# Characterizing the Value of Personalization

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Relevant Results Ranked Low

Relevant results often ranked low (see graph)
Global ranking attempts to address this
But...   Different users rate different results relevant
Study: People asked to rate relevance to *them* v. relevance to query
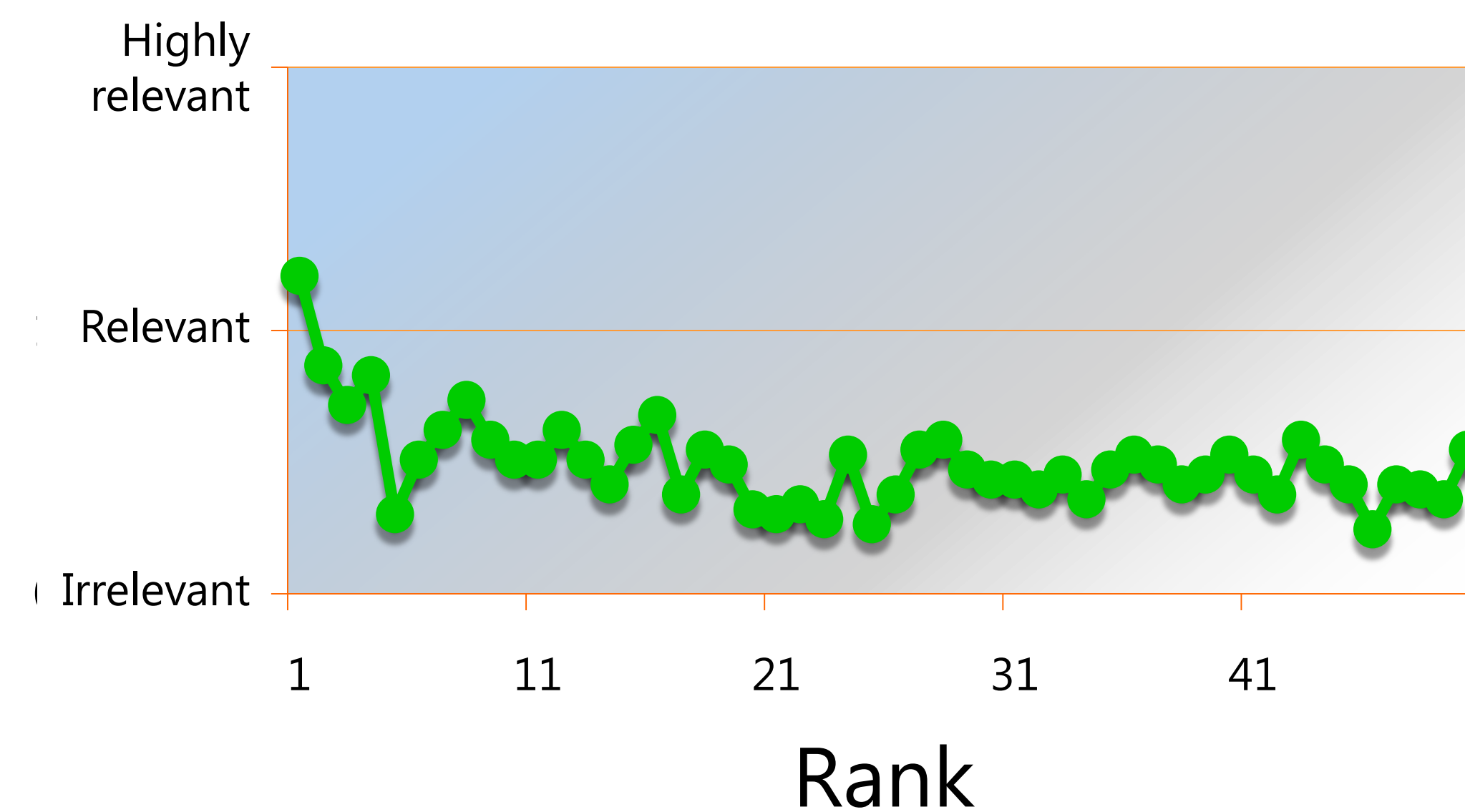
Understanding the Best Possible Ranking

Best Individual Rankings

Best Group Ranking

The best individual ranking places
Highly relevant documents first
Relevant documents next
Irrelevant documents last

Can a global ranking satisfy everyone?

