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The "All-Trump" Bridge Variant

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Bridge is a trick-taking card game. Play occurs between two pairs of players, with the members of each pair seated across from one another. The goal of the game is to score as many points as possible, or to be the first to reach a certain number of points, depending on which scoring variant of bridge one is playing.

Before any card play occurs, there is an *auction* for a *contract*. During this auction, players guess how many tricks they can take during play. One team, the offense, will successfully bid the contract and will have to make a prescribed number of tricks out of thirteen in order to score points. The other team, the defense, scores points for preventing the offense from completing their contract. In addition to defining the critical number of tricks for the offense to take, the contract also indicates what the trump suit is; or, in the case of "no trump," that there is no trump suit. Contracts consist of a level, which is a number between 1 and 7 inclusive, and a suit. Suits are arranged in increasing order as "Clubs, Diamonds, Hearts, Spades, No Trump."

It is important to note that each player makes his bids without any explicit knowledge of his partner's hand. Instead, during the course of bidding, partners may agree to attach meaning to certain bids to convey information about their hand. For example, a player may open with "1♠" to indicate that he has a certain number of the *honors* (Ace, King, Queen, Jack), and at least five of the Spades. The amount of expression viable using these systems is constrained by always bidding a higher contract, unless one chooses to pass. Using the complex *bidding conventions* that have come from this usage of the auction, a player may ascertain with a surprising amount of precision the holdings of his partner. Players may indicate important features of their hand, such as *strength*, a good holding of honors; *length*, a large number of cards in one suit; or *shortness*, a dearth of cards in a suit that may be exploited for trumping. The auction terminates when three consecutive players pass.

Once the contract has been determined, play starts. One person in the offensive pair is the declarer, the person who first named the contract suit. The other person is the dummy, whose hand is played face-up by the declarer. The first trick is led by the person to the left of the declarer. Play proceeds clockwise around the table, where each trick is led by the winner of the previous trick until players are out of cards.

The "All Trump" bridge variant introduces a sixth possible contract suit, "All Trump," so that the ranking of the contract suits in increasing order is Clubs, Diamonds, Hearts, Spades, No Trump, All Trump. The initial rule was that if one is unable to play the led suit, one may play any other suit and it is automatically trump. After the first trump suit is played, one must follow the trump suit if unable to follow the led suit; if one is also unable to follow the trump suit, then one may play a second trump suit, which is regarded as beating the first trump suit.

For example, suppose that South leads ♠9. West, who is void in Spades (that is, he has no Spades), plays ♢5 as a trump. North now must follow South's suit if his is able; if his is unable, then he should follow West's suit; if he is also unable to do that, only then may he play a new suit as trump. Thus we might have N ♢3, E ♠K, in which case West wins with ♢5; or N ♣T, E ♢8, where North wins; or N ♠A, E ♢Q, in which East wins.

This first version was playtested by people who had experience in trick-taking games, but not with contract bridge proper. Players ignored the auction phase of the game, under the assumption that contract was always 1 All-Trump (7 tricks required to fulfill contract), in order to ensure the testing of the variant mechanics. An illustrative example of play is given in the Appendix.

Testers observed that the person to lead the last trick would lose it. In that particular trick, in which each player as one card, the pair that has off-suit cards wins. In particular, this means that the lead has one chance to mismatch his own suit (that is, his partner's card), whereas the leader's opposition has two chances to do so. This principle actually extends frequently through the couple hands preceding the last, and indeed through the whole game it is felt that the team of the person leading has a disadvantage. This was observed as tricks frequently went back and forth. In other words, this formulation of the All Trump rules actually punishes players for winning tricks! A simple thought experiment suffices to show that it's also impossible for one team to take all 13 tricks.

Testers also tended to lead from their shortest suits whenever possible, in order to create voids quickly. Testers that went beyond this simplistic strategy and counted cards to predict other players' holdings were not rewarded for their higher understanding of the game, since the player that won a trick brought a disadvantage to his team in the next trick. As there was little that could be done to influence the outcome of a game beyond happening to have an extra honor, testers reached consensus that the game favored luck over skill too heavily.

The second iteration was played with the additional rule that when trumping, the card being trumped may not be any more than $n = 5$ values above the trumping card. Therefore in ♠4 – ♡8 – ♠Q – ♠5, the heart wins because the Queen is only four values above the 8. However, in ♠4 – ♡6 – ♠Q – ♠5, the Queen wins. Multi-suit trumping still applies, as in ♢6 – ♡J – ♠9 – ♣2, in which the Spade wins because it is close enough to the ♡J, but the Club does not because it is trying to trump the ♠9. This alteration only slightly fixed the aforementioned problems of excess trumping. In addition, testers felt that too much mental figuring was required, since they would have to do arithmetic and track 7's, 8's, and 9's as potential trumps in addition to the usual honors T, J, Q, K, A. Testing low values as $n = 2, 3$ restricted trumps too heavily. Values of $n = 5, 7$ gave too much range and did not remedy the issues named above.

