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THE DETERMINANTS OF MILITARY MANPOWER SYSTEMS: A POOLED TIME-SERIES, CROSS-NATIONAL ANALYSIS

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ABSTRACT

Although the choice of a military manpower system is an important issue, research on it generally remains out of the 'spotlight' among students of international relations and foreign policy. The reasons for this apparent shortage of interest are various, but lack of cross-national data over an extensive period stands out as a limitation to work so far. To broaden the scope of investigation with respect to military manpower systems, this study introduces international political factors. A multinomial logit model is tested on a pooled time-series, cross-national data set that spans over 100 years. The unit of analysis is the interstate dyad-year. The empirical results show that higher levels of military personnel and expenditure, along with satisfaction with the status quo, are associated with conscription, while democracy and joint memberships in international organizations are linked to a voluntary system.

1. The Significance of Military Manpower Systems

While the choice between conscription and voluntary service can be thought of as an indicator of the balance of political power between civilians and the military in domestic politics, it also may determine how states respond to external threats in international politics. Conscripted soldiers, for example, may be more readily available than volunteers for mobilization and deployment. Furthermore, the issue of conscripted versus voluntary soldiers has evolved around the interaction of domestic imperatives as well as the international environment. In Canada, for instance, a conscription crisis developed during World War I because nationalists in the Province of Quebec argued against the practice as a manifestation of an unwanted allegiance to the British Empire (Archer, Gibbins, Knopff, MacIvor and Pal 2002: 364). At the other extreme, some states avoid conscription altogether because of the perceived unreliability of the domestic population, even when aggressive intentions may exist; some examples, at various times, might include Pakistan, Saudi Arabia, Nigeria and others. In still other instances, states may seek conscription to undermine potentially threatening domestic elites, with France prior to World Wars I and II, Allende's Chile and Nicaragua as examples here. Thus greater understanding of the choice of one system over another is anticipated to have relevance to both domestic and international political processes.

Although the choice of a military manpower system is an important issue, research on it generally remains out of the 'spotlight' among students of international relations. The reasons for this apparent shortage of interest are various. One is lack of data. Although some descriptive and historical treatments exist, no integrated research project grants centrality to a time-series, cross-national analysis because data have not

been available. More importantly, most studies have been carried out not by political scientists, but by economists, who conduct cost/benefit analyses of conscripted versus voluntary systems. Thus research so far focuses mainly on *domestic implications* of military manpower structure, such as budget analysis for conscription and voluntary service, but not on *international political determinants*. In other words, military manpower system appears as a causal variable in relation to economic matters as opposed to something that is worthy of being explained from a political perspective.

Analysis of interstate dyads is used widely in studies of international relations, but is at quite some distance from the literature on civil-military relations in general and conscription in particular. Since a state's choice between use of conscripts versus volunteers depends on its political-military position vis-à-vis other states', a dyadic rather than monadic analysis is preferred. But it is imperative that research on the choice of military manpower system pay heed to pairs of states (dyads) over time because of its inherently *relational* character (Oneal, Russett and Berbaum 2003: 372).

To broaden the scope of investigation with respect to military manpower systems, this study introduces international political factors. A multinomial logit model is tested on a pooled time-series, cross-national data set that spans over 100 years. The unit of analysis is the interstate dyad-year. We go beyond existing scholarship on (a) international conflict in terms of method, where either simple ordinary least squares or logistic regression is employed for a single or few nations in a particular year;[1] and (b) military manpower systems in terms of substance, where issues of economic rather than international political significance predominate. In doing so, this study attempts to *explain the emergence of conscription versus voluntary military manpower systems*.

Four additional sections appear below. The second section consists of a literature review that places the attempt to explain conscription in context. Hypotheses, measurement, data and model-building are discussed in the third section. The fourth section reports empirical results about determinants of military manpower systems: conscripted versus voluntary. The fifth and last section summarizes the implications of the empirical findings.

