

	Crowdsourcing Study 2			Laboratory Study					
Seq.	3-2	3-2	2-3	3-2	2-3	2-4	4-2	2-4	4-2
F	0.16	6.58	0.07	1.49	3.48	4.8	9.55	5.36	9.87
P	0.688	0.012	0.878	0.226	0.066	0.032	0.003	0.024	0.003

Table 6: Statistical test results for Figure 5

adaptation strategy yields better QoE scores for identical video bitrates than single-dimensional strategies. In contrast to the widespread assumption that smooth switching performs better in terms of QoE, the presented results reveal that smooth switching performs only slightly better in the case of adapting towards lower quality.

Another unexpected result was the finding that frequent quality adaptation is not perceived considerably worse than videos where are less often quality changes happen. This might be based on that fact that we used chunk lengths typically used in current HAS implementations of 4 sec and 10 sec, which are considerably longer than those mostly used in related work.

Finally, the comparison between QoE perception of videos with quality adaptation vs. videos with one stalling of according length showed that, against the common assumption that stalling is always perceived much worse, in the tested cases stalling performed equally well with video adaptation in terms of resulting QoE.

The presented results are a first thorough analysis of several different impairment profiles very likely to appear in real-world HTTP adaptive streaming scenarios. They provide guidelines for QoE optimal adaptation strategies and additionally have revealed some new insights that have to be further analysed. In terms of quality adaptation vs. stalling, quality switches of larger amplitude together with longer stallings or multiple short stalling events would be a meaningful extension of the presented results. Similarly, additional quality switching amplitudes and periods are needed for better understanding the relationship between frequent quality adaptation and resulting QoE.

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