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Do touch that dial: A guide to continuous response measurement in agricultural communications

Abstract

As the gap in agricultural experiences between farmers and consumers grow, it is important for agricultural communicators to communicate strategically with their audiences and be proactive in addressing consumers' concerns. Communication media can present a variety of messages or pieces of information that represent multiple perspectives within one unit. The dynamic nature of communication media, such as video and audio messages, lead to the fluctuation of feelings and responses to different elements within one singular message. While agricultural communications has traditionally relied upon quantitative and qualitative survey data, there are likely gaps in complete understandings of individual perceptions in response to varying elements of the communications message. Continuous response measurement (CRM) is a method that can be used to monitor and track individual responses to media messages in real-time to reveal critical moments within a communications message. CRM holds the potential to help those in agricultural communications understand what specific elements within messages resonate most with consumers. This professional paper explores how researchers can use CRM, showcases benefits and drawbacks of CRM, and provides recommendations for contributions to agricultural communications literature.

Keywords

Continuous response measurement, sentiment analysis, message testing, methods

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Introduction

The gap in agricultural experience between those living and working on farms and those unfamiliar or inexperienced with agricultural production can lead to differing views and sometimes negative perceptions of the industry. Researchers have concluded that consumers are often skeptical of agricultural sciences, and often the messages portrayed in the media have been shown to have negative effects on consumer perceptions of the industry (Fischer et al., 2020; Holt & Cartmell, 2013; Lundy et al., 2007). At the same time, while the number of people involved in farming continues to decrease, interest in agricultural systems has increased (Roberts et al., 2016). Consumers seek information in an effort to understand agricultural processes and look for ways to bridge the gap with the producer (Cohen, 2014). From a standpoint of building connections with consumers, research has shown agricultural communicators must learn to strategically communicate with audiences (Fischer et al., 2020). Much can be gained from understanding what consumers find favorable and unfavorable within specific messages, what factors make them favorable or unfavorable, and what consumers wish to hear and see in messages to gain attention, resonate with audiences, and promote favorable attitudes toward the industry (Goodwin et al., 2011; Tarpley et al., 2020). Thus, agricultural communications practitioners need to be proactive in addressing consumer concerns and careful in crafting communications messages.

Communication media hold the potential to present a variety of messages and pieces of information within one unit. For example, a singular video may present several perspectives throughout its duration resulting in changing viewer perceptions as the video progresses from start to finish. Viewer perceptions and reactions to different elements of a message can fluctuate throughout the viewing experience (LaGrande, 2018). Agricultural communications research has capitalized on a variety of methodology ranging from qualitative and quantitative survey data to eye-tracking data. While these studies have expanded and provided great value to the discipline, continuous response management (CRM) offers the discipline an additional opportunity to bridge gaps in understandings of individual perceptions pertaining to varying elements within a communications message (Tarpley et al., 2020).

Unlike some other empirically-tested phenomena, the dynamic nature of communication results in continuous changes in individuals' cognitive states as they react to and understand media messages (Biocca et al., 1994). Due to this natural psychological phenomenon, some research instruments may not completely capture information from participants in certain research studies. In fact, Maurer and Reinemann (2009) argue that pertaining to measurement, stand-alone, post-stimulus questionnaires "seldom lead to valid results about the causes of respondent's opinions and opinion changes" (p. 2). On the other hand, analyzing responses from measures that capture information from a moment-to-moment perspective allows researchers to gain insights on individual preferences as the component unfolds and is experienced (Ramanathan & McGill, 2007).

Continuous response management (CRM), sometimes referred to real-time response or moment-to-moment analysis, is a measure that can be used to monitor and track individual consumer responses to media messages in real-time. CRM is a unique measure as it has the ability to reveal critical moments within a communications message that influence a participant's sentiment or perception about an experience (Izenzon, 2016). This distinctive ability helps to mitigate a key issue in communications research – memory bias and flawed recall (Izenzon, 2016). CRM allows researchers to examine reactions to specific moments or elements of content

within a stimulus and continuously monitor the believability of communication messages (Biocca et al., 1994). CRM research holds the potential to help communication and marketing professionals in the agricultural industry understand what specific message elements resonate with consumers.