2. The Political Economy of Military Manpower Systems

Existing literature on military manpower systems focuses mainly on the impact of the choice of voluntary versus conscripted soldiers on domestic factors, such as social opportunity cost and military preparedness. Anderson's (1945) "Universal Military Training and National Security", published by *The Annals of the American Academy of Political Social Science*, appears as an initial work in the field. It deals with military history, military and cultural considerations and manpower alternatives for Great Britain, the Soviet Union and France. Manpower studies in the United States began to pick up in the middle of the Vietnam War, during which an anti-war mood culminated in open and sometimes violent confrontations over the military draft. In response to such political and social situations, several prominent economists – interestingly enough, not political scientists – built a theoretical framework from the perspective of labor economics in the late 1960s and early 1970s.[2] Various related articles appeared in top economic journals that included *American Economic Review* and *Quarterly Journal of Economics* (see Altman and Fechter 1967; Hansen and Weisbrod 1967; Oi 1967; Miller 1968; Fisher 1969; Friedman 1972).

Although economic theorizing focused on identifying which manpower systems produced more desirable defense outcomes, discussion followed a normative direction and favored professional soldiers over conscripted ones. For example, Hansen and Weisbrod (1967), Miller (1968) and Friedman (1972) constructed a formal model in which volunteers are superior to conscripts due to greater economic efficiency (i.e., lower social costs). Other studies produced the opposite conclusion. For instance, based on the percentage of the eligible population recruited into the military and the dead-weight loss associated with conventional taxation, Lee and McKenzie (1992) and Warner and Asch (1995) developed an economic model in which the draft is more efficient than voluntary service.

Numerous empirical studies have tested various economic theories about the preferred type of military manpower system. Altman and Fechter (1967), Oi (1967) and Fisher (1969) found that, to maintain a military force of 2.65 million soldiers in the early 1970s, the US would have to accept significantly higher budgetary payroll costs. These costs, according to their estimates, would vary from $4 billion to $8.3 billion per annum. Comparing the two manpower systems in terms of issues of allocative efficiency and equity in the case of Belgium, Kerstens and Meyermans (1993) conclude that the mixed manpower system produces allocative inefficiency (i.e., too many able young men are drafted) and that the draft is a second best policy due to inequality (i.e., the draftees pay implicit taxes much higher than the observed average income tax rates). Based on an economic analysis of manpower procurement in the Dutch military, Duindam (1999) contends that, because the economic cost of conscription outweighs the benefits, eligible

men are less willing to serve. These studies, taken together, would seem to favor a voluntary system, at least in terms of economic criteria.

Aside from the economically oriented studies just noted, some political, historical, sociological and cultural studies exist. Anderson and Honegger's (1982) edited volume, *The Military Draft: Selected Readings on Conscription*, provides an excellent collection. With a focus on various aspects of the policy debate over conscription, it deals with (1) the history, philosophy, constitutionality and economics of conscription; (2) universal national service; (3) the practices of other nations; and (4) powerful, emotional arguments from both advocates and opponents. In addition, several policy-oriented studies have come out. For example, *In Pursuit of Equity* (the so-called "Marshall Report", 1967), prepared by The Report of the National Advisory Commission on Selective Service, along with *The Report of the President's Commission on an All Volunteer Armed Force* (labeled as the "Gates Report", 1970), paved the way to introduction of an all-voluntary force in the US in 1973. Bowman, Little and Sicilia's (1986) edited book, *The All-Volunteer Force after a Decade: Retrospective and Prospect*, concluded that the all-voluntary force in the US was in good shape at the end of fiscal year 1983, but also predicted that, due to rising costs, sophisticated new weapons systems and a smaller recruitment pool, serious manpower procurement challenges could occur in the future. In the same vein, Gilroy, Phillips and Blair (1990) argue that, despite the less favorable recruiting environment during the 15 years since its inception, the all-volunteer army has succeeded primarily because of the systematic development of the Army College Fund.

3. Research Design: Hypotheses, Measurement, Data and Model Building

1) *Hypotheses*

Since the determinants of military manpower systems have not been studied systematically, the causal mechanism is open to question. In response, this study adopts hypotheses derived from the field of international relations, most notably, well-established findings from the study of conflict processes. Both international and domestic factors are included in an initial model of the choice of a military manpower system.

