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Linked Balance Sheet Representation

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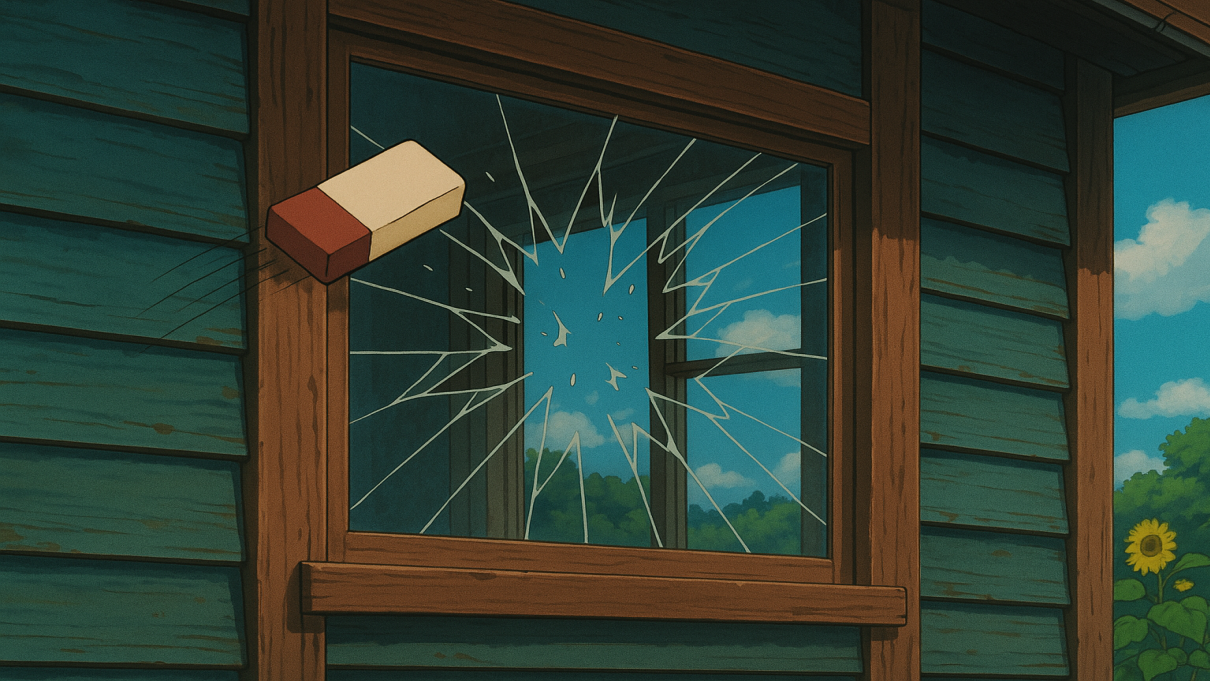
Einhorn and Hogarth 1986

A hammer hits a watch and the glass breaks.

- At home $\rightarrow$ likely the hammer caused it.
- In a factory $\rightarrow$ maybe the glass was weak due to item defect.

We believe a cause when it makes sense and nothing else does.



Cues to Causality (Einhorn and Hogarth 1986)

1. **Contiguity:**
   - A ball hits a window $\rightarrow$ it breaks immediately.
   - Feels causal because they happen close together.

2. **Congruity:**
   - A ball hits a window $\rightarrow$ window breaks, feels right
   - A tshirt hits a window $\rightarrow$ window breaks, feels wrong

Three Ways of Presentation

Presentation 1		**Presentation 2**		**Presentation 3**
What the company owns	$12,000	Equipment	$12,000	Equipment (after depreciation)
Expenses	$10,000	Less: Depreciation	($10,000)	$2,000