An array of messages are used within communications campaigns to generate benefits for both individuals and society at large (Atkin & Freimuth, 2013). As agricultural commodity groups and other agricultural stakeholders strive to create greater understanding and awareness between consumers and producers (Goodwin et al., 2011), the response to the message cannot be overlooked. Given the complexities within agriculture and natural resources, and the variety of content within publicly shared media messages, agricultural communicators need to better understand the dynamic nature of consuming communications messages. The limited nature of the posttest survey and its inability to capture responses on multiple aspects of a communications stimulus make it a measure not always appropriate for agricultural communications studies. A deeper understanding of consumer responses to communication messages is warranted.

Given the potential to uncover and add valuable insights to the ways in which media consumers experience messages, four objectives guided this professional development piece on past and prospective uses of Continuous Response Measurement in agricultural communications research:

1. Explain the procedures for using CRM tools and software.
2. Examine potential uses of CRM in agricultural communications research.
3. Explore past use of research in CRM and discuss limitations of these research tools.
4. Provide recommendations for future research in agricultural communications.

Procedures Used in CRM

CRM tracks responses from participants in a moment-to-moment sequence. In order to rate the stimulus, CRM study participants use an input device such as a dial or slider to continuously evaluate media content as the message progresses (Maurer & Reinemann, 2009). Typically, CRM participants are asked to participate as a group with approximately 25 people or less. While numbers may vary based upon the study, no more than 100 participants should be tested in a room at a time, depending on the availability of input devices (Mitchell, 2015). Software packages, such as the Perception Analyzer, allow the researcher to set up the test, collect and analyze data in the field (such as a live speaking presentation or debate), or in a laboratory setting where prerecorded videos can be shown. The software, equipment, and dials can be used in conjunction with any media that changes over time including radio broadcasts (Cummins & Gong, 2015), podcasts (Opat, 2020), political debates (Stewart et al., 2018; Saks et al., 2016), informational/educational videos (Cummins et al., 2018; Tarpley et al., 2020), persuasive campaign videos (LaGrande, 2018; VanDyke & Callison, 2018), music (Wen & Krumhansl, 2017), and television commercials (Morning Consult, 2018).

Choosing a Stimulus. In CRM research, a dynamic stimulus (i.e., audio, video, or multimedia) is selected for testing. While the stimulus must be long enough to allow participants to react to it over time, it should not be so long that participants might lose interest. The ideal length of testing for videos ranges from 30 seconds to three minutes, depending on what element,

such as different verbal messages, transitional cuts, music cues, on-camera sources, or other, is being tested (R. G. Cummins, personal communication, January 15, 2018).

If performing an experiment, stimuli should be as similar as possible beyond the manipulated variable(s). The stimuli can be used in a pretest to determine reliability. For example, a researcher testing the credibility of a speaker at critical moments in a video may run a pretest to determine whether audiences react to the credibility of the speaker at those moments. The pretest can help to determine if the stimulus is intelligible, if the stimulus is an appropriate length, or if any other factors influence the reactions to the critical moment, or moment of measurable change in scores.

Choosing Response Options. Participants of CRM studies can only be asked to rate a stimulus based on a single quality, emotion, or semantic space at once (Maurer & Reinemann, 2009). Participants are asked to indicate the rating that most corresponds with their attitude, feeling, or perception throughout the stimulus by continuously moving their dial along a continuous scale (i.e., 0 to 100). The data are collected from the dial (input device) at time intervals designated by the researcher, such as every second. Participants are tasked to rate the messages based upon constructs related to the purpose of the study. In agricultural communications research, constructs such as trust, quality of argument, persuasiveness, or comfortability could be assessed. Nearly any item that can be tested using a Likert-type scale can be tested using CRM. As an example, Tarpley et al. (2020) asked participants to report their perceived level of comfort by responding to the statement, “I am comfortable with the material I am viewing,” by using the dial. Participants’ response options ranged from 0 (*extremely uncomfortable*) to 100 (*extremely comfortable*).

