment it becomes increasingly more difficult for decision makers to identify decision-relevant joint effects and environment characteristics. At the decision point decision makers don't know neither the probability of the decision results nor their full extent characteristics and make therefore decisions under uncertainty. In the case of decisions under uncertainty, decision makers consciously or subconsciously tend to use their previously acquired experiences with similar or regarding events, to make subjectively as correct perceived decisions. (Nöldeke, 2011, p. 9) Has a decision maker already gained experience with similar or regarding events, are the probability and the possible losses of the risks for the decision maker either known or can be better estimated than unknown risks. By well-known risks, the decision maker assumes subjectively, that these risks can be better controlled by the decision maker. This subjectively perceived controllability of risks influences to risk sensitiveness and the decisions of the decision maker. Therefore, it is to be clarified in this study which forms of experience a decision maker makes use and which influence these forms of experiences have on the risk aversion of the decision maker.

### The theoretical context of experience and risk aversion

One theory to explain the relationship of experience and risk-averse behavior of decision makers is the Ellsberg Paradox. According to the Ellsberg Paradox preferring decision makers a risk whose probability distribution is known, in comparison with a risk whose probability distribution is unknown and even this risk have with the same probability of occurrence. (Ellsberg, 1961, pp. 643-669) Decision makers also evaluate the probability distribution of a risk whether the probability distribution is not measurable and therefore uncertain, or whether the probability distributions are measurable, but fraught with risk. (Keynes, 1937, pp. 209-223) (Aven, Renn, 2009, pp.209-223) An essential characteristic of complex investment projects, such as a direct investment, is a large number of affecting variables, which leading different probability distributions and severity of the investment risks. (Feess, 2016, p. 1) If a decision maker could already gained experience in the same or similar decision situations, these risks subjectively perceived as known and measurable and according to the Ellsberg Paradox as a lower risk valuated. Therefore, the hypothesis is stated, that the quantitative and the context-related experience have an influence on the risk aversion of the decision makers.

The relationship between expected profit and loss of an investment can be theoretically explained by the model of Prospect Theory. (Kahneman, Tversky, 1979, pp. 274) With their prospect theory Kahneman and Tversky describe the decision making behaviour of decision makers by decisions under uncertainty. To be able to evaluate the available decision alternatives, the decision maker defines a reference point. The reference point normally corresponds with the assets of the decision maker at the decision point. (Kahneman, Tversky, 1979, p. 274) Based on this reference point assessed a decision maker not the decision alternatives according to the final asset value, he assessed the profit or loss according to a relative relation to the reference point. (Kahneman, Tversky, 1979, p. 274) Therefore assess a decision maker the profit chances and loss risks of the investment. However, profits and losses are perceived differently by the decision maker. Decision makers perceive deteriorations in relation to the reference point (losses) significantly stronger than improvement (profits).

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To prevent threatening losses, decision makers therefore behave loss averse with occurring losses. In contrast, decision makers behave risk-averse in profit situations. (Kahneman, Tversky, 1981, p. 453; 1986, p. 260) For the results evaluation is the temporal distance of the occurrence for the decision maker relevant. With a growing temporal distance to the reference point, decision makers evaluate profits and losses with decreasing sensitivity and thus with less emotions. (Kahneman, Tversky, 1979, p. 277-280) The results of a decision are accepted by the decision makers with the time and ascribed to the status quo. (Thaler, 1999, p. 183-206) Through these results a new reference point. To assess expected profits or losses, decision makers can use the individually acquired experience to make decisions in the context of the business situation. (Laux, et. al., 2014, p. 14) As the expected decision results cannot be predicted for certain, according to prospect theory decision makers use their experience to estimate the expected result and the probability of occurrence. To estimate future events evaluate the decision makers with their experience the expected risks of events. If decision makers have already made experience with certain risks, these risks will be rated different than unknown risks. Small unknown risks are tended undervalued tended and large risks are tended undervalued. (Kahneman, Tversky, 1979, p. 277, 1981, p. 457-458) Thus the experience of the decision maker influences the risk aversion of the decision maker. In academic discussion it is assumed that decision makers realize more alternatives with increasing experiences and thus are better able to assess the consequences and the probability of occurrence of the decision. (Laux, et. al., 2014, p. 14) It should be added that the use of experience by the decision maker need not always lead to successful decisions, as successful solutions of the past can only solve present problems in exceptional cases. (Laux, et. al., 2014, p. 14)

