International Telecommunication Union

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Quality of Experience in Mobile TV

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Overview

- Background
- Assessing Quality of Experience
- Mobile TV experience
- Empirical studies
  - Study on content types, resolution, encoding bitrates, audio quality
  - Study on text quality
  - Post-hoc on shot types
- Conclusions

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User experience of mobile TV

- Definition:
  - Not product centred but as close as possible to actual experience
  - The sum of factors influencing the user's experience during the use of the service
  - How to measure experience
    - Mimicking real experience as closely as possible
    - Method of limits (McCarthy et. al *ACM CHI 2004*)
    - comprehensive approach; not only ratings but also qualitative feedback and analysis

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Methodology – for user experienced quality

- Binary response during watching full length clips (verbal or by logging)
- Acceptability of video quality based on Fechnerian method of limits (JND)
- Low cognitive load
- Low impact on passive watching task
- Can be mapped onto utility curves which helps service providers in real-world decision making

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Requirements for mobile TV adoption

- Handset usability and acceptance
- **Technical performance** and reliability
- Usability of the mobile TV service
- **Satisfaction with the content**

(Mäki, 2005)

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Parameters under study

- Encoding bitrates
- Resolution
- Multimedia quality
  - Video
  - Audio
  - Text
- Content types

As close as possible to real life experience

Real handsets,

Full length content

Mobile TV viewing ratio

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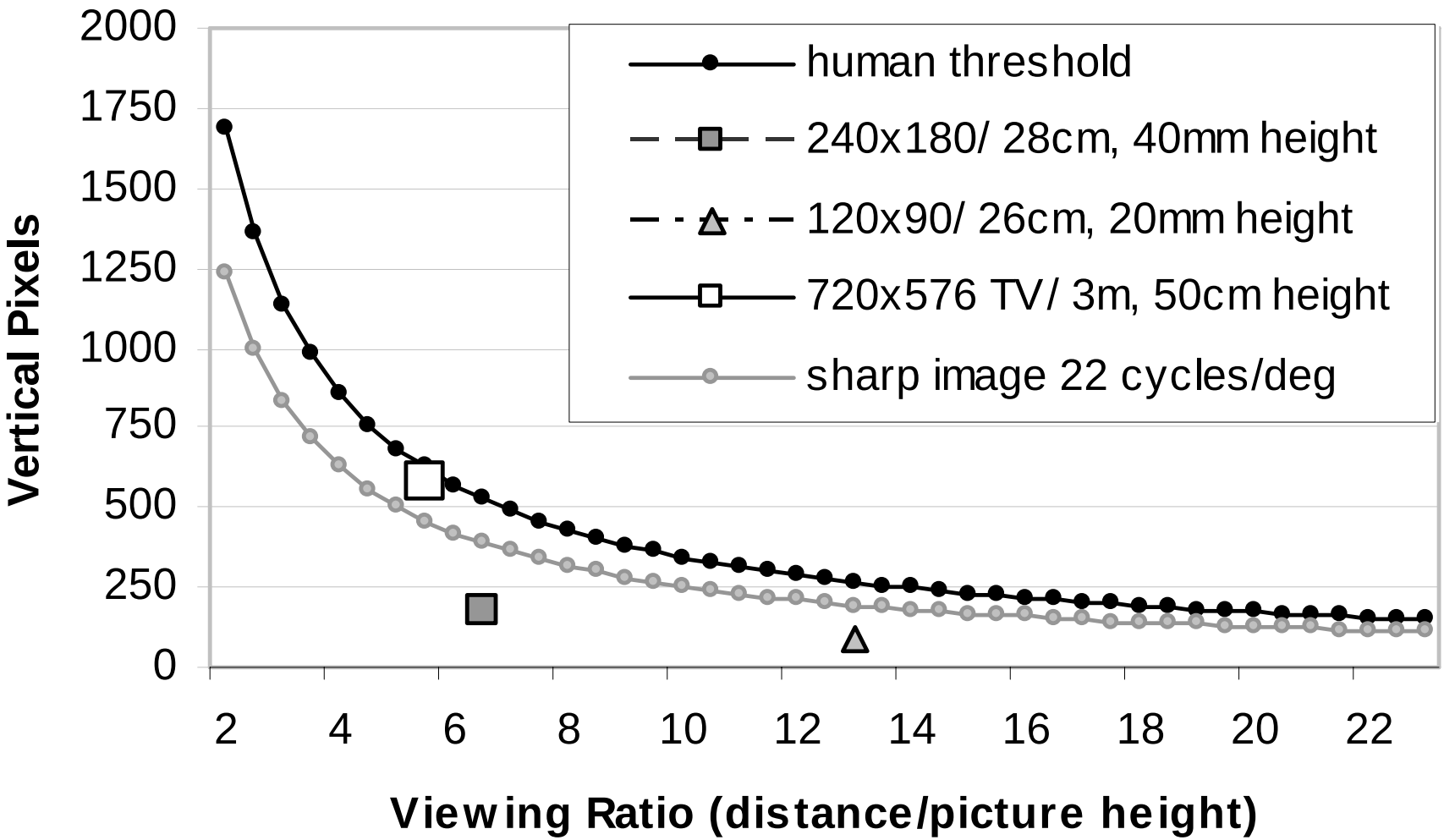

Methodology

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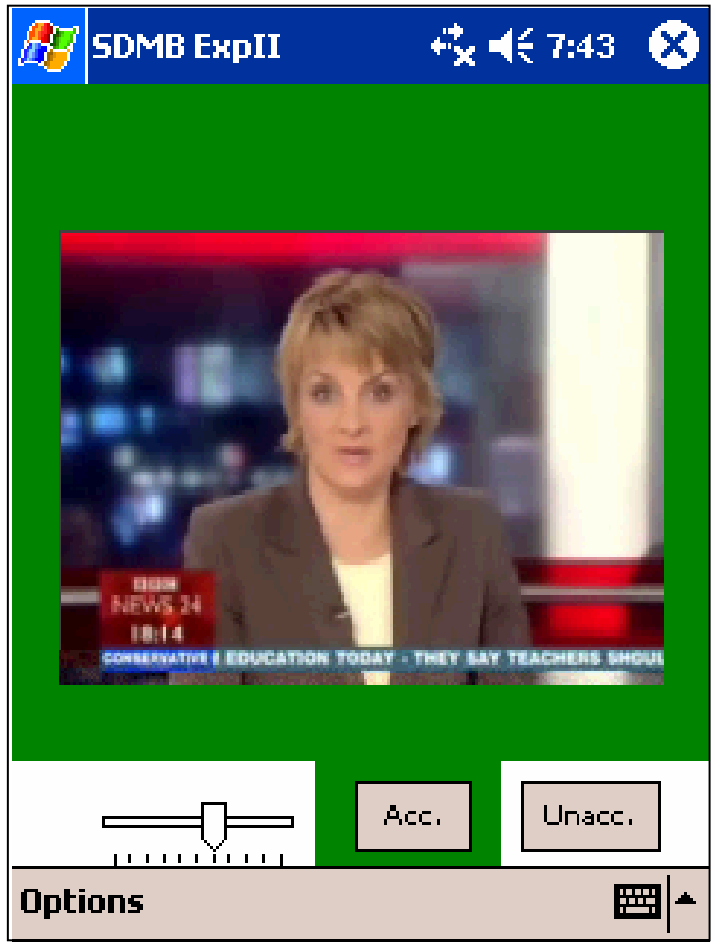
- 128 participants
- Four groups:
- size order x audio: 32, 16kbps
- 4 x 4 TV clips
  (news, music, animation, sports)
  - 7 x 20 secs,
  - Degrading: 224 … 32kbps

