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A Systematic Assessment of First-mover Advantages

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Abstract

Many strategic management and marketing scholars have been occupied by the question as to whether early entrants into a market achieve higher performance. Despite a wealth of research related to the hypothetical first-mover advantage (FMA), there has been little consensus as to whether the FMA actually exists. To redress these inconsistencies, we perform a systematic literature review to reconcile the contradictory perspectives offered by the extant empirical literature. The 31 articles selected for analysis contained 261 statistical tests of the relationship between entry timing and performance. Of these tests, 168 (64.4%) provided statistical support for the relationship between early entry and performance, 61 (23.4%) were non-significant, and 24 (9.5%) significantly refuted the presence of the FMA (i.e., they provided evidence for first-mover disadvantages).

Key words: first-mover advantage, systematic review, entry timing, performance, moderating effects

1. Introduction

The question of whether early entrants achieve higher performance has occupied many strategic management and marketing scholars. Since Lieberman and Montgomery (1988), much theoretical and empirical research has been conducted from many perspectives. Despite the wealth of first-mover advantage (FMA) research, there is little agreement about whether FMA actually exists. Some scholars are skeptical, suggesting that FMA's existence depends on contingent factors. Golder and Tellis (1993) pointed out that empirical research misunderstood FMA due to sampling bias, and Schnarrs (1986) insisted that FMA was eroded by imitation.

We conduct a systematic review to reconcile the opposing perspectives offered by the empirical literature. Different from a narrative review, the widely used systematic review selects a sample for analysis systematically. Its advantage is its exclusion of the sampling bias seen in the narrative literature (Chalmers and Altman, 1995; Tranfield et al., 2003).

Though developed in the medical sciences, systematic reviews have been applied in social science and business management studies. For example, David and Han (2004) conducted a systematic review on transaction cost theory, and Newbert (2007), following David and Han (2004), also conducted a systematic review. Our study adheres to those works in its investigation of FMA's mechanism.

2. First-mover Advantage Theory

Lieberman and Montgomery (1988) identified three primary sources of FMA: (1) technological leadership, (2) preemption of assets, and (3) buyer switching costs. First-movers, they who can run down the learning curve most quickly, can gain comparative advantage in cost competition. They can also engage in early research and development to advance new technology and accumulate technological skills and knowledge. Moreover, first-movers can preemptively exploit valuable and/or scarce resources such as input factors, store or factory locations, or customers' cognitive positions. Finally, buyer switching costs often prevent buyers from

selecting transaction partners other than first-movers.

First-movers also have liabilities. The first is the free-rider effect, in which first-movers frequently have their innovations imitated at a lower cost. Second, first-movers unintentionally reduce technological and market uncertainty for later movers, who then benefit from the stability. Third, changes in technology or customer demand led by other innovators would cause the efforts of a first-mover in a corresponding market to come to nothing. Fourth, incumbent inertia can weaken the first-mover's advantage.

Since Lieberman and Montgomery (1988), many researchers have tested for the presence of FMA using multiple perspectives and by investigating the empirical data. For example, Szymanski, Troy, and Bharadwaj (1995) and Robinson, Kalyanaram, and Urban (1994) found that FMA exists after reviewing the relevant empirical studies. On the other hand, Vandewerf and Mahon (1997) claimed that conclusions about FMA's existence depend on the study's method of analysis. They pointed out that studies applying "market share" as an indication of firm performance tended to posit FMA's existence more than did studies applying other indications, such as survival rate or benefit rate. Additionally, Kalyanaram, Robinson and Urban (1995) also argued that FMA exists but with some conditions. They claimed that not everyone could be a pioneer because acquiring FMA requires the appropriate technological skills, knowledge, and resources. Thus, the reviews of empirical FMA studies from the 1990s make it clear that FMA exists, but it depends on certain conditions and on certain factors. However, since 1995, when the last of these reviews was published, few studies have analyzed the results of empirical tests for FMA.

3. Data and Method

Following the methodology used by past systematic review studies (e.g., David and Han, 2004; Newbert, 2007), we reviewed a series of empirical articles that test for the presence of FMA and/or its conditions.

First, we searched the ABI/Inform and EconLit databases for journal articles using five keywords presumed to match words in the titles or abstracts of relevant articles: “first mover advantage,” “early mover advantage,” “pioneering advantage,” “entry timing,” and “entry order.”