Separate Presentation

Assets	
Securitized assets	$ 12,000
Liabilities	
Non-recourse financing	$ 10,000

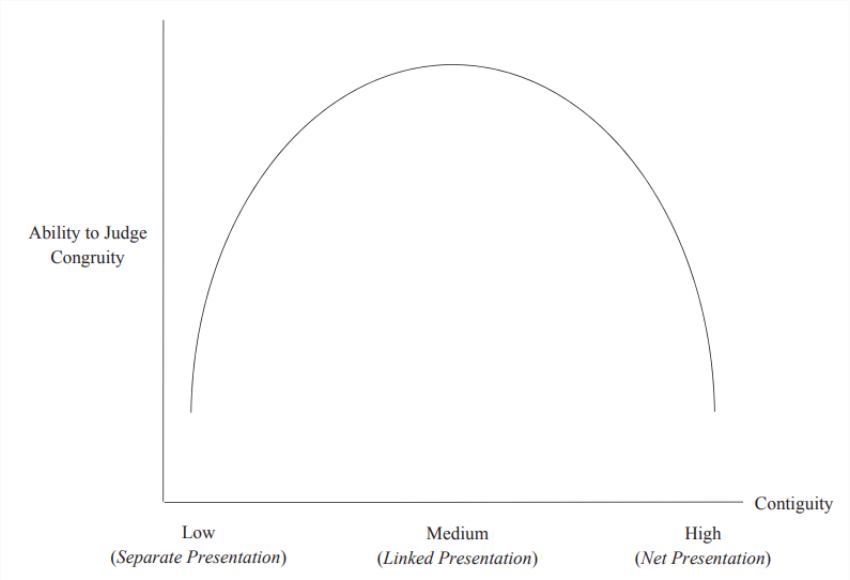
Linked Presentation

Assets	
Securitized assets	$ 12,000
Less: Non-recourse financing	(10,000)

Net Presentation

Assets	
Securitized assets (net of non-recourse financing)	$ 2,000

Separate vs Linked Vs Net Presentation



Contiguity-Congruity

Overview: Research question and motivation

- How do **separate**, **linked**, and **net** presentation formats for related balance sheet items affect users' ability to discern economic relationships?

- **Practical Problem:** Users struggle to link related items (e.g., derivatives and hedged items)
- **Regulatory Gap:** FASB/IASB consider linked presentation but lack evidence
- **Theory:** Contiguity & congruity (Einhorn & Hogarth, 1986)

Accounting in Practice:

- **Separate Presentation** : Default under GAAP/IFRS
- **Net Presentation** : Rarely permitted (e.g., repurchase agreements)
- **Linked Presentation** : Proposed but rarely used

Experiment 1 (hedging): Participants

Panel A: Experiment one participants	
Number of participants	170
Investing experience:	
Number of participants with investing experience	110
Average number of stock trades (among participants with investing experience)	51.8
Years work experience:	
Mean	7.2
Median	6
Participants with experience in the following industries:	
Banking & Finance	38
Technology	31
Energy	15
Aviation/Aerospace	10
Healthcare	8
Manufacturing	8
Military	8
Marketing	7
Engineering	5
Real Estate	5
Other	35

Experiment 1 (hedging): 3×2 Research Design

- **Presentation Format** (3 levels: separate, linked, net)
- **Hedge Effectiveness** (2 levels: high, low)
- **DV: Risk assessment** (0-100 scale)

Panel A: Separate presentation

(High hedge effectiveness)

EnergyCorp
Excerpts from Quarterly Balance Sheets
(In Millions)

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Assets				
Current assets	$ 2,750	$ 2,760	$ 2,775	$ 2,795
Inventory	5,000	8,000	4,500	5,500
Other assets	3,275	3,325	3,425	3,525
Liabilities				
Account payable	2,695	2,700	2,715	2,740
Other borrowings	4,325	4,340	4,390	4,465
Derivative contracts	1,000	4,000	500	1,500

(Low hedge effectiveness)

EnergyCorp
Excerpts from Quarterly Balance Sheets
(In Millions)

