

“Organizing for Performance: Coalition Effectiveness on the Battlefield”

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APPENDICES

These appendices provide additional evidence in support of our theoretical claim that the interaction of coalitions’ command structures and co-belligerents’ resource contributions conditions their collective effectiveness.

In Appendix I and Appendix II, we offer two extensions of the evidence reported in the main text. The first is an in-depth reporting of primary source documents shedding light on the nature of British thinking about, and interaction with the French regarding, coalition plans, operations, and conduct between August and November 1914. For reasons of space and narrative flow, the evidence offered in the main text is drawn almost exclusively from secondary sources; the information presented here “shows our work” with respect to our interpretation of the change in the functionality of Entente command arrangements and its effect on the coalition’s effectiveness over time. The second extension is an additional case study, drawn from the Eastern Front during World War I. We examine the command structure and effectiveness of the German and Austro-Hungarian coalition as the Central Powers fought the Russians during the Gorlice-Tarnow offensive. In terms of our typology, the Germans and Austro-Hungarians contributed qualitatively asymmetric forces to the fight and employed a U-form command structure to coordinate combined operations. Accordingly, the case complements those presented in the main text: the Entente case reflects co-belligerents increasing in quantitative (rather than qualitative) symmetry while operating almost exclusively through a M-form structure and the Axis case features co-belligerents that were consistently asymmetric in qualitative terms while varying their type of command structure. Together, these extensions offer considerable additional support for validity of our theoretical claim.

In Appendix III, we provide the coding rules for the *Belligerents in Battle* data referenced in the main text; the data, which is used to create the statistics presented in the main text is available as a separate .xls file. The coding rules provide information regarding the creation of the data, including how we account for major battles, identify belligerents, count coalition members, and assign the regime type of coalition members as well as how we account for the presence of democratic coalitions, preexisting institutionalization, and battle outcomes. The data included accounts for the relevant characteristics of belligerents in 480 battles, fought in 62 interstate wars waged between 1900 and 2003.

Appendix I: British Intransigence and the Operation of the Entente M-Form Coalition

In the main text, we argue that, with one brief exception, British and French forces consistently employed a M-form structure while varying in their relative resource contributions over the fall of 1914. In line with our theoretical expectations, there were fewer coordination problems in, and transaction costs incurred during, the period in which the British and French forces were more symmetric in their resource contributions to battle (First Ypres) than when their resource contributions were more asymmetric (First Marne). In making this claim in the main text, we present primarily secondary sources, with a few direct quotes from participants. In this section, we draw extensively from the documentary record to demonstrate three things: 1) the Entente's command arrangement was consistently M-form throughout the time period we examine, with one short exception, 2) that exception occurred when the British willingly subordinated themselves to U-form command *during the fighting* of the First Battle of the Marne, and 3) the management of collective operations was both easier and more effective when our theory expects that it would be.

To establish the veracity of our description of the Entente command structure as well as the congruence of our theoretical expectations and events in the historical record, we consulted Sir John French's memoir of 1914 as well as official British records from the period. Our research focus solely on these records, as opposed to the both French and British documents, is theoretically and analytically justified. Joining a coalition requires the constituent partners—all rational, cost-minimizing actors—to negotiate limitations on their sovereign prerogatives (Wolford, 2015). Specifically, they must decide whether limits will be placed on national militaries' rights to determine the size, disposition, and use of the troops and materiel they field. If such limits are to be put in place, co-belligerents must also decide who is empowered to make such determinations (Kreps, 2011: 15–20; Weitsman, 2013: 35–43). Because conclusion of such negotiations and subsequent adherence to any decisions made depends on the willingness of all parties to relinquish some of their sovereign rights, when a coalition is comprised of two co-belligerents, examining the choices and perceptions of one partner provides information on the whole. In this case, the foregoing means that the form of the Entente's command structure depends on the degree to which the British relinquished their rights to control their forces during the fighting on the Continent. Regardless of the form of command structure the French perceived to be in operation, the actual nature of the arrangement depended on what the British believed it to be.¹ If the British believed themselves to have relinquished national sovereignty over the size, disposition, and employment of their forces in the war against Germany, and afforded power over such decision making to a French commander-in-chief, then the Entente would have employed a U-form command system. If, however, the British believed themselves to have retained sufficient sovereign authority that Sir John French could treat directions from a French commander regarding the size, disposition, and employment of British forces as suggestions and requests rather than orders, the Entente would have in fact employed a M-form command system. Focusing solely on the content of British source documents thus permits us to demonstrate 1) the nature of the Entente command structure throughout the fall of 1914, 2)

¹ There is evidence that French Commander-in-Chief, Marshal Joseph Joffre, thought he sat atop a U-form command structure and possessed the associated authority at the outset of the war (Greenhalgh, 2005: 26–28; Philpott, 1996: 18–19).

whether and to what extent that command structure changed during the fighting of the First Battle of the Marne, and 3) the relative efficiency and effectiveness of the adopted command structure(s) over time.

As noted, to gather the requisite information, we consulted two types of records. The first is Sir John French's memoir. In it, French recounts several conversations and transcribes the contents of several documents related to Entente command arrangements. Because historians have raised questions about the veracity of some specific interpretive claims made in the memoir regarding the achievements and faults of various individuals, and particularly the blame French casts on other officers, we focus almost exclusively on his transcriptions of orders and correspondence. The second resource we employ is the archival record of contemporaneous beliefs and decisions. The first group of records we consulted was the personal papers of Sir John French, held at the Imperial War Museum in London. Included in this record set (Documents.7813) are French's diaries from the fall of 1914; French's correspondence with Secretary of State for War Horatio Herbert Kitchener, First Lord of the Admiralty Winston Churchill, and other British government officials; copies of cypher telegrams sent both by French to the War Office in London and by the War Office to French; and correspondence between French and France's Grand Quartier General. We also examined the papers of Secretary of State for War Kitchener, held at The National Archives at Kew. Included in this record set (PRO 30/57/49 and PRO 30/57/51) are copies of telegrams sent from the War Office to French, some of which were present in French's personal papers, as well as personal correspondence between Kitchener and French. The final set of records we consulted were the collected papers of various ministers and officials serving the Foreign Office during World War I (FO 800/56A). These documents allow us insight into the discussions held at the nexus of the British civil-military relationship during the opening months of World War I regarding precisely what Sir John French's orders were, how much deference he was to show to Joffre, and how French carried out his responsibilities. They allow us to demonstrate the nature of the Entente command structure and how it conditioned Anglo-French coalition effectiveness during the fall of 1914.

Turning to the documentary record, as noted in the main text, Sir John French was dispatched to serve as commander of the British Expeditionary Force (BEF) with the explicit instruction that his command was to be an independent one (Greenhalgh, 2005: 17). French reports the complete version of the instructions he received prior to embarking for France on 14 August 1914 in his memoir. Because the initial instructions shed light on several key aspects of the British approach to coalition management and operations, they are worth quoting in full:

Owing to the infringement of the neutrality of Belgium by Germany, and in furtherance of the Entente which exists between this country and France, His Majesty's Government has decided, at the request of the French Government, to send an Expeditionary Force to France and to entrust the command of the troops to yourself.

The special motive of the Force under your control is to support and cooperate with the French Army against our common enemies. The peculiar task laid upon you is to assist the French Government in preventing or repelling the invasion by Germany of French and Belgian territory and eventually to restore the neutrality of Belgium, on behalf of which, as guaranteed by treaty, Belgium has appealed to the French and ourselves.

These are the reasons which have induced His Majesty's Government to declare war, and these reasons constitute the primary objective you have before you.

The place of your assembly, according to present arrangements, is Amiens, and during the assembly of your troops you will have every opportunity for discussing with the Commander-in-Chief of the French Army, the military position in general and the special part which your Force is able and adapted to play. It must be recognized from the outset that the numerical strength of the British Force and its contingent reinforcement is strictly limited, and with this consideration kept steadily in view it will be obvious that the greatest care must be exercised towards a minimum of losses and wastage.

Therefore, while every effort must be made to coincide most sympathetically with the plans and wishes of our Ally, the gravest consideration will devolve upon you as to participation in forward movements where large bodies of French troops are not engaged and where your Force may be unduly exposed to attack. Should a contingency of this sort be contemplated, I look to you to inform me fully and give me time to communicate to you any decision to which His Majesty's Government may come in the matter. In this connection I wish you distinctly to understand that your command is an entirely independent one, and that you will in no case come in any sense under the orders of any Allied General.

In minor operations you should be careful that your subordinates understand that risk of serious losses should only be taken where such risk is authoritatively considered to be commensurate with the object in view.

The high courage and discipline of your troops should, and certainly will, have fair and full opportunity of display during the campaign, but officers may well be reminded that in this, their first experience of European warfare, a greater measure of caution must be employed than under former conditions of hostilities against an untrained adversary.

You will kindly keep up constant communication with the War Office, and you will be good enough to inform me as to all movements of the enemy reported to you as well as to those of the French Army.

I am sure you fully realise that you can rely with the utmost confidence on the wholehearted and unswerving support of the Government, of myself, and of your compatriots, in carrying out the high duty which the King has entrusted to you and in maintaining the great tradition of His Majesty's Army.

(Signed) KITCHENER, 'Secretary of State' (French, n.d.: Chapter I)

Four aspects of these instructions are notable. First, as evidenced in the first three paragraphs, the British government regarded their participation in the war as both a function of their treaty commitment to Belgium and a favor to France. This attitude is indicative of a state that believes its military force should be considered as an equal partner in decision-making and operations.

Second, as noted in the fourth paragraph, the British government explicitly referred to Joffre as the Commander-in-Chief of the *French* army, not the Entente forces as a whole. To that end, the BEF commander was to negotiate with, and not simply conform to the wishes of, the French commander over the size, disposition, and employment of British troops. Further, he was to undertake such negotiations, as his instructions note, with an eye toward minimizing British casualties above all else. Third, in case the implied equality in the Anglo-French command relationship was not clear, the fifth paragraph explicitly states that the BEF commander's office was independent and that he should accept no orders from any Allied general. Finally, in the penultimate paragraph, the British government insisted that the BEF commander keep in constant communication with the War Office in London and, among other things, report on the movements of the French Army. This kind of communication is that which would be expected from an equal partner in coalition command.