One would expect two types of states to rely on conscripted soldiers over voluntary ones: states that 1) perceive a strong external threat, and 2) seek to oveturn the status quo. States that choose conscription are likely to do so because national leaders perceive external threats to national security (i.e., a likelihood of war) in the future. For example, because of continuing threats under the Cold War bipolar security regime, the US maintained manpower based largely on a conscription force until 1973. South Korea, with its sizable and wealthy capital so near the border with hostile North Korea, still does. Yet, the United States chose to move to an all-voluntary force in the wake of the Vietnam War and the waning of the Cold War. After the fall of the USSR and consequent reduction in the risk of a general war, European states moved towards all-voluntary forces (Anderson, Halcoussis, and Tollison 1996: 189). Based on a sample of 143 countries for 1984, White (1989) reports that war involvement is positively associated with conscripted soldiers. Thus, in light of intuition, theory and evidence from the literature as related to external threat, the hypothesis based on war likelihood is as follows:

H_1: A relatively high likelihood of war is more likely to lead to conscription within an interstate dyad.

It also is rational for states to choose conscription if they seek to overturn the status quo, that is, to facilitate the launch of a military attack. In this context, conscription can be considered as a driving force behind at least some international conflict.[3] National leaders are likely to become more interventionist in that conscripted soldiers reduce the relative cost of pursuing that option (Beukema 1982: 489; Brigance 1945: 198-199). Put differently, conscripted soldiers are more readily available for use than volunteers. Mussolini's Fascist Italy, Hitler's Nazi Germany and Tojo and the warlords of Japan took conscription to its extreme in World War II. Thus, the hypothesis about satisfaction with the status quo is as follows:

H_2: Satisfaction with the status quo is less likely to lead to conscription within an interstate dyad.

Military expenditure and the number of military personnel in uniform impact upon choice of a military manpower structure. High military expenditures effectively encourage conscription because a large standing army becomes more feasible. One would expect that the military would prefer to maintain more soldiers for contingency planning and as a player in the bureaucratic political game (Choi 2002).[4] Use of conscription also would appear to create lower per unit cost to the military than voluntary soldiers, who must be paid at a level more closely approaching market wages (Altman and Fechter 1967; Oi 1967; Fisher 1969). Thus, the hypothesis about military expenditure is as follows:

H_3: An increase in military expenditure is more likely to lead to conscription within an interstate dyad.

A conscripted army within a military infrastructure would be more usable than a smaller professional force in the ongoing struggle for influence within government. Hansen and Weisbrod (1967: 401) claim that "with a draft the military is readily able to secure whatever men are needed, whenever they are needed." Size, after all, would seem to matter, at least in principle. Furthermore, relative costs for conscription are lower than for voluntary soldiers, meaning that a larger army should be more likely to use conscription. Among 78 countries for 1983, Ross (1994) finds that the size of a military produces a positive effect on the decision to use conscripted soldiers. Thus, the hypothesis about the size of the military is as follows:

> H_4: An increase in the number of military personnel is more likely to lead to conscription within an interstate dyad.

Given the centrality of neo-Kantianism in the study of international conflict, it is interesting to assess the impact of the three basic variables – democracy, economic interdependence, and joint memberships in international organizations – on the choice of a military manpower system. These variables show persistent pacifying effects in relation to conflict processes, such as Militarized Interstate Disputes (MIDs) and wars (Russett and Oneal 2001), so it is reasonable to expect that their effects might carry over to a security-oriented national attribute such as military manpower systems.

Conscription is not entirely consistent with individual freedom. While a volunteer army preserves the freedom of individuals to serve or not, conscription "is absolutely opposed to the principles of individual liberty which have always been considered a part of American democracy" (Quoted in Nixon 1982: 604). Democracies, therefore, have

less legitimacy in requiring that their citizens be conscripted. Conscientious objectors, for example, are not unknown in such soccieities (Horeman and Stolwijk 1998). Thus, the hypothesis about democracy is as follows:

H_5: A higher level of democracy is less likely to lead to conscription within an interstate dyad.

Economic interdependence is likely to discourage interstate conflicts (Oneal and Russett 1999; Russett and Oneal 2001). States with extensive economic ties should be more likely to choose voluntary service over conscription in that they have a lower chance, all other things being equal, of becoming involved in interstate disputes. Such disputes, after all, would be more likely to occur in the presence of conscripted forces because of their higher military preparedness in comparison to all-volunteer forces (Ross 1994). Thus, the hypothesis about economic interdependence is as follows:

H_6: A higher level of economic interdedependence is less likely to lead to conscription within an interstate dyad.