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Assets				
Current assets	$ 2,750	$ 2,760	$ 2,775	$ 2,795
Inventory	5,000	8,000	4,500	5,500
Other assets	3,275	3,325	3,425	3,525
Liabilities				
Account payable	2,695	2,700	2,715	2,740
Other borrowings	4,325	4,340	4,390	4,465
Derivative contracts	1,000	2,500	750	1,250

Panel B: Linked presentation

(High hedge effectiveness)

EnergyCorp
Excerpts from Quarterly Balance Sheets
(In Millions)

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Assets				
Current assets	$ 2,750	$ 2,760	$ 2,775	$ 2,795
Inventory	5,000	8,000	4,500	5,500
Less: Derivative contracts	(1,000)	(4,000)	(500)	(1,500)
Other assets	3,275	3,325	3,425	3,525
Liabilities				
Account payable	2,695	2,700	2,715	2,740
Other borrowings	4,325	4,340	4,390	4,465

(Low hedge effectiveness)

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	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Assets				
Current assets	$ 2,750	$ 2,760	$ 2,775	$ 2,795
Inventory	5,000	8,000	4,500	5,500
Less: Derivative contracts	(1,000)	(2,500)	(750)	(1,250)
Other assets	3,275	3,325	3,425	3,525
Liabilities				
Account payable	2,695	2,700	2,715	2,740
Other borrowings	4,325	4,340	4,390	4,465

Panel C: Net presentation

(High hedge effectiveness)

EnergyCorp
Excerpts from Quarterly Balance Sheets
(In Millions)

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Assets				
Current assets	$ 2,750	$ 2,760	$ 2,775	$ 2,795
Inventory (net of derivative contracts)	4,000	4,000	4,000	4,000
Other assets	3,275	3,325	3,425	3,525
Liabilities				
Account payable	2,695	2,700	2,715	2,740
Other borrowings	4,325	4,340	4,390	4,465

(Low hedge effectiveness)

EnergyCorp
Excerpts from Quarterly Balance Sheets
(In Millions)

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Assets				
Current assets	$ 2,750	$ 2,760	$ 2,775	$ 2,795
Inventory (net of derivative contracts)	4,000	5,500	3,750	4,250
Other assets	3,275	3,325	3,425	3,525
Liabilities				
Account payable	2,695	2,700	2,715	2,740
Other borrowings	4,325	4,340	4,390	4,465

Experiment 1 (hedging): Procedures

1. **Pre-Manipulation**
   Initial assessment Baseline risk (0–100) after company description; later used as covariate.
2. **Random assignment – 3 formats $\times$ 2 hedge levels.**
   - Separate — Linked — Net
   - High (100% offset) — Low (50% offset)
3. **Statement review.**
   Four quarterly balance sheets shown in assigned format.
4. **Post-manipulation risk.**
   Second 0–100 rating.
5. **Process & Boundary measures.**
   - *Contiguity & congruity*: physical separation, ease of seeing relationship.
   - *Enough Prompting*: \$1 000 inventory value increase $\rightarrow$ derivative change.
   - *Boundary test (separate sample)*: Linked vs Net + Footnote (2$\times$2) to see whether footnote disclosure can compensate for information lost in net.
6. **Manipulation checks.**
   Format recognition and hedge-effectiveness recall (>95% pass).