Collectively, the points made in French's initial instructions underscore the British belief that the Entente command relationship to be M-form: they regarded Sir John French as an equal participant in decision-making with Joffre on matters related to the size, disposition, and employment of British forces. They did not believe they had surrendered their sovereign rights to make such determinations in sending troops to the Continent to fight the German forces. As a consequence, regardless of what Joffre or officials in Paris believed, the functional structure of the Entente command relationship at the outset of the war was M-form.

When the BEF commander met with Joffre in person for the first time on 16 August, the extent of the officers' divergent beliefs about the nature of the Entente's command structure was made clear. French reported the content of his instructions to Joffre and the latter informed him that the BEF would be positioned on the exposed left flank of the Entente line. Likely recalling the portion of his instructions that commanded him to avoid such exposure, French asked Joffre to place one of his cavalry divisions and two reserve divisions under BEF orders to help buffer against the German threat. Joffre, on instruction from Paris, refused (French, n.d.: Chapter III). Neither co-belligerent was willing, or able to force its partner, to subordinate any portion of its forces to the command of the other.

During the subsequent Battle of the Frontiers, which included the fighting around Mons during which the BEF suffered tremendous casualties, coordination between British and French forces was slow and inefficient. On 23 August, for example, the BEF commander requested that General Sordet, commander of the French cavalry division nearest the British position, help protect the left flank. Sordet indicated "that he had received no orders to move to the left flank and must, therefore, await these instructions before he could march" (French, n.d.: Chapter IV). Until Sordet relayed French's request to Joffre and received explicit instructions to comply with that request, he was not authorized to undertake operations that would serve to bolster and protect the British portion of the Entente line.

This slow process frustrated the British commander, to the point that civilians in London feared French and Joffre had seriously quarreled and were incapable of working together (Churchill, 1914). French himself stoked some of these fears. On 25 August, for example, he wrote to Kitchener that "It is, of course, always difficult to work with an ally, and I am feeling this rather acutely. The French do not keep me sufficiently informed as to the general situation, and they

evidently try to conceal reverses or compulsory retirements. ...It is very difficult to induce these French generals to consider any modification of the views they have formed, but I will do what I can with [Joffre]" (French, 1914a). The fear in London was sufficient that representatives were dispatched to the front to ascertain the quality of the relationship between French and Joffre. Sir Francis Bertie, the British ambassador to France, reported his findings to Kitchener on 1 September, noting "General French has not quarreled with General Joffre, but they work separately a good deal and it seems difficult to make combined plans" (Bertie, 1914).

The BEF commander's frustration, combined with the contents of his initial instructions, led him to continually rebuff Joffre's efforts to exert authority over him and British forces. On 30 August, as Joffre was attempting to firm up the Entente line in the wake of the Anglo-French routs during the Battle of the Frontiers, the BEF commander told Kitchener:

My confidence in the ability of the leaders of the French Army to carry this campaign to a successful conclusion is fast waning, and this is my real reason for the decision I have taken to move the British Forces so far back. ...I feel most strongly the absolute necessity for retaining in my hands complete independence of action and power to retire on my base when circumstances render it necessary. I have been pressed very hard to remain, even in my shattered condition, in the fighting line; but I have absolutely refused to do so, and I hope you will approve of the course I have taken. Not only is it in accordance with the spirit and letter of your instructions but it is dictated by common sense. (French, 1914b)

After sending several such missives to London and engaging in a back-and-forth debate with Kitchener on British cooperation with France, the Secretary of State for War gently rebuked French on the point, urging the BEF commander to cooperate more thoroughly with Joffre. On 1 September, after a brief visit to the Continent to meet with French and inspect the front in person, he wrote:

After thinking over our conversation today, I think I am giving the sense of it in the following telegram to [the Government] I have just sent.

'French's troops are now engaged in the fighting line where he will remain conforming to the movements of the French Army, though at the same time acting with caution to avoid being in any way unsupported on his flanks.'

I feel sure you will agree that the above represents the conclusions we came to, but in any case, until I can communicate with you further in answer to any thing you may wish to tell me, please consider it as an instruction. By being in the fighting line you of course understand I mean dispositions of your troops in contact with, though possibly behind, the French as they were today; of course[,] you will judge as regards to their position in this respect. I was very glad to meet you today and hope all will go well and that Joffre & you will make the best plans possible for the future, which you will I hope communicate to me. I leave the first thing tomorrow morning." (Kitchener, 1914a)

It was against this background that the multi-pronged, convoluted pre-battle negotiation over and planning for the coming conflict along the Marne described in the main text took place. As noted there, French consistently reiterated several points: his concern for his spent forces, the potential for exposure in the position on the line that Joffre wanted him to take up, and the independent nature of his command. At times, his arguments were leveraged against London as much as Joffre. On 4 September, two days before the beginning of the battle along the Marne, he wrote to Kitchener:

I wish you to clearly understand that in my opinion the force under my command is not in its present condition able to render effective support to our allies no matter what their positions may be. I do not seem to be able to bring home to the cabinet the shattered condition of 2 divisions of my small force and the necessity of rest and refitment for the remainder and the impossibility of making things right so long as we are in close contact with the enemy. As to Gen. Joffre's general plans I never know decidedly what it is except that the general result ends in a retreat of the allies and the advance of the Germans. I am sure I need not tell you that if you choose to order it[,] we will go up into the front line tomorrow and do our utmost but I am convinced it would end in grave disaster to the French troops for I could never extricate them as I did before. I am grateful to you for the confidence you express in me and my troops and your words are a great encouragement to all of us but I should be culpably wanting in my duty if I did not make our position perfectly clear to you. (French, 1914c)

Ultimately, French acceded to Joffre's plan and participated in the battle along the Marne. As noted in the main text, that compliance came after considerable effort on Joffre's part to personally lobby the BEF commander. In his memoir, French notes that Joffre personally came to his headquarters to appeal for BEF assistance no fewer than four times between 26 August and 5 September (French, n.d.: Chapters IV, V). Joffre also appealed to London's ambassador in France as well as Kitchener and ultimately convinced the War Office that his plan was sound. As a result, Kitchener all but ordered French to participate, with the omnipresent caveat that he preserve British strength to the best of his ability. On 6 September, the day the battle began, he wrote to French:

Ambassador reports that General Joffre has decided to employ all his troops on a most vigorous offensive. Consider strategical position to be excellent. Joffre considers essential that you should fully realize importance of cooperating most vigorously. ...Of course[,] we have [been] full [of] confidence that you will use your force to the best advantage in contributing to the success of Joffre's movement. (Kitchener, 1914b)

Once the BEF commander had been pressured into cooperation with Joffre, his mindset changed with respect to how he should relate to his ally. In his memoir, French notes that, on the eve of battle, he "realized fully that the situation demanded the utmost care and watchfulness, as everything depended on the timing of [Entente] movements, the utmost measure of mutual support, and the most vigorous and continuous attacks" (French, n.d.: Chapter VI). In short, he temporarily abandoned his insistence on fully equal power in deciding when and how the British forces would be used; he acceded to a U-form system of command. The acceptance of a U-form command system with the French operationally in command is apparent in the BEF

commander's description of his activities after the first day of fighting: "I sent a dispatch to General Joffre, telling him of our work during the day and the points we had reached, and requested instructions from him for the 7th" (French, n.d.: Chapter VI). He then followed Joffre's instructions as though they were orders. Then, summarizing BEF contributions to the battle, he writes, "For the British Army I claim that we carried out the role assigned to us, and that our rapid passages of the various river lines in face of great opposition, and our unexpected appearance on the lines of retreat of the forces opposing the [French] 5th and 6th Armies, were practically decisive of the great result" (French, n.d.: Chapter VI). The BEF commander seems to have recognized that the shift from M-form management of Entente operations to U-form was both essential and effective during the fighting of the Battle of the Marne.

The Entente armies were engaged in almost continuous fighting in the weeks after the Marne and, though they were occupied directing their troops in the field, French and Joffre were also consumed with wrangling over their respective powers and prerogatives within the coalition. The dispute came to a head at the beginning of October, when French was pressing to move BEF units to the far left of the Entente line where they would be closest to the English Channel and afforded a greater degree of latitude on account of their position. The BEF commander described his correspondence with Joffre on the point to Kitchener on 1 October, noting that he told the French commander-in-chief the movement of British units to the far-left flank would facilitate the rapid incorporation of four infantry and two cavalry divisions that would soon be arriving on the Continent and increased freedom of action, permitting "a much better opportunity of turning" the German flank (French, 1914d). Joffre, while amenable to the proposal in principle, demurred on the timing of the move, suggesting a partial withdrawal and redeployment of British forces, with the remainder following at a later time, when combat was less heated. Ultimately, French notes in his missive to Kitchener, he agreed to a slightly adapted version of Joffre's altered timeline (French, 1914d).

The underlying correspondence French reports in this note is reproduced his memoir. Remarkable in the letters exchanged between French and Joffre is the language used, which highlights the extent to which it was truly a negotiation, rather than a subordinate appealing to a superior for permission. In his response to French's 29 September letter, which laid out the BEF commander's proposal, Joffre addressed the British general as "His Excellency, Marshal French," and concluded the lengthy missive objecting to the timing of French's maneuver by noting "The Commander-in-Chief would be grateful to His Excellency, Marshal French, if the latter would let him know whether he shares his views as to the proposals indicated above." French, in turn, replied to Joffre on 30 September, noting in part "The Field-Marshal Commander-in-Chief, British Forces, has received the note which His Excellency the Commander-in-Chief has been kind enough to address to him, in reply to his Memorandum of the 29th instant" (French, n.d.: Chapter VII). After outlining the extent to which French was prepared to act in accord with Joffre's wishes, he issued counter proposals to matters on which he was less inclined to settle. Remarkably, Joffre relented to a significant degree, writing back to French on 1 October and noting "He [Joffre] is happy to be able to comply with the wishes expressed by the Field Marshal and to state, once more, the entire unanimity of views which exists between the Commanders of the Allied Armies" (French, n.d.: Chapter VII). The BEF commander began the discussion on 29 September employing language suggesting that it was important that Joffre accede to his wishes and then, when Joffre was insufficiently decorous in

his response, French asserted his lengthier title on 30 September to signal his co-equal status. Joffre's phrasing in the 1 October reply suggests that he understood the message French was sending: the issue of whether and when to move BEF units to the far left of the Entente line was a matter for negotiation between sovereign entities, not a matter for command and obedience. In the language of our theoretical framework, it was an issue to be settled through M-form, rather than U-form, management.

