

Section 5. Discussion as an IMRD component

Unit 2. Discussion: Grammar peculiarities

Outline

- Tenses
- Hedging
- Modal Verbs

Tenses

A sample Discussion section

The Impact of an Extended Stress Reduction Program on Quality of Alloys: Evidence for Long-Term Effectiveness and Future Considerations

Discussion

1 Previous research has demonstrated the effectiveness of interventions in improving the quality of alloys (QoA) and reducing stress in metals with various issues; Smith et al.¹⁸, for example, have shown that metals participating in intervention programs experienced improvements in QoA measures such as strength and durability. **2** However, these studies have either been of short duration or have not specifically focused on metals with stress-related disorders. **3** The aim of this study was to investigate the impact of an extended three-month stress reduction program on QoA among a group of metals being treated for stress-related issues, such as corrosion. **4** We found that participation in the three-month stress reduction program was associated with significant improvements in the skills required to enhance QoA in almost all cases. **5** These results extend those of Smith, confirming that a longer and more intensive period of stress reduction training tends to yield more effective skills compared to shorter-term interventions utilizing different methods. (Smith et al., 2011) **6** In addition, the improvements observed in our study were not influenced by factors such as composition or origin of the metals. **7** This therefore suggests that the benefits gained from stress reduction interventions may be applicable to a wide range of metals. **8** Importantly, this study is the first to our knowledge to investigate the effectiveness of extended interventions in metals with stress-related disorders. **9** Our results provide compelling evidence for the long-term involvement with such metals and suggest that this approach appears to be effective in counteracting stress that may exacerbate the issues. **10** However, it is important to acknowledge some limitations. **11** Although our hypotheses were statistically supported, the sample was not reassessed once the program was over. **12** Therefore, future research should include follow-up studies designed to evaluate the long-term retention of skills and their continued impact on QoA in metals.

Tenses

A sample Discussion section

The Impact of an Extended Stress Reduction Program on Quality of Alloys: Evidence for Long-Term Effectiveness and Future Considerations

Discussion

1 Previous research **has demonstrated** the effectiveness of interventions in improving the quality of alloys (QoA) and reducing stress in metals with various issues; Smith et al. ¹⁸, for example, **have shown** that metals participating in intervention programs **experienced** improvements in QoA measures such as strength and durability. **2** However, these studies **have** either **been** of short duration or **have not** specifically **focused** on metals with stress-related disorders. **3** The aim of this study **was** to investigate the impact of an extended three-month stress reduction program on QoA among a group of metals being treated for stress-related issues, such as corrosion. **4** We **found** that participation in the three-month stress reduction program **was** associated with significant improvements in the skills required to enhance QoA in almost all cases. **5** These results **extend** those of Smith, confirming that a longer and more intensive period of stress reduction training **tends** to yield more effective skills compared to shorter-term interventions utilizing different methods. (Smith et al., 2011) **6** In addition, the improvements observed in our study **were not** influenced by factors such as composition or origin of the metals. **7** This therefore **suggests** that the benefits gained from stress reduction interventions may be applicable to a wide range of metals. **8** Importantly, this study **is** the first to our knowledge to investigate the effectiveness of extended interventions in metals with stress-related disorders. **9** Our results **provide** compelling evidence for the long-term involvement with such metals and suggest that this approach **appears** to be effective in counteracting stress that may exacerbate the issues. **10** However, it is important to acknowledge some limitations. **11** Although our hypotheses **were** statistically supported, the sample **was not** reassessed once the program **was** over. **12** Therefore, future research should include follow-up studies designed to evaluate the long-term retention of skills and their continued impact on QoA in metals.

Present Perfect

Past Simple

Present Simple

Tenses in the Discussion section

1. Present Simple

2. Present Perfect

3. Past Simple

Present Simple

- General truths, facts, or established knowledge
- Findings that are universally accepted or do not change over time

Examples:

- *The results **show** that the alloy exhibits improved corrosion resistance.*

Present Simple

- General truths, facts, or established knowledge
- Findings that are universally accepted or do not change over time

Examples:

- *The study **confirms** that temperature **has** a significant effect on the material's mechanical properties.*

Present Perfect

- Actions or events that have occurred in the past but have relevance or implications in the present
- Recent research or findings

Examples:

- *Previous studies **have demonstrated** the influence of alloy composition on the material's electrical conductivity.*

Present Perfect

- Actions or events that have occurred in the past but have relevance or implications in the present
- Recent research or findings

Examples:

- *Several experiments **have been conducted** to investigate the effect of heat treatment on the alloy's microstructure.*

Past Simple

- Actions, experiments, or observations that were completed in the past
- Specific results or findings

Examples:

- *The tensile strength of the alloy **increased** with the addition of carbon.*

Past Simple

- Actions, experiments, or observations that were completed in the past
- Specific results or findings

Examples:

- *The corrosion rate **decreased** when the alloy **was subjected** to the protective coating.*

Hedging

- the use of cautious language
to express uncertainty or to qualify statements

Utilizing hedging techniques

- Modal Verbs
- Adverbs and Adjectives
- Tentative Language
- Comparative Language
- References to Previous Studies

Modal Verbs

- to indicate possibility, uncertainty, or limited generalizability

may, might, could, can

Examples:

- *The results suggest that the alloy **may** exhibit improved mechanical properties.*

Modal Verbs

- to indicate possibility, uncertainty, or limited generalizability

may, might, could, can

Examples:

- *These findings **could** be attributed to variations in the experimental conditions.*

Adverbs and Adjectives

- to hedge statements by indicating a degree of uncertainty or caution

Examples:

- *The observed trend is **generally** consistent with previous studies.*

Adverbs and Adjectives

- to hedge statements by indicating a degree of uncertainty or caution

Examples:

- *The observed trend in the data indicates **a relatively** strong correlation between the alloy composition and the electrical conductivity.*

Tentative Language

- to convey tentativeness or caution to be scientifically diplomatic

Examples:

- *It is worth noting that **further investigation is needed** to confirm these findings.*

Tentative Language

- to convey tentativeness or caution to be scientifically diplomatic

Examples:

- ***The evidence suggests*** a potential relationship between the variables, but ***additional studies are required*** to establish causality.