Experiment 1 (hedging): Main Findings

Panel C: Planned interaction contrast and simple effects for post-manipulation risk assessments	
Presentation × Hedge Effectiveness	$F = 10.14$, $p < 0.01$
Residual effect of manipulated variables	$F = 0.89$, $p = 0.47$
Contrast effect size, r^2	74.01%
Effect of hedge effectiveness given:	
Separate Presentation	$t = 1.23$, $p = 0.22$
Linked Presentation	$t = 2.87$, $p < 0.01$[†]
Net Presentation	$t = 0.70$, $p = 0.49$

- **Linked presentation uniquely enables users to assess risk differences.**

Experiment 1: Main Findings

	Physical Separation Question	Easy to Judge Relationship Question	Balance Prediction Question
Panel C: Simple effects of presentation format			
Effect of presentation format comparing:			
Separate vs. Linked Presentation	$t = 2.14$, $p = 0.03$	$t = 2.59$, $p = 0.01$	$t = 1.74$, $p = 0.08$
Separate vs. Net Presentation	$t = 6.32$, $p < 0.01$	$t = 7.76$, $p < 0.01$	$t = 1.37$, $p = 0.17$
Linked vs. Net Presentation	$t = 4.24$, $p < 0.01$	$t = 10.42$, $p < 0.01$	$t = 3.14$, $p < 0.01$
	Physical Separation Question	Easy to Judge Relationship Question	Balance Prediction Question
Panel D: Simple main effects of hedge effectiveness			
Effect of hedge effectiveness given:			
Separate Presentation	$t = 0.53$, $p = 0.59$	$t = 1.04$, $p = 0.30$	$t = 3.68$, $p < 0.01$
Linked Presentation	$t = 1.22$, $p = 0.23$	$t = 2.15$, $p = 0.03$	$t = 4.11$, $p < 0.01$
Net Presentation	$t = 0.78$, $p = 0.22$	$t = 1.41$, $p = 0.16$	$t = 1.06$, $p = 0.29$

- **Physical separation ratings matched expectations.**
- **Ease of judging the relationship peaked for linked presentation.**

Experiment 1 (hedging) – Key Follow-up Results

- **Enough Prompting:** Linked and separate formats enabled accurate forecasts of the \$1 000 derivative change ($p < 0.01$), whereas the net format did not ($p = 0.29$) $\rightarrow$ netting removes information needed for forward-looking judgments.
- **Supplemental Net + Footnote test:** Adding a footnote that discloses gross inventory and derivative amounts improved performance relative to plain netting but still fell short of the linked format $\rightarrow$ Linked Presentation remains the most effective presentation.

Experiment 2 (lending): Participants

Panel B: Experiment two participants	
Number of participants	32
Lending decisions made:	
Mean	1030
Median	275
Years work experience:	
Mean	21.1
Median	20
Participants with experience in the following roles:	
Banking	28
Management	10
Finance (other)	9
Finance (corporate)	7
Accounting	5
Marketing	3
Engineering or other technical	3

Experiment 2 (lending): 2×2 Design

- **Within-Subject Factor**: Presentation format
  (each participant sees both)
  - **Separate** – debt & asset in different sections
  - **Linked** – debt shown *directly below* restricted asset
- **Between-Subject Factor**: Restricted-asset liquidity
  - Liquid (marketable securities)
  - Illiquid (land)
- **DV**: Loan interest rate

Main Finding
Only the **linked** presentation revealed risk differences: lenders charged higher rates for liquid collateral ($p = 0.05$), whereas rates did not differ under the separate format ($p = 0.80$).

Contribution

- **Not all forms of disaggregation presentation are equal.** This paper demonstrates that physical separation between the disaggregated information materially alters users' judgments.
- **Extend causal reasoning theory.** Contiguity between related items has an inverse U-shaped relationship to people's ability to judge congruity.
- **Policy implication for standard setters.** Linked presentation has a potential benefit, in that it helps users to distinguish between firms with different economics.