Second, we eliminated irrelevant articles by matching the initial results against the following 22 additional title and abstract keywords: EXIT, SURVIVAL, PERFORMANCE, PROFIT, MARKET SHARE, MARKETING, RESOURCE, LEAD TIME, RESOURCE BASED VIEW, EARLY MOVER, FOLLOWER, LATE*, SUSTAINAB*, ENVIRONMENT*, BRAND, ASSET*, BARRIER*, ENTRANT*, INDUSTR*, SECOND, DISADVANTAGE*, and LAGGARD*. This step extracted the empirical articles that applied the variables and research concepts appropriate for our purpose.

Third, in order to ensure “empirical” content, we selected articles whose abstracts or content included at least one of the following seven keywords: DATA, EMPIRICAL, TEST, STATISTICAL, FINDING*, RESULT*, and EVIDENCE.

Fourth, we screened the resultant articles based on the kind of journals in which they appeared. By applying a method used in past systematic review studies, we excluded articles that appeared in journals in which any other relevant article was not published in order to ensure the articles’ relevance to FMA.

Fifth, we read the abstracts of the articles remaining after the above process and extracted those that analyzed the relationship between entry order and performance. We then applied the same extraction by reading the article contents. In the last step, we eliminated duplicate articles that appeared in the results for both ABI/Inform and EconLit. Ultimately, 31 articles (25 from ABI/Inform and 6 from EconLit) remained. We read and analyzed the results of these articles, organizing the information into tables.

4. Results

The 31 articles selected for analysis contained 261 statistical tests of the relationship between entry timing and performance. Of these, 168 (64.4%) were statistically supported, 61 (23.4%) were insignificant, and 24 (9.5%) were statistically significant in the opposite direction (i.e., showing first-mover disadvantages). Below, we break down our results by independent variable, dependent variable, independent–dependent variable pair, industry, and independent variable interaction.

4.1 Independent and dependent variables

Table 1 shows the independent and dependent variable categories. The upper side of Table 1 presents the independent variable categories, of which there are four: *entry order*, *time lag*, *category*, and *pioneer*. The interaction terms are *entry timing*resource*, *entry timing*environment*, and *entry timing*strategy*.

Entry order reflects a firm's position in the market entry order. If a firm entered the market first, then $i=1$; if a firm entered the market second, then $i=2$; and so on. Out of 27 tests, 24 (88.9%) were statistically supported. For example, Jakopin and Klein (2012) analyzed the effect of entry order, market share, and profit rate using a sample of 191 mobile network operators from 49 countries. Out of six tests, six (100%) were statistically supported.

Time lag reflects the time that has elapsed after the first market entry. Some studies have used a proxy for years, others months and weeks. Out of 56 tests, 46 (82.1%) were statistically supported, while 3 (5.4%) were significant in the opposite direction. For example, Nehrt (1996) found a positive relationship between investment timing and profit growth, with four out of four (100%) tests statistically supported.

Third, *category* was employed through a dummy variable assigned to each group of elements: early entrants, early followers, and late entrants. Out of 30 tests, 18 (60%) were statistically supported; there were no counter tests.

Fourth, *pioneer* is a categorical variable taking 1 if a firm is a first entrant, and 0 otherwise. This variable does not consider either the second or the third entrant: studies suggest that one problem with empirical research on FMA is the ambiguity of the term “first-mover,” and we have formulated this variable strictly to avoid such ambiguity. Out of 51 tests, 33 (64.7%) were supported and nine (17.6%) were significant in the opposite direction.

The bottom of Table 2 shows the classification of the dependent variables. The main variables used in the empirical research are *market share*, *profit*, and *survival*. For *market share*, a widely used dependent variable, 77 (84.6%) were statistically supported out of 91 tests, while two (2.2%) were counter-supported. For *profit*, 27 (65.9%) were supported and two (4.9%) counter-supported out of 41 tests. Finally, for *survival*, seven (41.2%) were supported, while five (29.4%) were counter-supported out of 17 tests.

