Journal of Extension

Volume 57 | Number 4 Article 7

8-1-2019

Dairy Cattle Handling Extension Programs: Training Workers and Cattle

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Journal of Extension
www.joe.org

August 2019
Volume 57
Number 4
Article # 4RIB8
Research In Brief

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Abstract

Cattle handling Extension program educators often overlook the animal training component of efficient handling. The objectives of the study described in this article were to measure young dairy heifer behavioral responses toward handlers who received different types of training and to document whether repeated handling or time of day of handling affected heifer behavioral responses to handlers. Six handlers received training through a lecture, hands-on workshop, or video. An observer recorded heifer behavior during handling tests. The day and time of heifer training were most influential on heifer behavior, but heifer handling ease was improved when handlers had participated in the hands-on training.

Keywords: behavior, dairy, handling, safety, training

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Introduction

In 2017, the nonfatal injury and illness rate for dairy cattle and milk production workers was 5.5 cases per 100 full-time workers, and the rate across all industries was 3.1 cases per 100 workers (U.S. Department of Labor Bureau of Labor Statistics, 2018). Because livestock handling is the second or third most common cause of farm worker injuries (as reviewed by Langley & Morgan Morrow, 2010), dairy operation leaders pursue opportunities to redesign facilities and educate workers to minimize injuries. Dairy producers surveyed in Colorado listed human safety (90%) and animal safety (55%) as the two most important considerations when designing cattle facilities (Adams, Olea-Popelka, Grandin, Woerner, & Roman-Muniz, 2014). They placed safety as a higher priority over facility cost (Adams et al., 2014). Facility design helps minimize injuries, but it is only one aspect of cattle handling. Over 60% of surveyed Minnesota dairy producers listed cattle handlers as the most important factor for good cattle flow (Sorge, Cherry, & Bender, 2014). Educators teach dairy workers about handling practices through cattle handling programs and typically measure a program's effectiveness by assessing worker knowledge gained while overlooking the animal training component of efficient cattle handling. For example, one popular cattle handling training

method, watching videos (Sorge et al., 2014), includes no animal training component.

Individual animals respond differently to human interactions (Gibbons, Lawrence, & Haskell, 2009; Meagher, von Keyserlingk, Atkinson, & Weary, 2016), but certain age groups of animals may be more difficult to handle. In a 2014 survey, Minnesota dairy producers identified milking postpartum heifers and moving calves as challenges when handling dairy cattle (Sorge et al., 2014). The techniques dairy workers use to handle animals are crucial to minimizing human and animal injuries. For example, educators train workers to handle cattle slowly to promote walking behavior and reduce the risk of slipping in cattle. Workers who use forceful physical interactions to move cows have a greater risk of being kicked or head-butted by cows (Lindahl, Pinzke, Herlin, & Keeling, 2016). Cattle that approach a handler are more likely to head-butt a handler (Duve, Weary, Halekoh, & Jensen, 2012). Whether cows perceive interactions with humans as positive or negative also affects cow conception rates and milk yield (Hemsworth, Coleman, Barnett, & Borg, 2000). A cattle handling training program focused on training both workers and cattle could minimize injuries and improve cow production.

The objectives of the study described in this article were to (a) measure young dairy heifer behavioral responses toward handlers who received different types of training; (b) evaluate relationships among the percentages of heifers that walked, slipped, faced the handler, and approached the handler; and (c) document whether training conditions (repeated handling within a day, handling across multiple days, or handling at different times of day) affected heifer training. We hypothesized that heifers handled by participants with hands-on training, as compared to those handled by participants with non-hands-on training, would walk more often, slip less often, and approach the handler less often during handling tests. Our team predicted that the number of heifers that slipped, faced the handler, and approached the handler would decrease with repeated handling within a day and across multiple days. Extension educators can use the information presented herein to facilitate dairy cattle handling programs that incorporate animal training in addition to worker training.

Materials and Methods

Our study adhered to all animal care and use guidelines enforced by the University of Pennsylvania (protocol #806017). A 500-cow dairy housed the animals used in the study. Thirty-six weaned Holstein heifers, 98–132 days of age, were housed in six pens in groups of six per pen. All pens were inside an open-sided barn with 4.5 m^2 of space per heifer. Heifers acclimated to their pens and groups prior to the study.

