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Factors that Influence Farm Safety Decisions of Young Adults when Entering Agricultural Grain Bins

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Abstract

The approaches that parents take in the supervision of youth who perform hazardous tasks on family farms can affect youth safety outcomes. This research examines the most significant factors affecting youths' decisions to enter agricultural grain storage facilities. Over 200 students attending a Midwestern land-grant university who had grain bin experience as youth completed a decision-making survey. Students chose from a list of actions in three realistic but hypothetical scenarios involving grain bin entry. Afterward, they ranked factors according to the level of importance in their decision. Although most participants chose options that emphasized safety when answering the scenario questions and held the "personal safety" factor in highest regard, some chose higher-risk options and valued "productivity." The findings revealed that youth held little value in their parents' authority and pressure when making decisions related to grain bin entry. The study's limitations are addressed, as are the implications of these findings for youth safety outcomes on family farms.

Keywords

Decision-making; External pressures; Farm youth safety; Grain bin safety

In 2012, there were approximately 14,000 documented injuries of youth living on, working on, or visiting U.S. farms (Hendricks et al., 2018). Youth in agriculture are at a unique risk for injuries for several reasons. The lack of separation between their home and work is a primary reason (Rivara, 1997), but there are other risk factors. Youth are more susceptible to injury because they are smaller, weaker, and lack maturity and experience (Arcury et al., 2015). The frequency of injuries and fatalities of agricultural youth has declined in recent years; however, this is not the case when analyzing incidents involving grain storage facilities, or grain bins (Issa et al., 2016b).

A grain bin is a type of agricultural confined space that poses both entrapment and engulfment hazards. Grain entrapment is a partial submersion in which the victim's head remains visible above the grain, whereas engulfment is when the victim is fully submerged, and the victim's head is not visible above the grain (Issa et al., 2017b). Historically, one in five recorded grain entrapment and engulfment cases has involved a youth age 20 or younger

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(Issa et al., 2016b). In 2018 alone, there were five grain entrapment and engulfment cases involving a youth age 21 or younger where the victim's age was known (Cheng et al., 2019). From 2015 to 2019, the average annual number of grain entrapment and engulfment cases where the victim's age was known that involved a youth age 21 or younger was 2.4 (Cheng et al., 2018, 2019, 2020; Issa et al., 2016a, 2017a).

In an industry with the second-highest fatality rate among youth workers, there are regulations for protecting young agricultural employees' health and welfare (Miller, 2012). The Hazardous Occupations Orders for Agriculture (HOOA) labeled eleven tasks as too dangerous for youth age 16 and younger to perform. One task is "working inside a fruit, forage, or grain storage designed to retain an oxygen-deficient or toxic atmosphere" (USDOL, 2007, p. 5). However, there are exemptions to this regulation, including "youths employed on farms owned or operated by their parents" (USDOL, 2007, p. 5). This exemption means there is an opportunity for youth under the age of 16 to legally work on a farm owned by their parents. Injury data from Cheng et al. (2019), Issa et al. (2017a), and others suggest that youth under the age of 16 are not only working on farms, but they are also injured on farms. Whether parents are supervising the youth in these situations is not documented in the literature. Further, little published research has examined the role that parents and other external parties play in influencing youth decision-making about farm hazards.

Parent and Youth Interface in Agriculture

Parents may involve their children in farm work because they perceive the benefits outweighing the risks (Elliot et al., 2018). Parents recognize their responsibility in making the farm environment as safe as possible for their youth yet feel unable to protect them in every way (Nilsson, 2016). Parents modeling safe farm behaviors could mitigate their youth's risk-taking tendencies (Jinnah and Stoneman, 2016). Still, unsafe behaviors occur. A positive correlation between fathers' unsafe farm behaviors and their children's behaviors has been documented, as youth often mimic their elders (Jinnah and Stoneman, 2016).

