

Judgmental adjustments and scenario use: Individual vs group forecasts

Dilek Önkal

**Newcastle Business School
Northumbria University**

M. Sinan Gönül

**Newcastle Business School
Northumbria University**

Paul Goodwin

**School of Management
University of Bath**

Scenarios

- Powerful tools for constructing alternative futures and exploring the pathways leading to these futures
(Godet, 1982)
- Used in corporate strategy and planning since early 1960s
(Chernack, 2017; Godet, 1982; Schoemaker, 1993;
Goodwin & Wright, 2010)
- Support planning for the range of plausible uncertainties;
challenge managerial thinking
(Schnaars & Topol, 1987; Schoemaker & Tetlock, 2012)

- Can help predict/analyse stakeholder behaviour – link to Decision Analysis
(Cairns, Goodwin & Wright, 2016; Wright & Cairns, 2011)
- Scenarios may help with problems due to cognitive biases
(Wright & Goodwin, 2009)
- Scenarios may be perceived to be more credible by users in comparison to dull & dry statistical numbers
(Schnaars & Topol, 1987; Taylor & Thompson, 1982)

Scenarios and Forecasting

Through offering structured storylines of plausible futures, scenarios:

- promote future-focused thinking
- offer collaborative pathways for information sharing
- facilitate communication
- provide a platform to formally recognize the uncertainties
- enable forecasting agility

Scenarios can be used to

- support constructing and updating forecasts
- enhance trust in forecasts (Önkal, Gönül, De Baets, 2019)

Research Interest:

Examining the role of scenarios in judgmental forecasting and predictive analytics

Research Focus:

Investigating the effects of providing multiple scenarios as forecast advice on individual and group-based judgmental predictions

Önkal, Sayım, Gönül (TFSC, 2013)

- Optimistic & pessimistic scenarios may be utilized effectively as channels of forecasting advice in individual and group prediction tasks
- Scenario availability reduces the size of judgmental adjustments

Goodwin, Gönül, Önkal (EJOR, 2019)

- No differences between optimistic and pessimistic scenarios in their influence on production decisions
- Scenarios reduce overconfidence
- Potentially damaging effect of scenarios depending on participants' focus on the scenario that is congruent with the most recent behaviour of the time series (to the cost of neglecting/discounting the other scenario)

Goodwin, Gönül, Önkal, Kocabıyıkoglu, Göğüş (JBDM, 2019)

Contrast effect:

- when asked to judge the implications of a best-case scenario, participants made forecasts that were more positive if they also had access to a worst-case scenario
- when asked to judge the implications of a worst-case scenario, participants made forecasts that were more negative if they also had access to a best-case scenario

Current Work: Scenario-Dilution

Study Design:

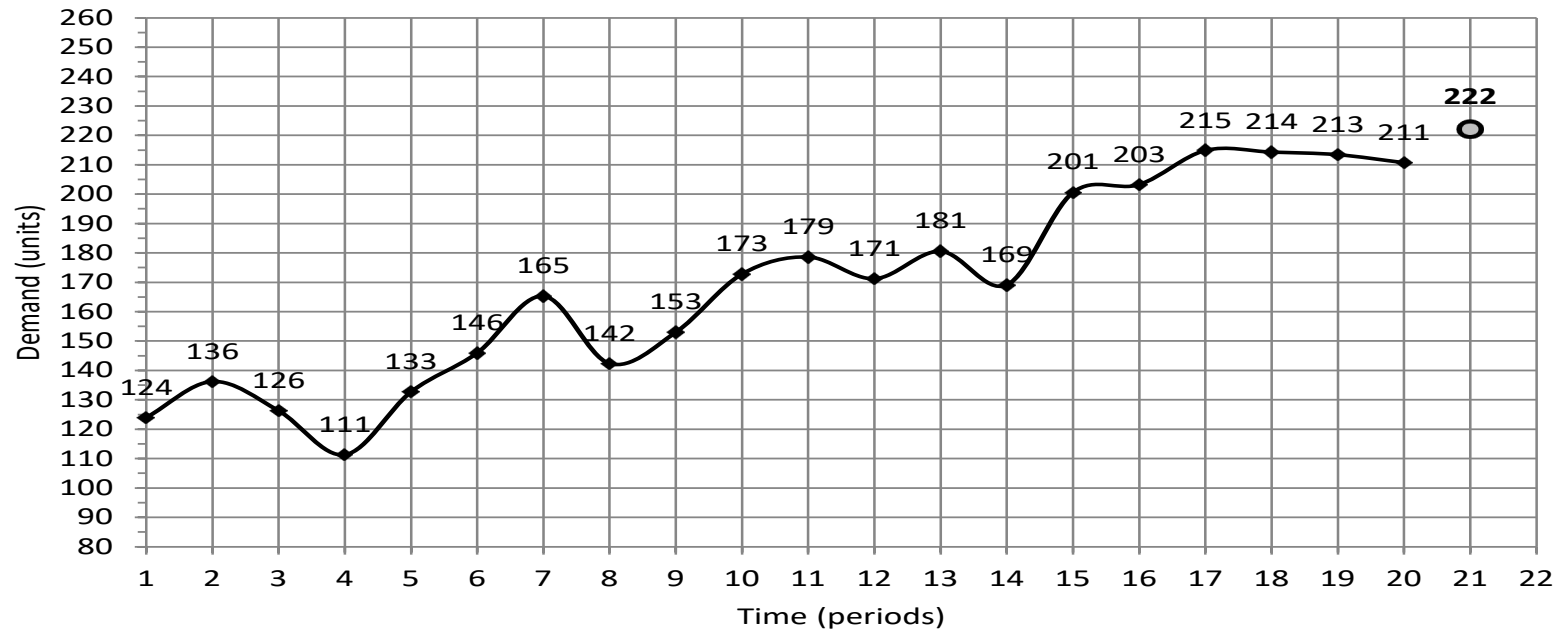
- Phase 1: Individual forecasts
- Phase 2: Consensus forecasts (two-person teams)

Phase 1– Individual Forecasts

- Participants are given 18 time-series plots showing
 - past demand for mobile phones +
 - model-based point forecasts +
 - scenarios

- They are asked to make their *individual predictions* via
 - Point forecasts
 - Best-case/worst-case forecasts
 - Hit probability
(probability that the actual demand will be between their best-case forecast and worst-case forecast)

PRODUCT D



Model-based forecast for period 21: **222**

Worst-case scenario:

This product has been among our best selling smart phones with android operating system. It has been competing somewhat effectively in its market category with a gradually increasing sales volume. However it seems to have entered a stable phase since period 15, which was the time when three competitors launched their new models almost at the same time. The demand is absolutely not large enough to support five major models competing in the same category. Model D has been doing okay since then, in spite of these market conditions, but only with the help of most aggressive and continuous promotion campaigns. We strongly believe that it will soon enter a period where keeping the sales at this level will not be possible despite promotions. We certainly expect to see a severe downturn starting very soon and it might turn out to be a very drastic one.

PRODUCT D

YOUR FORECASTS:

Please provide your point forecast for period 21 :

Please provide your best-case forecast(highest value you predict) for period 21 :

Please provide your worst-case forecast(lowest value you predict) for period 21 :

What is the probability that the actual demand for period 21 will be a hit?

(What is the probability that the actual demand for period 21 will be between your best-case forecast and your worst-case forecast?) :%

Phase 2– Consensus Forecasts

- Participants are assigned to two-person teams
- Each participant is provided with a "Consensus Forecasts Form" that includes
 - the same 18 time-series plots +
 - the same model-based forecasts +
 - their corresponding scenarios from Phase 1
- Participants are requested to:
 - discuss the given model-based forecasts, past demands and scenarios as a dyad
 - arrive at ***consensus forecasts*** (in the form of point, best-case, and worst-case predictions, as well as their dyad's hit probability assessments) for each of the 18 products
- Upon completing the consensus forecasts for each product, they are asked to convey their ***preferred individual predictions*** (the forecasts they would have preferred after the information exchange in the group discussion)

PRODUCT D

CONSENSUS FORECASTS FOR YOUR GROUP

Please provide your group's consensus point forecast for period 21 :

Please provide your group's consensus best-case forecast(highest value predicted) for period 21 :

Please provide your group's consensus worst-case forecast(lowest value predicted) for period 21 :

What is the probability that the actual demand for period 21 will be a hit? :.....%

(What is the probability that the actual demand for period 21 will be between your group's consensus best-case forecast and your group's consensus worst-case forecast?)