➢ Acc. Unacc. Feedback
➢ Video-taped
➢ Interviews



IPAQ 2210: 320x240, 512MB SD

Resolution requirements depend on content

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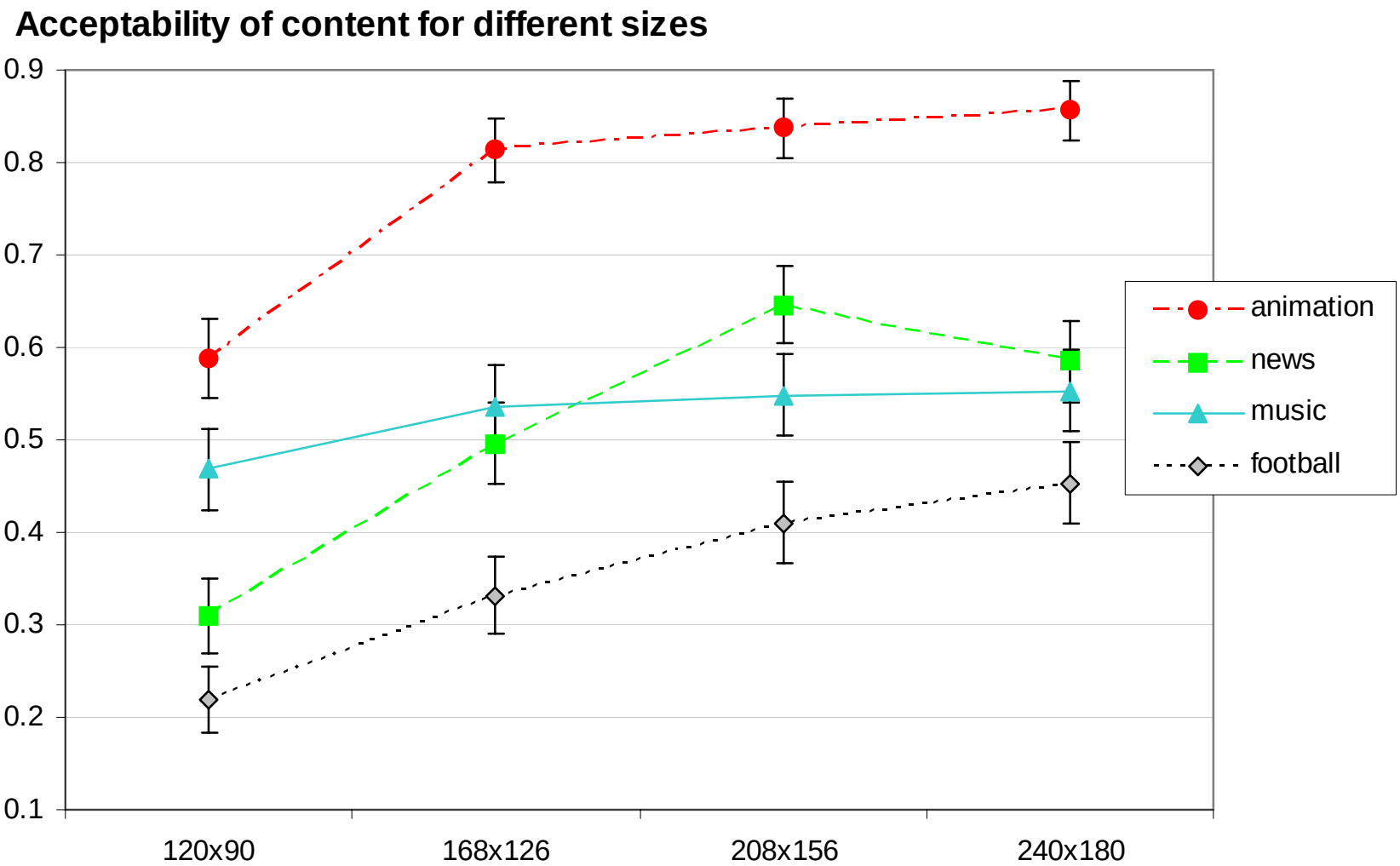

Lower audio, higher video quality ratings

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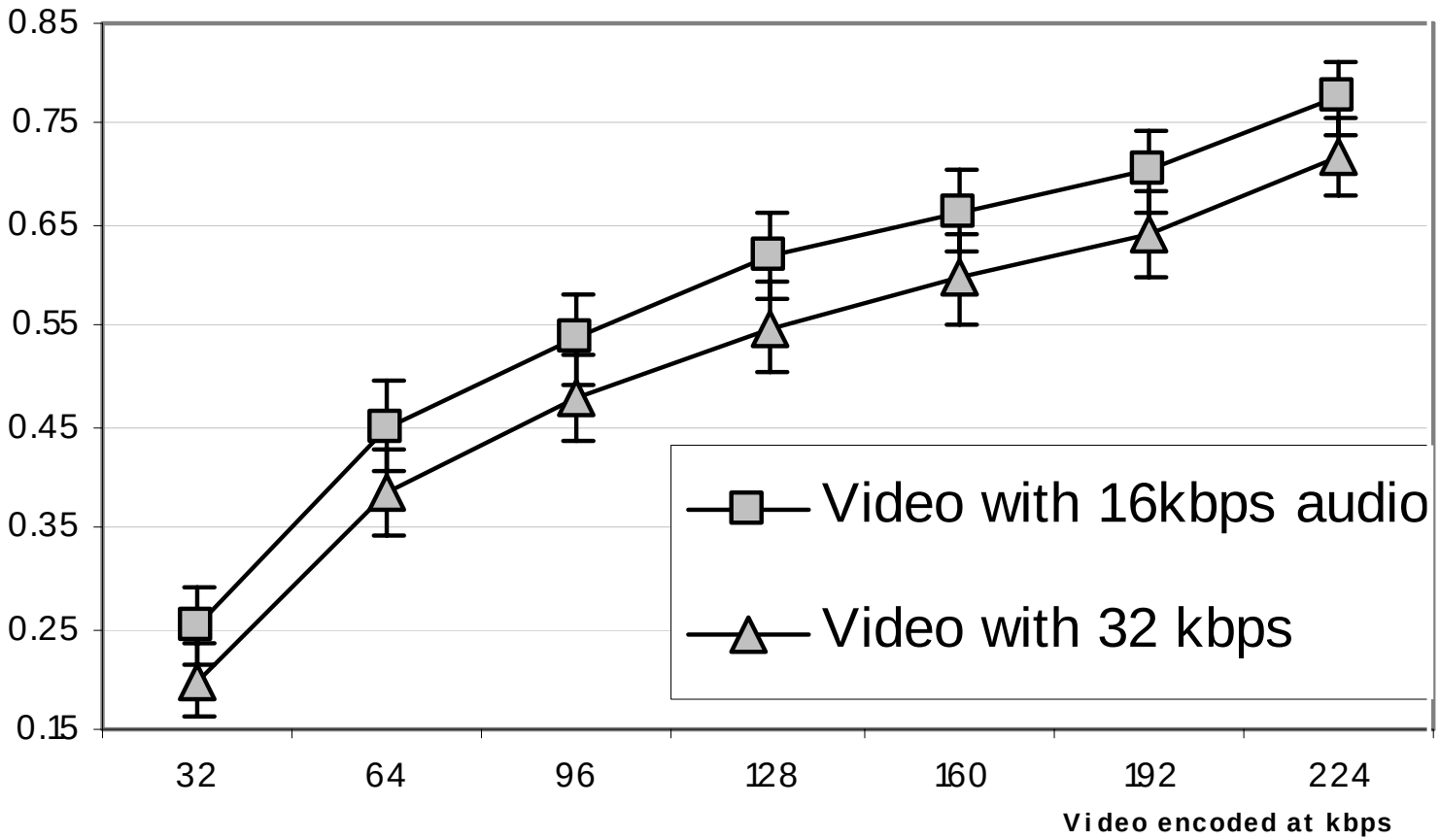
Video with different audio support



News content on mobile TV

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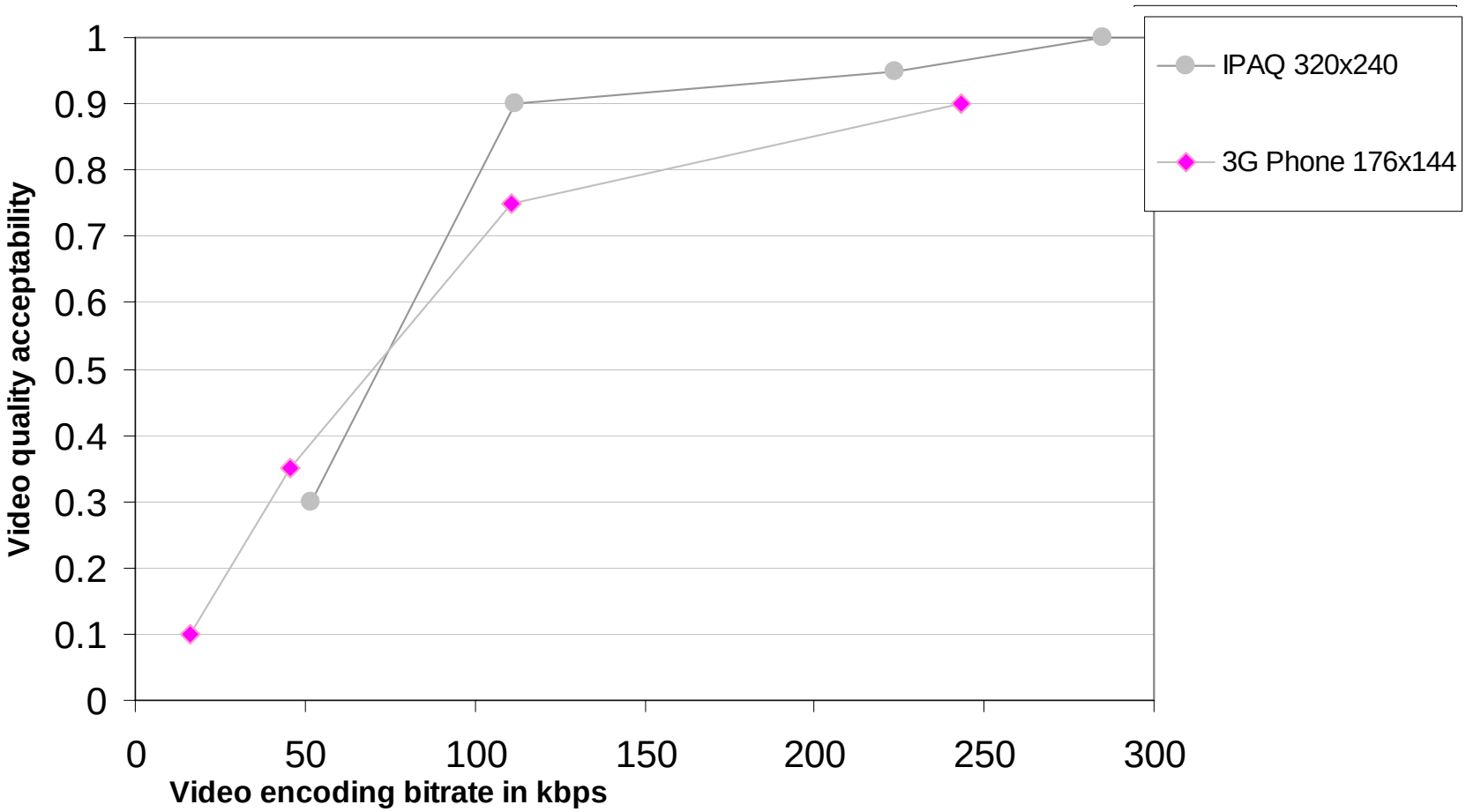