If the researcher wishes to study reactions to a stimulus on a construct with multiple components, study participants should not be exposed to the stimulus multiple times and asked to provide a rating based upon each unique variable making up the construct. Instead, researchers should present the stimuli to multiple groups of similar participants assigned to rate a single variable under investigation. For example, trustworthiness is a construct consisting of multiple elements. To test this construct using CRM, LaGrande (2018) studied the degree to which participants rated the trustworthiness of a video published by Texas Farm Bureau using Ohanian’s (1990) trustworthiness scale comprised of five dimensions (dependability, honesty, reliability, sincerity, and trust). Instead of requiring a single group of participants to rate the stimulus repeatedly based on each of the five dimensions, LaGrande (2018) presented the stimulus to five different groups of 30 participants and tasked them to submit their responses based on only one of the five dimensions of trustworthiness. After all data were collected, responses for each dimension of trustworthiness were aggregated and compared.

Data Collection Procedures. To set up a CRM study for data collection, the researcher should download the Perception Analyzer software to a laptop and connect it to the CRM external console unit before beginning the experiment. Because the dials are connected to the console unit, the dials and unit must work in connection with one another. The Perception Analyzer software is able to detect whether each dial is turned on and the percentage of battery that remains. The researcher can use this information to remove and/or replace dials with low charges and thus prevent dials from running out of power during the study.

Before starting the study, researchers should turn dials off that are not being used by participants during the presentation of the stimuli to not only preserve valuable battery power,

but also to prevent the collection of inaccurate data. The Perception Analyzer software will collect data from any dial that is turned on, regardless of whether the dial is being used by a participant. A dial not in use by a participant, but with power remaining on, will continue to record a response and be included with the participant responses. These erroneous data must be later located and deleted by the researcher.

As depicted in Figure 1, the CRM device is typically a hand-held tool that features a dial with a continuous scale. Many CRM systems' input devices allow the participant to report indifference by placing their dial at a midpoint, such as a 50 mark on a 0-100 scale (Biocca et al., 1994). With this feature in mind, participants should be instructed to begin the viewing experience with their input device at the mid-point (neutral) before the stimulus is presented in order to allow the participant to begin the study from a place of indifference (Biocca et al., 1994). Starting at the midpoint also allows for neutrality in participant responses – as the participant begins processing the information, they can indicate their ratings throughout the duration of the stimulus by moving the dial or slider to the rating that most corresponds with their attitude or feeling during different points of the message presentation.

Figure 1

Handheld Dial Used to Continuously Report Reactions to a Stimulus



Along with collecting moment-to-moment reactions or longitudinal data from participants, CRM dials can also be set to collect nominal data before or after consuming media. Researchers can adjust the dials to collect categorical data such as academic classification by asking participants to turn their dial to the left (number 1) if they are an undergraduate student or right (number 2) if they are a graduate student. If a researcher chooses to collect categorical data using the dials rather than with a survey, the researcher may then categorize the CRM data to reflect only the undergraduate students' impressions or the graduate students' impressions.

Assigning numbers to each dial is also helpful. Numbering can be useful as researchers work to organize and pair data. First, researchers may monitor participants who may lose interest during the message presentation, and as a result, whose data may be considered invalid. Numbering can also be used to organize and compare pretest or posttest survey responses or focus group questions to CRM participant data. The researcher can pair posttest items, pretest items and qualitative data by asking each participant to write his or her corresponding input device number on a written or online questionnaire. Opat (2020) measured participants' attitudes toward science using a pretest survey and later compared the responses with participants' dial testing data to better understand how science attitude related to the message being tested. Additionally, LaGrande (2018) compared participants' dial testing data to a posttest survey to gain better insight regarding why a participant might have trusted one message element more than another, revealing many participants trusted the message from an older gentleman because of an association of him with their grandfather. An example CRM study posttest questionnaire with a space for participants to write in their dial number is show in Figure 2.