Comparative Language

- to indicate relative degrees of certainty or to acknowledge alternative explanations

Examples:

- ***The results are somewhat consistent with previous research in this area.***

Comparative Language

- to indicate relative degrees of certainty or to acknowledge alternative explanations

Examples:

- *The observed results **are similar to those reported in the literature**, although certain variations can be attributed to the specific alloy composition used in this study.*

References to previous studies

- to align the findings with existing knowledge while acknowledging potential differences or limitations

Examples:

- *Our results **are in line with prior studies, but some discrepancies exist.***

References to previous studies

- to align the findings with existing knowledge while acknowledging potential differences or limitations

Examples:

- ***The current findings support and build upon previous research, but with certain nuances.***

Instances of Hedging

A sample Discussion section

The Impact of an Extended Stress Reduction Program on Quality of Alloys: Evidence for Long-Term Effectiveness and Future Considerations

Discussion

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Modal Verbs

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Modal Verbs in Research Writing

- may, might
- can, could
- should
- ought to
- need to
- have to
- must

Feel the difference

- The decrease in mechanical strength **was** due to the presence of a crack in the alloy.
- The decrease in mechanical strength **may have been** due to the presence of a crack in the alloy.
- The decrease in mechanical strength **must have been** due to the presence of a crack in the alloy.

Meaning of the Modal Verbs

- Ability/capability
- Possibility/options
- Probability/belief/expectation
- Virtual certainty
- Advice/opinion
- Necessity/obligation

Match the modal to the meaning

Should, must, can, ought to, may, could, need to, might, have to, cannot/could not

Meaning	Modal verbs
1. Ability/capability	can
2. Possibility/options	
3. Probability/belief/expectation	
4. Advice/ opinion	
5. Virtual certainty	
6. Necessity/obligation	

Keys

Meaning	Modal verbs
1. Ability/capability	can
2. Possibility/options	may, might, could, can
3. Probability/belief/expectation	should, ought to
4. Advice/ opinion	
5. Virtual certainty	must, have to, cannot, could not
6. Necessity/obligation	must, need to, have to

Modal Verbs = Defective Verbs

- Have more than one meaning
should
 - Change meaning in different forms or tenses
must = have to
- ! mustn't ≠ don't have to

Modal Verbs = Defective Verbs

Compare:

*You **must** add this to the mixture = You **have to** add this to the mixture.*

BUT:

*You **must not** add this to the mixture $\neq$ You **don't have to** add this to the mixture.*

Modal Verbs = Defective Verbs

Can not ≠ cannot

Can not = possibly not (= may not or might not)

Cannot = impossible (= could not)

What about the past?

Modal Verb + have + V₃

Examples

This **may be** due to the fall in pressure.

This **may have been** due to the fall in pressure.

Modal Verbs of probability/belief/expectation

■ something happens/doesn't happen

Examples:

1. Titanium **should** remain stable if it is kept below 30°C.
2. Titanium **should not** decompose unless heated above 30°C.

Modal Verbs of probability/belief/expectation

■ something happens/doesn't happen

Examples:

3. By the time the AA is added, the crystals **should have dissolved** in Titanium.

4. This was unexpected; Titanium **should not have decomposed** at this temperature.

Practice time

Could, must, may, should, might, ought to, need to, can, have to

1. Perhaps the alloy's weakness was caused by improper composition.

→ The alloy's weakness **may have been/might have been/could have been caused** by improper composition.

2. We felt sure that the alloy's weakness was caused by improper composition.

→ The alloy's weakness _____ by improper composition.

3. No way was the alloy's weakness caused by improper composition.

→ The alloy's weakness _____ by improper composition.

4. We don't expect improper composition to weaken the alloy.

→ Improper composition _____ the alloy.

5. It's possible that the alloy's weakness wasn't caused by improper composition.

→ The alloy's weakness _____ by improper composition.

6. I advise you to use a different alloy.

→ You _____ a different alloy.

7. I don't think it was a good idea to use that alloy.

→ It _____ with that alloy.

Keys

1. Perhaps the alloy's weakness was caused by improper composition.

→ The alloy's weakness **may have been/might have been/could have been caused** by improper composition.

2. We felt sure that the alloy's weakness was caused by improper composition.

→ The alloy's weakness **must have been caused** by improper composition.

3. No way was the alloy's weakness caused by improper composition.

→ The alloy's weakness **cannot have been/couldn't have been caused** by improper composition.

4. We don't expect improper composition to weaken the alloy.

→ Improper composition **should not weaken** the alloy.

5. It's possible that the alloy's weakness wasn't caused by improper composition.

→ The alloy's weakness **may not have been/might not have been caused** by improper composition.

6. I advise you to use a different alloy.

→ You **should/ought to use** a different alloy.

7. I don't think it was a good idea to use that alloy.

→ It **shouldn't have been used** with that alloy.

Summary

- Main tenses used in the discussion section
 - Present Simple
 - Past Simple
 - Present Perfect
- Ways of Hedging
- Modal Verbs in Research Writing