4.2 Main independent–dependent variable pairs

Table 2 shows the main independent–dependent variable pairs. We selected four major independent variables (i.e., *entry order*, *time lag*, *category*, and *pioneer*) and three dependent variables (i.e., *market share*, *profit*, and *survival*). The most common pair is that of *time lag* and *market share*; out of 18 tests, 15 (83.3%) were supported. Min and Wolfinbarger (2005) tested the effects of a time lag on market share and found support for two (100%) of two tests. The next common variable pair is the relationship between *pioneer* and *market share*; out of 15 tests, 15 (100%) were supported. Among the many test results available, no empirical test of the relationship between *entry order* and *survival* has been conducted. There is only one test of entry lag’s effect on survival, which resulted in 100% support. These results indicate that, while some variable pairs were used in numerous studies, few variables have been observed in the literature.

4.3 Results by industry

Table 3 presents the results by industry in four categories: *service*, *manufacturing*, *entry into*

foreign countries, and *across multiple industries*. The *entry into foreign countries* category comprises cases in which a host country firm tried to widen its business boundaries by entering a foreign country. The *across multiple industries* category reflects cases in which researchers selected not just one industry for their purpose but various industries, regardless of service or manufacturing industry.

The *across multiple industries* group has the highest support rate: all 35 tests (100%) were supported. For example, Murthi, Srinivasan, and Kalyanaram (1996) analyzed a sample drawn from the PIMS database and found that three out of three (100%) tests showed a positive effect of pioneering markets on market share.

On the other hand, the *service industry* category has the worst support rate, with 38 (56.7%) tests supported out of 67. The following industries were used: mobile telecommunications (Jakopin and Klein, 2012), on-line retailers (Sungwook and Wolfenbarger, 2005), and money market/mutual funds (Makadok, 1998). The *entry into foreign markets* category also has low support; 27 (57.4%) out of 47 tests were supported.

4.4 Interaction effect variable

Whether a first-mover obtains above-normal returns depends not only on the timing of entry but also on the moderating effects of firm resources and environmental factors. In order to investigate moderating effects, we set three interaction term categories: *environment*, *resource*, and *strategy*.

First, as seen in Table 4, the interaction effect between entry timing and environment supported six (60%) out of 10 tests. The *environment* category includes external context variables such as GDP, industry competition, and industry growth. The interaction effect between *entry timing* and *resource* supported 21 (47.7%) out of 44 tests. The *resource* category comprises a firm's internal factors, marketing capability, technological capability, pre-entry experience, and high R&D. Finally, the interaction effect between *entry timing* and *strategy* supported 13 (30.2%) out of 43 tests; *strategy* comprises the cost leadership, entry mode, and

marketing variables.

5. Discussion and conclusion

In this section, we discuss five general findings on FMA. First, as shown in Table 1, 64.4% of the tests in this study supported FMA, a support rate higher than any other in the systematic review literature. For example, David and Han (2004) conducted a systematic review of transaction cost theory, which was supported by only 47% of the tests. Similarly, the systematic assessment of the resource-based view in Newbert (2007) was supported by only 53% of the tests. Thus, the results indicate that FMA is a more common phenomenon than is suggested by major strategic management theory. One may therefore say that entry timing is an important factor in firm performance.

Second, the performance variables used in the tests affect FMA's support rate. When *market share* is used as a dependent variable, 84.6% of the tests are supported. Using *profit* or *survival* reduces the support rate to 65.9% and 41.2%, respectively. Kalyanaram, Robinson, and Urban (1995) surveyed both the established and emerging empirical generalizations and concluded that entry order did not have a significant effect on survival. Vandewerf and Mahon (1997) found that empirical research using market share as a performance measure was significantly more likely to find FMA than were tests using other measures (such as profitability or survival). Our results lead to similar conclusions.

Third, the dependent variables have been operationalized since the 1990s. Lieberman and Montgomery (1998) pointed out that, although market share has been widely used in empirical tests as a dependent variable, few tests have used other variables, such as profit or survival. However, our results were produced by a variety of performance measures. Although *market share* is the most common (28.8%), *profit* (19.2%) and *survival* (9.6%) have become increasingly accepted in the empirical research. Other performance measures, such as *profit growth* and *SCARs*, have also been used.

Fourth, there is no significant difference between industries. The support rate is 60.7% for *manufacturing*, 56.7% for *service*, and 57.4% for *entry into foreign markets*. The low support rate for *entry into foreign markets* is caused by the high uncertainty produced by the undeveloped market systems and political instability of the foreign nations (Li, Lam, and Qian, 2001). For the service industry, the ease with which followers can imitate early entrants at low cost causes the insignificant support for FMA.