Once the British forces moved to the left of the Entente line, Joffre appears to have formally accepted the M-form command arrangements. On 10 October, he sent the message reproduced in Figure A1 below. The missive notes that, given the emergent German threat on that portion of the line, "it is essential, for coordinating the operations, that all the English troops be put under the sole command of Marshal French. For our part, all the French troops operating in this region have been put under the orders of General Foch who acts in conjunction with Marshal French" (Joffre, 1914).² Rather than continue to haggle with French over the size, disposition, and employment of British forces, Joffre thus offloaded the responsibility onto his subordinate, General Ferdinand Foch, whose XX Corps abutted the BEF on the left side of the Entente line. Significantly, Joffre explicitly notes that French and Foch should "coordinate" operations such that the separate national forces could act "in conjunction." It is as well that Joffre did not attempt to extend any authority over French to Foch, as Kitchener notes in a telegram to the BEF commander on 11 October. He writes that the British government "must maintain their right to determine the general policy on which [British forces] are employed and under whose orders they shall act. His Majesty's Government must retain the right (which I hope they will not have to exercise) to withdraw troops from France whenever they consider such a course imperative" (Kitchener, 1914c).

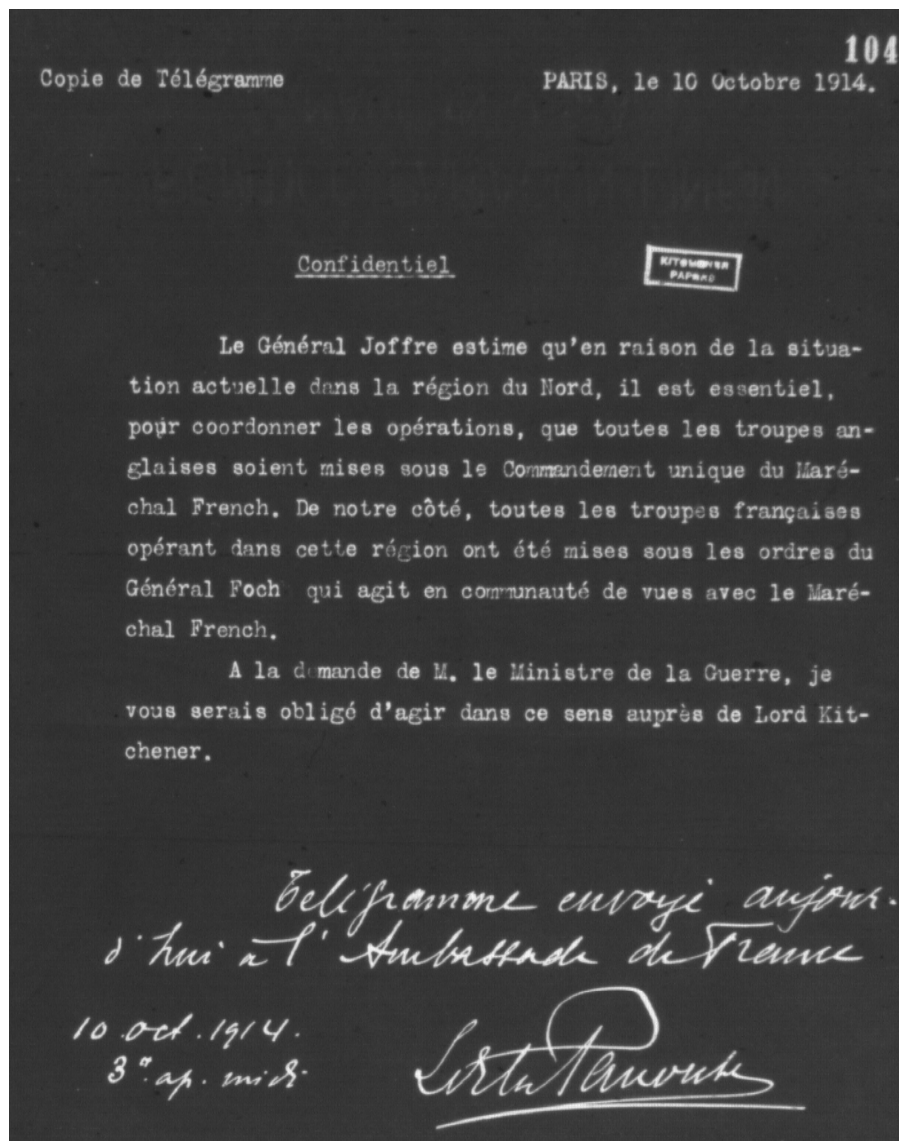
This formalized M-form arrangement served the Entente better than did the informal arrangement implemented during the earlier period of fighting. Almost immediately upon receipt of the communique from Joffre, French and Foch met to plan operations in the Ypres area; between 10 and 13 September, they developed a common set of principles, expectations, and understandings regarding the actions to be taken by the separate national forces. That agreement then guided the actions of the commanders during the battle (French, n.d.: Chapters IX, X). We noted in the main text the approval with which the BEF commander's deputy, Henry Wilson, viewed the arrangements and cooperative spirit shared with the British allies during the actual fighting. Much of French's correspondence with Kitchener during the First Battle of Ypres (19 October – 22 November 1914) reflects similar sentiments. Part of the improved relations between the British and French commanders directing operations at Ypres was their physical proximity; the BEF commander noted in a telegram to the War Office on 25 October that Foch had moved his headquarters to a location near French's own (French, 1914e). During the battle, then, French, Foch, and their subordinate commanders frequently interacted to coordinate operations. One illustrative example, worth quoting at some length given the extent of cooperation it reports, is relayed in the telegram French sent to Kitchener on 31 October. In it, he writes:

I then went on to [I Corps commander General Douglas] Haig, whose headquarters are east of YPRES. When I left him yesterday[,] I was rather anxious as to the strength of the

² We thank John T.S. Keeler for assistance in translating from the original French.

enemy against him, and I made strong representations to General Foch that he must be supported by French troops. The Commander of the 9th French Corps sent [Haig] three battalions, two regiments of Cavalry and a group of Artillery. News of this reached me in the evening, but I did not consider the support was sufficient: so[,] I sent strong messages through [French liaison officer Colonel Victor] Huguet to Foch, whom I met at one o'clock in the morning. He was very desirous of giving all the help he could, as he has always been; and he promised that five more battalions and another group of Artillery should be placed at Haig's disposal at daybreak to-day. Full instructions as to these reinforcements were sent at once to the First Corps. As Haig last night had arranged for a counter attack to recover the lost ridge of HOLLEBEKE in front of Gough's position with only the troops which were then at his disposal, I had strong hopes that, with the addition which Foch gave me in the middle of last night, he would be able to give the enemy a pretty good punch. (French, 1914f)

Figure A1: Official Communiqué, Joffre to French, 10 October 1914



As we note in the main text, the Entente operated more effectively and, not coincidentally, achieved more of their operational objectives during the First Battle of Ypres in large part due to the now-formalized M-form system used to facilitate the combined actions of the increasingly symmetric co-belligerents.

This examination of the British documentary record substantiates and underscores the arguments made in the main text in three ways. First, as is evident, the British regarded the Entente's command arrangements to be M-form throughout the fall of 1914. This view forced an M-form arrangement on the coalition; though Joffre believed, and certainly wished, he possessed generalissimo authority from the outset of the fighting, French's refusal to submit, and the War Office's consistent support on the point, precluded the lasting establishment of U-form command arrangements. Second, there was a brief period during the actual fighting of the First Battle of the Marne when the Entente functioned as though it employed a U-form command system. That brief U-form arrangement was only possible, however, because the BEF commander willingly submitted himself and his command to the direction of Joffre. Once the battle was over, French reasserted British national prerogatives regarding the determination of the size, disposition, and employment of BEF troops. When he did so, Joffre was forced to negotiate with, rather than instruct, his ally to achieve his intended goals. Finally, the Entente's effectiveness in the preparation for and execution of combat operations during the fall of 1914 corresponds with our theoretical expectations. As described in the main text, the Entente was highly asymmetric in terms of the resources the British and French contributed to the fight at the outset of the war. The M-form arrangement enabled British intransigence and imposed considerable transaction costs on the coalition in the run-up to the fight along the Marne, when the resource asymmetry was greatest. That asymmetry ceased to matter when the BEF commander submitted during combat, though, and the asymmetric, U-form Entente operated more effectively and fought well. At Ypres, when the M-form arrangements had been formalized by Joffre and the co-belligerents brought similar resources to bear in the fight in that sector, the collaborative, consensus-based system of organization enabled the Entente to operate effectively, make good use of the men and materiel it possessed, and achieve most of its operational goals. In short, the documentary evidence substantiates and reinforces the coding of our independent variables, tracing of stipulated causal mechanisms, and conclusions regarding our dependent variable presented in the main text.

Appendix II: Germany and Austria Hungary in the Gorlice-Tarnow Campaign, 1915

In the main text, we argue military coalitions' effectiveness is conditioned by the interaction of co-belligerents' command structures and relative resource contributions. Specifically, we argue coalitions are likely to function most effectively in planning, coordinating, and exploiting comparative advantages when co-belligerents with asymmetric resource contributions employ a unified, U-form, command structure and when co-belligerents with symmetric resource contributions employ a more diffuse, multi-divisional, M-form, command structure. Coalitions will operate ineffectively when they achieve other combinations of command structure and resource distributions. We test our argument with two cases characterized by within-case variation: 1) the initially asymmetric Entente powers during the Fall of 1914, which, with one brief exception, consistently employed a M-form structure and became increasingly symmetric over time, and 2) the consistently asymmetric Axis powers in North Africa in 1940-41, which began coordinating through a M-form structure and adopted increasingly U-form characteristics over time. The Entente and Axis operated effectively and ineffectively at the various points in time our theory expects.