**The survey design**

The present study investigates the influence of experience on the decision making behaviour of decision makers in the management of small and medium-sized enterprises (SME) for complex decisions. For this study, decision makers in SMEs are of interest, as 95.6% of SMEs are the only or predominant livelihood and income source of the entrepreneurs and their families. (Müller, 2013, p. 6) Due to these particular economic structures, decision makers in SMEs are particularly suited to analyze risk-averse behaviour as the decisions have an immediate influence on the economic situation of the decision maker.

The basis of the survey is the decision making situation of a direct investment in the BRIC countries. A direct investment in the BRIC countries is a complex investment, which result depends on a number of entrepreneurial internal and external influencing factors. (Autschbach, 2013, p. 4) The dynamic of these influencing factors additionally raises the complexity of the direct investment. (Maghrour, 2014, p. 37) But with increasing complexity the result-influencing the environment states of the direct investment can only be prognosticated with uncertainty, whereby the risk-averse behaviour of the decision maker is being influenced. (Stock, 2013, p. 12) Therefore is the decision making situation of a direct investment in the BRIC countries well suited to analyse the connection between experience and risk aversion. The participants in the survey were asked about their assessment of chances and risks of a direct investment in the BRIC countries and could assign school marks from 1 (very good) to 6 (failed). In the case of 4 BRIC countries the participants in the survey could assign at least 4 credits as the best mark and at a maximum 24 credits as the worst mark. This means: The lower the number of credits, the higher the chances and the lower the risks of a direct investment in the BRIC countries are being evaluated (et vice versa). For the interrogation were risk-averse decision makers assumed. The question after expected chances of a direct investment in the BRIC countries was asked intentionally, as decision makers also take risks and chances as a whole into account in the decision making process. To validate the hypothesis, 113 middle-class members of the Chamber of Commerce Wuppertal – Solingen – Remscheid, Germany were interviewed. In 2014 were 221 SMEs registered in the CC Wuppertal – Solingen – Remscheid. As the decision behaviour in the case of a direct investment is being investigated, those registered enterprises are excluded, which do not operate internationally due to their kind and their economic activity. After subtracting regional and savings banks, clinics and public companies amount a basis of 177 SMEs and a confidence level of 95.4%. The interviewed enterprises roughly correspond in their distribution according to economic sectors with the economic sectors in Germany.

4 comparison groups underlie the study: comparison group 1 divides the survey participants according to nationally or internationally active enterprises, comparison group 2 distinguishes whether there is already a direct investment and comparison group 3 distinguishes if the decision makers have already terminated a direct investment. The termination of a direct investment is a misinvestment which not only influences the current economic situation, but also the future economic success of the business. (Schulte, 2013, p. 44) From a theoretical perspective is the termination of a direct investment a particularly interesting decision making situation, since it is expected that the negative experience of a misinvestment significantly influences the decision making behaviour and that the decision making behaviour will differ from the other comparison groups. The comparison group 4 analyzed more detailed if after a termination of a direct investment the company have other direct investments, or if there are no further direct investments. The survey sample sizes are distributed as follows:

**Categories of the survey participants**

**Table 1. Categories of the survey participants, source: self-illustration**

| Group 1 | n | Group 2 | n | Group 3 | n | Group 4 | n |
|---|---|---|---|---|---|---|---|
| National active | 30 | With FDI | 34 | Closure FDI | 11 | Closure FDI but further FDI | 7 |
| International active | 83 | Without FDI | 79 | With FDI | 34 | Closure FDI no further FDI | 4 |
| | 113 | | 113 | | 45 | | 11 |

The 113 survey participants were categorized according to their professional experience: 1-5 years = n 22, 5-10 years = n 23 and > 10 years = n 68. Therefore is an evaluation according to events and experience possible.