Figure 2

Example of Handheld Dial and Posttest Questionnaire



Regarding interaction with participants, the researcher must provide the same oral directions for each experimental group (Biocca et al., 1994). To ensure consistency, researchers are encouraged to create a script that can be read identically to each research group and by multiple researchers if necessary. To further increase ecological and external validity, CRM studies be conducted in a way that most reflects a natural viewing environment; a theatre-like setting is appropriate for most mediums.

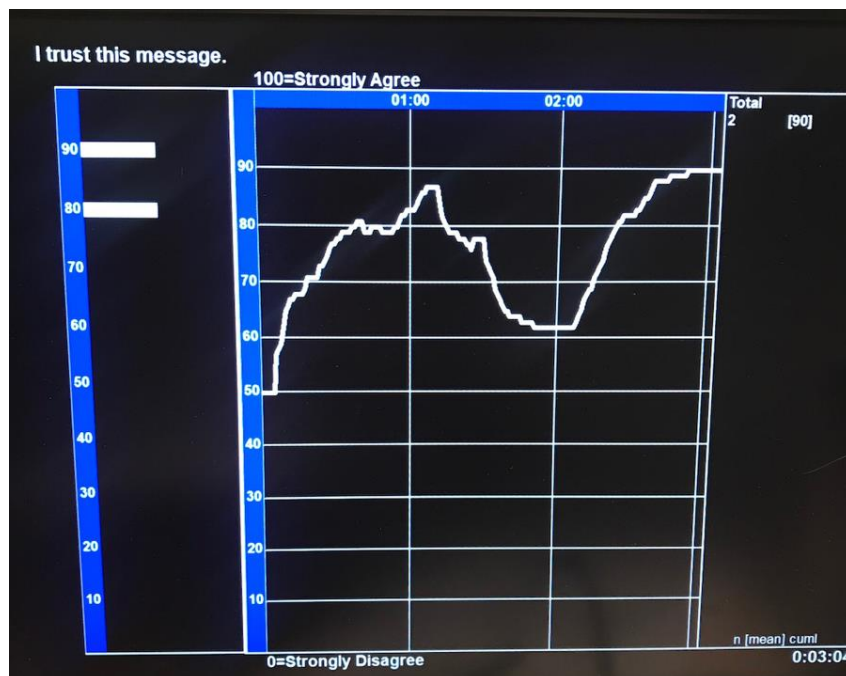
Before presenting the experimental stimuli, researchers are encouraged to lead participants through a practice session where a stimulus unrelated to the study can be evaluated. This approach may help to alleviate issues surrounding the novelty and unfamiliarity of the dial-testing technology. In such a scenario, participants may be told:

We are going to take a few minutes to practice using the dials. Please turn your dial to the 50. In a few moments, I will start a brief video. While watching the video, you should continuously move your dial to respond the statement, "I trust the speaker," as the video plays. If you move your dial to the left or toward the zero, you are indicating that you do not trust the speaker. If you move your dial to the right or toward the 100, you are indicating that you do trust the speaker. Do you have any questions before we proceed?

After participants have finished with the practice videos, they should next be exposed to the study stimuli. The researcher should reiterate how to use the dial and how the process works to the participants and ask the participants to continuously rate the stimuli based on the assigned construct. As depicted in Figure 3, the Perception Analyzer software provides a visual graph of the data, enabling researchers to watch participant responses unfold in real-time. When the stimuli presentation has concluded, participant responses are recorded wirelessly and converted to a numerical value on the researcher's laptop. Here, the data show the participant's number, the time interval, and the recorded response from the dial. These data are quantitatively stored on the researcher's computer, and data can be exported as a .CSV document. This document can then be imported into the data analysis software of the researcher's choosing (Maurer & Reinemann, 2009; Weaver et al., 2009).