To further substantiate confidence in the validity and analytical utility of our theory, we report the results an additional test of coalition organization and effectiveness here. Specifically, we examine the Central Powers' experience during the Gorlice-Tarnow offensive on the Eastern Front during the spring and early summer of 1915. The case is an instance of the German and Austro-Hungarian co-belligerents making numerically similar but qualitatively asymmetric contributions to the campaign while employing a U-form structure to manage their combined operations. It is accordingly a bridge between the cases presented in the main text with respect to both the relative symmetry of the co-belligerents and the command structure employed to coordinate and direct the multinational force in the field.

Considering first the relative symmetry in the Central Powers' resource contributions, the case mirrors elements of both the Entente and Axis cases while diverging from both in important ways. The Entente featured co-belligerents making numerically asymmetric, but qualitatively similar, contributions of troops to the fight along the Marne and more symmetric contributions of qualitatively similar troops to the fight at Ypres (Beckett, 2006: 226; Clodfelter, 2007: 419; Farrar-Hockley, 1998: ix; Prete, 2009: 19). The Axis featured numerically similar but qualitatively asymmetric forces, and the co-belligerents were also asymmetric insofar as the Germans provided the bulk of the armored units while the Italians provided the bulk of the infantry units (Clodfelter, 2007: 474; Playfair, 2009: Appendix 8). The nature of the co-belligerent asymmetry in the Gorlice-Tarnow case is thus similar to, but not quite the same as, that evinced in the Axis case. Significantly, it is also similar to the Entente case insofar as the type of contribution made by each partner—primarily infantry—was the same.

With respect to the co-belligerents' use of a U-form command structure, the Gorlice-Tarnow case also mirrors elements of, but departs in important ways from, both the Entente and Axis cases. Most obviously, the Central Powers achieved in the battle a purer version of the type of coalition command structure the Axis attempted later in the fight in North Africa. The case also echoes a portion of the Entente experience—the command structure employed when it was

actually fighting at the Marne. It thus allows us to examine in detail the dynamics of coalition organization and effectiveness in a cell that was only briefly, and imperfectly, captured in the analysis presented in the main text. Gorlice-Tarnow’s case type is represented in Figure A2.

Figure A2: Central Powers, Entente, and Axis Coalition Forms

		Command Structure	
		<i>U-form</i>	<i>M-form</i>
Resource Contribution	<i>Asymmetric</i>	Germany-AH, May-June 1915	Germany-Italy, 1940-41 UK-France, Fall 1914
	<i>Symmetric</i>		

In choosing the Gorlice-Tarnow case, we followed the same selection rules that governed our choice of the Entente and Axis cases discussed in the main text. Specifically, we sought to ensure that factors cited in existing literature as potential alternative explanations for coalition effectiveness were either held constant and stacked against our theory. First, the coalition was not institutionalized in any substantial way. Prior to the war, there was no joint command in place and little prewar coordination. Neither the Triple Alliance agreement of 1882 nor the ten supplementary agreements concluded between 1887 and 1911 raised the issue of a possible joint German-Austro-Hungarian supreme command (Herwig, 2015: 306–307). Moreover, at no time did Field Marshal Alfred von Schlieffen, chief of the Imperial German General Staff from 1891 to 1906, or General Helmuth von Moltke (the younger), chief of the Imperial German General Staff from 1906 to 1914, meaningfully seek to establish a unified command with the Austro-Hungarians. Personal rivalries and professional distrust across the German and Austro-Hungarian forces blocked serious efforts at creating a joint command, coordinating strategy, and developing common doctrine for combined operations until the eve of the war (Craig, 1965: 337–339; Herwig, 2014: 51–53, 2015: 306–307). This lack of coordinated planning was revealed fully by Lieutenant Colonel Karl von Kageneck, the German military’s attaché in Vienna, who on 1 August 1914 cabled the General Staff in Berlin: “It is high time that the two general staffs consult now with absolute frankness with respect to mobilization, jump-off time, areas of assembly and precise troop strength. ...I take the liberty of begging Your Excellency once again to persuade His Excellency the Chief that the measures necessary to provide for co-operation and coherence in the operations against Russia must be taken with the greatest possible speed. Everyone has been relying upon the belief that the two chiefs of staff had worked out these most intimate agreements between themselves” (Craig, 1965: 338).

Second, regime type explanations are of little help. Both coalition states in question and their joint adversary were non-democratic before the war and through the period of the offensive. The Polity index, for example, codes Germany at 2, Austria-Hungary at -4, and Russia at -6 in both 1914 and 1915 (Marshall and Jagers, 2012). This lack of variation in governance structures,

combined with the lack of institutionalization on the part of the Central Powers, suggests that, by the terms of existing scholarship, the coalition should not be able to operate effectively during the Gorlice-Tarnow campaign.

One additional point is worth noting. There is little reason to believe that material imbalances allowed the Central Powers to function as though they were effective, even if in fact they were not. The Russians outnumbered the Central Powers across the Eastern Front. At the end of April 1915, 366,000 German forces faced 640,000 Russians across the Vistula, on the northern portion of the front. Further to the south, in Galicia, there were a combined 238,000 German and Austro-Hungarian troops facing 407,000 Russians. In Bukovina, there were a combined 699,000 German and Austro-Hungarian troops facing 720,000 Russians (Falkenhayn, 1920: 333). Moreover, while Russia was far from the highest quality force at the outset of World War I—its general staff was littered with young aristocrats who secured their positions through nepotism and purchase, the command structure was outdated and inefficient, and its weaponry was deficient in both quantity and quality—Russia was a formidable opponent during the period (Cruttwell, 2007: 39–40; Walsh, 2016: 81–82; Wawro, 2014: 182–183). The troops Russia fielded during the first two years of the war were its best; they were those who had received the most training and were best equipped to fight the war being waged (Tunstall, 1993: 89; Walsh, 2016: 60–62). Additionally, Russia consistently managed to achieve numerical superiority in individual combat actions (Falkenhayn, 1920: 333).

Gorlice-Tarnow Offensive: Plans, Conduct, and Achievements

The Gorlice-Tarnow offensive, fought 2 May – 27 June 1915, was a combined German and Austro-Hungarian operation intended to permanently weaken the Russian forces (DiNardo, 2010: 51; Herwig, 2014: 144; Tunstall, 2016: 304–305). The Central Powers' plan called for the newly formed German Eleventh Army to launch an assault toward Zmigrod, Sanok, and the Dukla Pass, then liberate Fortress Przemysl. Once those objectives were achieved, and with the Austro-Hungarian Third and Fourth armies protecting its flanks, the German Eleventh Army would use one portion of its force to attack the Russian Eighth Army at Lupkov Pass and the other portion to flank the Russians in the south and pierce the enemy's line near Gorlice (Clodfelter, 2007: 438; DiNardo, 2010: 50; Herwig, 2014: 144–145; Tunstall, 2016: 298). The Russians, which had been in possession of the territory the Central Powers sought to capture for more than five months, intended to wage a fierce defensive battle to repulse any assault. They were well-prepared to do so. During the time they held the area, the Russians had built up a formidable defensive position marked by three lines of trenches, numerous machine gun nests, and specially created sight-lines for laying down flanking fire.

The Gorlice-Tarnow offensive was marked by impressive levels of effectiveness achieved by, and a resounding combat success for, the combined Central Powers forces. Within 48 hours, the Germans had shattered six enemy divisions and broken through the Russian line. A day later, the prepared Russian defensive position was completely overrun. After a week of fighting, the Russians had lost 210,000 men, including 140,000 prisoners of war. By mid-May, the Russians had been hurled back more than 100 miles back from their initial position to a new line north of the Vistula River. The fighting continued and, by the end of May, the Russians had lost a total of 412,000 men. On 3 June, the combined German and Austro-Hungarian forces retook the fortress

of Przemyśl and, on 22 June, Lemberg fell, bringing the major combat actions of the Gorlice-Tarnow offensive to an end (Herwig, 2015: 145, 147–148; Tunstall, 2016: 301–309). The Germans and Austrians suffered a combined 87,000 casualties during the fighting (Clodfelter, 2007: 438).

Explaining the Central Powers' Coalition Effectiveness

Relative Resource Endowments: German Superiority

Germany and Austria-Hungary's resource contributions were qualitatively asymmetric throughout the Gorlice-Tarnow offensive. At the end of April 1915, the Germans had 639,000 forces in theatre and the Austro-Hungarians fielded 664,000 (Falkenhayn, 1920: 333). While the Austro-Hungarian army was slightly more numerous, it was qualitatively less impressive than its German counterpart.

The Austro-Hungarian troops qualitative deficiency was a function of multiple factors, including limited budgets, issues surrounding the integration of multiple nationalities in fighting units, shortages in weaponry, and questionable tactical competence (Hadley, 2010: 301; Lein, 2014: 104–107; Rothenberg, 1989). Austria-Hungary's constrained spending on its military had wide ranging impacts, but the effect was felt acutely in procurement; field guns, in particular, were in short supply. Limited funds also impacted training, leaving Austria-Hungary's troops underprepared for the task at hand. In 1907, 1908, and 1911, the German attaché, von Kageneck, repeatedly reported to Berlin that, in the Austro-Hungarian maneuvers he observed, the infantry showed insufficient respect for artillery, moving slowly across open spaces in whole platoons at a time rather than in smaller groups that would be more difficult to target. In 1910, von Kageneck attended a corps-level maneuver and noted that the conduct of the officers in the firing line needed improvement, as they remained far too long in the saddle. In 1912, he noted that Austro-Hungarian officers often failed to consider the effect of hostile fire: one regimental staff sat out in the open 200 paces from an enemy company and, in his words, “naturally they were quickly put out of action.” Elsewhere, officers frequently stood up behind their firing line and, “Again, as usual,” troops moved in a single mass over open country (Hadley, 2010: 308). The conclusion of the German General Staff's 1913 assessment of their future partner, based on von Kageneck's reporting, was clear: “The Austro-Hungarian army will not be able to carry out the urgent necessary relief of the German forces on the Russian border if they are busy on both their own east and south borders at the same time” (Hadley, 2010: 300).