Handler Training

One male and five female adult handlers (aged 18 years and older) participated in one of three training programs: (a) a face-to-face classroom lecture only (Group A, n = 2), (b) a face-to-face classroom lecture and hands-on workshop (Group B, n = 2), or (c) an automated video-based lecture only (Group C, n = 2). Group A handlers were taught dairy cattle handling skills by an experienced instructor (Dr. Don Höglund from Dairy Stockmanship) during a 1.5-hr face-to-face classroom lecture. Dr. Höglund also taught Group B handlers during the 1.5-hr face-to-face classroom lecture, followed by a 1-hr hands-on workshop. Group C handlers watched a series of commercially available automated video-based lectures ("Introduction to Dairy Stockmanship" by Dr. Paul Rapnicki and Dr. Don Höglund, "Moving Cows to the Milking Parlor" by Dr. Paul Rapnicki and Dr. Don Höglund, and "Handling Dairy Calves and Heifers" by Dr. Ben Bartlett). After the first

handling test on the morning of Day 1 (immediately after the initial training session), handlers from Group A and Group C also received the hands-on workshop training with Dr. Höglund.

Handling Tests and Heifer Behavior

We randomly assigned each heifer pen to one of the handler groups (Group A, Group B, or Group C). All handlers were similar in height and wore similar clothing. Handlers participated in tests over 2 days; all groups participated in two tests (morning and afternoon) on Day 1, and all but one group participated in two tests on Day 2. Group A handlers were not available for tests on Day 2. We did not conduct simultaneous tests in adjacent pens. Each handling test comprised a series of six sets of herding (handler moved heifers to opposite end of pen) and holding (handler stood in center of pen). At the beginning of each test, a team member instructed the handler to enter the assigned pen from the back of the pen (opposite the feed bunk) and herd heifers toward the front of the pen, toward the feed bunk. The handler had 2 min to complete the herding and then stood in the center of the pen, holding his or her position for 2 min. After the 2-min hold, the handler herded the heifers toward the back of the pen. The handler repeated this pattern of a 2-min herding followed by a 2-min hold six consecutive times (which we identified as herding numbers 1–6).

A video camera (Sony-DCR-SX41 Handycams, Tokyo, Japan) located in the front of each pen recorded continuously, and a trained researcher analyzed all footage. The researcher recorded the number of heifers that walked (instead of running), slipped (at least one foot slid on the flooring), faced the handler (heifer's body oriented toward the handler with binocular vision on the handler), or approached the handler (walked toward the handler with binocular vision on the handler) during each handling test.

Statistical Analysis

To evaluate the primary effect of different handler training methods on heifer behavior, we analyzed data from the first handling test separately using the MIXED procedure in SAS (version 9.4, SAS Institute). We used Pearson's correlations to analyze relationships among the percentages of heifers that walked, slipped, faced the handler, and approached the handler. We analyzed data from all handling tests to evaluate the effects of training conditions (repeated handling within a day, handling across multiple days, or handling at different times of day) on heifer training using the MIXED procedure.

Results

Heifer Behavior: Responses to Handler Training

A negative correlation existed between the percentages of heifers that walked and slipped ($p < .0001$). During the first test, a greater percentage of heifers in Group B tended to walk compared to heifers in Group A ($p = .06$) (Figure 1). When we compiled the data from all test sessions, we found that a greater percentage of heifers in Group B walked compared to heifers in Group A ($p = .03$) (Figure 1). During the first test, Group B heifers tended to slip less often than Group A heifers ($p = .09$), and when we compiled the data from all test sessions, we found that Group B heifers tended to slip less often than Group A and Group C ($p = .07$) (Figure 2) heifers.

Figure 1.

