**Does safety leadership training improve frontline construction leaders’**

**safety leadership practices and overall jobsite safety climate?**

**Supplementary material**

**Hypothesis 1:** *Compared to the leaders in the lagged (control) group (Group = 0; Pre\_T0, ref = T-2), the leaders in the early group (Group = 1) will show an increase in their:*

1. Understanding of the FSL safety leadership skills (Post\_T0, ref = Pre\_T0)
2. Use of FSL safety leadership practices (T+1, ref = Pre\_T0)
3. Use of safety practices (T+1, ref = Pre\_T0)
4. Crew reporting of safety-related conditions (T+1, ref = Pre\_T0)

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| **Supplemental Table 1** – Leader outcomes: Mixed models including and excluding intervention group (early vs. lagged) parameter (Hypotheses 1) | | |
|  | **Model 1 (Std. Error)** | **Model 2 (Std. Error)** |
| **Understanding safety leadership skills** |  |  |
| Time | 0.12 (0.04) \*\*\* | -0.16 (0.06) \*\*\* |
| Group |  | -0.49 (0.19) \*\*\* |
| Time\*Group |  | 0.46 (0.07) \*\*\* |
| *Between-person variance* | *0.07 (0.02)* | *0.08 (0.02)* |
| *Within-person variance* | *0.20 (0.02)* | *0.18 (0.02)* |
| ln(likelihood) | *-417.85* | *-401.05* |
| Difference in -2 ln(likelihoods) = 33.6 \*\*\* |  |  |
| **Safety leadership practices** |  |  |
| Time | 0.03 (0.01) \*\* | -0.06 (0.04) |
| Group |  | 0.10 (0.06) \* |
| Time\*Group |  | 0.21 (0.05) \*\*\* |
| *Between-person variance* | *0.14 (0.02)* | *0.13 (0.01)* |
| *Within-person variance* | *0.08 (0.01)* | *0.07 (0.01)* |
| ln(likelihood) | *-287.99* | *-273.51* |
| Difference in -2 ln(likelihoods) = 28.96 \*\*\* |  |  |
| **Safety practices** |  |  |
| Time | 0.06 (0.01) \*\*\* | -0.01 (0.04) |
| Group |  | 0.08 (0.06) |
| Time\*Group |  | 0.22 (0.05) \*\*\* |
| *Between-person variance* | *0.16 (0.02)* | *0.15 (0.02)* |
| *Within-person variance* | *0.09 (0.01)* | *0.08 0.01)* |
| ln(likelihood) | *-327.97* | *-316.53* |
| Difference in -2 ln(likelihoods) = 22.9 \*\*\* |  |  |
| **Crew safety reporting** |  |  |
| Time | *0.05 (0.20) \*\** | 0.02 (0.07) |
| Group |  | 0.06 (0.09) |
| Time\*Group |  | 0.14 (0.09) |
| *Between-person variance* | *0.22 (0.03)* | *0.21 (0.03)* |
| *Within-person variance* | *0.27 (0.02)* | *0.27 (0.02)* |
| ln(likelihood) | *-536.31* | *-536.18* |
| Difference in -2 ln(likelihoods) = 0.26 |  |  |
| \*\*\*p < 0.01; \*\*p< 0.05; \*p < 0.10  *Note*. All models controlled for ethnicity, language, and learning goal orientation. | | |

**Hypothesis 2:** *Compared to workers of leaders in the lagged (control) group (Group = 0; T-1, ref = T-2), workers in the early group (Group = 1) will report:*

1. An increase in their leader’s use of safety leadership skills (T+1, ref = T-1)
2. An enhanced safety climate (T+1, ref = T-1)
3. An increase in their use of safety practices (T+1, ref = T-1)
4. An increase in their reporting of safety-related conditions (T+1, ref = T-1)