Complicating Austro-Hungarian efforts to improve training and make the best use of limited weapons stocks was the multinational character of the force. The professional officer corps overwhelmingly spoke German, but the bulk of the army was comprised of various ethnicities competent only in their home languages. At the September 1908 imperial maneuvers in Hungary, Kageneck noted that, as a result of the multiple languages—and even illiteracy—of some troops, the officers could not demand the same from the Austro-Hungarian infantry that the Germans did of theirs (Hadley, 2010: 303). In 1914, mobilization posters had to be issued in fifteen languages (Stone, 1966: 100). Beyond the challenge of navigating of language problems in both training and operations, the Austro-Hungarians had to cope with some groups' loyalty to the state. For example, in November 1912 Kageneck wrote, “I am astounded to hear from [Austro-Hungarian

Field Marshal and Chief of the General Staff Franz Conrad von Hötzendorf's] mouth that he could not guarantee the absolute reliability of the Austrian units of Serbian nationality in the event of an offensive war against Serbia" (Hadley, 2010: 304).³

Prior to the combined Gorlice-Tarnow offensive, Austria-Hungary performed horribly in solo operations both in Serbia and when facing the Russians, nearly knocking themselves out of the war. The German's were well aware of Austria's abysmal performance. On 2 September 1914, Chief of the German General Staff Moltke confided in his diary, "In Austria it's going badly. The army is not moving forward. I see it coming, they will be defeated" (Hadley, 2010: 295). On the same day, General Hermann von Stein, the German Minister of War, sent a letter to Moltke's wartime representative in the Austrian command, General Hugo von Freytag-Loringhoven, asking why the Austro-Hungarian forces were fighting so poorly. Freytag-Loringhoven responded "The problem was that the Austrians were also no better than a militia, and there were far fewer of them" (Hadley, 2010: 295). He later wrote to Moltke to describe in detail the sorry state of affairs in the Austro-Hungarian high command, in the officer corps, among the troops, and in the shortages of ammunition, weapons, and reserves. "As for an attack," Freytag-Loringhoven said, "the Austrians were unable to make the transition from 'wanting' to 'achieving'" (Hadley, 2010: 295).

By the end of 1914, Austria-Hungary was almost eliminated as an effective fighting force. War Minister Alexander von Krobatin calculated losses at 692,195 soldiers; in reality, the figure stood closer to 1 million. More than 189,000 officers and men died, 490,000 were wounded, and 278,000 were taken prisoner. Officer casualties alone were 26,500 (Herwig, 2014: 117). Additionally, Austria-Hungary had no trained reserves to fall back upon, compounding the effect of these losses. In December 1914, the Dual Monarchy fielded only 303,000 combatants against the Russians (Herwig, 2014: 117). These troops could not even claim to be particularly well-led; Austro-Hungarian Chief of the General Staff Conrad noted that "The best officers and non-commissioned officers have died or been removed from service" (Herwig, 2014: 112). German fears for the collapse of the Austro-Hungarian army were not exaggerated (Chickering, 2014: 53–54).

In contrast to their Austro-Hungarian counterparts, the German troops sent to the Eastern Front for the Gorlice-Tarnow offensive, while fewer in number than their ally, were formidable. The Germans that participated in the combined offensive had experience fighting in the West and were successfully battle-tested on the Eastern Front in the late fall of 1914.

Facing stalled efforts in the West, German Chief of Staff General Erich von Falkenhayn decided to prioritize the Eastern Front: "The operations entrusted to the 9th Army [on the Eastern Front, near Breslau] offered favorable prospects. There was no doubt at G.H.Q. that all forces that could be spared even from the West must be used to make it a success, after it was realized that the hoped-for decision in the West could not now be forced" (Falkenhayn, 1920: 37). To bolster the Central Powers' chances of victory against the Russians, he pulled "seven infantry divisions and one cavalry division" from the Western Front" (Falkenhayn, 1920: 37). The specific forces sent east were quite experienced, which is in stark contrast to the approach taken early in the war. At the outset, the German General Staff sent *Ersatz* formations east, comprised primarily of

³ See also (Stone, 1966)

men who had received no peacetime training (Showalter, 1981: 173–174). The troops, which had been fighting on the Western Front, received additional training en route east. Speaking of those troops, Falkenhayn notes:

The first that could be reckoned upon were a new[ly created] army of nine divisions. Their mobilization had been ordered by the Minister of War [and] immediately the new formations, which were used at Ypres and Lodz later, were ready, and training personnel and equipment had been set free. These divisions, however, could not be ready for use before the end of February, unless they were to be sent prematurely to the front. Experiences with the first new formations had shown that it was absolutely essential to avoid this. The eagerness, therefore, of one leader or another, and the impatience of the allied G.H.Q., had to be curbed. This reticence was repaid in excellent fashion. The new divisions responded brilliantly to the expectations placed in them by the result of the winter battle in Masuria. (Falkenhayn, 1920: 46)

The Bavarian 11th Division, for example, was one of the units sent east for the Gorlice-Tarnow offensive that underwent this additional training. Those forces were “trained extensively in cooperation between infantry and artillery. The infantry were given marching exercises to prepare them for mobile warfare. Units were also trained in resupplying individual batteries or guns with ammunition during an attack. Cavalry units practiced the art of reconnaissance against fortified positions. Exercises were progressive in terms of the size of units involved. In the space of five days the division went from having regimental-size exercises to conducting a division-size exercise” (DiNardo, 2010: 46–47).

Not only were the German units deployed in the Gorlice-Tarnow offensive seasoned and sent through additional training, they were reorganized to increase effectiveness. Specifically, each division was reduced in size by about twenty-five percent to bring them in line numerically with the original strengths of Russian divisions. The shrinking permitted “the possibility of forming new fighting units out of the surplus of the old formations that were already trained equipped and provided with leaders. This plan was adopted with great success after the artillery, guns and other war material, which was needed to supplement the arrangement, could be supplied” (Falkenhayn, 1920: 41).

In addition to being better-seasoned, -trained, and -organized, the German forces were better-equipped than their Austro-Hungarian counterparts. As Falkenhayn notes in his memoir, “Particular stress was laid upon the promotion of the production of munitions and the manufacture of long range guns, the elaboration of the trench mortar into a serviceable weapon, the increase of the machine-gun supply and of the air-service, as well as the development of gas as a means of warfare. The most urgent was the supplementing and increase of artillery ammunition. ...It shall only be mentioned here that as early as spring, 1915, G.H.Q. was relieved of any serious anxiety with regard to the munitions supply” (Falkenhayn, 1920: 49).

Given the experience and training of the German units, their reorganization, and the plentiful air and artillery capabilities as well as stocks of munitions they brought with them, Falkenhayn was confident in his troops’ capabilities: “Although the German Army, in contrast to the French, for example, had not had a really thorough peace-time training in trench fighting, the troops

succeeded in mastering it far more quickly and better than any one of the enemies. ...Nowhere have the admirable warlike qualities of the German, supplemented by his strict training, celebrated greater triumphs than in the trench war; that is, of the German as he was before the accursed revolution, which was just as unnecessary as it was unfruitful” (Falkenhayn, 1920: 45). More importantly, German Chief of Staff was confident they would achieve victory on the Eastern front, noting, “It was not to be denied, indeed, that four quite fresh German army groups, formed and trained with particular care, would presumably win considerable successes at any point in the East where they might go into action” (Falkenhayn, 1920: 59).

The resource contributions of Austria-Hungary and Germany were thus qualitatively asymmetric during the Gorlice-Tarnow offensive. The most significant imbalance was not the number of forces employed—the Austro-Hungarians contributed more men—but rather the quality of troops and weapons used. The Germans consistently outclassed their partners. Austro-Hungarian troops were poorly trained and equipped, their officer class was lacking, and their loyalty was questionable. The Germans, by contrast, fielded well-experienced troops supplied with ample equipment.

Command Structure: Getting to U-Form

In late 1914 and early 1915, Germany decided to wage a joint offensive with Austria-Hungary to weaken the Russians. The Germans realized that they needed to shore up their partner if Austria-Hungary was to be kept from being knocked out of the war. If Austria-Hungary fell—and, indeed, they were considering a separate peace with Russia—it would leave the Eastern front open for a Russian invasion of Germany. Moreover, if the Central Powers could permanently weaken the Russian forces, Germany could concentrate on the Western Front.

In his memoirs, Falkenhayn expressed the danger of Russia’s continued gains in the east to Germany, the German war effort, and the Central Powers’ likely fortunes. Reflecting on the situation in September 1914, he wrote,

If the enemy took advantage of this and pressed ruthlessly forward, a grave danger to the province of Silesia would necessarily arise. Even a temporary over-running of Upper Silesia by the Russians, however, was inadmissible. It would have robbed Germany of the rich resources of Silesia, and consequently would have made it impossible for her to continue the war beyond a limited time. Further, the dangers of the proximity of the Russians to Bohemia could not be underestimated. This would presumably have led to internal convulsions within the Dual Monarchy, which would have completely crippled the latter’s military strength. Last, but not least, it seemed at the time as though any further successes on the part of the Russians over the Austro-Hungarian forces would destroy the hope of inducing the Balkan nations, principally Turkey, to join the Central Powers. (Falkenhayn, 1920: 20)

He went on to state, “The frontiers had to be held, not because G.H.Q. lacked the courage to abandon German soil temporarily to the enemy...but because the loss of the frontier territories would have rendered the continuation of the war impossible after a comparatively short time. The industrial and agricultural districts of the East were quite as important as the industrial

districts on both banks of the Rhine. Neither the exclusion of the one nor the other was practicable for Germany or her allies” (Falkenhayn, 1920: 24). On 28 October 1914, Moltke, on sick leave but still the titular German Chief of Staff, echoed Falkenhayn’s concerns, writing in his diary, “I am very worried about the size of the Russian forces facing us. I see it coming; after the Austrians are defeated again our army will have to pull back. The Austrian defeat is the greatest blow that we could suffer” (Hadley, 2010: 295).