YOUR INDIVIDUAL FORECASTS AFTER CONSENSUS

Please provide the point forecast you'd have preferred :

Please provide the best-case forecast(highest value predicted) you'd have preferred :

Please provide the worst-case forecast(lowest value predicted) you'd have preferred :

Please provide the hit probability you'd have preferred :

STUDY 1



Phase 1 (Individual Forecasts):

- **G1:** Weak optimistic scenario
Time-series plots, model-based forecasts, weak optimistic scenarios (“best-case scenario”)
(# of individuals = 31)
- **G2:** Strong optimistic scenario
Time-series plots, model-based forecasts, strong optimistic scenarios (“best-case scenario”)
(# of individuals = 28)
- **G3:** Weak pessimistic scenario
Time-series plots, model-based forecasts, weak pessimistic scenarios (“worst-case scenario”)
(# of individuals = 30)
- **G4:** Strong pessimistic scenario
Time-series plots, model-based forecasts, strong pessimistic scenarios (“worst-case scenario”)
(# of individuals = 29)

Phase 2 (Consensus Forecasts):

- **X1:** weak optimistic scenario [G1] & weak pessimistic scenario [G3]
(# of dyads = 17)
- **X2:** weak optimistic scenario [G1] & strong pessimistic scenario [G4]
(# of dyads = 14)
- **X3:** strong optimistic scenario [G2] & weak pessimistic scenario [G3]
(# of dyads = 13)
- **X4:** strong optimistic scenario [G2] & strong pessimistic scenario [G4]
(# of dyads = 15)

Performance Measures

Eight performance measures used for both individual and dyad forecasts:

1. Percentage change: *point forecasts*

$$\text{Percent Change Point Frcst} = 100 * \frac{(\text{generated point forecast} - \text{provided point forecast})}{\text{provided point forecast}}$$

2. Percentage change: *best-case forecasts*

$$\text{Percent Change BestCase Frcst} = 100 * \frac{(\text{generated bestcase forecast} - \text{provided point forecast})}{\text{provided point forecast}}$$

3. Percentage change : *worst-case forecasts*

$$\text{Percent Change WorstCase Frcst} = 100 * \frac{(\text{generated worstcase forecast} - \text{provided point forecast})}{\text{provided point forecast}}$$

4. Absolute difference: *point forecasts*

$$\text{Abs diff pt frcst} = |\text{generated pt frcst} - \text{model-based pt frcst}|$$

5. Absolute difference: *best-case forecasts*

$$\text{Abs diff best-case frcst} = |\text{generated best-case frcst} - \text{model-based pt frcst}|$$

6. Absolute difference: *worst-case forecasts*

$$\text{Abs diff worst-case frcst} = |\text{generated worst-case frcst} - \text{model-based pt frcst}|$$