**The survey evaluation**

The experience of decision makers is influence on the one hand by context-related experiences and on the other hand due to acquired quantity experiences. (Bruggmann, 2013, pp. 56) Context-related experiences, are in the here considered decision situation of a direct investment, the international experiences of a decision maker.

Decision makers are acquiring quantitative experiences within their professional activity. To verify the causal connections of the variable experience to the risk aversion, a variance analysis of the context-related experience of decision makers is carried out. The variance analysis showed significant differences in the assessment of the chances of a direct investment within and between all comparison groups. Also the assessment of the risks of direct investments in the BRIC states shows for nearly every comparison group significantly different assessments of the decision makers. Thus, the hypothesis is confirmed that the variable experience influences the risk assessment and therefore the risk aversion of decision makers. Only if a company already has to closure a direct investment, the given answers of the decision makers did not differ significantly. It can be assumed that the experienced loss due to the closure of a direct investment caused a loss aversion to the decision makers and that this loss aversion leads a similar risk assessment and the definition of a reference point.

**Table 2. ANOVA of context-related experiences, source: self-illustration**

| ANOVA | Chances comparison groups 1 - 4 | | | | | | Risks comparison groups 1 - 4 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | *M* | SD | P-Value | T-Test | α | n | *M* | SD | P-Value | T-Test | α |
| National active | 30 | 12,9 | 2,6 | 79,4 | 2,0 | Yes | 30 | 13,4 | 2,5 | 78,6 | 2,0 | Yes |
| International active | 83 | 12,8 | 2,4 | | | | 83 | 12,8 | 2,5 | | | |
| With FDI | 34 | 12,5 | 2,5 | 89,0 | 2,0 | Yes | 34 | 13,5 | 2,8 | 26,8 | 2,0 | Yes |
| Without FDI | 79 | 12,9 | 2,4 | | | | 79 | 12,8 | 2,4 | | | |
| Closure FDI | 11 | 13,2 | 1,6 | 34,9 | 2,0 | Yes | 11 | 12,5 | 2,2 | 26,8 | 2,0 | Yes |
| Without FDI | 34 | 12,5 | 2,5 | | | | 34 | 13,5 | 2,8 | | | |
| Closure other FDIs | 7 | 12,6 | 1,4 | 2,3 | 2,3 | Yes | 7 | 12,6 | 2,1 | 2,0 | 2,3 | No |
| Closure no further FDI | 4 | 14,3 | 1,3 | | | | 4 | 12,5 | 2,5 | | | |

We now consider the assessed chances and risks of the 4 comparison groups in context with differing international experiences of the decision makers. The here analysed experience is therefore a context-related experience. Decision makers which are only nationally active will have no experience with a direct investment. In contrast, internationally active decision makers command more experience on international markets, which not necessarily include experience with a direct investment. Decision makers without a direct investment could have national as well as international experience. In this study have decision makers with a direct investment have the largest context-related experience.

**Table 3. Analysis of context-related experience, source: self-illustration**

| **Analysis of context-related experience** | | Chances | | Risks | |
|---|---|---|---|---|---|
| Situations / reference groups | n | Mean | SD | MW | SD |
| National active | 30 | 12,9 | **2,6** | 13,4 | 2,5 |
| International active | 83 | 12,8 | 2,4 | 12,8 | 2,5 |
| With FDI | 34 | 12,5 | 2,5 | **13,5** | **2,8** |
| Without FDI | 79 | 12,9 | 2,4 | 12,8 | 2,4 |
| Closure FDI | 11 | 13,2 | 1,6 | 12,5 | 2,2 |
| Closure FDI but further FDI | 7 | 12,6 | 1,4 | 12,6 | 2,1 |
| Closure FDI no further FDI | 4 | **14,3** | 1,3 | 12,5 | 2,5 |

Decision makers in enterprise which work nationally, internationally and without direct investments assess the chances of a direct investment with only minimal deviations in the same way. As decision makers have different context-related experiences with direct investments, they assess the chances better, than the decision makers from the other comparison groups. Therefore, decision makers in enterprises which must terminate a direct investment, assess the chances of a direct investment due to the negative experience as worse than decision makers in enterprises which have not made these negative experiences.