Panel A: Separate presentation

ABC Company Comparative Balance Sheets (In Millions of US Dollars)			
	Fiscal 2018	**Fiscal 2017**	**Fiscal 2016**
Assets			
Cash and receivables, net	1,440	1,379	1,495
Marketable securities	4,222	4,208	4,316
Inventory	2,060	1,868	1,729
Plant and equipment, net	2,991	3,033	3,004
Land	4,222	4,222	4,222
Other assets	1,096	911	474
Total Assets	**16,031**	**15,621**	**15,240**
Liabilities			
Accounts payable	3,034	2,802	2,563
Other current liabilities	1,490	1,417	1,306
Long-term debt	4,000	4,000	4,000
Other non-current liabilities	2,501	2,075	1,587
Equity			
Common stock & APIC	2,031	1,985	2,045
Retained earnings & other equity	2,975	3,342	3,739
Total Liabilities and Equity	**16,031**	**15,621**	**15,240**

Panel B: Linked presentation (restricted asset liquid)

ABC Company Comparative Balance Sheets (In Millions of US Dollars)			
	Fiscal 2018	**Fiscal 2017**	**Fiscal 2016**
Assets			
Cash and receivables, net	1,440	1,379	1,495
Marketable securities	4,222	4,208	4,316
Less: Long-term debt	(4,000)	(4,000)	(4,000)
Inventory	2,060	1,868	1,729
Plant and equipment, net	2,991	3,033	3,004
Land	4,222	4,222	4,222
Other assets	1,096	911	474
Total Assets	**12,031**	**11,621**	**11,240**
Liabilities			
Accounts payable	3,034	2,802	2,563
Other current liabilities	1,490	1,417	1,306
Other non-current liabilities	2,501	2,075	1,587
Equity			
Common stock & APIC	2,031	1,985	2,045
Retained earnings & other equity	2,975	3,342	3,739
Total Liabilities and Equity	**12,031**	**11,621**	**11,240**

Panel C: Linked presentation (restricted asset illiquid)

ABC Company Comparative Balance Sheets (In Millions of US Dollars)			
	Fiscal 2018	**Fiscal 2017**	**Fiscal 2016**
Assets			
Cash and receivables, net	1,440	1,379	1,495
Marketable securities	4,222	4,208	4,316
Inventory	2,060	1,868	1,729
Plant and equipment, net	2,991	3,033	3,004
Land	4,222	4,222	4,222
Less: Long-term debt	(4,000)	(4,000)	(4,000)
Other assets	1,096	911	474
Total Assets	**12,031**	**11,621**	**11,240**
Liabilities			
Accounts payable	3,034	2,802	2,563
Other current liabilities	1,490	1,417	1,306
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Equity			
Common stock & APIC	2,031	1,985	2,045
Retained earnings & other equity	2,975	3,342	3,739
Total Liabilities and Equity	**12,031**	**11,621**	**11,240**

Critique 1: Linked Presentation Can Increase Cognitive Load

Contention: When disclosures involve multiple components, linked presentation may overwhelm rather than aid, congruity is not value-relevant to all users

- **Net (High Contiguity):**
  "Total inventory risk = \$1B; hedges reduce net exposure to \$600M."
  Direct, aggregated, low effort.
- **Linked (Medium Contiguity):**
  - Electronics: \$300M → \$100M hedge
  - Clothing: \$200M → \$50M hedge
  - Perishables: \$500M → \$250M hedge

  Requires mental aggregation: \$1B exposure, \$400M hedge, net = \$600M.

Critique 2: Non-detail isn't high contiguity

Version A: Net Presentation (Clean, No Clarity)

Total:	*$320*

Version B: Linked Presentation (Grouped, Informative)

Food:	
Steak (John)	*$70*
Pasta (Anna)	*$20*
Dessert (John)	*$10*
Drinks:	
Wine (Anna)	*$60*
Beer (John)	*$8*
Total:	*$168*

(John: $88, Anna: $80)

Critique 3: Bias-Correction vs. Conceptual Integrity

Framework Assumes: Informed, rational users; prioritizes *relevance*, *neutrality*, *faithful representation*.

Issue: Designing for bias risks misrepresentation.

Trade-offs:	Aid novices	→ Mislead experts
	Reduce error	→ Distort signal
	Highlight links	→ Imply causality

Should we instead use footnotes to guide?