While the Germans recognized the need to join with the Austro-Hungarians to permanently weaken the Russian forces in the late fall of 1914, force requirements on the Western Front and winter weather conditions—the “roadless season” in the east—prevented them seriously moving on the matter until the spring of 1915 (Falkenhayn, 1920: 24). Strategically, the Germans did not believe the delay in their main effort would hurt the Central Powers, since “No pressing emergency from which Austria-Hungary had to be relieved existed at the moment. ... The Austro-Hungarian front on the Hungarian frontier stood fast at the time. Even if the enemy was continually reinforcing himself there, the relative strength of the forces was not such, that in view of the natural strength of the defence in mountains, a brave army could not have looked confidently into the future” (Falkenhayn, 1920: 59–60). In the meantime, however, the Germans deployed the forces they did have in the region—Eighth Army, under General Richard von Schubert—to positions that would help mitigate any Russian blows and continued to work on new a strategic and operational plan intended to facilitate removing “the main mass of the enemy as far as possible from the German frontier and to cause it to draw further reserves to [the] battle front” (Falkenhayn, 1920: 24).

While the Germans were somewhat slow to realize they needed to devote more attention to, and aid their partner on, the Eastern Front, the Austro-Hungarians consistently understood the need for, and requested, assistance. Austria-Hungary knew Russian breakthrough would put the Tsar’s armies on the Hungarian plain where they would pose a mortal wound to the Dual Monarchy. To stave off such an outcome, Conrad wanted to launch both an attack against the Russians in the Carpathians with German assistance and a combined offensive in East Prussia as soon as possible (DiNardo, 2010: 22).⁴ Germany agreed to send a small contingent, which would ultimately become the Süd Army, to aid in the Carpathians. Conrad, not dissuaded by the relatively small German contribution to his plans, attempted both the breakthrough in the Carpathians with the Süd Army and the offensive on the Eastern Front on his own. Both went horribly. As historian Richard DiNardo notes, the period between “January-March 1915 was one of unparalleled disaster for Austro-Hungarian arms. Conrad’s Carpathian offensives had cost the Austro-Hungarian Army about 600,000 men. ... The loss of Przemysl added a further 120,000 men to the roll of losses, in this case permanently. Vast quantities of equipment had been lost, including 900 guns in Przemysl. The Carpathian battles also effectively used up Conrad’s last reserves of trained manpower” (DiNardo, 2010: 25).

⁴ Conrad’s plan echoed the plan put forth by the *Ober-Ost*, the supreme command of German forces in the east. The German eastern command, headed by Paul von Hindenburg and Erich Ludendorff, glimpsed a chance in 1915 to strike a blow of immense proportions against an overstretched and precarious Russian position in Poland. They secured Falkenhayn’s reluctant assent for an offensive in the region around Gorlice-Tarnów (Falkenhayn, 1920: 59; Jones, 2016: 307).

In response to these losses, Conrad again called for more German assistance. On April 6, Conrad asked Falkenhayn for an additional boost of approximately four divisions that would bring the German contribution in the region to twelve divisions—ten shoring up the Austro-Hungarian position in the Carpathians and two to be used against either Italy or Romania (DiNardo, 2010: 27). This time, fearing an immediate collapse of Austria-Hungary, the Germans were prepared to acquiesce (Falkenhayn, 1920: 65). Germany committed four corps to achieve the requisite superiority for a breakthrough in the Gorlice-Tarnow region (DiNardo, 2010: 28–29). On April 13, Falkenhayn informed Conrad that he would send an army of at least eight German divisions backed very strongly with artillery to the Gorlice area for an offensive that would be supported by the Austro-Hungarian Fourth Army. Falkenhayn, on the back of his significant contribution to the offensive, assumed the combined effort would be under his control, noting in his missive to Conrad that the partner forces should be “united in one command, and naturally a German one in this instance” (Falkenhayn, 1920: 93).⁵

The Austro-Hungarians, though appreciative of Falkenhayn’s contribution of troops, did not immediately agree that the offensive should be a unified command by a German. Part of the reason for Austria-Hungary’s objection to U-form command was the two armies’ extreme unfamiliarity with one another. During 1914, there was virtually no coordination on joint German-Austro-Hungarian planning matters. Indeed, in August 1914, the armies of Imperial Germany went to war acting in accordance with their famed single-force design, the Schlieffen Plan. Its operations on the Western Front were understandably not coordinated with Austria-Hungary but, somewhat surprisingly, neither were those on the Eastern Front. For their part, the Austro-Hungarians, to the ignorance of their German ally, emphasized operations against Serbia in the south over those against Russia in the east in their planning (Herwig, 2014: 53–57; Tunstall, 1993: 81–108). Neither paid much attention to the details of military capabilities or the operation potential of the other. The Germans, in particular, had almost no conception of the Austro-Hungarian army’s organization, command system, or national composition, and even less of its technical features, such as its tactical doctrine, logistics or rail support (Jones, 2016: 302–304). There was little attempt to rectify these shortcomings in familiarity once the war began, as German and Austro-Hungarian commanders regarded each other warily and only occasionally spoke on the telephone (DiNardo, 2010: 21–22; Herwig, 2014: 117, 136). As late as December 1914, there was still “little or no coordination between Habsburg and Hohenzollern staffs. [...Each partner] conducted its own campaign with little regard for the other” (Herwig, 2014: 136).

Despite these barriers to effective cooperation, both sides assumed command relations would be relatively easily established, with the forces of the other subordinated to their own authority. German leadership preferred and pressed for a hierarchical command structure in which Austro-Hungarian units would be subjected to their control. They were willing to consider permitting Archduke Friedrich, Supreme Commander of the Austro-Hungarian Army, to continue in his position nominally and Conrad to command the German Ninth Army, but both would be answerable to a German commander. The Austro-Hungarians preferred and pressed for the opposite; indeed, Conrad believed that any joint command would necessarily involve the subordination of German commanders to his authority (Rauchensteiner, 2013: 68–73).

⁵ See also (DiNardo, 2010: 29–30).

This Austro-Hungarian preference was consistent with their previously articulated positions on the outlines of any coalition command structure. Despite the Central Powers' lack of familiarity with one another, the possibility of establishing a joint command to help coordinate operations on the Eastern Front had been broached a few times in the fall of 1914. When he first heard of such a proposal, Conrad vowed hotly not to permit Austro-Hungarian forces to serve under a foreign power, even if it was an ally (Jones, 2016: 307). In October 1914, the German Kaiser requested that the Austro-Hungarian army be placed under the command of General Paul von Hindenburg, who was leading German operations in the east. The Austrian High Command, to which the Kaiser's request had been passed, immediately responded that subordinating the First Army was out of the question. Then, when Conrad requested additional troops to be sent to the region at the end of October, the Kaiser repeated his suggestion of subordinating the First Army under Hindenburg's command. The Austro-Hungarian high command again refused. The Germans continued to press the issue, inviting Conrad to Berlin. Conrad declined the invitation and no progress was made (Rauchensteiner, 2013: 258–260).

The stalemate over control of the combined command structure was so entrenched that even Austrian Emperor Franz Joseph, who was more inclined to accommodate German wishes than was his military, could not push the armies toward closer cooperation. General Alfred von Bolfras, on behalf of Austria's Military Chancery (and therefore the Emperor), sent Conrad a telegram on 4 November in which he suggested the creation of a joint supreme command for the German and Austro-Hungarian troops in Galicia and Poland. The command, for which there was political agreement, would not necessarily be structured as a German-dominated hierarchy. Instead, the entity would be more similar to a M-form arrangement in which there would be collaboration between the German and Austro-Hungarian chiefs of staff, with general Erich von Ludendorff as the potential German head and Lieutenant Field Marshal Alfred Kraus as the potential Austro-Hungarian head (DiNardo, 2010: 37; Rauchensteiner, 2013: 258–260). Conrad remained opposed to the notion of a combined command that did not feature Austro-Hungarian dominance and cabled that he thought the introduction of a supreme command of the sort proposed was inappropriate. In the suggestion to make Ludendorff the chief of the general staff, he further saw a cue that he had lost his majesty's trust and announced his outright resignation if the plan were implemented (Rauchensteiner, 2013: 258–260). With Conrad's rejection, the effort went nowhere and the Germans and Austro-Hungarians continued to operate through distinct national command structures rather than a combined coordinative system.

Progress was finally made on the issue when the Germans committed a larger number of troops to the Eastern Front than Conrad requested. When, on 13 April 1915, the Germans tasked the entire Eleventh Army to attack in the area of Gorlice, Falkenhayn committed far more forces than Conrad had demanded or even hoped for. Rather than deploy the four divisions Conrad had requested, Falkenhayn sent four army corps—double the number of troops. In the face of the massive German contribution to the effort on the Eastern Front, Conrad's previous objections weakened and he eventually agreed to the German demand of command of the joint troops, even though the Austro-Hungarian troops would still be larger in absolute numbers (DiNardo, 2010: 29–30; Rauchensteiner, 2013: 322).

Once Conrad agreed to a joint command, a U-form command structure was swiftly implemented, with the Germans in charge. German General August von Mackensen, commander of the

Eleventh Army, was empowered as chief of the Central Powers' effort at Gorlice-Tarnow (Craig, 1965: 342; Falkenhayn, 1920: 34). The Austrian High Command would build its plans with an eye toward consensus with, but ultimately at the discretion of, the German Supreme Army Command (Craig, 1965: 342; Rauchensteiner, 2013: 323–324). On the battlefield, the Austro-Hungarian armies were subordinated to the newly formed German Eleventh Army (DiNardo, 2010: 36, 112). In this structure, Mackensen was to acknowledge directives issued by the Austrian general staff, but any official orders had to be consented to by Falkenhayn. The principle of consent only ran one way, however; Mackensen was empowered to issue orders to Austro-Hungarian forces subordinated to the German Eleventh Army, without regard for the prestige of his partner's force (DiNardo, 2010: 42). Mackensen was thus truly the head of a U-form structure encompassing all German and Austro-Hungarian forces tasked with operations during the Gorlice-Tarnow offensive (Craig, 1965: 342; DiNardo, 2010: 42). Crucially, Mackensen remained at the head of the Central Powers' U-form command structure—which in turn retained its organizational integrity—throughout the offensive (DiNardo, 2010: 86–87; Tunstall, 2016: 330–331).