Fifth, there is a moderating effect between entry timing and performance. As shown in Table 4, the interaction terms (i.e., *environment*, *resource*, and *strategy*) have a moderating effect on entry timing. However, the degree of this effect varies among the variables. First, the interaction effect of environment was supported by 60% of the tests. Suarez and Lanzolla (2007) observed that firms' external factors moderated the performance of first movers. On the other hand, support for resource's interaction effect is slightly low, with 47.7% of tests supporting it. Lieberman and Montgomery (1998) found an interaction effect between the resource-based view and FMA. They insisted that entry timing does not have a directly positive effect on market share but that market share is affected, either positively or negatively, when resource, capability, and marketing interact with entry timing.

The resources and entry order interaction variables shown in Table 4 can be approximately categorized as "technological capability and complementary assets" (Teece, 1986) or "experiences," representing the resources directly applicable to the current business or that proxy for firms' information resources, such as knowhow and knowledge, respectively. The *high R&D firm*, *concentrated technologies*, *quality*, *specific resource*, and *technological capability* variables can all be interpreted as "technological capability"; their moderating effects on FMA are supported with a 50% probability. Moreover, *firm size* and *marketing capability*, as complementary assets, are supported as moderating effects with a 25% probability. On the other hand, *international experience depth* and *pre-entry experience*, reflecting firm experience, are not at all supported as moderating effects on FMA. These results indicate that followers with the appropriate technological capabilities or complementary assets can somewhat neutralize FMA,

but that a firm's experience of an earlier entrant in a similar market or industry does not affect FMA.

Finally, the interaction effect of strategy was supported by 30.2% of the tests, the lowest support rate. In a global strategy, it is important for managers to decide whether to enter in a joint venture (JV) with a local partner or as a wholly owned subsidiary. The first-mover must also decide whether differentiation or cost leadership is the best strategy. Although these strategic options are important moderators, we did not test which strategy moderates FMA.

Our study suggests possibilities for future empirical research on FMA. First, studies should control for differences among industry structures. Using samples composed of developing countries would allow us to examine the mechanism that generates the differences among advanced countries. Second, more interaction effects should be investigated. Although theoretical models of moderating effects have been advanced by many authors (e.g., Kerin et al., 1992; Szymanski et al., 1995), few attempts have been made to study them empirically. To accurately understand the mechanism of FMA, we must elaborate the methods and theoretical models of our investigations.