Nearly half of all youth injured on farms are under the supervision of an adult who is actively performing farm work (Wright et al., 2013). Parents may assume that farm safety is "common sense" (Summers et al., 2017) and that safety conversations can be disregarded because their youth know the hazards. Some parents insist that doing farm work while young teaches youth how to be safe, and they argue that a minor injury is beneficial because it allows youth to learn safety on their own (Nilsson, 2016). However, because youth have limited life experience, they require explicit safety training.

Youth Development and Risk-Taking

Parents may rely on a child's age to determine when that child can perform specific farm tasks (Jinnah and Stoneman, 2016). Per Piaget's stage theory of cognitive development, most individuals are inadequate at reasoning and abstract thinking until they reach the formal operational stage at 18 years old (Huitt and Hummel, 2003). Piaget's stage theory of cognitive development does not account for individual differences between children, but it

is accepted by many child development specialists as the best description for how children learn, take in information, and take action (NRC, 2000). Given the framework offered by Piaget, farm tasks that require consideration of multiple moving parts and several hazards, such as those related to grain bins, may be inappropriate for youth younger than 18 years old to perform.

Gender often determines the level of youth responsibility on farms (Summers et al., 2017). Stoneman and Jinnah (2016) determined that fathers believed boys could safely operate machinery at a younger age than girls. This belief was maintained even though historical data show that the number of youth farm injuries increases with age, and boys are twice as likely as girls to be injured (Rivara, 1997). Gender also plays a role in risk-taking propensity, as boys are twice as likely as girls to partake in risky activities (Lasenby-Lessard et al., 2013).

Youth who have increased experience with an activity may show heightened risk-taking, and the experience may not necessarily translate to lower levels of injuries (Lasenby-Lessard et al., 2013). Instead, more experience could lead to more injuries because youth may take added risks with familiar activities. According to Lasenby-Lessard et al. (2013), youth will take added risks when they assess an activity as having low danger and low vulnerability for injury. Thus, continuous exposure to grain storage facilities likely leads to lower risk-assessment levels due to youths' increased experience. Because of their added experience with specific activities, youth decision-making could be skewed.

Decision-Making

The theory of cognitive dissonance explains the relationship between contradicting cognitions, which causes an uncomfortable state of mind (Festinger, 1957). An individual will typically attempt to quickly resolve contradicting cognitions to reduce the mind's discomfort (Mosher et al., 2013). There are three ways employees can address this internal conflict: (1) ignore their judgment and obey their leadership, (2) ignore their leadership and follow their judgment, or (3) delay the decision until forced to act (Das et al., 2008).

Workers must make decisions based on their safety knowledge and external pressures (Mosher et al., 2014), yet various additional factors play a role in decision-making. Mosher et al. (2014) presented adult grain elevator workers with a grain bin entry scenario and asked them to choose an action. The study found that safety was the main factor in worker decisions, whereas productivity, peer pressure, and supervisor opinion were less critical to the decision-making process (Mosher et al., 2014).

Previous research acknowledged that youth work on family farms under parental supervision (Summers et al., 2017; Jinnah and Stoneman, 2016; Stoneman and Jinnah, 2016). This study seeks to determine if youth decision-making patterns concur with adult workers regarding grain bin entry, as documented by Mosher et al. (2014). Data were collected in response to two research questions:

1. What role does parental supervision play in youth safety-related decisions on family farms?

2. How do personal safety, productivity, hazard level of the task, likelihood of engulfment, parental authority and pressure, and sibling and peer pressure affect youths' decisions?

Methods

The study population included students enrolled in the following departments at a Midwestern land-grant institution: agricultural and biosystems engineering, agricultural education and studies, agronomy, animal sciences, horticulture, and economics (N = 2,687 students). These specific academic departments were selected due to their hypothesized concentration of students who grew up on farms and therefore would have grain bin experience. The sampling frame included students who self-identified as having experience inside grain bins when younger than 18 years old. The precise number of students within the targeted departments who met this criterion cannot be measured or confirmed. Therefore, coverage error is possible (Dillman et al., 2009).