Result quality can be measured using DCG

$$\text{DCG}(i) = \begin{cases} G(1) & \text{if } i=1, \\ \text{DCG}(i-1) + G(i)/\log(i) & \text{otherwise.} \end{cases}$$

The best result list maximizes DCG
The best group ranking puts results
with highest collective gain first
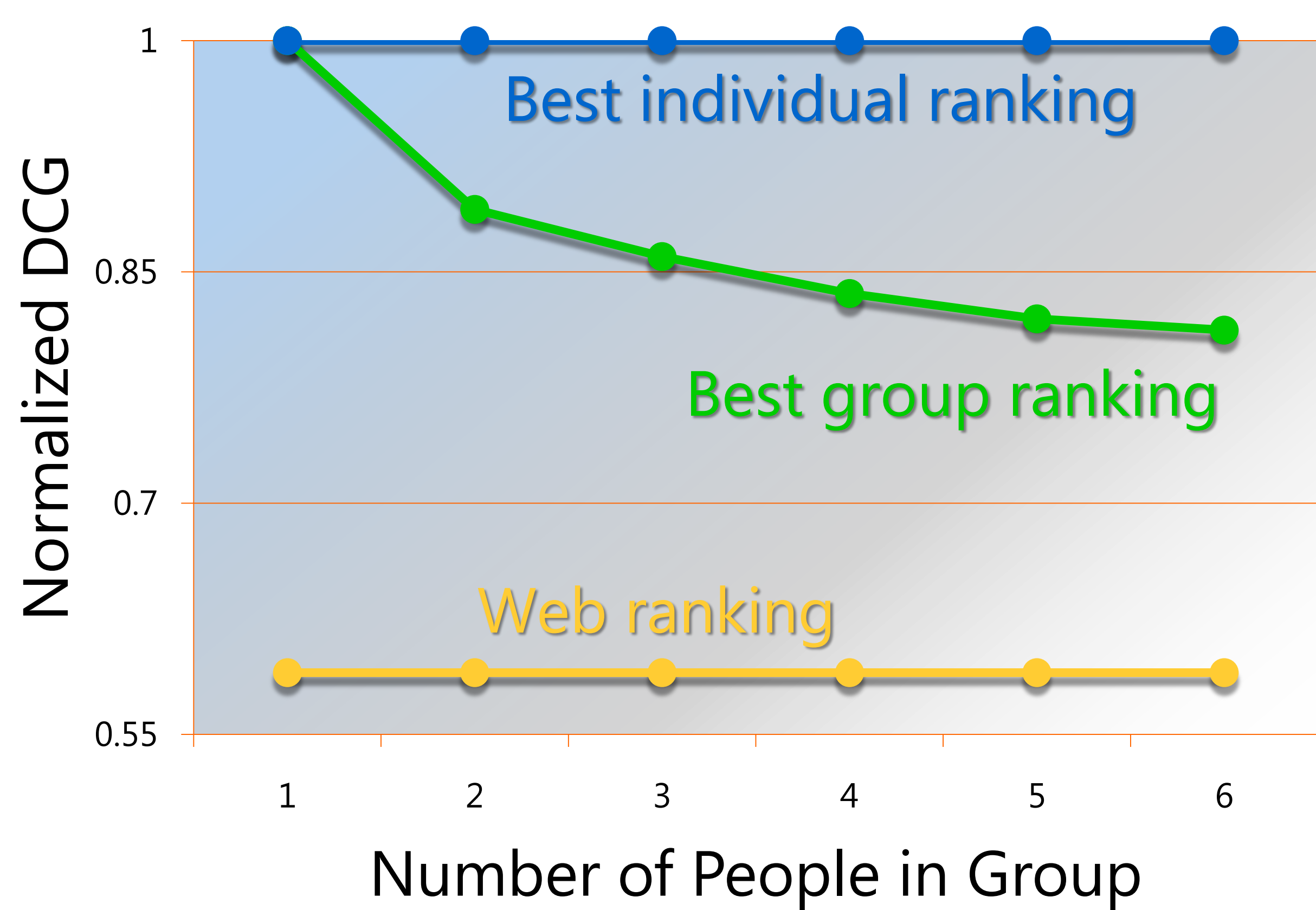
Kendall-Tau distance measures list differences
KT distance of 0:   Lists are the same
KT distance of 1:   Lists in reverse order

