

# Hypothesis Memo: The Information Precision Valley

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## Research Question

Does partial information about opponent valuations create an “information valley” in bargaining — reducing deal rates below both full-information and no-information baselines?

Standard bargaining theory predicts that more information monotonically improves efficiency: information asymmetries are the primary source of failed negotiations (Myerson & Satterthwaite, 1983), so revealing more should help. But this prediction conflates two distinct functions of information: (1) *focal point coordination* (exact values provide a natural split-the-difference anchor) and (2) *aspiration calibration* (any information about the opponent shapes what you think you can get). We hypothesize that partial information — knowing a range but not exact values — activates the second function without the first, creating a paradoxical zone where *more knowledge produces worse outcomes*.

The core intuition: when you know the opponent’s valuation is somewhere between \$50 and \$80, you anchor to the extreme that favors you (a buyer assumes the seller’s cost is near \$50; the seller assumes the buyer’s value is near \$80). Both sides form inflated aspirations. But neither has a precise focal point to coordinate on, so they negotiate aggressively from incompatible positions. Under no information, risk aversion drives exploratory compromise. Under exact information, the known ZOPA provides a natural coordination point. Range information gives the worst of both worlds: confident enough to be aggressive, but too uncertain to coordinate.

This matters because most real-world negotiations involve partial information — parties know *something* about each other’s position, but rarely exact values. If partial information is genuinely the worst regime, it reframes information disclosure policies: vague transparency (“the seller paid between \$200K and \$300K”) may be worse than either full disclosure or no disclosure at all.

## Interestingness Argument

No sharpening needed. The hypothesis already features a non-monotonic prediction, two identified mechanisms, a moderating interaction (ZOPA size), and cleanly observable outcomes.

## Causal Model

### Variable Definitions

### Testable Implications

1. **The valley:** Deal rate under Range info < deal rate under No info < deal rate under Exact info. The non-monotonic ordering is the central prediction.
2. **Aspiration inflation:** Opening offers in the Range condition are more aggressive (further from the fair split) than in No info or Exact info conditions.
3. **Focal point clustering:** Deal prices in the Exact info condition cluster near the ZOPA mid-point; prices in Range and No info are more dispersed.

Dimension	Score	Reasoning
Prediction surprise	4	Most researchers predict monotonic improvement with more information. The non-monotonic “valley” — partial info is <i>worst</i> — contradicts the standard intuition. Some information economists might predict this, but most experimentalists would not.
Literature gap	4	Information precision as a continuous variable (none $\rightarrow$ range $\rightarrow$ exact) has theoretical treatments in mechanism design, but direct experimental comparison of all three precision levels in the same bargaining game is rare. Prior work in this project tested info <i>source</i> (verified vs. claims) and info <i>asymmetry</i> (one-sided vs. two-sided), but not <i>precision</i> .
Mechanism specificity	4	Two competing mechanisms — aspiration inflation (drives failure under range info) vs. focal point coordination (drives success under exact info) — and the 3-condition design isolates each. Comparing opening offers across conditions tests aspiration inflation directly.
Boundary conditions	4	ZOPA tightness moderates: the valley should be deepest with tight ZOPA (inflated aspirations eat a small surplus) and shallowest with wide ZOPA (room for both aspirations). This is a clean, testable interaction.
Testability in games	5	Deal rate is binary and cleanly observable. Opening offer aggressiveness (distance from the fair split) directly measures aspiration inflation. Deal prices under exact info test focal point clustering.
<b>Total</b>	<b>21/25</b>	Proceed as-is (strong hypothesis).

Table 1: \*  
Triviality scorecard. Score  $\geq 18$ : proceed without sharpening.

4. **ZOPA moderation:** The deal rate gap between Range and Exact conditions is larger with tight ZOPA (\$10) than wide ZOPA (\$25). With wide ZOPA, all conditions should achieve high deal rates (ceiling effect suppresses the valley).

### Identification Strategy

- **Randomize:** Information precision (3 levels)  $\times$  ZOPA size (2 levels) = 6 cells, between-subjects
- **Hold constant:** Number of rounds (6), no cheap talk, both agents are earnings maximizers with identical goal prompts, same underlying valuation draws within ZOPA-size conditions
- **Ruled out:** AI strategy confounds (same earnings-maximization goal across all conditions), ZOPA variation within cells (controlled parameterization), cheap talk confounds (excluded)
- **Unidentified:** Whether “aspiration inflation” is the true cognitive mechanism vs. some other

Does partial information create an "information valley" in bargaining deal rates?