News content on mobile TV

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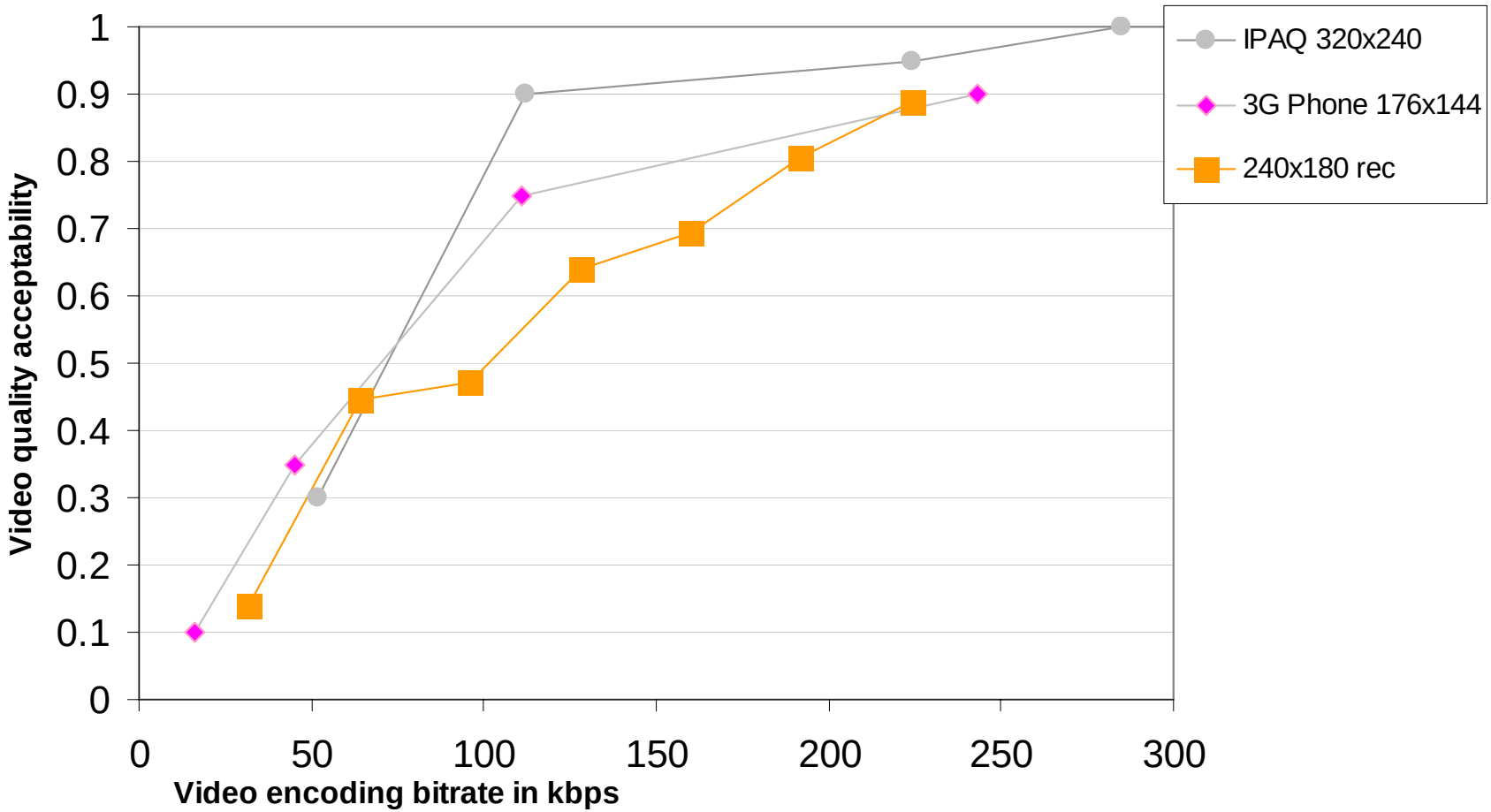

News content on mobile TV

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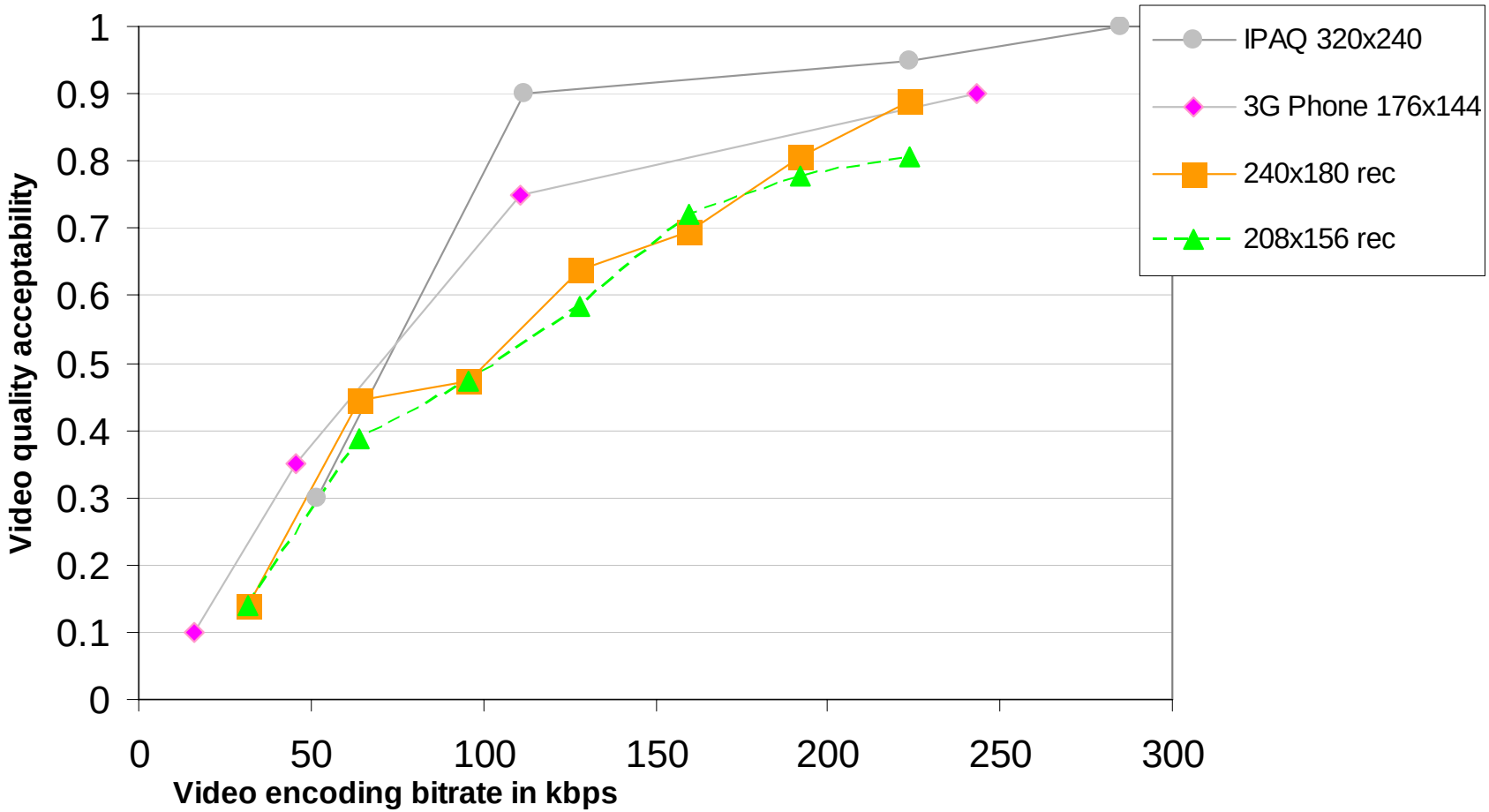