Joint memberships in international organizations are likely to increase collective security (Oneal and Russett 1999; Russett and Oneal 2001). A non-aggression treaty organization would be an example. States within such networks should have a lower incentive to employ conscription in anticipation of violent conflict. Thus, the hypothesis about joint memberships is as follows:

H_7: A higher number of joint memberships in international organizations is less likely to lead to conscription within an interstate dyad.

2) *Measurement and Data*

The dependent variable, military manpower system, is coded as '2' if both states in a dyad-year adopt a conscription system for active duty military personnel; '1' if either state in a dyad-year has conscripts; and '0' otherwise. No aggregate data on manpower exists over an extended spatial and temporal domain, so we have consulted with the following two sources which, to the best of our knowledge, are the most comprehensive and representative with respect to each state's military manpower system: Horeman and Stolwijk (1998) and Prasad and Smythe (1968).[5]

War is coded as '1' if both states in a dyad-year become involved in an international war; it is '0' otherwise. We have recoded Maoz's (1999) standard five categories (i.e., 1 for no militarized action; 2 for threat to use force; 3 for display of force; 4 for use of force; and 5 for war) for the level of hostility in each dyad-year into two values (i.e., 0 and 1).[6]

Satisfaction with the status quo is a measure of how each state views its current situation based on the correspondence between its portfolio of alliances and that of the hegemon, as indicated by the tau-b measure of statistical association; 1 is added to each state's tau-b score to make it positive; and then it is multiplied by the score of the two states in a dyad to create a measure of joint satisfaction. Each state's tau-b score is from Oneal and Russett's (1999) data set.

Military expenditure is calculated as follows: First, an annual growth rate for military expenditure is calculated for each state in a dyad for a given year. Second, the *smaller* value of the percentage expenditure between the two states in each dyad-year becomes the recorded value.[7] The data come from Bennett and Stam's data set, *Expected Utility Generation and Data Management Program* (EUGene).[8] Bennett and Stam's

military expenditure data originally come from the 1993 update to the Correlates of War (COW) National Capabilities data file, which is the standard among students of international conflict. Since the original military expenditure is recorded as a nominal value (i.e., not inflation-adjusted), it is converted into a real value using Sahr's Inflation Conversion Factors for 1700 to Estimated 2010.[9] 2000 is the base year for the Consumer Price Index (CPI).

The variable for military personnel is calculated as follows: First, the number of soldiers as a percentage of population is determined for each state. Second, the weak link assumption is used to derive a score for the dyad-year. Like the military expenditure data, the data for this variable are obtained from Bennett and Stam's data set, *EUGene*, which includes military personnel and total population in the form of the National Capabilities data file.

Measurement and data for democracy, economic interdependence, and joint memberships in international organizations utilize Oneal and Russett's (1999) pioneering work. Democracy is based on the weak link assumption: the score for the less democratic state in a dyad is taken to be the stronger determinant of conscription. Economic interdependence also assumes the weak link: the score for the less interdependent state in a dyad is taken to be the stronger determinant of conscription. The international organization variable is measured by the number of joint memberships. Hence, the more joint memberships in intergovernmental organizations, the more constrained states are expected to be less likely to engage in a dispute and, in turn, the dyad is regarded as less likely to adopt conscription.

3) *Building a Multinomial Logit Model*

Since the dependent categorical variable is not ordered, but nominal, we choose a multinomial logistic regression to test our hypotheses. Multinomial logit models are multiequation models. Since the dependent variable has three categories, our multinomial logit model will generate two equations. Each of these two equations is like a binary logistic regression comparing a group with the reference group (i.e., no conscription). We use *Stata Statistical Software* (version 7.0) to carry out maximum-likelihood multinomial logistic regression.