The Central Powers' Coalition Effectiveness

The combination of the asymmetry between the slightly more numerous but qualitatively inferior Austro-Hungarian troops and the better trained and equipped German troops and the U-form command structure employed to manage combined operations allowed the coalition to operate effectively prior to, and then generate considerable combat power during, the Gorlice-Tarnow offensive. As our theory anticipates, there were few instances of chafing, free-riding, shirking, or communication problems, with the U-form structure affording Mackensen the requisite operational control to concentrate needed resources where they would have the greatest effect against Russian defenses while heading off potentially detrimental actions by the Austro-Hungarians (Herwig, 2015: 145; Tunstall, 2016: 304). Additionally, Mackensen was able to employ German and Austro-Hungarian units according to their comparative advantage—the Germans conducted flexible maneuver strikes and initial breakthroughs while the Austro-Hungarians protected German flanks and assumed static defensive roles.

Broadly speaking, the Central Powers' ability to exploit the authority relations inherent to a U-form command structure allowed them to plan for and then effect the concentration of their troops at crucial points on the battlefield—a capability critical in facilitating their breakthrough Russian defenses. Particularly given their relative disadvantage in manpower vis-à-vis the Russians, concentration was essential. Former German Chief of General Staff Ludwig Beck underscores the point, noting that, in the face of superior numbers, “the German and Austro-Hungarian forces [had to] exploit the interior lines in accordance with a coordinated plan and [ensure] that the latter forces [were] protected against exposure to an isolated defeat by superior Russian forces” (Craig, 1965: 337). Concentration in itself was not wholly sufficient, however; the concentrated troops had to possess an extra advantage over their Russian foes. As Falkenhayn notes, for Austro-Hungarian troops to perform a useful function in the fight against the Russians, then care had to be taken to “use them side by side with the Germans, and not let [them] do the real work of the attack” (Falkenhayn, 1920: 70–71). With the increased numbers allowed by fighting jointly, the Austro-Hungarians, with their relatively poorly trained and equipped forces, could protect the flanks of the Central Powers' strike while the Germans

concentrated their better-trained and equipped forces—especially their well-resourced artillery—on the critical points of the Russian front (DiNardo, 2010: 46; Tunstall, 2016: 301).

The specific benefits of the qualitatively asymmetric Central Powers operating through a U-form command structure were immediately apparent in the opening days of the offensive. As planned, the German Eleventh Army, with the Austro-Hungarian Third and Fourth armies protecting its flanks, made the main effort. In contrast to their previous efforts, whether they were tasked with assaulting the strength of the Russian army, the assignment of the Austro-Hungarian armies to the sides of the battle enabled them to use their less-skilled forces to great effect against the enemy. The Fourth Army, for instance, was comprised of IX and XIV Corps. The latter took its assigned objectives, most notably Hill 481 and Sugar Loaf Hill, with relatively few casualties. X Corps, which was part of Austria-Hungary's Third Army, was similarly successful, driving Russia's 9th Infantry Division from the east of Malastow (DiNardo, 2010: 60). Indeed, events went so well at the end of the first day (2 May) that Mackensen decided to continue the attack the following day. In addition to ordering his own troops to continue their thus-far successful push against the Russian main force, he issued orders to the Austro-Hungarian Fourth Army to continue its attack as well, and move beyond the goals assigned to it. The reformulated objective was for the Central Powers' forces to advance a little over six miles and put the German Eleventh Army in a position to advance to and cross the Wisloka River on 4 May (DiNardo, 2010: 61).

Similar progress was made further south where, on 3 May, elements of the Austro-Hungarian Third Army also continued to advance against the Russians. After taking Biecz, for example, the Austro-Hungarian 12th Infantry Division crossed the Ropa River, stormed Hill 349, and established solid contact with the German XXXXI Reserve Corps (DiNardo, 2010: 65). By 5 May, Mackensen's first operational objective was achieved and the Central Powers crossed the Wisloka River. After crossing the river, the Germans exploited their advantage over the Russians in heavy artillery to secure Wilczak Mountain, effectively eliminating Russian ability to maintain a defensive line west of the river (DiNardo, 2010: 63–64). That same day, Mackensen sent messages to German headquarters confirming breakthrough and noted, “the Austrians responded gallantly” (DiNardo, 2010: 68). The German and Austro-Hungarian forces worked exceptionally well together through their U-form command structure; while the German Eleventh Army had “torn a gaping hole in the Russian 3rd Army's front,” the Austro-Hungarians performed the vital service of widening the shoulders of the breakthrough and foreclosing any possibility of a Russian flanking attack (DiNardo, 2010: 68).

The operational benefits of coordinating partner military actions through an effectively operating U-form command structure continued after the opening phases of the battle. After the initial Central Powers breakthrough, Mackensen decided to continue the offensive with the goal of capturing two critical crossing points on the San River—Jarsoslau and Radymno—to facilitate the assault on Przemyśl. The principal elements tasked with taking Jarsoslau were the German Guard Corps and the Austro-Hungarian VI Corps (DiNardo 2010: 72). Over the next several days, the Germans and Austro-Hungarians, following the orders of Mackensen's supreme command, worked in tandem to move their way down the San. Action culminated on 15 May, when the arrival of artillery ammunition allowed for a renewed bombardment and assault, ultimately enabling success against the Russians. The German 2nd Guard Division reached the

railroad embankment while the Austro-Hungarian 39th Infantry Division gained a foothold on Hill 264 (DiNardo, 2010: 74). At the same time, the German 1st Guard Division and the Austro-Hungarian 12th Infantry Division occupied Jaroslau and advanced up the west bank of the river (DiNardo, 2010: 75). Over the next several days, the German and Austro-Hungarian forces, working together, were able to cross the San and set the stage for the next phase of the Gorlice-Tarnow offensive.

While the benefits of the Germans and Austro-Hungarians operating through a U-form structure were legion, the Central Powers' system of organization was not a panacea. As the multinational force was crossing the San, the Austro-Hungarian Third Army, joined by the recently arrived Second Army and following the original operational plan agreed to by Conrad and Falkenhayn, was pushing toward Przemysl from the west and south. The task proved too much for the Austro-Hungarians on their own; though the U-form structure permitted concentration of Central Powers forces and the assignment of units to tasks where their comparative strengths would be most useful, it could not compensate for all of the qualitative deficiencies of the Austro-Hungarian forces (DiNardo, 2010: 76; Falkenhayn, 1920: 110).

After a mid-May pause to refit and resupply, the Central Powers continued their offensive with the goal of capturing Przemysl. The campaign progressed more slowly than it had at the outset of fighting, as there were some complications that inhibited the operations of the combined force. On 27 May, for example, a Russian attack collapsed the Austro-Hungarian Fourth Army's bridgehead at Sieniawa, forcing the Austro-Hungarian 10th Infantry Division back across the San. The setback did not metastasize into a disaster, however, because, as a consequence of the organizational capabilities of the U-form structure, Germany's X Corps was rapidly sent to help Fourth Army stabilize the situation (DiNardo, 2010: 79). Once the situation along the San was addressed, Mackensen ordered the German X, Austro-Hungarian VI, and German Guard Corps to assume a defensive position along the German Eleventh Army's left flank. Thus protected, the Germans reduced Przemysl's defenses and, by 3 June, took the position (DiNardo, 2010: 80).

In June, the coalition turned its eye toward the final objective of the Gorlice-Tarnow offensive: the capture of Lemberg. As before, the main effort was to be made by the Eleventh Army with the Austro-Hungarian Fourth Army covering Mackensen's left flank and Second Army on his right flank (DiNardo, 2010: 86). The initial attack was carried out by the Austro-Hungarian Fourth Army and left flank of the Eleventh Army at Sieniawa on 12 June, with the goal of setting the stage for the main assault. That major effort was undertaken shortly thereafter by Eleventh Army, with the support of the Austro-Hungarian VI, German Guard, and German XXII Reserve corps (DiNardo, 2010: 90). A few days later, Russian defenses had collapsed and Mackensen looked to clear the area. The Austro-Hungarian Fourth Army continued to cover the Eleventh Army's left flank as the Germans pressed the Russians until Lemberg was liberated, and the Gorlice-Tarnow offensive concluded, on 22 June 1915.

In addition to facilitating the Central Powers' troop concentration, placement of units where they best exercised their comparative advantage, and the relatively rapid response to battlefield setbacks during the Gorlice-Tarnow offensive, the German and Austro-Hungarian asymmetrical resource contributions combined with their U-form command structure to help prevent shirking. During the offensive, on 23 May, Italy declared war on the Central Powers. Conrad wanted to

immediately break off the fight against the Russians at Gorlice-Tarnow and crush Italian army (Tunstall, 2016: 302). Though the Italians did pose a threat to the Austro-Hungarians—with the Central Powers forces engaged against the Russians, they could march almost unopposed into Hapsburg territory—Mackensen adamantly opposed the premature cessation of operations on, and Austro-Hungarian withdrawal of troops from, the Galician front. The authority vested in Mackensen to command all forces at Gorlice-Tarnow delayed Conrad's withdrawal sufficiently that Falkenhayn had time to convince the Austro-Hungarian commander that a) the offensive against Russia had to be continued to ensure the Central Powers' victory over the long term, and b) adopting a defensive posture vis-à-vis Italy with what forces were not already engaged would be sufficient for the time being (Tunstall, 2016: 302, 309). The Austro-Hungarian impulse to abandon their commitment to the joint Gorlice-Tarnow offensive in order to address their own concerns was thus precluded in large part by the organizational structure used to facilitate coordination on the battlefield.