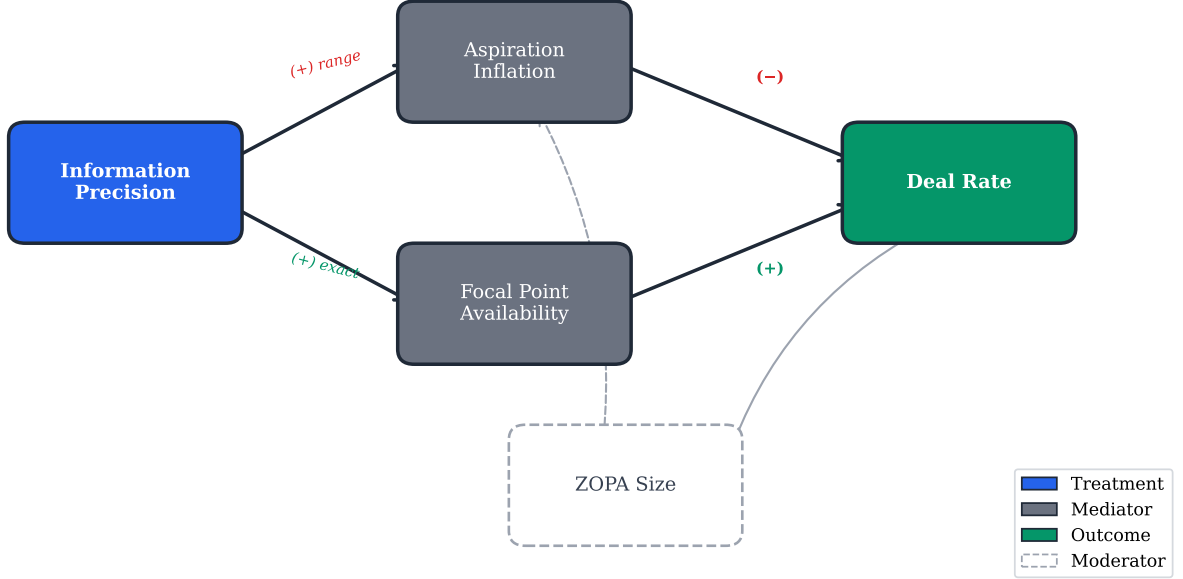


Figure 1: Causal DAG for the Information Precision Valley hypothesis. Information Precision (treatment, 3 levels) affects Deal Rate through two competing mediating pathways: *aspiration inflation* (activated by range information, reduces deals) and *focal point availability* (activated by exact information, increases deals). ZOPA Size moderates by amplifying aspiration inflation when surplus is small.

Variable	Type	Operationalization	Game implementation
$X$	Treatment	Information precision: None / Range / Exact	3 game conditions varying what players are told about each other's valuation
$M_1$	Mediator	Aspiration inflation: opening offer aggressiveness	Distance of first offer from the ZOPA midpoint
$M_2$	Mediator	Focal point availability: convergence target	Clustering of deal prices around ZOPA midpoint (exact info) vs. dispersion (range/none)
$Y$	Outcome	Deal rate; rounds to deal; surplus efficiency	Binary deal/no-deal; round count; (deal price – seller cost) / ZOPA
$Z$	Moderator	ZOPA size: tight (\$10) vs. wide (\$25)	Controlled by buyer_value and seller_cost parameters

process — we observe aggressive offers, not beliefs. Also, AI agents may not exhibit human-like anchoring biases, limiting external validity.

## Next Steps

This hypothesis is ready for `/design-experiment` to map it to a concrete game design. The design should produce 6 game conditions (3 precision levels  $\times$  2 ZOPA sizes), with a tight ZOPA condition calibrated to produce real impasse risk (deal rates between 40–80%, not ceiling 100%). The prior `info_source_bargaining` experiment showed that a \$30 ZOPA produced 100% deal rates — the tight condition here should use  $\sim$ \$10 to create variance.

Run: `/design-experiment info_precision_bargaining`