The negative experience due to the termination does not only lead to a nearly uniform assessment, but also shift the reference point in contrast to decision makers who have not yet made this negative experience. That the termination of a direct investment leads a shift of the reference point becomes most obvious when an enterprise terminated a direct investment and has no more direct investments. In this situation evaluate the decision makers the least chances in a direct investment in the BRIC countries. This assessment also is mostly unanimous, as here the standard deviations are the lowest. However, this assessment not permanently the worst: Decision makers in enterprises which have after a termination other direct investments, approaches the assessment of the chances to those of the first three comparative groups. Apparent is here the, by Thaler described, increasing temporal distance to the reference point and the continued positive experiences through the other existing direct investments, noticeable.

If the survey participants are asked after the risks of a direct investment, another picture emerges, because the means and the standard deviations between the assessed chances and risks and the assessment within the comparison groups differ. Obviously, the survey participants don't regard chances as the positive side of risks; in the decision making situations they assess chances and risks independently. One explanation may be that losses are seen to be more negative than profit and risks are seen as threatening losses. Additionally, qualitative risk determinants such as voluntariness of taking on the risk, subjective controllability of risks and personal acquaintance with risks determine the risk aversion of decision makers. (Gleißner, 2009, p. 316) Decision makers in enterprises which are only nationally active evaluate the risks of a direct investment higher than the chances. The lack of experience with foreign markets leads a more risk-averse behaviour than by decision makers in international enterprises. In this situation the decision makers lack the context-related experience with foreign market risks. In contrast, decision makers in internationally working enterprises already have made experiences with foreign markets and evaluate the chances and risks of a direct investment equal.

Unlike the risk assessment of a decision maker in enterprises with a direct investment: These decision makers assess on average the risks with one grade less than the chances and at the same time as the worst of all comparison groups. This result however confuses, because according to Sachs, the familiarity with the risks of a direct investment should lead a decreasing risk aversion. (Sachs, 2013, p. 2) This is not the case here. Obviously, the effect of familiarity is overcompensated by two other effects. In this situation the decision maker perceives the only conditionally controllable foreign market risks as an additional risk. Additionally, due to the long-term binding of the direct investment to the enterprise the voluntariness of risk assumption does not exist de facto. Thus, the limited risk control and a low degree voluntariness of risk assumption of decision makers at complex investment projects have a stronger influence on individual the risk aversion, than their individual experience with risks. If the context-related experiences are compared between decision makers with and without a direct investment in the BRIC countries, then the decision makers without a direct investment assess the chances lower than the decision makers in the comparison group. In contrast, decision makers with a direct investment in the BRIC countries assess the risks as higher than in the comparison group.

**Table. 4. Analysis of context-related experience with / without FDI in BRIC countries, source: self-illustration**

| Context-related experience FDI in BRIC countries | | Chances | Risks |
|---|---|---|---|
| Situations / reference groups | n | Mean | Mean |
| All reference groups without FDI in BRIC countries | 98 | 12,9 | 12,9 |
| FDI in BRIC countries | 15 | 11,9 | 13,5 |

Now we are analyze the quantitative experience of the decision makers. A meta-study of 126 studies shows that decision makers with high experiences are able to generate more successful decisions in repeating decision making situations than those with few experiences. (Bruggmann, 2013, pp. 11) How successfully a decision maker can use his experiences depends on whether a decision making situation is repeated. (Gann, 2013, p. 36) Therefore it is not only the quantity of the experience important, but also their repeatability. However, by direct investments can be already made experiences only transferred in a limited way to other direct investments, as every new foreign market has different parameters. (Wang, 2014, p. 161) Thus, decision makers can only rely on similar experiences which they have made in a time lapse. To verify the causal connections of the quantitative experiences of decision makers on their risk aversion, a variance analysis is also carried out.