Survey

The Qualtrics^{XM} platform was used for survey development and administration (https://www.qualtrics.com). The Dillman et al. (2009) tailored design helped frame the survey development process. Participant consent was obtained, followed by a screening question to ensure that all participants had grain bin experience when younger than 18 years old. Included participants were asked to describe why they were in grain bins as a youth and what tasks they performed.

Next, the survey presented three scenarios involving grain bins. Students chose an action that best reflected how they would react if they were presented with that scenario as a youth under 18 years of age on their family farms:

Scenario 1—You are working with your parent to unload a grain bin on your family farm when you notice that the auger is moving less corn than before. Your parent suggests there may be a blockage of bad grain and asks you to drop into the top of the bin to physically break up the obstruction while the auger continues running. Your parent agrees to supervise the auger. What is your next step?

A. Enter the grain bin to remove the blockage.

B. Use a pole to break up the blockage from outside the bin.

C. Wait five minutes to see if the blockage breaks down by itself.

D. Tell your parent it is dangerous to enter the bin.

Scenario 2—Your neighbor agreed to help you unload corn from your bin when she gets home from work at 4:00 p.m. The local elevator closes at 5:00 p.m., and you need to take in your final load of the season to complete your contract. You figure you can at least start without your neighbor's help, and as the clock is ticking, you think about entering the bin to walk down the corn for quicker loading. What is your next step?

A. Call your neighbor to see how much longer they will be.

B. Wait ten minutes and then check the progress of the unloading.

C. Enter the bin to walk down the corn, potentially speeding up the unload.

D. Patiently wait for the grain to unload.

Scenario 3—You have a sibling of the same gender and similar age. You are both working to unload a grain bin when you learn that there is moldy corn caked on the side of the bin from top to bottom. Your sibling offers to enter the bin to break up the moldy corn they can reach with a shovel. Your sibling suggests that you turn off the auger and help break up the blockage. What is your next step?

A. Beat on the outside of the bin to break up the blockage.

B. Communicate the possibility of avalanched grain to your sibling.

C. Enter the bin to remove the blockage with your sibling.

D. Wait a few minutes to see if the blockage breaks down by itself.

After answering the three scenario questions, participants were asked to recall each scenario and rank how specific factors affected their decision-making in the scenario. The factors were chosen based on their significant association with safety decisions in previous research (Mosher et al., 2014; Kouabenan, 2009; Mullen, 2004). The factors included personal safety, productivity, hazard level of the task, likelihood of engulfment, parental pressure and authority, and sibling and peer pressure.

The survey also collected demographic data including age, gender, home state, and academic major. Finally, the survey asked if the participants had been entrapped or engulfed in grain when they were younger than 18 years old. If so, the participants were asked the year of the incident, how old they were when the incident occurred, and, if they wished, to briefly describe the incident.

Statistical Analyses

Results were calculated using IBM SPSS (ver. 27). Chi-square tests of independence were performed to determine if there were dependent relationships between variable pairs. In this study, the variable pairs were the participant's decision in each scenario and the demographic characteristics (age, gender, state, and academic major).

Following the chi-square tests of independence, the standardized adjusted residuals were analyzed to determine the strength of the dependent relationships (Agresti, 1999, pp. 261–262). The positive or negative sign of a residual depends on the difference between the observed frequency of a variable versus its expected frequency. When the observed frequency is greater than the expected frequency, a positive residual is detected. Conversely, when the observed frequency is less than the expected frequency, a negative residual is found (Agresti, 1999, pp. 261–262). An adjusted residual value greater than 2 suggests a dependent relationship between a pair of variables. However, substantial evidence for a dependent relationship between two variables is demonstrated when an adjusted residual value is greater than 3 (Agresti, 1999, pp. 261–262).