The next iteration of this variant defines the trump suit during a trick as the suit above the led suit, rather than the most recent new suit played. Thus when Diamonds is led, Hearts is trump; but when Spades is led, Clubs is trump. For example, in ♡7 – ♡K – ♠4 – ♣T, the Spade wins. This modification was intended to restrict the number of potential trump cards in any given trick, but preserve the sense that any suit could be trump under the right conditions. It also eliminates the emergent behavior that statistically punishes players for winning tricks. The resulting rules were intended to create a less chaotic All Trump contract play. An example from this iteration is given in the Appendix.

Randomly distributed hands were less strongly won than this one, as would be expected. In order to investigate more realistically, testers began re-shuffling deals which were considered unfavorable to All Trump play. Beyond that cardplay now felt more orderly and strategic, observations recorded from this iteration pertained to contract choice in the auction; we will discuss this presently.

In addition to ensuring that All Trump cardplay is not cumbersome to player, we must also ensure that playing in such a contract is favorable with respect to the auction metagame. Effectively, we must check that there are hands that are best played in All Trump or, failing that, that there is an incentive to playing All Trump and scoring fewer tricks over playing a suited contract and scoring more.

For this iteration, our playtesters were experienced bridge players who could compete at the national level or

better. Testing was done over the Internet. A few practice hands were played as before, without auction, so that testers could become familiar with the mechanic. In particular, testers were to gain an understanding of how to determine when to play an All Trump contract. They were then dealt cards and bid on them without playing. Hands were revealed and testers discussed the accuracy of their bids.

Testers favored playing All Trump contracts in two cases: With two-suited hands that mismatched with partner's, as in 5♠/2♡/1♢/5♣ partnered with 1♠/5♡/5♢/2♣; or with minor-suited hands that would produce more points in an All Trump contract than in one of the appropriate minor. For example, a pair with a definite club fit and good values might prefer to play in All Trump instead of in Clubs, since they would get more points per trick, and would reach "game" faster.

Testers considered playing All Trump contracts to be more difficult than playing No Trump contracts. As a result, they favored bidding schemes that placed All Trump higher than No Trump in the auction suits, and scoring schemes that awarded slightly more points per All Trump trick than for No Trump tricks. Bidding conventions tended imbue All Trump as signoff when bid (that is, partner should not attempt to escalate to a higher contract), or as artificially meaning strong multi-suited hands.

The final set of rules is as follows:

- During a trick in an All Trump contract, the trump suit is the suit above the suit that is led. Clubs are considered to be above Spades. If there are multiple cards played in the trump suit, the highest of them wins.

- All Trump is ordered above No Trump in the contract suits.

- In an All Trump contract, 40 points are awarded per trick taken starting with the seventh.

Extensive tweaking of this last rule has yet to be done. It may be favorable to reward enough points to reach "game" (more than 100 points) in All Trump more quickly than in No Trump. This value is important to bridge players, as extra points are rewarded for bidding and fulfilling a "game" contract. However, setting rewards for All Trump much higher may unbalance the game. Players are rewarded points for making contract tricks, but if they fail to make the required threshold they are instead punished by a larger number of points. If All Trump tricks become worth too much, it may become advantageous to bid All Trump in unreasonable situations, just because the expected gain from doing so becomes positive. With these few modifications, All Trump can easily be a reasonable strategic variant of Bridge.