**Table. 5. Variance analysis of quantitative experiences, source: self- illustration**

| Chances | ANOVA: Quantitative experience | | | | | | | | | | | Risks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Groups | n | df | *M* | VAR | SSW | | n | df | *M* | VAR | SSW | |
| 1-5 years | 22 | 21 | 12,2 | 3,3 | 655,7 | | 22 | 21 | 13,1 | 4,0 | 708,1 | |
| 5-10 years | 23 | 22 | 12,9 | 2,7 | | | 23 | 22 | 12,6 | 4,9 | | |
| > 10 years | 68 | 67 | 13,0 | 7,9 | | | 68 | 67 | 13,1 | 7,7 | | |
| Source | QS | df | VAR | F | P Value | α | QS | df | VAR | F | P Value | α |
| Between Groups | 9 | 2 | 4,7 | 0,8 | 0,5 | | 6 | 2 | 2,9 | 0,5 | 0,6 | |
| Within Groups | 656 | 110 | 6,0 | F-Test: 3,1 | | No | 708 | 110 | 6,4 | F-Test: 3,1 | | No |

However, the variance analysis of quantitative experiences shows no significant differences between and within the underlying categories of quantitative experience. But this not means that the quantitative experiences of a decision maker have no influence on the risk aversion and therefore the hypothesis is to disprove. Rather, the answers of the survey participants are not significant due to the wide variety of experiences. Nevertheless, the influence of the quantitative experience on can be proved.

**Table. 6. Analysis of time-conditioned experiences, source: self-illustration**

| Analysis quantitative experience | | Chances | | Risks | |
|---|---|---|---|---|---|
| Experience / years | n | Mean | SD | Mean | SD |
| 1-5 years | 22 | 12,2 | 1,8 | 13,0 | 2,1 |
| 5-10 years | 23 | 12,9 | 1,6 | 12,6 | 2,2 |
| > 10 years | 68 | **13,0** | **2,8** | **13,1** | **2,8** |

From table 6 it can be seen that with increasing experience decision makers evaluate the chances of direct investment as worse and the risks as higher. According to this, decision makers become more risk-averse with growing experience. But why do decision makers become more risk-averse with growing experience? Experience can only be gathered in a time lapse. Thus, making experiences takes time. Therefore, it can be assumed that decision makers with increasing experiences are economically longer active and thus have amassed assets.

The reference point of the decision makers therefore rises in value with the time. But if the reference point increases in value, decreases the advantage of a direct investment relative to the reference point, as only a certain return can be generated on a foreign market. The chances and risks of a direct investment therefore deteriorate in value relatively to the increased reference point. Therefore decrease the probability of occurrence and the expected amount of the investment result. If the expected investment return is too close to the reference point, risk-averse decision makers will not suspend already safe generated returns for a danger of a misinvestment and renounce therefore an additional, but small yield growth. Therefore preferring risk-averse decision makers certain returns, than a possible but uncertain returns of a direct investment in the BRIC countries and comparing a direct investment with alternative investment options. In this situation, the decision maker has to take into account additional variables from the business environment and from their individual economic environment. It can also assume that with growing experience the use of environment-related experience increases. A decision maker will therefore use his context-related as well as his environment-related experiences. As individually attained experiences vary with increasing experience, the standard deviation is the highest by the most experienced decision makers. Whether one of the described forms of experiences is dominant should be now validated with a combined analysis of the 4 comparison groups and the quantitative experiences. This combination also corresponds closer with reality.