A statistical analysis adopted from Keren et al. (2006) was used to examine the significance of individual decision-making factors versus all other factors. The factors were arranged in the order in which they were most commonly ranked for each scenario. The calculation analyzed the number of times a certain factor was chosen in its most common ranking versus the number of times it was chosen in all other rankings. For example, the personal safety factor was ranked most commonly as first for scenario 1. The analysis divided the number of times personal safety was ranked first by the number of times personal safety was ranked second, third, fourth, or fifth. A value of one was labeled the ultimate mean, which represented factors that were not prioritized more or less than other factors. If a value less than one was calculated, the factor was deemed less important than the other factors. If a value greater than one was calculated, the factor was deemed of greater importance in relation to the other factors.

A t-test analysis was also conducted to determine the significance of each factor's mean value compared to the assumed mean value. Because there were five factors to be ranked for scenarios 1 and 3, the hypothesized mean value, or middle ranking value, was 3. However, for scenario 2, which only had four factors to be ranked, the hypothesized mean value was 2.5. A significant result indicated that the particular factor was prioritized more than the other factors.

Results

The survey yielded 229 recorded responses (11.7% response rate). Of the recorded responses, 206 participants had grain bin experience when younger than 18 years old and were therefore included in the study. Participants who met this criterion were involved with the following grain bin experiences: cleaning or removing grain from a bin (n = 172, 92.9%), repairs and maintenance (n = 67, 36.2%), playing inside a bin (n = 33, 17.8%), checking the grain level, condition, or moisture content (n = 25, 13.5%), or leveling grain (n = 20, 10.8%). Because the demographic questions were positioned at the end of the survey, there was a percentage of survey breakoff. Some participants completed the scenario portion of the survey but failed to answer the demographic questions. The survey demographics are listed in table 1.

One student reported having been entrapped in grain as a youth. The incident occurred in 2006 when the participant was 11 years old. According to the participant, they were "cleaning a bin and following [the] sweep and was wrapped in [the] auger." The participant stated that the local fire department came to the farm to remove them from the grain. The participant was flown to the area hospital for treatment.

Scenarios

Two of the variable pairs showed a significant relationship using the chi-square test of independence. The level of significance (α) was 0.05. The significant pairs were the relationship between gender and scenario 2, χ^2 (3, N = 169) = 12.41, p = 0.006, and the relationship between gender and scenario 3, χ^2 (3, N = 169) = 8.56, p = 0.035. Table 2 shows the associations between the demographic variables for each scenario.

The standardized adjusted residual analysis, shown in tables 3, 4, and 5, suggested a strong association between males and entry into grain bins for all three scenarios, with males more likely to enter the bin rather than wait. The analysis also indicated that the younger members of the sample (ages to 18 to 21) were more likely to choose options that were productive but did not require them to enter the bin, such as using a pole to break up the blockage, beating on the outside of the bin, communicating, or waiting.

Factors Affecting Scenarios

Scenario 1 analyzed personal safety versus external pressure. In addition to the personal safety factor, external pressure also had a value greater than one. This indicates the importance of each factor over other factors in the participants' decision-making. In scenario 2, which analyzed personal safety versus saving time, personal safety was the only factor with a value greater than one. Therefore, personal safety was the only factor that the participants held of great importance in scenario 2. Scenario 3 examined personal safety versus sibling and peer pressure. Personal safety and sibling and peer pressure provided values that were significantly greater than one, indicating their greater importance over the remaining factors. Table 6 outlines the full analysis versus the ultimate mean.

The significance level for the t-test analysis was $\alpha = 0.001$. In scenario 1, the factors personal safety, productivity, and parental authority and pressure all yielded p-values less than 0.001, which indicated their importance over the hazard level of the task and the likelihood of engulfment (table 7). Two factors yielded significant values for scenario 2: personal safety and likelihood of engulfment (table 8). Finally, scenario 3 yielded three significant p-values less than 0.001. The factors showing significant values were personal safety, hazard level of the task, and sibling and peer pressure (table 9). Because all three scenarios exhibited t-test values showing that personal safety was significant, this factor was extremely important in the participants' decision-making.