The Central Powers' command system also enabled timely and amicable communication between the Germans and Austro-Hungarians during the Gorlice-Tarnow offensive. The responsiveness of the Central Powers' coalition during the fighting—which required effective communication between the forces—is described above. Crucially, the move to create a U-form structure and its operation improved intra-coalition communication off the battlefield as well. The improvement in the co-belligerents' communication began in late December 1914, as the Germans were recognizing the need to foster better relations with their co-partner in the east, and increased throughout the run-up to the campaign, with Falkenhayn and Conrad meeting often (DiNardo, 2010: 21–22). In addition to these regular meetings, Colonel August von Cramon was assigned as the German General Staff's representative to Teschen on 30 January 1915. Cramon's primary task was to represent Falkenhayn's views to Conrad. He was also to keep the German General Staff informed about the conduct of Austro-Hungarian operations and report especially on any Austro-Hungarian measures that would be contrary to German interests. He was assisted in these tasks by a small group of officers who split time between the Austro-Hungarian army headquarters at Teschen and the capital in Vienna. In performing his duties, Cramon had regular access to Conrad and worked with Conrad's chief of staff. He also developed a good relationship with Conrad's chief intelligence office, getting detailed information on Russian troop movements and order of battle. This acquisition of information meant that, while prior independent German and Austro-Hungarian offensives tended to be undertaken on the basis of either faulty assumptions about Russian capabilities or intentions. Indeed, it was Cramon who provided the requisite information on the state of the Russians, the Austro-Hungarian command and forces, and the viability of the Gorlice-Tarnow area for offensive operations that led to the undertaking of the campaign (DiNardo, 2010: 22–29). The improved communications across the various levels of command facilitated by the Central Powers' command structure was thus crucial in enabling the joint forces to launch a coordinated offensive marked by an excellent appreciation of terrain, impressive coordination of artillery and infantry, and the capacity to protect their flanks and send relief to embattled units when needed.

Conclusion

During the spring and early summer of 1915, the Central Powers were able to operate effectively in their fight against the Russians. The dynamics and trends highlighted in this section align with our theory's expectations. At the outset of the fighting, the Central Powers employed a U-form

command structure to manage qualitatively asymmetric forces. As expected, the coalition was able to use its U-form arrangement to develop coherent and sensible plans, exploit both its numerical advantage and the partner forces' comparative advantages to inflict a number of defeats on the Russians, and minimize the deleterious effects of combining forces fielded by states with periodically divergent strategic interests.

Beyond providing additional evidence in support of the validity and analytical utility of our theory, the supplemental material presented in this section also addresses two of the questions left open for future research in the main text: the reasons why states choose to fight in coalitions and how they go about choosing the command structures they use. Turning first to the decision to create a coalition, in the Gorlice-Tarnow case, the Germans and Austro-Hungarians appear to have been motivated to fight together out of fear that they would both be fatally weakened if they did not: the former because their rear would be exposed through further Russian advances and the latter because their military would be rendered ineffective. This kind of fear may be a common driver of states choosing to fight in coalitions, though it is important to note that neither the British in World War I or the Germans in World War II seem to have felt the same kind of pressing, immediate existential fear when they came to the aid of the French and the Italians. The frequency with which fear drives coalition formation remains an empirical question that future work should investigate. With respect to the Central Powers' decision to employ a U-form command structure, Germany's decision to provide far more troops than Austria-Hungary expected when asking for assistance seems to have provided the former with decisive authority in determining organizational matters. This kind of dynamic aligns with the expectations of some existing literature, which highlights the negotiating power possessed by the coalition member contributing the most vital resources to the fight (Wolford, 2015). However, as noted in the main text, the Germans were unable to exercise the same leverage over the Italians in North Africa and Joffre was only able to exercise control through a U-form arrangement during the fighting of the battle at the Marne, when the British commander willingly—and temporarily—relinquished his own authority. Here, too, more research is needed to ascertain the frequency with which various potential drivers of coalition command structure choices operate in the historical record.

Appendix III: Belligerents in Battle: Interstate War and Coalition Incidence, Composition, and Performance, 1900-2003

The descriptive statistics presented in the main text speak to the relative frequency and potency of coalitions in battle during the twentieth century as well as indicate that common arguments about the effectiveness of institutionalized and democratic coalitions are incapable of speaking to the likely performance of the vast majority of multinational forces over that same time. Here, we describe the data collected to generate these statistics. The relevant underlying raw data is available in a separate data file.

Our *Belligerents in Battle* (v1.0) dataset encompasses all major land battles fought during conventional interstate wars featuring a significant ground operations component from 1900-2003, as identified in the Correlates of War Project Inter-State War Dataset v4.0 (Sarkees and Wayman, 2010).⁶ Major battles are significant discrete combat actions in which there is contextually substantive ground activity on both sides. Crucially, this means that engagements counting as major battles differ in terms of size, length, and other characteristics across wars. This is because imposing some criterion like a manpower or duration threshold that would capture substantive ground activity in a small war like the Third Central American War (1906) would include many operations in larger wars like World War I (1914-1918) that are not substantively relevant; imposing a manpower or duration threshold to capture only the substantive ground activity in the world wars would exclude almost all battles from smaller conflicts. In identifying specific major battles in individual wars, we rely on the assessments of historians of each war; those battles specialists determine to have included contextually substantive ground activity are included.⁷ Using these rules, we collect data on 480 battles, 960 belligerent sides, in 62 interstate wars.

For each battle, we identify the belligerents that engaged in combat. For many battles, there are only two belligerents: one on each side. In several, however, a coalition fought on either one or both sides. To identify coalition participants in individual battles, we distinguish between belligerents fighting the larger war and those that undertake an active role in the relevant combat engagements. More specifically, we limit coalition participation in particular battles to those belligerents that shared and fought in a common battlespace at the operational and tactical levels. When the co-belligerents engaged solely in strategic coordination—for example, fighting on geographically opposite sides of a two-front war or launching self-contained operations intended to achieve larger strategic objectives—participants were not coded as having fought *in that instance* as combined fighting forces. For example, in the latter stages of World War II, the

⁶ Our focus on battles in conventional interstate wars that feature a significant ground operations component aligns with standard approaches to the study of military performance in existing literature. Practically, because we also count non-state participants in major battles, the effect of this rule is to exclude only two wars—the Taiwan Straits War (1958) and the Sino-Vietnamese War (1987). Both wars featured solely air and artillery combat and neither involved a coalition on either side.

⁷ Some argue such an approach endogenizes the features of a war that one might wish to use battles to explain. This is potentially true for some research questions, such as those seeking to understand the role individual battles play in shaping broader war and political outcomes. It is less concerning given our focus, which is understanding how coalitions approach and operate in discrete combat actions during wars. On the difficulties of using battles as a unit of analysis, see (Weisiger, 2016: 357).

United States and the United Kingdom fought together to fend off the *Wehrmacht*'s last significant offensive strike in the Ardennes (16 December 1944 – 16 January 1945) but the United States fought on its own in the battle of Alsace-Lorraine (31 December 1944 – 21 January 1945). Coding both battles as coalition fights merely because the United States and the United Kingdom were fighting in the same theatre would overrepresent the British contribution in the latter battle. Counting neither as a coalition fight would understate the incidence of multinational combat operations on the Western front. If a belligerent only conducted air strikes in support of ground operations during the battle, we designate it accordingly. Using these rules, we code information for 960 belligerent sides.

To account for the composition of the coalitions that fought individual battles together, we code the number of discrete actors contributing forces to battle. Coding the number of discrete actors is straightforward: if a coalition member's troops fought in the battle, it is included in the count. When colonial, commonwealth, or otherwise affiliated forces fight alongside imperial or otherwise politically predominant forces, we code the former as separate actors *only* when they exhibited independent command over their soldiers and resources. We also code whether the co-belligerents contributing troops to the battle were state or non-state actors. For non-state actors to be counted, they had to be sufficiently organized to be acknowledged as a meaningful force on the battlefield and there had to be at least some coordination between the sovereign and non-sovereign forces with respect to the creation and execution of battleplans. If a coalition partner only provided air strikes while other partners provided ground forces, we note the contribution.

We code the regime type of the sovereign states contributing forces to the coalition. For this purpose, we rely on the Polity IV dataset and employ the traditional threshold of +6 on Polity's -10 – +10 scale (Marshall et al., 2018).⁸ Non-state actors and states coded as undergoing "foreign interruption" are coded as -10. When a coalition is comprised solely of sovereign states that score +6 or greater on the Polity scale, we designate that collective as a "democratic coalition."

To account for institutionalization, we code for whether the coalition members had pre-existing defense cooperation agreements. With respect to agreements, we use a dichotomous measure indicating whether at least two coalition participants in a specific battle had a preexisting defense treaty that obligated members to come to the aid of the other(s) in the event of an attack, as defined by the Alliance Treaty Obligations and Provisions (ATOP) Project (Leeds et al., 2002).

To account for battle outcomes, we use a dichotomous measure indicating whether each belligerent won or lost its battle. We ascribe victory to the side that achieved most or all of its operational objectives while denying the same to its adversary (Grauer and Horowitz, 2012: 96). We ascribe defeat to forces that do not achieve their operational objectives while their adversary does. When historians regard battles as draws, meaning neither side achieved its major operational objectives, the outcome is coded as a loss for both sides.

⁸ We employ the Polity indicators of regime type because they are less conservative in designating states as "democratic" than are measures like those created by Freedom House and the V-Dem Project. In analyzing whether all-democratic coalitions behave differently than all-non-democratic and mixed coalitions, this rule serves to create a "hard test." Put differently, if all-democratic coalitions behave differently than other types of coalitions when we employ the Polity measures of regime type, those findings are likely to be reinforced by using the more restrictive Freedom House and V-Dem standards. On alternate indicators of regime type, see (Coppedge et al., 2019; Freedom House, n.d.) On hard tests, see (Eckstein, 1975)

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