Table 1. Independent and dependent variables

Variable	# Articles ^a	% Total articles	# Tests	% Total tests	# Supported	% Supported	# Not supported	% Not supported	# Counter supported	% Counter supported	# Not counter supported	% Not counter Supported
<i>Independent variable</i>												
Time lag	13	42%	56	21%	46	27%	7	11%	3	12%	0	0%
Pioneer	11	35%	51	20%	33	20%	8	13%	9	36%	1	13%
Interaction of resource	9	29%	49	19%	23	14%	15	25%	7	28%	4	50%
Interaction of strategy	6	19%	35	13%	16	10%	12	20%	5	20%	2	25%
Entry category	7	23%	30	11%	18	11%	12	20%	0	0%	0	0%
Entry order	7	23%	27	10%	24	14%	3	5%	0	0%	0	0%
Interaction of environment	4	13%	10	4%	6	4%	3	5%	1	4%	1	13%
Interaction of resource and strategy	1	3%	3	1%	2	1%	1	2%	0	0%	0	0%
Total	31		261		168	64%	61	23%	25	10%	8	3%
<i>Dependent variable</i>												
Market share	15	48%	91	35%	77	46%	10	16%	2	8%	2	29%
Profit	10	32%	41	16%	27	16%	12	20%	2	8%	0	0%
Survival	5	16%	17	7%	7	4%	5	8%	5	20%	0	0%
Market share growth	2	6%	30	11%	8	5%	6	10%	13	52%	3	43%
Competitive position	2	6%	5	2%	5	3%	0	0%	0	0%	0	0%
Firm performance (manager's perception)	1	3%	24	9%	8	5%	16	26%	0	0%	0	0%
Brand trial penetration	1	3%	14	5%	14	8%	0	0%	0	0%	0	0%
Profit growth	1	3%	8	3%	6	4%	2	3%	0	0%	0	0%
Combined abnormal announcement return of the target and acquirer	1	3%	6	2%	3	2%	3	5%	0	0%	0	0%
Share of outlet	1	3%	4	2%	4	2%	0	0%	0	0%	0	0%
Industry performance	1	3%	3	1%	0	0%	3	5%	0	0%	0	0%
Performance satisfaction	1	3%	3	1%	1	1%	2	3%	0	0%	0	0%
Expense ratio	1	3%	2	1%	1	1%	0	0%	1	4%	0	0%
Marketing efficiency	1	3%	2	1%	0	0%	2	3%	0	0%	0	0%
SCARs	1	3%	2	1%	2	1%	0	0%	0	0%	0	0%
Time-of-peak-sales	1	3%	2	1%	1	1%	0	0%	0	0%	1	14%
First repeat purchases	1	3%	1	0%	1	1%	0	0%	0	0%	0	0%
Growth	1	3%	1	0%	0	0%	0	0%	0	0%	1	14%
Height-of-prak-sales	1	3%	1	0%	0	0%	0	0%	1	4%	0	0%
Level of operational risk	1	3%	1	0%	1	1%	0	0%	0	0%	0	0%
Productivity	1	3%	1	0%	0	0%	0	0%	1	4%	0	0%
Sales	1	3%	1	0%	1	1%	0	0%	0	0%	0	0%
Trial penetration	1	3%	1	0%	1	1%	0	0%	0	0%	0	0%
Total	31		261		168	64%	61	23%	25	10%	7	3%

^a Because several articles employ multiple approaches and multiple independent and dependent variables, the subtotals and total reported for this column do not equal their sums.

Table 2. Main independent-dependent variable pairs

Independent variable	Dependent variable	# Articles ^a	% Total articles	# Tests	% Total tests	# Supported	% Supported	# Not supported	% Not supported	# Counter supported	% Counter supported	# Not counter supported	% Not counter Supported
Time lag	Market share	7	23%	18	12%	15	14%	2	7%	1	11%	0	0%
Pioneer	Market share	6	19%	15	10%	15	14%	0	0%	0	0%	0	0%
Resource	Market share	5	16%	20	14%	16	15%	2	7%	1	11%	1	50%
Pioneer	Profit	5	16%	10	7%	5	5%	4	15%	1	11%	0	0%
Time lag	Profit	4	13%	9	6%	6	6%	3	11%	0	0%	0	0%
Strategy	Market share	3	10%	15	10%	12	11%	2	7%	0	0%	1	50%
Category/	Market share	3	10%	10	7%	10	9%	0	0%	0	0%	0	0%
Entry order	Market share	3	10%	9	6%	6	6%	3	11%	0	0%	0	0%
Pioneer	Survival	3	10%	8	5%	5	5%	0	0%	3	33%	0	0%
Environment	Profit	2	6%	6	4%	4	4%	2	7%	0	0%	0	0%
Strategy	Profit	2	6%	5	3%	1	1%	3	11%	1	11%	0	0%
Category	Survival	2	6%	4	3%	0	0%	4	15%	0	0%	0	0%
Entry order	Profit	2	6%	4	3%	4	4%	0	0%	0	0%	0	0%
Environment	Market share	2	6%	3	2%	2	2%	1	4%	0	0%	0	0%
Resource	Survival	2	6%	3	2%	2	2%	1	4%	0	0%	0	0%
Category	Profit	1	3%	4	3%	4	4%	0	0%	0	0%	0	0%
Resource	Profit	1	3%	2	1%	2	2%	0	0%	0	0%	0	0%
Environment	Survival	1	3%	1	1%	0	0%	0	0%	1	11%	0	0%
Time lag	Survival	1	3%	1	1%	0	0%	0	0%	1	11%	0	0%
Total		31		147		109	74%	27	18%	9	6%	2	1%

^a Because several articles employ multiple approaches ad multiple independent and dependent variables, the subtotals and total reported for this column do not equal their sums.