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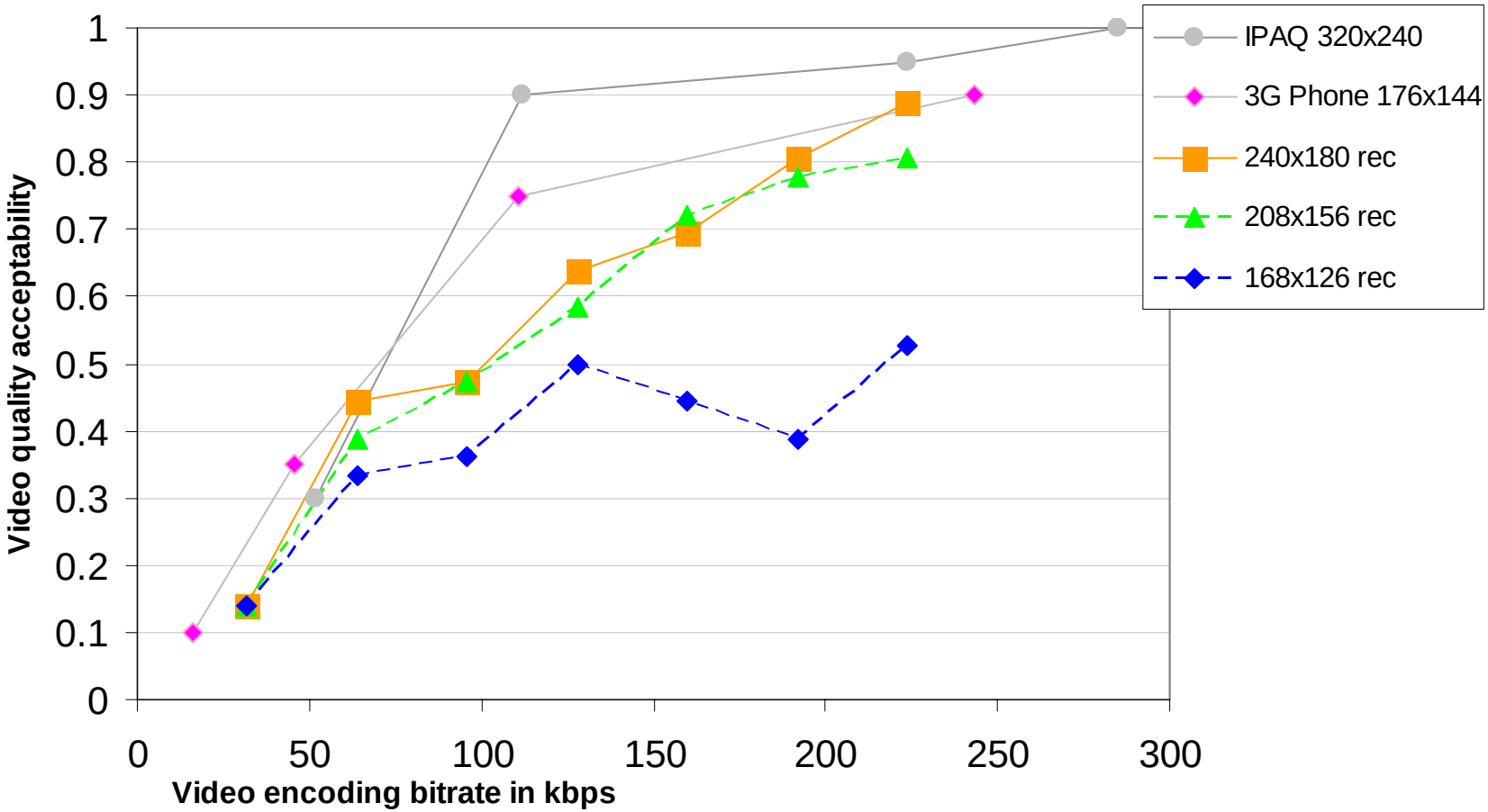

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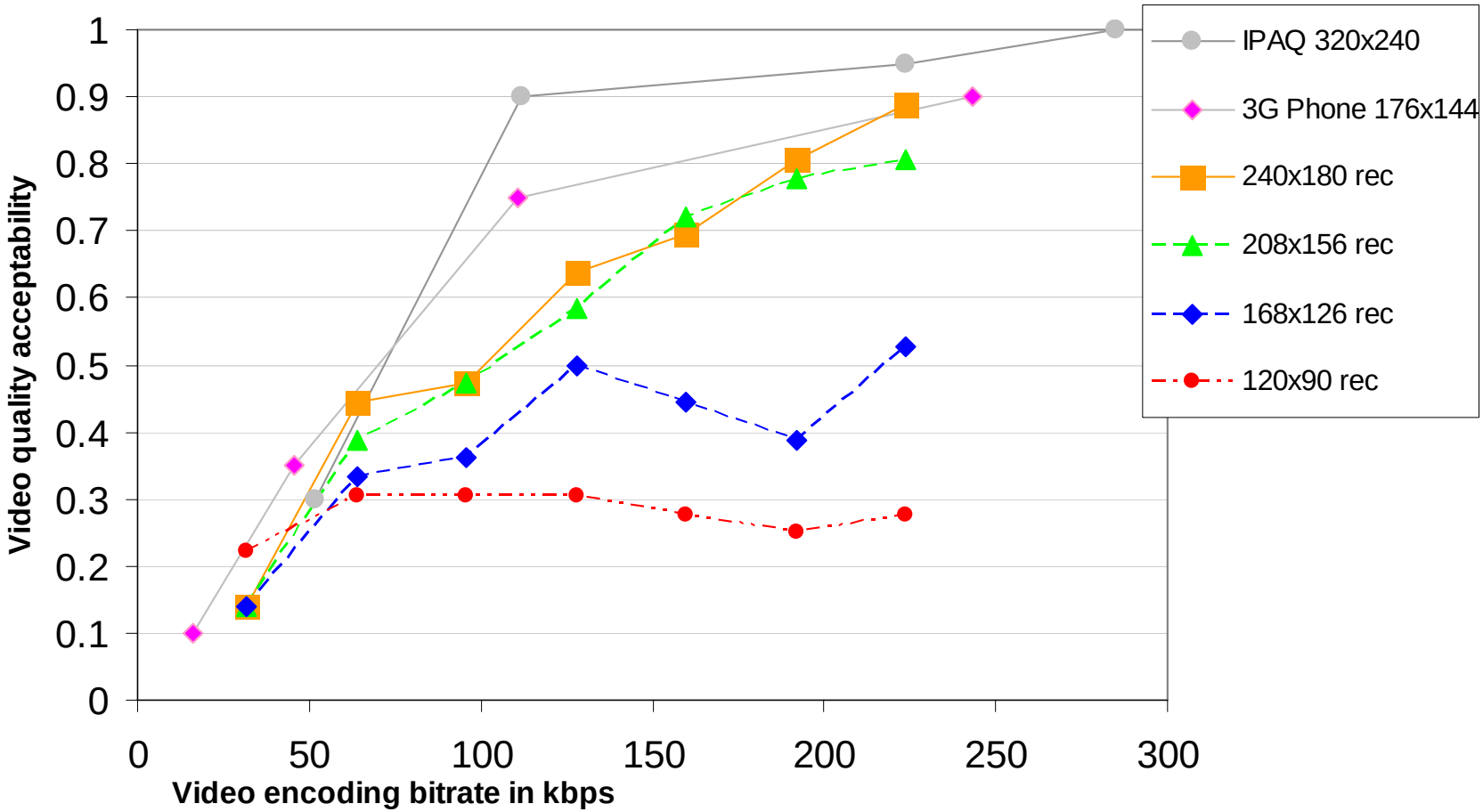

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Qualitative feedback

- Low resolution/small size
  - '*It was unacceptable when I couldn't read the text right away*'
  - 'The smallest size was clear but it was still unacceptable'
  - *'I didn't expect the text to be legible so I didn't mind'*
  - 'I *had to really concentrate to work out what was going on*'
  - 'it was pointless when I couldn't read the text'

Text quality study - Methodology

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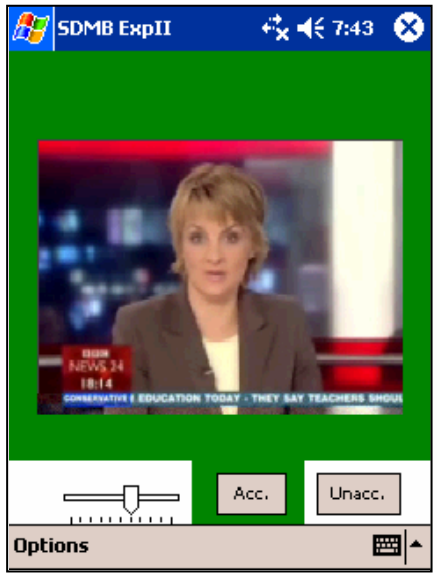
- 64 participants
- Four groups:
- 8 news TV clips:
  - 7 x 20 secs,
  - Degrading: 224 ... 32kbp
- size order x high/degr. text