Acknowledgements

A Sample Cardplay from First Iteration

S/1AT	♠ KT5	Lead: ♣9
	♡ 432	
	◇ KT3	
	♣ K872	

♠ AQJ73		♠ 98642
♡ J96	N	♡ Q85
◇ 864	W E	◇ J
♣ T9	S	♣ QJ64

♠ –
♡ AKT7
◇ AQ9752
♣ A53

West leads with the ♣9 intending to create a void as quickly as possible. South wins tricks in Clubs, Hearts, and Diamonds, finishing in the dummy. He then leads into his spade void and trumps with a Club from his own hand. Now South plays and wins his ♣A, creating a second void.
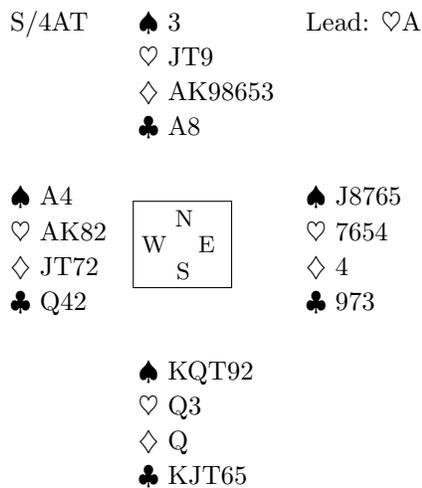
	♠ KT	Lead: S
	♡ 43	5 – 0
	◇ T3	
	♣ 87	

♠ AQJ7		♠ 9864
♡ J9	N	♡ Q8
◇ 86	W E	◇ –
♣ –	S	♣ QJ

♠ –
♡ KT7
◇ AQ975
♣ –

South wants to lead a Club from dummy in this position, hoping that East does not have a Club void. He does not care if West has a Club void, since he expects to trump in Diamonds and force West to follow him into that suit. Unfortunately, he has no way to win a trick in dummy, so he plays a heart to move toward a void. West and East win four of the next five tricks as they discover their complementary voids and trump in Spades when South leads into Hearts.

```
              ♠ K          Lead: E
              ♡ –            6 − 4
              ♢ –
              ♣ 87

  ♠ QJ7      ┌─────────┐    ♠ 9
  ♡ –        │    N    │    ♡ –
  ♢ –        │  W   E  │    ♢ –
  ♣ –        │    S    │    ♣ QJ
             └─────────┘
              ♠ –
              ♡ –
              ♢ AQ9
              ♣ –
```
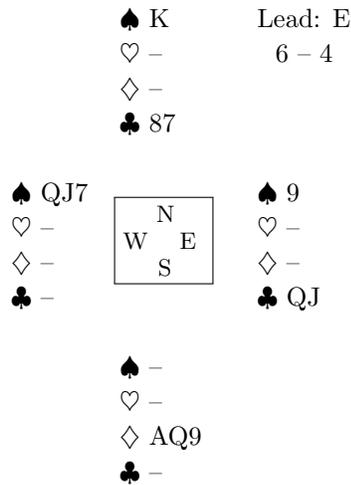
East now leads a Club into his partner's void, and then wins the last trick due to limited suit choices; N/S makes their 1AT contract.

B   Sample Cardplay from Second Iteration

```
  S/4AT     ♠ 3          Lead: ♡A
            ♡ JT9
            ♢ AK98653
            ♣ A8

  ♠ A4      ┌─────────┐    ♠ J8765
  ♡ AK82    │    N    │    ♡ 7654
  ♢ JT72    │  W   E  │    ♢ 4
  ♣ Q42     │    S    │    ♣ 973
            └─────────┘
            ♠ KQT92
            ♡ Q3
            ♢ Q
            ♣ KJT65
```

West opens by making good on his two aces before trumping becomes an issue. He then plays ♢J, reasoning that he wants to draw out one of North's honors (this is a mistake; West would get an extra trick in the end by cashing his ♡K early along with the Aces). South instead plays low from dummy and wins in hand with his singleton ♢Q.

S/4AT   ♠ –   Lead: ♡A
          ♡ JT
          ♢ AK9865
          ♣ A8

♠ 4   ♠ J876
♡ K82   N   ♡ 765
♢ T72   W   E   ♢ –
♣ Q42   S   ♣ 973

          ♠ KQT9
          ♡ Q
          ♢ –
          ♣ KJT65

South now plays a Spade to North's Clubs. South makes good on the ♣A in dummy, creating a void that will feed directly into his long Diamond suit; followed by a low Diamond to the singleton Heart in hand (he is surprised by East's Diamond void, but the ♡Q is good enough to beat East's weak heart holdings). Now South plays two of his own Clubs to North's Diamonds, and North's two Hearts to his own Spades.

          ♠ –   Lead: S
          ♡ –   8 – 2
          ♢ AK9
          ♣ –

♠ –   ♠ J87
♡ K   N   ♡ –
♢ T7   W   E   ♢ –
♣ –   S   ♣ –

          ♠ K
          ♡ –
          ♢ –
          ♣ KJ

South takes two of the last three tricks. He play the ♠K first, winning it on its own (he can do this securely, since by card-counting he knows that he holds the only two unplayed Clubs), then playing a Club to North's ♢A and losing the last trick to West's ♡K trump. North/South therefore takes 10 of the 13 tricks, and could have bid and made 4AT.