7. Expected hit rate

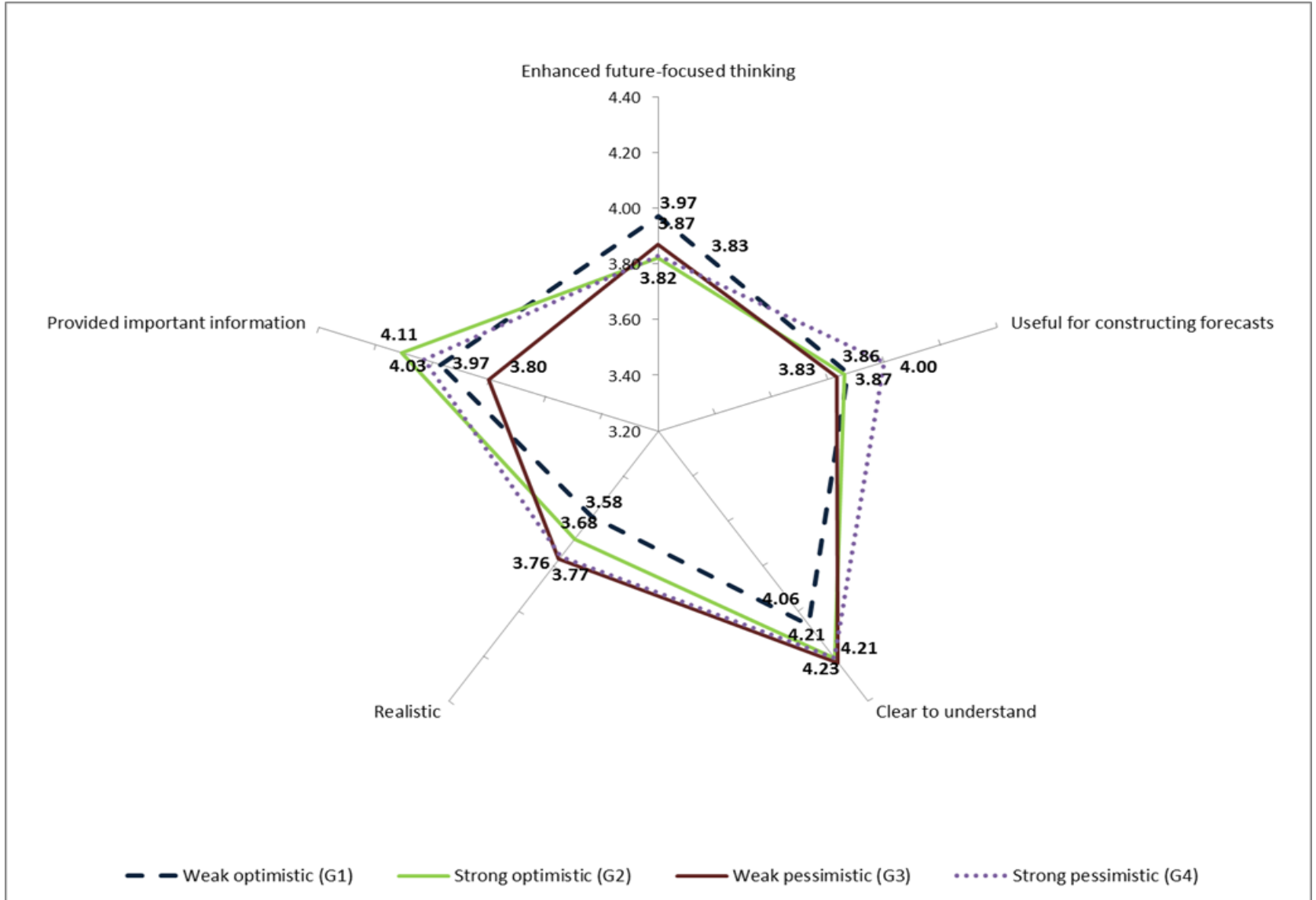
8. Asymmetry ratio (O'Connor, Remus & Griggs, 2001)

$$ASR = 100 * \frac{(\text{point forecast} - \text{worstcaseforecast})}{(\text{bestcaseforecast} - \text{worstcaseforecast})}$$

FINDINGS



ASSESSMENT OF SCENARIOS



PERFORMANCE MEASURES

- Individual forecasts:
 - ✓ Significant main effect of outlook (optimistic/pessimistic)
 - ✓ Significant main effect of tone strength (weak/strong)

- Consensus forecasts:
 - ✓ Significant interaction effect between strength of optimism and strength of pessimism

IMPLICATIONS FOR FORECAST MANAGEMENT

- Scenarios may be used as effective forecast advice to:
 - Challenge mental frames and tunnel vision in decision making
 - Debias against confirmation bias, hindsight bias, desirability bias, and overconfidence
 - Counteract *future myopia* and *retrospective sensemaking*
- Optimism – pessimism balance

FUTURE RESEARCH

- Forecasting and scenario use across different organizational contexts
 - group size
 - group process
- Scenarios constructed by
 - forecasters
 - domain experts
 - stakeholders
 - collaboratively
- Users' perspective: how to assess scenario 'quality'
(Wicke, Dhami, Önköl and Belton, *IJF*, *in press*)

- *“The turbulence surrounding Covid-19 presents a productive living and learning laboratory that ... highlights how constructing scenarios are not sufficient if they do not translate to forecasts and actions”* (Önkal & De Baets, 2020)
- World Economic Forum – Global Risks Report 2007- onwards: Emphasize the risk of a major global pandemic, highlighting that countries around the world are underprepared for them
- The act of writing a scenario may make a tail event more ‘real’ as a possibility (Derbyshire, Mandeep, Önkal, Belton – SAMS/BAM Grant), drawing attention to the importance of its forecast

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THANK YOU

dilek.onkal@northumbria.ac.uk