Discussion

Several noteworthy findings resulted from this study. Research question 1 examined the role of parental supervision in youth safety-related decisions on family farms. The results from scenario 1, which analyzed personal safety versus external pressure (including parental pressure), showed that participants in this study generally did not place these external pressures above their personal safety. Instead, the participants looked for other ways to remain productive rather than enter the bin, confront the parent, or wait until they were forced to act.

Research question 2 analyzed the factors that affected youths' decision-making. The factors analyzed were personal safety, productivity, hazard level of the task, likelihood of engulfment, parental pressure and authority, and sibling and peer pressure. From the survey results, it is evident that the participants considered their personal safety when making grain bin entry decisions. Both results aligned with the findings of Mosher et al. (2014) and Keren et al. (2009), who found that personal safety was important to workers when making decisions in grain handling and industrial settings, respectively. The t-tests generated the

same result, i.e., personal safety was significant in the decision-making process for all three scenarios, indicating that the participants highly valued their personal safety.

The findings revealed differences among the participants' choices according to their demographics. The younger population was much more likely to find alternative methods to remain productive instead of entering the bin. This population favored using a pole or beating on the outside of the grain bin to break up the blockage. The older population could have indicated more risk-averse behavior for various reasons, but the younger population, likely due in part to their lack of experience, may feel differently.

Gender differences played a noteworthy role in youth safety-related decisions. In scenarios 2 and 3, there was a significant difference between the decision-making of males and females. In both scenarios, males were more willing to enter the grain bin. Females were more likely to wait until forced to act or choose an alternative option, even if it took more time. These findings concur with previous research that determined females and males behave differently in high-risk environments (Lasenby-Lessard et al., 2013). The differences in responses with gender raise a question about how parents supervise their sons versus how they supervise their daughters when working on the farm. A closer examination of these differences in future research is warranted.

Aside from their decision-making and demographic associations, the participants were highly aware of grain entrapment hazards. The t-test results for scenario 3 showed a significant value for the hazard level of the task, indicating that the participants knew the hazard level associated with the avalanched grain scenario and the hazard of the confined space. This finding aligns with other work suggesting that youth are familiar with hazards (McCallum et al., 2013; Ramaswamy and Mosher, 2015; Wright et al., 2013). Similarly, the t-test results for scenario 2 showed a significant value for likelihood of engulfment. Therefore, the participants knew the dangers of walking down grain in scenario 2 and thought there was a high likelihood that they may become engulfed. In general, the participants knew the hazards associated with grain bin entry.

Because self-preservation was held in such high regard, and the participants were well aware of the hazards, it is questionable why grain entrapment incidents continue to occur. Knowing the hazards associated with grain bin entry does not always correspond with safely performing tasks (Sanderson et al., 2010). Undoubtedly, the factor related to saving time plays a role in youth grain bin entry decisions, although the data suggest that the participants did not hold saving time at a high level of importance. The findings of this study point toward the need for additional research to understand more broadly the influencing factors in youth decisions regarding hazardous farm tasks, including grain bin entry.

Limitations

Several limitations of this study should be noted. Because participants were aware that the study was analyzing farm safety, they may have responded in a more risk-averse manner, resulting in response bias (Creswell, 2012). Further, the characteristics of the study population (undergraduates at a Midwestern land-grant institution) could have influenced each participant's perspective on safety, also raising the possibility of response bias.

Specifically, social desirability bias is possible, as the participants may have responded in socially appropriate ways instead of revealing their actual opinions (Grimm, 2010). To help combat this issue, the survey reminded the participants that "there are no right or wrong answers" because what may be considered "right" from a safety perspective differs drastically from what is "right" from a productivity standpoint. Additionally, the participants were reminded that the researchers wanted to identify "how you would first react if you were in each situation." Despite the reminders, it is possible that some participants still provided biased responses.

The scenarios were intended to be as realistic as possible; however, they were hypothetical. A participant could have answered each scenario one way on the survey but a different way in person. Therefore, there could be differences between what the participants reported they might do in a hypothetical situation versus what they would actually do in a real situation. However, Kahneman and Tversky (1979) determined that providing participants with the chance to make a hypothetical choice is the simplest procedure for examining theoretical questions. Therefore, posing hypothetical scenarios and asking participants how they would react was a rational method for collecting data in this study.