News content on mobile TV – with legible text

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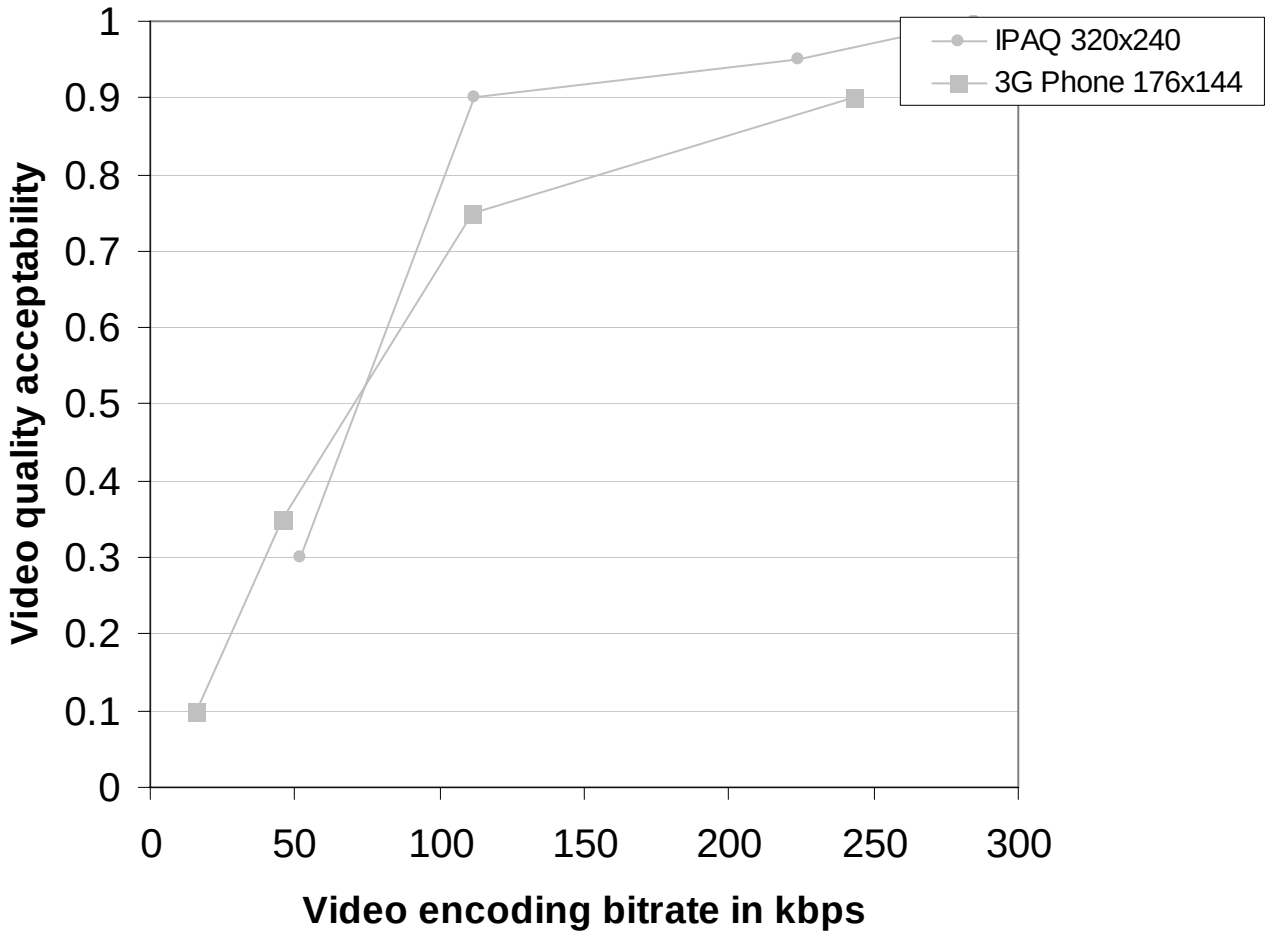

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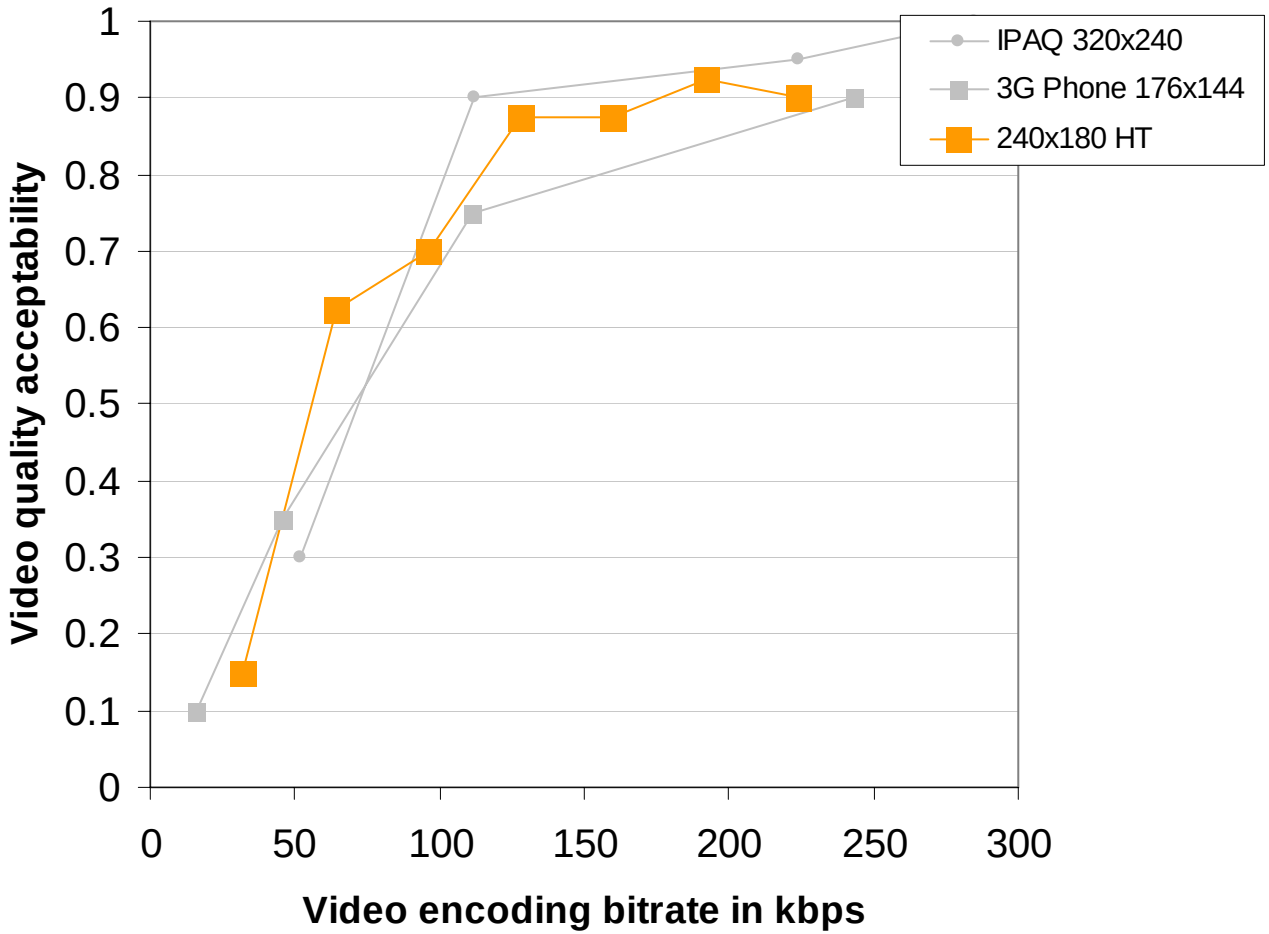