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| **Supplemental Table 2** – Worker outcomes: Mixed models including and excluding intervention group (early vs. lagged) parameter (Hypotheses 2) | | |
|  | **Model 1 (Std. Error)** | **Model 2 (Std. Error)** |
| **Leaders safety leadership practices** |  |  |
| Time | 0.03 (0.01) \*\*\* | 0.08 (0.05) |
| Group |  | 0.13 (0.08) |
| Time\*Group |  | 0.01 (0.07) |
| *Between-person variance* | *0.22 (0.03)* | *0.21 (0.03)* |
| *Within-person variance* | *0.09 (0.01)* | *0.09 (0.01)* |
| ln(likelihood) | *-265.93* | *-266.68* |
| Difference in -2 ln(likelihoods) = -1.5 |  |  |
| **Safety climate** |  |  |
| Time | 0.02 (0.1) \* | 0.05 (0.05) |
| Group |  | -0.02 (0.06) |
| Time\*Group |  | -0.00 (0.06) |
| *Between-person variance* | *0.09 (0.01)* | *0.09 (0.02)* |
| *Within-person variance* | *0.08 (0.01)* | *0.08 (0.01)* |
| ln(likelihood) | *-188.81* | *-191.45* |
| Difference in -2 ln(likelihoods) = -5.28 |  |  |
| **Safety practices** |  |  |
| Time | 0.02 (0.01) \* | 0.01 (0.05) |
| Group |  | -0.04 (0.06) |
| Time\*Group |  | 0.06 (0.06) |
| *Between-person variance* | *0.12 (0.02)* | *0.12 (0.02)* |
| *Within-person variance* | *0.07 (0.01)* | *0.07 (0.01)* |
| ln(likelihood) | *-188.11* | *-190.36* |
| Difference in -2 ln(likelihoods) = -4.5 |  |  |
| **Self-reported safety reporting** |  |  |
| Time | 0.02 (0.01) \*\* | 0.08 (0.05) |
| Group |  | 0.11 (0.08) |
| Time\*Group |  | -0.00 (0.07) |
| *Between-person variance* | *0.19 (0.03)* | *0.19 (0.03)* |
| *Within-person variance* | *0.09 (0.01)* | *0.09 (0.01)* |
| ln(likelihood) | *-252.66* | *-253.90* |
| Difference in -2 ln(likelihoods) = -2.48 |  |  |
| \*\*\*p < 0.01; \*\*p< 0.05; \*p < 0.10  *Note*. All models controlled for ethnicity, language, and learning goal orientation. | | |

**Hypothesis 3:** We also analyzed data from the early intervention group only to test the hypotheses that there would be continued improvement from 2-weeks after to 4-weeks after the training (Group = 1; T+2, ref = T+1) in:

*Leaders:*

1. Use of safety leadership practices
2. Use safety practices

Crew reporting of safety-related conditions

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| **Supplemental Table 3** – Leader outcomes: Mixed models comparing leaders’ 2- and 4- week follow-up data (Hypotheses 3) | |
|  | **Model 1 (Std. Error)** |
| **Safety leadership practices** |  |
| Time | 0.11 (0.03) \*\*\* |
| *Between-person variance* | *0.06 (0.01)* |
| *Within-person variance* | *0.05 (0.01)* |
| **Safety practices** |  |
| Time | 0.11 (0.03) \*\*\* |
| *Between-person variance* | *0.09 (0.01)* |
| *Within-person variance* | *0.05 (0.01)* |
| **Crew safety reporting** |  |
| Time | 0.24 (0.04) \*\*\* |
| *Between-person variance* | *0.23 (0.04)* |
| *Within-person variance* | *0.13 (0.02)* |
| \*\*\*p < 0.01; \*\*p< 0.05; \*p < 0.10  *Note*. All models controlled for ethnicity, language, and learning goal orientation. | |

**Hypothesis 4:** We also analyzed data from the early intervention group only to test the hypotheses that there would be continued improvement from 2-weeks after to 4-weeks after the training (Group = 1; T+2, ref = T+1) in:

*Workers:*

1. Their leader’s use of safety leadership skills
2. Safety climate
3. Use of safety practices

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| **Supplemental Table 4** – Worker outcomes: Mixed models comparing workers’ 2- and 4- week follow-up data (Hypotheses 4) | |
|  | **Model 1 (Std. Error)** |
| **Safety leadership practices** |  |
| Time | -0.01 (0.04) |
| *Between-person variance* | *0.18 (0.03)* |
| *Within-person variance* | *0.07 (0.01)* |
| **Safety climate** |  |
| Time | 0.00 (0.03) |
| *Between-person variance* | *0.10 (0.02)* |
| *Within-person variance* | *0.06 (0.01)* |
| **Safety practices** |  |
| Time | -0.03 (0.03) |
| *Between-person variance* | *0.13 (0.02)* |
| *Within-person variance* | *0.07 (0.01)* |
| **Crew safety reporting** |  |
| Time | -0.03 (0.04) |
| *Between-person variance* | *0.14 (0.02)* |
| *Within-person variance* | *0.09 (0.01)* |
| \*\*\*p < 0.01; \*\*p< 0.05; \*p < 0.10  *Note*. All models controlled for ethnicity, language, and learning goal orientation. | |