Percentages of Heifers That Walked During Handling Tests

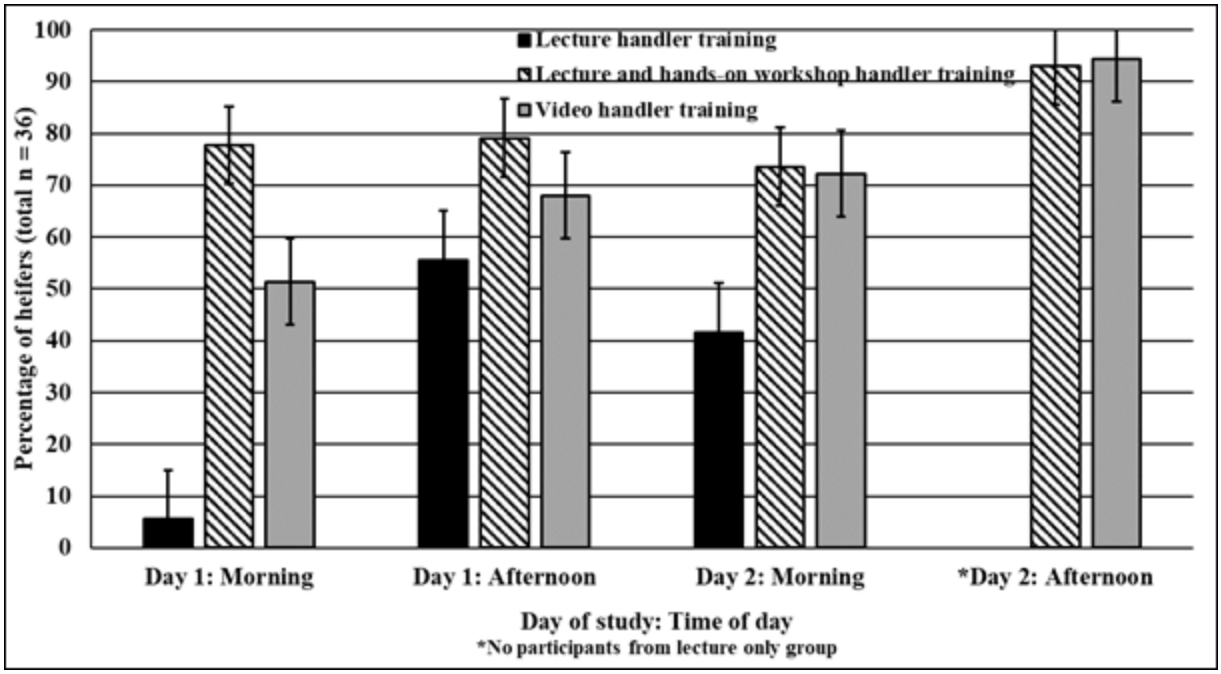
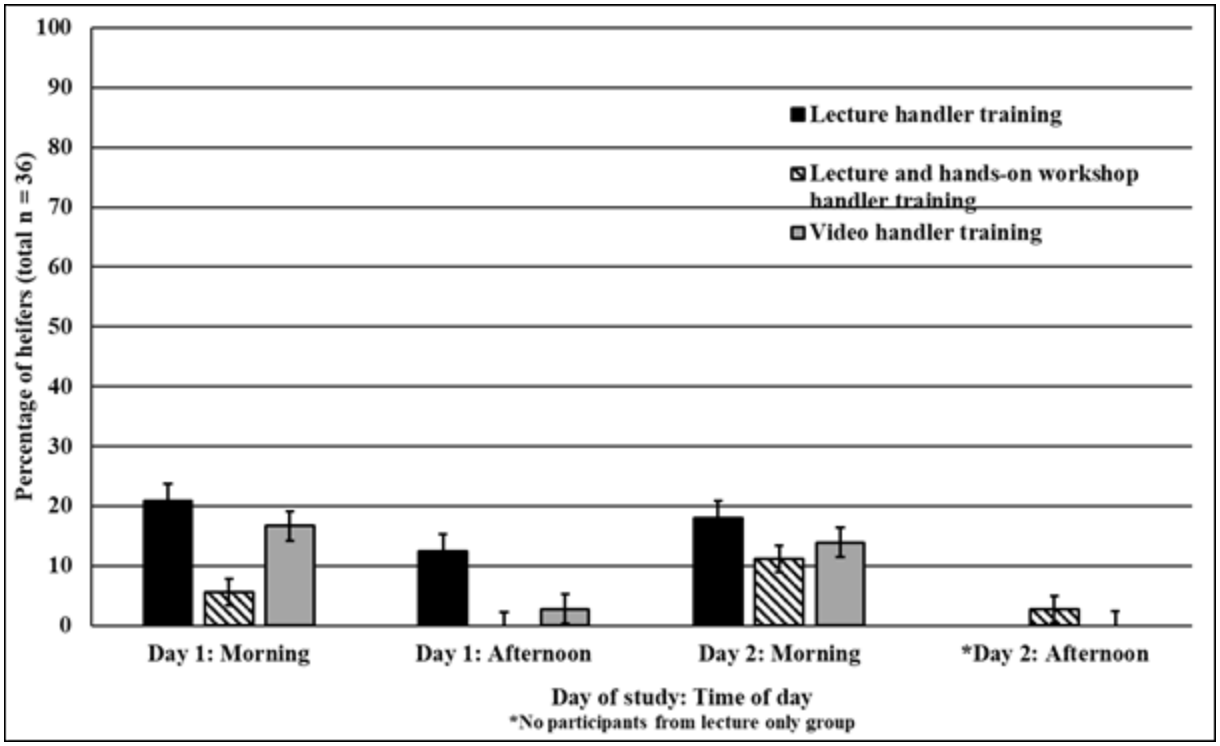