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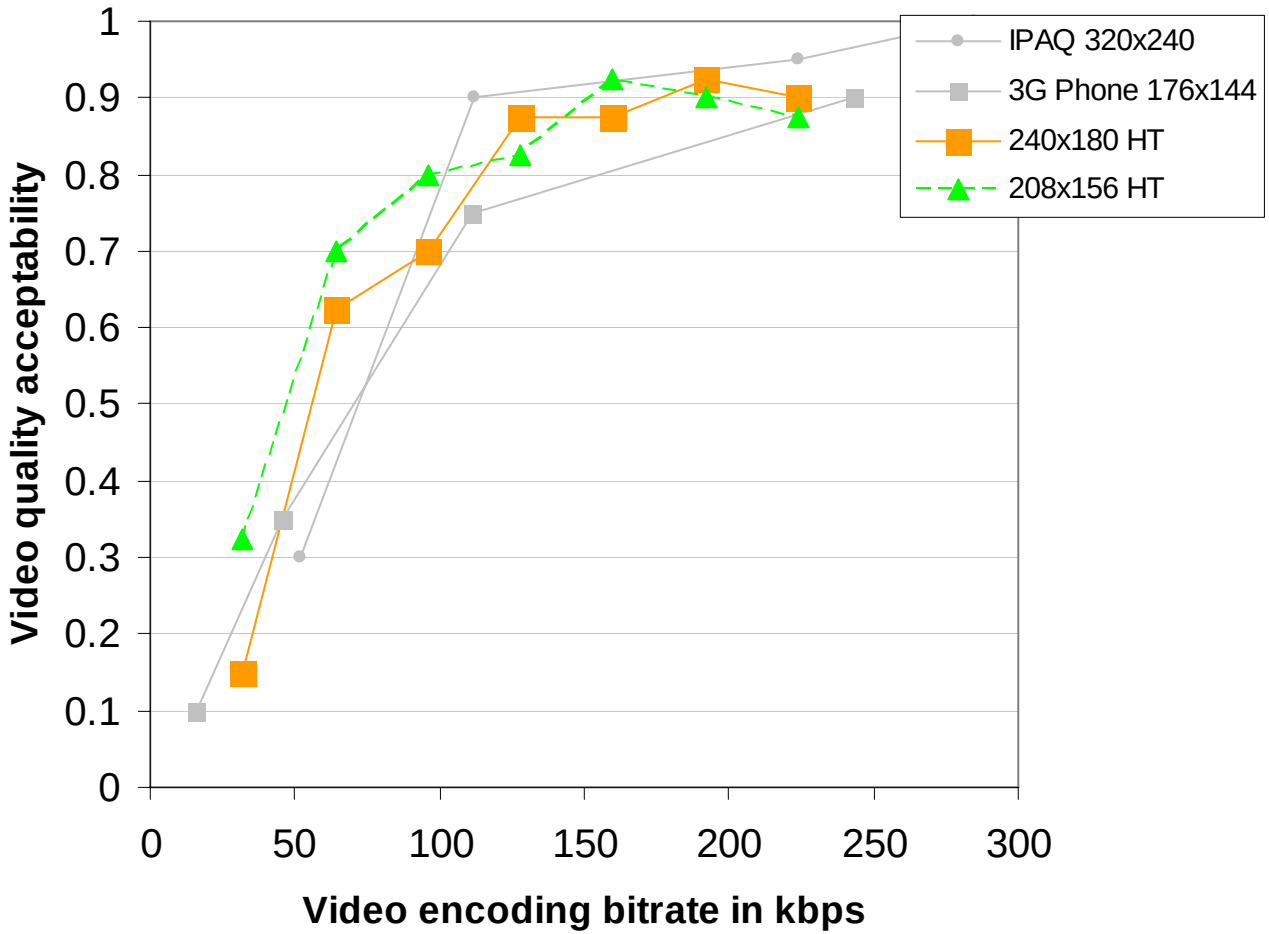

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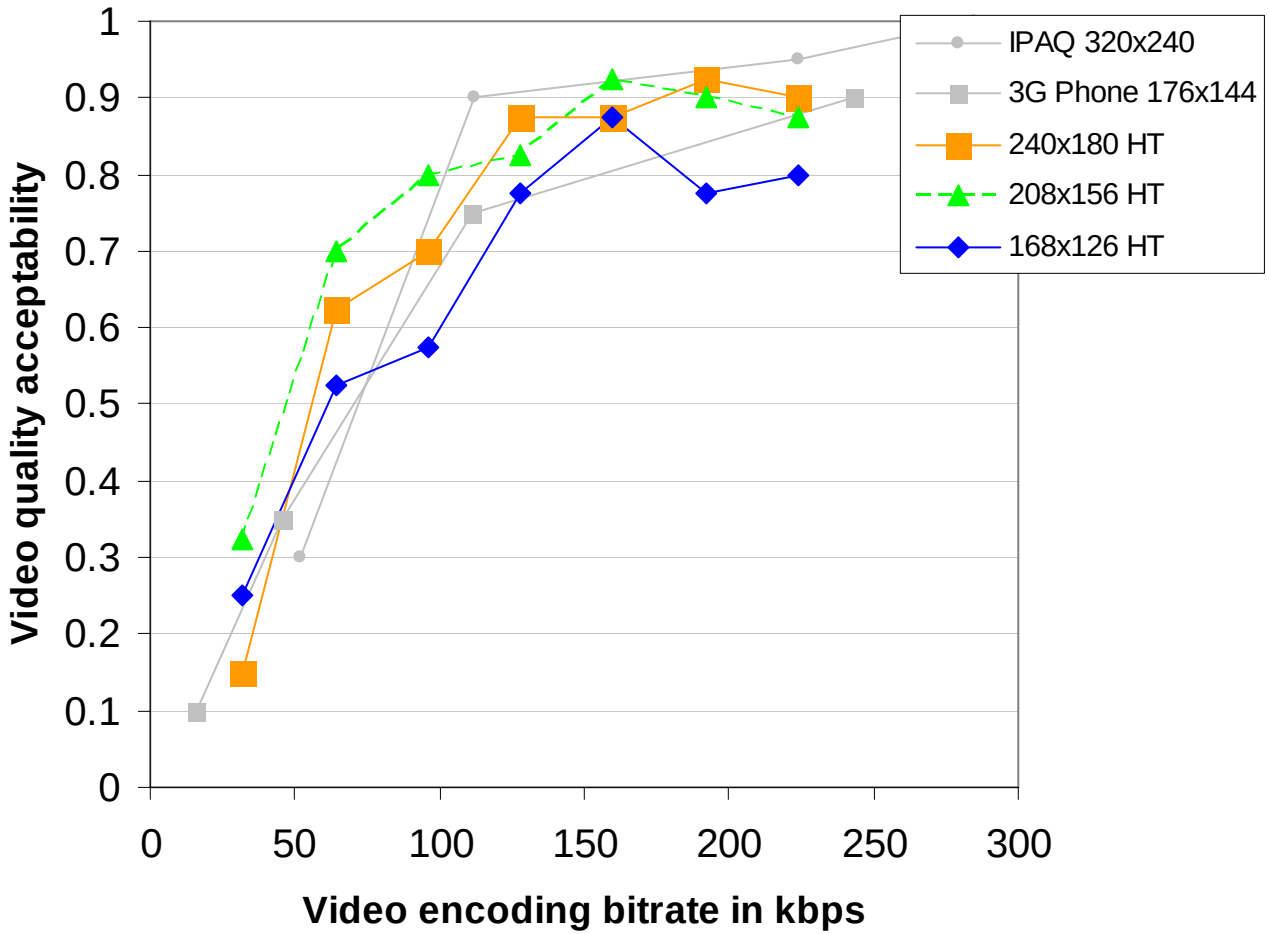

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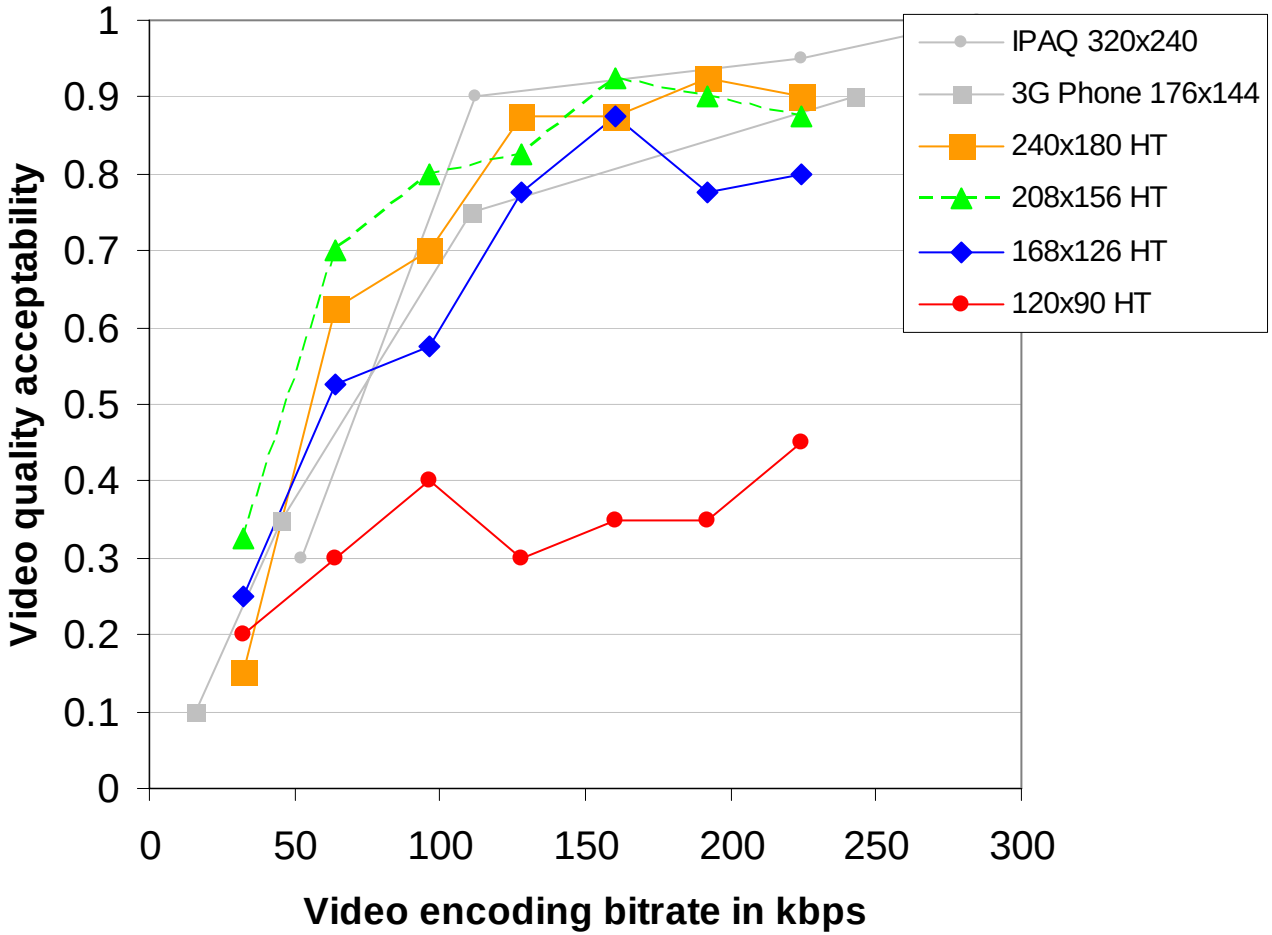