Instead of sampling a population that was younger than 18 years old, the sample population in this study was college students studying agriculture at a Midwestern university who were responding to hypothetical scenarios that may have occurred when they were younger. This population was selected primarily because there is a lack of research on how college-age individuals perceive safety hazards on farms. The study sought to fill this void. Additionally, Institutional Review Board approval was less rigorous when using a population older than 18 because parental consent was not needed for each participant. Therefore, this study does not adequately capture the attitudes and safety perceptions of youth 18 and younger, as it was not the intention of this study. There is also a possibility that the participants did not remember their actions as they actually occurred due to the participants' distance from the choice over time. While the population used in this study may seem like a possible limitation, we do not consider it to have influenced the findings.

Finally, this study only surveyed students at one Midwestern university. The results cannot be generalized to other universities nor to various years at the same university due to discrepancies in enrollment figures and demographics. In addition, because this population is studying at a four-year institution, they may think about safety differently or be more safety-conscious than a population in the same age range who are not pursuing post-secondary education. Again, these results cannot be adequately generalized to other populations within the same age range without accounting for discrepancies in education level. We acknowledged this limitation before beginning the study. The study was intended to provide better understanding of the situations in which youth made safe or unsafe decisions on farms while facing external pressures, including parental authority and pressure, sibling and pressure, and productivity.

Conclusion

Youth value their personal safety and are aware of the hazards associated with grain bin entry. Factors including parental authority and pressure, sibling and peer pressure, and productivity do not influence youth decisions regarding grain bin entry. However, it is still questionable why youth choose to make hazardous decisions involving grain bins.

It is evident that there is much more to understand about youth decision-making in hazardous agricultural situations. Additional research should be conducted to expand the participant population, include a broader scope, and adapt the survey instrument to include various agricultural tasks. There may also be associations between participant demographics and decision-making. A better understanding of youth decision-making would allow safety professionals to pinpoint the contributing factors in youth farm incidents and prevent their occurrence.

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Highlights

- A grain handling scenario-based survey was administered to college students studying agriculture.
- Participants chose an action after reading each scenario and ranked factors affecting their decision-making.
- Most participants chose a “safe” option and claimed to value their personal safety when making decisions.
- Parental authority and pressure had little influence on participants’ decisions to enter grain bins.

Table 1.

Characteristics of student sample.

Characteristics		Frequency	Percentage
Gender (*N* = 169)	Male	113	66.9%
	Female	56	33.1%
Age (*N* = 169)	18 to 21 years	132	78.1%
	22 to 33 years	37	21.9%
Home state (*N* = 168)	Iowa	133	79.2%
	Non-Iowa	35	20.8%
Academic major (*N* = 168)	Agricultural and biosystems engineering	28	16.7%
	Agricultural business	39	23.2%
	Agricultural studies	34	20.2%
	Agronomy	39	23.2%
	Animal science	28	16.7%

Table 2.

Chi-square values and significance levels of variable pairs per scenario.

Scenario	Variables	Chi-Square Value	Degrees of Freedom	p-Value
1: Safety vs. External pressure	Gender	7.13	3	0.067
	Age	0.41	3	0.938
2: Safety vs. Saving time	Gender	12.41	3	0.006*
	Age	1.85	3	0.602
3: Safety vs. Sibling/peer pressure	Gender	8.56	3	0.035*
	Age	1.85	3	0.603

Note:

* significant at $\alpha = 0.05$

Table 3.

Adjusted standardized residual analysis of scenario 1: Safety vs. external pressure.[a]

Scenario 1 Options	Gender		Age	
	Male	Female	18–21	22–33
Enter the grain bin to remove the blockage	3.0**	−2.0*	1.3	0.0
Tell your parent it is dangerous to enter the bin	0.8	2.1*	2.4*	0.3
Use a pole to break up the blockage from outside the bin	3.4**	1.4	3.2**	1.9
Wait five minutes to see if the blockage breaks down by itself	0.7	1.8	1.7	0.7

[a]Asterisks indicate association:

* = evidence of association, and

** = evidence of strong association.

Table 4.