For the multinomial logit model, all independent variables are lagged by one year, so they are not affected by a choice of conscription. Equation 1 includes one dependent variable and seven independent variables as follows:

(1) $Y_t = \alpha + \beta_1 X_{1t-1} + \beta_2 X_{2t-1} + \beta_3 X_{3t-1} + \beta_4 X_{4t-1} + \beta_5 X_{5t-1} + \beta_6 X_{6t-1} + \beta_7 X_{7t-1} + \varepsilon$

Here,

Y_t: military manpower with conscripted soldiers

X_{1t-1}: war

X_{2t-1}: satisfaction with the status quo

X_{3t-1}: military expenditure

X_{4t-1}: military personnel

X_{5t-1}: democracy

X_{6t-1}: economic interdependence

X_{7t-1}: joint memberships in international organizations

ε: error term

This study includes over 130 states during the period from 1886 to 1992, so we employ a pooled time-series, cross-national analysis. As mentioned earlier, due to the necessity of looking into the relations of pairs of states over time on military manpower, data analysis focuses on dyad-years. Since the hypotheses are directional, this study employs a one-tailed test for each variable.

4. Empirical Results

Table 1 shows the empirical results during the period from 1886 to 1992. The first column lists the variable names. The second and third columns present the results when *either one or both states* have conscripted soldiers, respectively.

Table 1 Predicting the Likelihood of Conscription, 1886-1992

Independent Variables	Conscription versus Voluntary Service	
	Conscripted Soldiers, either A or B	Conscripted Soldiers, both A and B
War	-0.5927	0.2444
	(-0.7688)	(0.7536)
Satisfaction with the status quo	0.3206***	0.6334***
	(0.0755)	(0.0795)
Military expenditure	0.0624	0.1383***
	(0.0409)	(0.0426)
Military personnel	1.8502***	3.8368***
	(0.2042)	(0.2183)
Democracy	-0.0053	-0.0272***
	(0.0071)	(0.0075)
Economic interdependence	-8.9576	-0.4109
	(11.5997)	(9.5880)
International organizations	-0.0127***	-0.0087***
	(0.0027)	(0.0028)
Constant	0.9319***	-0.3240**
	(0.1212)	(0.1310)
Chi^2	696.93	
P of Chi^2	0.0000	
Log likelihood	-107390.8	
Pseudo R^2	0.075	
N	120,690	

*p<.05; **p<.01; ***p<.001, one-tailed tests

The second column reveals what factors determine the use of conscription by either state, as compared with a voluntary military manpower system. The war variable shows no statistical significance, which indicates that, although one of the two states in a

dyad-year perceives a strongest external threat, conscription does not necessarily ensue within an interstate dyad. This result concurs with Ross' (1994: 125) recent study that reports no significant effect for war on the presence of conscription. Satisfaction with the status quo is statistically significant at the 0.001 level. When either state is satisfied with the distribution of benefits achieved under the leadership of the most dominant state, the dyad is more likely to maintain conscripted soldiers.

The military expenditure variable is not statistically significant, indicating that an increase can appear without implications for conscription. The military personnel variable is statistically significant at the 0.001 level. When the number of soldiers increases, either state in a dyad-year becomes more likely to employ conscription. This result is in accord with White's (1989: 779) empirical study on the relationship between conscription and the size of armed forces.

The democracy variable is not statistically significant. It appears that type of regime does not affect the military manpower structure of either state in a dyad-year. The economic interdependence variable also is not statistically signficant, which suggests that trade volume does not reduce the likelihood of conscription. Joint memberships in international organizations are negatively associated with conscription, which makes it the one component of the neo-Kantian triad that works in this context. Of course, it should be pointed out that the research design is an especially challenging one for neo-Kantianism; it includes a dependent variable that is a national attribute as opposed to a form of direct action by states, like participation in a MID or war. For such reasons, the performance of the neo-Kantian variables at this stage of the analysis should not be regarded as discouraging. Instead, the results suggest that the neo-Kantian triad, like any

other successful theoretical framework, eventually reaches an outer limit for its application.

The third column shows which factors are associated with use of conscription by both states in a dyad. The war variable again shows no statistical significance. Satisfaction with the status quo again is statistically significant at the 0.001 level. It is more likely that conscripted soldiers will be maintained by both states in a dyad-year under greater satisfaction with the status quo.

The military expenditure variable is statistically significant at the 0.001 level, which means that an increase is more likely to lead to conscription by both states in a dyad-year. The variable for military personnel again shows statistical significance at the 0.001 level; when the number of soldiers increases, both states in a dyad-year become more likely to adopt conscription.