The influence of text on perceived video quality

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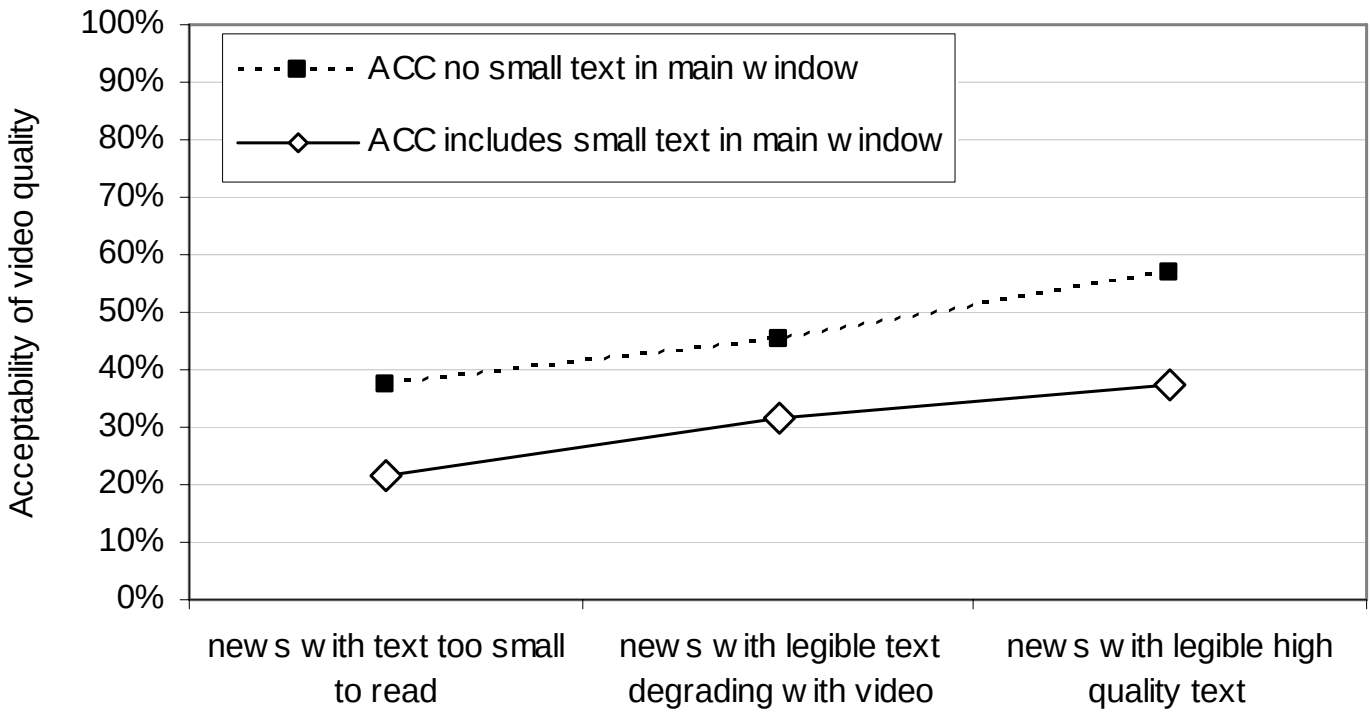

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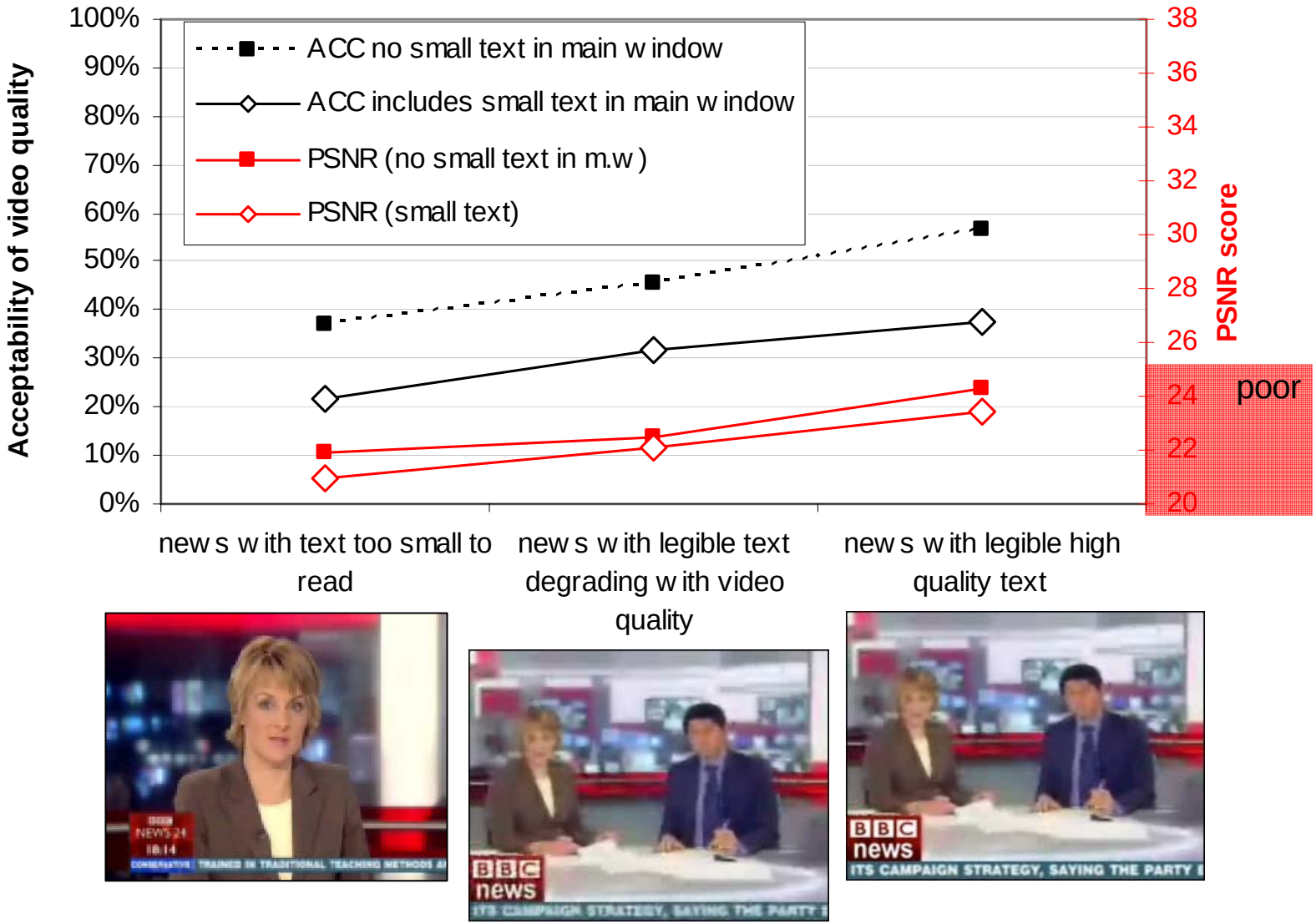
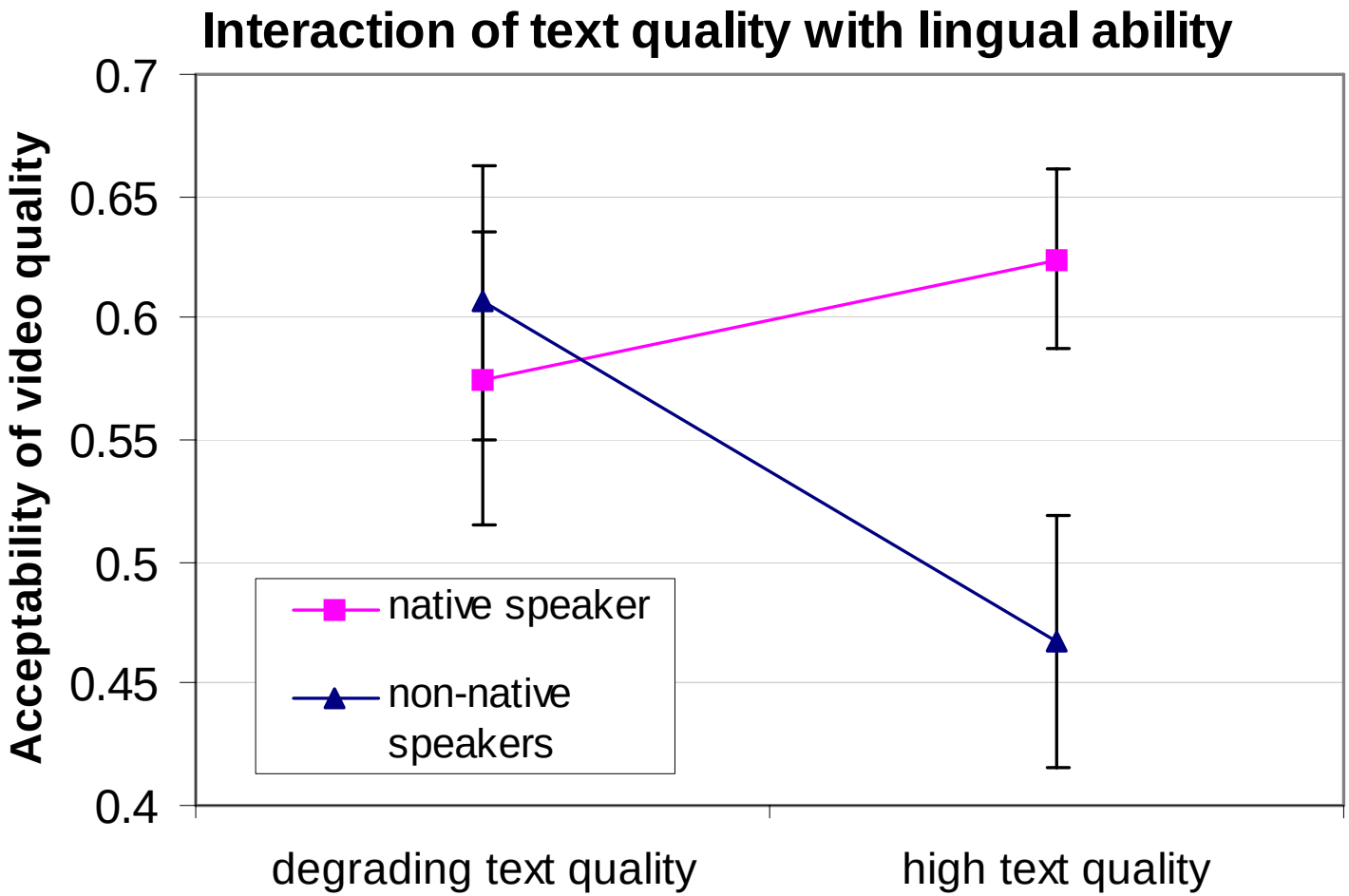