Adjusted standardized residual analysis of scenario 2: Safety vs. saving time.[a]

Scenario 2 Options	Gender		Age	
	Male	Female	18–21	22–33
Call your neighbor to see how much longer they will be	1.0	1.5	0.8	2.1*
Enter bin to walk down the corn, potentially speeding the unloading	4.3**	−2.6*	1.8	0.4
Patiently wait for the grain to unload	2.8*	2.3*	4.0**	1.1
Wait ten minutes and then check the progress of the unloading	−0.1	2.9*	2.4*	0.0

[a] Asterisks indicate association:

* = evidence of association, and

** = evidence of strong association.

Table 5.

Adjusted standardized residual analysis of scenario 3: Safety vs. sibling and peer pressure.[a]

Scenario 3 Options	Gender		Age	
	Male	Female	18–21	22–33
Beat on the outside of the bin to break up the blockage	3.5**	0.2	3.5**	0.3
Communicate the possibility of avalanched grain to your sibling	0.7	4.7**	4.1**	0.9
Enter the bin to remove the blockage with your sibling	3.1**	−0.8	1.0	2.0*
Wait a few minutes to see if the blockage breaks down by itself	1.0	−0.2	0.3	0.7

[a]Asterisks indicate association:

*= evidence of association, and

**= evidence of strong association.

Table 6.

Analysis of factors versus ultimate mean.

Scenario	Factor	Value[a]
1: Safety vs. External pressure	Personal safety	2.45*
	Productivity	0.72
	Hazard level of the task	0.52
	Likelihood of engulfment	0.69
	Parental authority and pressure	1.27*
2: Safety vs. Saving time	Personal safety	1.69*
	Productivity	0.82
	Hazard level of the task	0.64
	Likelihood of engulfment	0.60
3: Safety vs. Sibling and peer pressure	Personal safety	1.70*
	Productivity	0.67
	Hazard level of the task	0.79
	Likelihood of engulfment	0.58
	Sibling and peer pressure	1.70*

[a]Asterisks (*) indicate significance (value greater than the ultimate mean of 1).

Table 7.

Testing mean values for scenario 1: Safety versus external pressure.[a]

Factor	Mean	Std. Dev.	t-Score	p-Value
Personal safety	1.42	0.77	−26.444	0.000*
Productivity	3.37	1.24	3.872	0.000*
Hazard level of the task	2.78	1.11	−2.512	0.013
Likelihood of engulfment	3.25	1.12	2.908	0.004
Parental authority and pressure	4.17	1.12	13.482	0.000*

[a]$N = 166$

asterisks (*) indicate significance at $\alpha = 0.001$.

Table 8.

Testing mean values for scenario 2: Safety versus saving time.[a]

Factor	Mean	Std. Dev.	t-Score	p-Value
Personal safety	1.49	0.74	−16.500	0.000*
Productivity	2.81	1.25	3.005	0.003
Hazard level of the task	2.74	0.82	3.476	0.001
Likelihood of engulfment	2.96	0.91	6.142	0.000*

[a] $N = 148$

asterisks (*) indicate significance at $\alpha = 0.001$.

Table 9.

Testing mean values for scenario 3: Safety versus sibling and peer pressure.[a]

Factor	Mean	Std. Dev.	t-Score	p-Value
Personal safety	1.59	0.89	−19.485	0.000*
Productivity	3.36	1.31	3.438	0.001
Hazard level of the task	2.53	0.91	−6.472	0.000*
Likelihood of engulfment	3.11	1.18	1.155	0.250
Sibling and peer pressure	4.41	0.96	18.073	0.000*

[a]$N = 154$

asterisks (*) indicate significance at $\alpha = 0.001$.