This time the democracy variable is statistically significant at the 0.001 level. It appears that, when they become more democratic, both states are likely to employ volountary soldiers over conscripts for their national security in a given dyad-year. This result concurs with Anderson, Halcoussis and Tollison's (1996: 198) recent study. The economic interdependence variable continues to show no statistical signficance. Joint memberships in international organizations again are associated negatively with conscription. It appears that, with an increase in joint memberships, both states are less likely to maintain conscripted soldiers in a given dyad-year.

5. Conclusion

Employing a multinomial logit model, this pooled time-series, cross-national data analysis stands as an initial effort to identify what factors distinguish conscription from

voluntary service for dyad-years from 1886 to 1992. Given the fact that existing literature on the determinants of military manpower systems is thin, this study should be regarded as an attempt to broaden its scope and method, especially by incorporating international political factors *and* analyzing interstate dyads. Put differently, this study seeks to address an understudied and neglected area of international relations: the choice of military manpower systems within the increasingly paradigmatic level of analysis represented by interstate dyads.

The empirical results show that a larger number of military personnel, along with satisfaction with the status quo, are associated positively with the likelihood of conscription, and joint memberships in international organizations are associated negatively. Yet, war and economic interdependence have little to do with conscription. The data analysis also reveals that both states in a dyad-year are more likely to employ conscripted soldiers with an increase of military expenditure and are less likely to maintain conscripts when they become more democratic.

It is interesting that satisfaction with the status quo turns out to have a counterintuitive effect. This result may be regarded as favorable to a realist perspective: 'If you want peace, prepare for war'. It seems that states are more likely to pursue their security by maintaining conscription in an anarchical world when their preferences are more consistent with those of the leading power – a puzzle certainly in need of further attention, given its apparent extreme inconsistency with hegemonic stability theory and intuition based on research findings.

Our multinomial logit model, which incorporates international and domestic factors, captures only part of the whole story with respect to military manpower systems.

Future research should include other aspects, such as civic duty. As Choi and James

(2003) indicate, the choice of military manpower structure may be based on the concept

of the civic duty (i.e., to serve the state) more than national security in response to

external threats. If so, this would suggest that a combination of variables from

comparative political studies rather than international relations might prove more

promising at the next stage of research.

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ENDNOTES

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[1] It should be noted that cross-national analysis is often criticized for it static nature.

[2] Oneal (1992)'s analysis of budgetary savings from conscription among NATO members and Choi and James' (2003) analysis of the impact of conscription on interstate disputes are exceptions.

[3] Counter-examples are the Afghanistan War (2001) and Iraq War (2003), where the US did not use conscripted soldiers. Use of a voluntary military by the US may result from political rather than military considerations as a by-product of experience with the Vietnam War (Chambers 1987). Moreover, the extremely high defense spending of the US makes it a virtually unique actor in world politics with respect to military preparedness or strength.

[4] The hypothesis that follows may not apply to navies in the modern interstate system.

[5] The following sources have been used for either cross-checking or complementing military manpower data with respect to reliability and validity: International Institute for Strategic Studies (1970 through 2000), Anderson (1976), Keegan (1979, 1983), Stockholm International Peace Research Institute (1985), Pope (1987) and Schumacher, Sevrens, O'Donnell, Torrence and Carney (1989).

[6] Zeev Maoz, Dyadic Militarized Interstate Disputes (DYMID1.1) Dataset—Version 1.1. Dyadic MID Codebook (1999): 1-9, downloaded from ftp://spirit.tau.ac.il/zeevmaoz/dyadmid.html. It should be noted that the level of hostility is originally based on MIDs data assembled from the Correlates of War Project (see Gochman and Maoz 1984).

[7] Dixon (1993, 1994) has standardized this operationalization by calling it the "weak link" assumption. The likelihood of an international dispute within a dyad should be a function primarily of the degree of constraint experienced by the *less* constrained state

(i.e., the smaller value) in each dyad, that is, the less democratic of the two. In the

present context, the lower value of *military expenditure* by percentage in a dyad

establishes the 'lowest common denominator'.

[8] (EUGene) version 2.10, http://www.eugenesoftware.org/.

[9] See http://www.orst.edu/dept/pol_sci/fac/sahr/sahr.htm for an explanation of this

method.

BIOGRAPHIES

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