The effect of text quality

- Depends on language skills



The influence of resolution on shot types in football content

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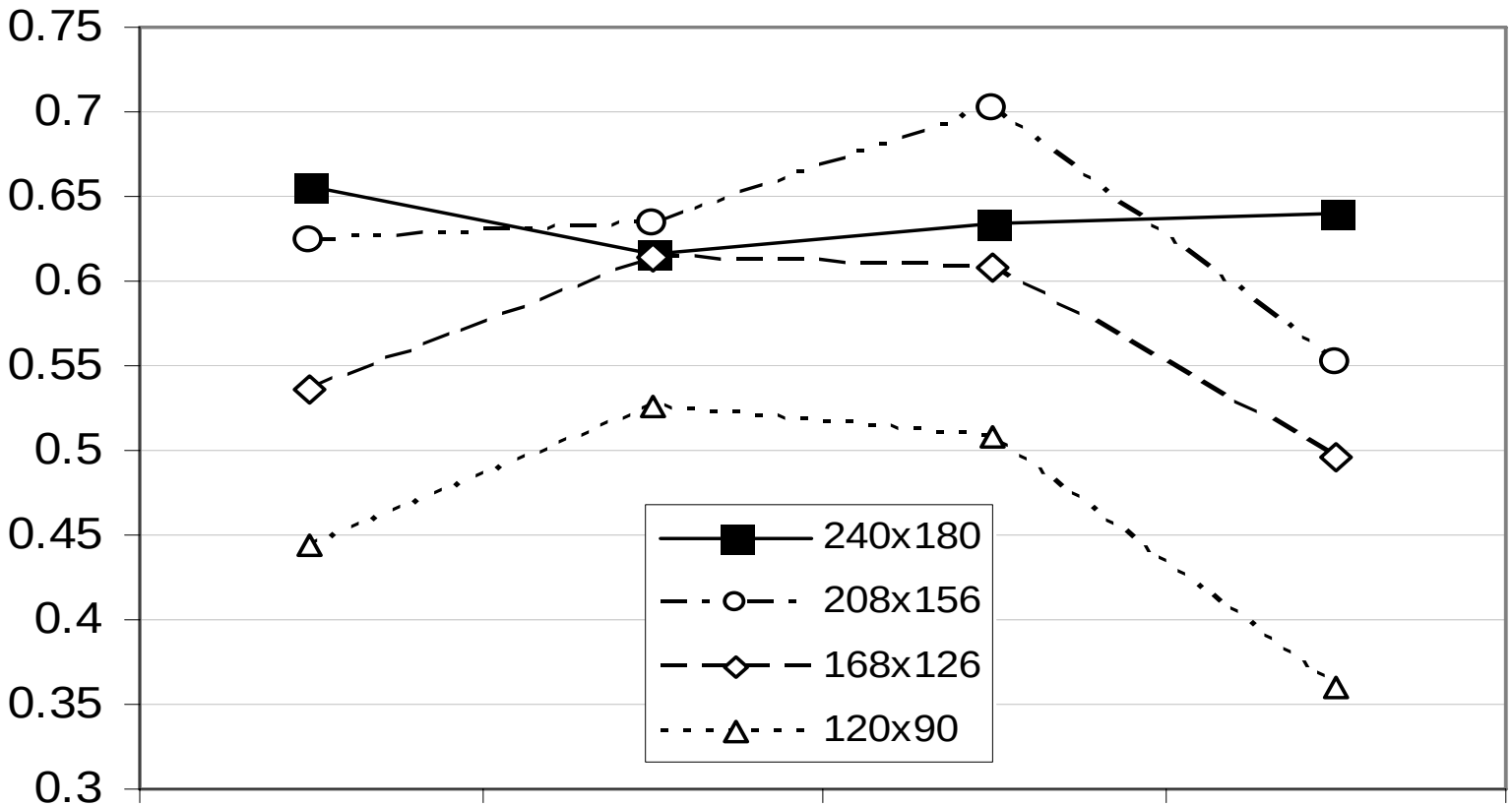
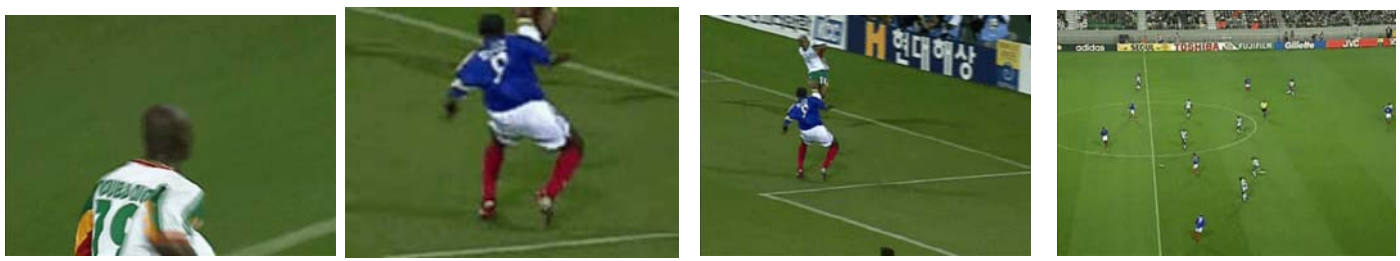


MS LS VLS XLS



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Summary

User experience of multimedia content depends on

- content
- interest in content
- size - total
  - and the shot types used within
- audio quality
- text quality

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