Figure 2.

Percentages of Heifers That Slipped During Handling Tests

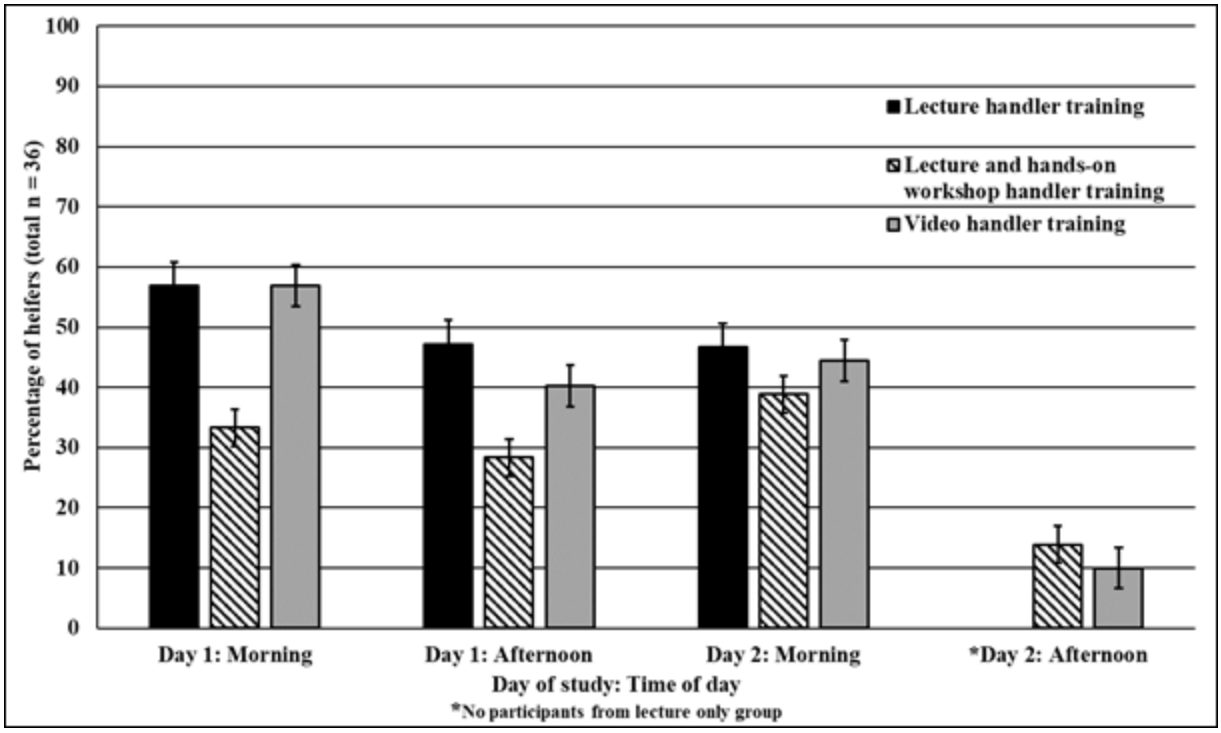


The percentage of heifers observed facing the handler was positively correlated with the percentage of heifers that approached the handler ($p < .0001$) and negatively correlated with the percentage of heifers that walked ($p < .0001$) or slipped ($p = .003$). During the first handling test, a smaller percentage of heifers in Group B faced handlers as compared to heifers in Group A ($p = .01$) or Group C ($p = .01$) (Figure 3). When