## Analysis of environment- and context-related experience

**Tab. 7. Analysis of environment- and context-related experience, source: self-illustration**

| Chances | National | | | International | | | With FDI | | | FDI closure | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | Σ | Mean | n | Σ | Mean | n | Σ | Mean | n | Σ | Mean |
| 1-5 years | 5 | 54 | 10,8 | 17 | 214 | 12,6 | 5 | 64 | **12,8** | 4 | 51 | 12,8 |
| 5-10 years | 5 | 63 | 12,6 | 18 | 235 | **13,0** | 6 | 76 | 12,6 | 2 | 31 | **15,5** |
| > 10 years | 20 | 271 | **13,6** | 48 | 610 | 12,7 | 23 | 269 | 12,3 | 5 | 63 | 12,6 |
| Σ Chances | 30 | | | 83 | | | 34 | | | 11 | | |
| **Risks** | **National** | | | **International** | | | **With FDI** | | | **FDI closure** | | |
| | n | Σ | Mean | n | Σ | Mean | n | Σ | Mean | n | Σ | Mean |
| 1-5 years | 5 | 59 | 11,8 | 17 | 226 | **13,3** | 5 | 67 | 13,4 | 4 | 53 | **13,3** |
| 5-10 years | 5 | 63 | 12,6 | 18 | 226 | 12,6 | 6 | 75 | 12,5 | 2 | 25 | 12,5 |
| > 10 years | 20 | 280 | **14,0** | 48 | 613 | 12,8 | 23 | 301 | **13,7** | 5 | 60 | 12,0 |
| Σ Risks | 30 | | | 83 | | | 34 | | | 11 | | |

Table 7 shows, with one exception, no clear dominance due to the combination of time- and context-related experience. Only decision makers in nationally active enterprises assesses with increasing quantitative experience the chances and risks of a direct investment in the BRIC countries progressively worse. But the decision makers in nationally active companies are lacking by their assessment of the chances and risks of a direct investment with context-related experience. But without context-related experience is the used environment-related experience dominant in this survey participants group. Moreover increases the risk aversion with increasing environmental experience.

From this study the following conclusions can be gained:

Decision makers evaluate chances not only as the positive other side of risks. Rather chances and risks are assessed independently of each other. Thus, assessed chances and risks of a decision differ from each other.

Experienced negative results, whose effects are cannot compensated, as for example by the termination of direct investment without further direct investments, lead a sustainable lower rating chances of a decision object by the decision makers. Decision makers make decisions on the basis of context- and environment-related experiences. Context-related experiences rely on experienced identical or almost identical decision making situations. Environment-related experiences taken decision-relevant variables, as well as additional other variables into account and are used above all, if the decision maker has no context-related experiences. With increasing quantitative experiences, decision makers assess the chances and risks of a complex decision increasingly negative and thus more risk averse. The influence of quantitative experience is always dominant, independent a decision has context-related experience of the decision-making situation, or not. But this means also: With e increasing experience must the reference point of the decision at least grow with the same degree of incline as the risk aversion; otherwise a decision maker reject with increasingly experience earlier risk-encumbered investment decisions, or will require an increasingly higher risk equivalent.

In the used example of a direct investment can lead these market entry barriers, which solely arise by the individual and subjective risk aversion of the decision makers. While on the one hand the risk aversion of decision makers may prevent an enterprise to enter incalculable risks, but on the other hand it is possible that the risk aversion also prevent to take chances. This dilemma can only solved by a as objectively as possible risk assessment. To enable a largely objective risk assessment, a combined use of structured information collection, investment calculation methods and scenarios is proposed. A structured information collection requires that a decision maker assesses the expected risks and their probabilities before taking a decision. Through the targeted and structured information collection, a decision maker concerned with the expected risks and is more familiar with the risks. This reduces the uncertainty of the decision maker. (Gleißner, 2009, p 316) A decision maker can use the individual experience to validate the recoverability of the information. Through the information collection newly acquired experience can also use for a more objective risk assessment. Even decision makers from only nationally active companies can collect, at least indirectly, context-related experiences and make therefore a more objective risk assessment. For an objective risk assessment are investment calculation methods suitable, because the assumptions of the decision and the risk assessments can be validated by third parties. Nevertheless, also with the use of investment calculation methods remain an uncertainty about the events. This uncertainty can be reduced through the use of scenarios, since the consequences of different causal processes can represent by scenarios. Based on their individual experience, have decision makers the possibility to evaluate more objectively the consequences of different causal processes. It should be noted that even with an objective risk assessment wrong decisions not completely avoided and that decision makers also continue to assess subjectively risks.

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