Table 3. Results by industry

Industry	# Articles ^a	% Total articles	# Tests	% Total tests	# Supported	% Supported	# Not supported	% Not supported	# Counter supported	% Counter supported	# Not counter supported	% Not counter Supported
Manufacturing	11	35%	112	43%	68	40%	21	34%	17	68%	0	0%
Service	8	26%	67	26%	38	23%	28	46%	1	4%	1	14%
Across multiple industry	9	29%	35	13%	35	21%	0	0%	0	0%	0	0%
Entry into foreign markets	6	19%	47	18%	27	16%	12	20%	7	28%	6	86%
Total	31		261		168	64%	61	23%	25	10%	7	3%

^a Because several articles employ multiple approaches ad multiple independent and dependent variables, the subtotals and total reported for this column do not equal their sums.

Table 4. Interaction of firm resources, environmental factors and strategy

	# Articles ^a	% Total articles	# Tests	% Total tests	# Supported	% Supported	# Not supported	% Not supported	# Counter supported	% Counter supported	# Not counter supported	% Not counter supported
<i>Resource</i>												
Firm size	2	6%	3	4%	2	7%	1	3%	0	0%	0	0%
High R&D firm	1	3%	20	29%	8	27%	4	14%	5	63%	3	75%
Marketing capability	1	3%	4	6%	0	0%	4	14%	0	0%	0	0%
Marketing capability * Low cost strategy	1	3%	3	4%	2	7%	1	3%	0	0%	0	0%
Concentrated technologies	1	3%	2	3%	2	7%	0	0%	0	0%	0	0%
Quality	1	3%	2	3%	0	0%	0	0%	1	13%	1	25%
Resource commitment	1	3%	2	3%	2	7%	0	0%	0	0%	0	0%
Specific resource	1	3%	2	3%	2	7%	0	0%	0	0%	0	0%
Technological capability	1	3%	2	3%	2	7%	0	0%	0	0%	0	0%
International experience depth	1	3%	100%	1%	0	0%	1	3%	0	0%	0	0%
Majority ownership	1	3%	1	1%	1	3%	0	0%	0	0%	0	0%
Marketing capability	1	3%	1	1%	0	0%	1	3%	0	0%	0	0%
Pre entry experience	1	3%	1	1%	0	0%	1	3%	0	0%	0	0%
Subtotal	14	45%	17	24%	21	70%	13	45%	6	75%	4	100%
<i>Environment</i>												
Industry competition	1	3%	2	3%	1	3%	1	3%	0	0%	0	0%
Industry growth	1	3%	2	3%	1	3%	1	3%	0	0%	0	0%
GDP per capita	1	3%	1	1%	0	0%	1	3%	0	0%	0	0%
Munificence	1	3%	1	1%	1	3%	0	0%	0	0%	0	0%
Really new product	1	3%	1	1%	0	0%	0	0%	1	13%	0	0%
Stability	1	3%	1	1%	1	3%	0	0%	0	0%	0	0%
Serial acquirer	1	3%	1	1%	1	3%	0	0%	0	0%	0	0%
Stock consideration	1	3%	1	1%	1	3%	0	0%	0	0%	0	0%
Subtotal	8	26%	10	14%	6	20%	3	10%	1	13%	0	0%
<i>Strategy</i>												
Entry mode(EJV)	2	6%	4	6%	2	7%	2	7%	0	0%	0	0%
Entry mode(WOS)	2	6%	4	6%	2	7%	1	3%	1	13%	0	0%
High advertisement firm	1	3%	20	29%	4	13%	0	0%	0	0%	0	0%
Low cost strategy	1	3%	6	9%	0	0%	6	21%	0	0%	0	0%
Intensity of investment	1	3%	4	6%	2	7%	2	7%	0	0%	0	0%
Cost leadership	1	3%	2	3%	1	3%	1	3%	0	0%	0	0%
Marketing intensity	1	3%	2	3%	1	3%	1	3%	0	0%	0	0%
Strategy/Marketing	1	3%	1	1%	1	3%	0	0%	0	0%	0	0%
subtotal	10	32%	43	61%	13	43%	13	45%	1	13%	0	0%
total	31 -		70 -		30	43%	29	41%	8	11%	4	6%

^a Because several articles employ multiple approaches ad multiple independent and dependent variables, the subtotals and total reported for this column do not equal their sums.

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¹ Studies preceded by '*' were included in the empirical dataset.

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