we compiled the data from all test sessions, we found that a smaller percentage of heifers in Group B faced handlers as compared to heifers in Group A (p = .04) or Group C (p = .05) (Figure 3). Treatment groups did not differ in the percentage of heifers that approached handlers.

Figure 3.

Percentages of Heifers That Faced Handler During Handling Tests



Heifer Behavior: Repeated Handling, Day, and Time of Day

When we compiled the data from all test sessions, we found that herding number (repeated handling within a day) did not influence the percentage of heifers that walked, slipped, faced the handler, or approached the handler (all p > .05). A higher percentage of heifers walked (p = .04) (Figure 1) and a smaller percentage of heifers faced the handler (p = .04) (Figure 3) on Day 2 than Day 1. A greater percentage of heifers walked (p = .05) (Figure 1) and a smaller percentage of heifers slipped (p = .02) (Figure 2) or faced handlers (p = .03) (Figure 3) in the afternoon than the morning. Time of day did not affect the percentage of heifers that approached the handler.

Discussion and Applications

Our findings have implications for Extension educators involved with dairy cattle handling programs. We acknowledge that our study involved a fairly low sample size and suggest that our work also can provide a foundation for future studies.

We trained the heifers in our study over 2 days and found that they faced the handler less and exhibited more walking behavior during herding on the second day of training than on the first day. Heifers faced the handler less, exhibited more walking during herding, and slipped less during the afternoon than morning. On

the basis of our results, we recommend offering hands-on dairy cattle handling Extension programs over at least 2 days and during the afternoon hours. Handlers who received the hands-on training at the study's beginning had fewer heifers face them and, in turn, more heifers walked and fewer heifers slipped. No differences existed in heifer behavior between pens with handlers who received the lecture only or video-based lecture only trainings. Livestock producers appreciate hands-on trainings for animal handling (Boyles, 2007), and Extension educators should consider this type of training for future programs. Respondents from a survey of dairies identified on-farm training with an educator or watching videos as preferred methods of training, but they did not list videos as the greatest influence on how they actually handle cattle (Sorge et al., 2014). Although some researchers have suggested that videos provide sufficient training for a stockperson (Coleman & Hemsworth, 2014), we found that the hands-on component of training is vital to support the melding of worker and cattle training.

Traditionally, avoidance behavior in dairy cattle is a measurement of human–animal interactions on dairies, and a small avoidance distance of cows toward an unfamiliar handler is desired (Hemsworth & Coleman, 1998; Windschnurer, Schmied, Brown, & Waiblinger, 2008). These small avoidance distances are helpful when workers need to capture and handle an individual animal, but a lack of distance between workers and animals could impede cattle flow when handling a group of cattle. It is more efficient to handle a group when all animals face toward the destination and away from the workers. Based on our results, we suggest that when heifers face a worker, they are more likely to approach the worker and less likely to walk during handling. Cattle handling Extension educators should teach workers how to train cattle to face toward the destination to promote walking behavior and prevent injuries.

Conclusions

Repeated hands-on training had a greater influence on cattle training than the type of training the handler received; however, hands-on handler training was most effective. Training cattle to face away from handlers increased heifer walking behavior and decreased slipping during handling. In conclusion, dairy cattle handling Extension programs should focus on training not only the workers but the animals as well.

Disclaimer and Acknowledgments

We did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors for the research described herein. We thank our cooperating dairy and volunteer handlers for assisting with our study. We also extend many thanks to Dr. Don Höglund for teaching the proprietary face-to-face classroom lectures and hands-on proprietary workshops used in his Dairy Stockmanship employee handling training program. Our team sends a special thank you to Allison Grove for her advice and assistance with editing.

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