KT(web, best individual) = 0.47
KT(web, best group) = 0.44

The best group ranking is significantly more like
the Web ranking

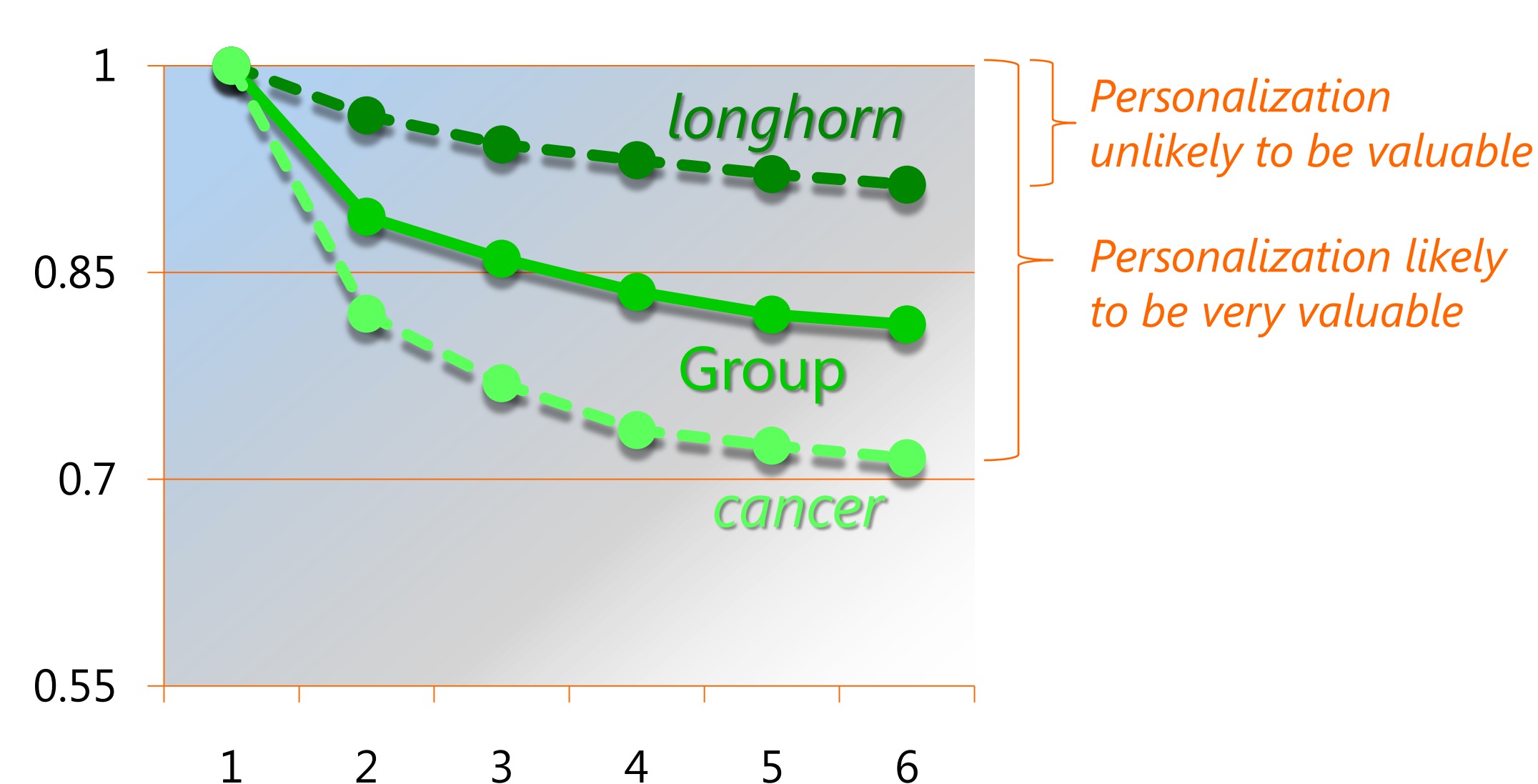## The Value of Personalization

There is also a significant difference in list quality between
The best individual ranking and
The best group ranking
As group size grows, DCG for each individual drops (see graph)
But...   No ranking seen by all can do better than group ranking

Gap is *value of personalizing* result list returned to the individual

Future work: Characterize
queries that personalize best
Value measured using:
Explicit judgments
Content match
Click behavior

Search engines do a good job of ranking results to maximize
global happiness, but do not do a very
good job for the specific individual.