**INTRODUCTION** Solving spectroscopy problems is complex. There are many possible approaches to solving the same problem. Using problem solutions by a range of problem solvers with varying academic expertise, we developed a method for capturing cognitive thought processes in spectral problem solving.

**RESEARCH QUESTION** How does experience influence the productivity of spectral problem solving?

**PROBLEM-SOLVING VIDEOS**
- 1H NMR: 4 probs/18 vids
- 13C NMR: 6 probs/31 vids
- IR/MS: 6 probs/19 vids
- 2D NMR: 5 probs/5 vids
- Total: 21 probs/73 vids

**METHODS: QUALITATIVE**
1. Generating themes
   - Think-aloud interviews
   - Transcription
   - Inductive coding with NVivo² (video & text)
2. Relating themes
   - Relationships analysis
   - Frequency analysis

**SOLUTION-PATHWAY ANALYSIS**
Examples of problem-solving strategies of an expert and novice, visualised using the solution-pathway method.²

**FREQUENCY ANALYSIS**
Examples of themes:
- Prediction (P)
- Using visual aid (UVA)

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<th>Expert</th>
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**REFERENCES**

**CONCLUSIONS**
- Qualitative analysis of think-aloud interviews revealed common problem-solving features among participants with different academic levels.
- The feature expression and solution productivity were expertise-dependent.