Figure 3

Example of Visual Data Generated by the Perception Analyzer



Note. As shown in LaGrande's (2018) study, participants' dial responses to message trust wirelessly transferred to the researcher's laptop and converted to a visual graph to show an immediate glimpse of the aggregate data.

Data Analysis. Analysis of the hand-dial data allows the researcher to pinpoint reactions with specific moments during the message. This creates an opportunity for the researcher to compare and connect CRM responses to singular verbal or visual elements within the stimulus. Data can be visually analyzed through a series of means or by analyzing the peaks and troughs present on the visual graph (Biocca et al., 1994; Cummins et al., 2018; Izenson, 2016).

The most popular analyses for CRM include aggregation, mean series, and peak analysis. Aggregation consists of calculating the mean scores of participants' ratings throughout the stimulus. Aggregation does not explain *how* or *why* a change occurred, but can reveal what, if any, changes occur throughout the media consumer's experience. The mean series analysis is the most visually recognizable form of CRM analysis. Mean series analysis consists of line graphs representing the mean score of a group or person at each time interval.

As LaGrande (2018) experienced, some dial testing data may show no change scores in data. Change scores for each second, or other designated time interval, are calculated by subtracting the initial raw value from each subsequent raw value (Cummins & Gong, 2017). Participant data containing no change scores indicates participants may have been too distracted or too unaffected by the video to move their dials to reflect how their reactions or feelings about different parts of the video. Based on pretest recommendations, the stimuli can be edited to manipulate a variable or highlight a critical moment, particularly for experiments.

A peak analysis may be prepared by first standardizing the data from each group or participant, so the average score equals zero. Peaks and troughs are then identified based upon the resulting Z-scores. Typically, the researcher sets a threshold to showcase differences – such as two standard deviations. Other times, researchers set a numerical threshold before analyzing data. For example, any data point with a Z-score greater than 2 would be interpreted as a peak while those with a Z-score less than -2 would be considered a trough. Peaks and troughs can also be visually identified if this analysis is being conducted during data collection as part of a mixed-methods study. The peaks and troughs can next be converted to qualitative data by analyzing the sections of the stimulus that coordinate with those critical moments. Scores surrounding a critical moment in a stimulus can also be studied.

Statistical analysis can also be used to confirm peaks and troughs (i.e., Cummins et al., 2018; Tarpley et al., 2020). After researchers visually inspect mean scores to identify critical moments during the media presentation, researchers may conduct a series of paired samples *t*-tests to determine any statistically significant differences in the moments immediately prior to the critical moment and immediately after the critical moment. CRM can also be used to collect nominal data, but usually only for the purpose of collecting demographic information from participants in conjunction with a CRM study. For example, researchers may want to collect data prior to the study regarding age or gender. The Perception Analyzer allows for this collection procedure.

Limitations. While CRM presents a multitude of advantages, it is not without limitations. Perhaps the most difficult issue to overcome with CRM technology is the cost of equipment and software needed for data collection and analysis. The Perception Analyzer, including software, a console unit, antenna, and 30 handheld dials, costs between \$20,000 and \$25,000. In addition to monetary expenses, there is a time cost associated with training students and faculty on how to collect data and use the software. Some students and faculty have participated in courses or workshops focused on how to use CRM. Further, several universities

have worked directly with IT staff or laboratory managers to help the researchers learn to use the software and collect data.

Additionally, while efforts can be taken to better ensure validity and reliability, these important factors remain a concern in CRM studies. In particular, ecological validity can be a concern as the results of CRM studies cannot be generalized in natural settings. The laboratory-type environment that is frequently associated with CRM studies can also be problematic because participants must allocate attention to turn their dials to reflect their shifts in opinions, and many distract their attention away from the stimulus (Mauer & Reinemann, 2009). One suggestion for combatting this issue is to allow participants the chance to use their dials before they watch the stimulus, so they are able to concentrate on the stimulus, rather than on how to move their dials. Participants should also be given instructions during the training and prior to the distribution of each stimuli introduced in the study. LaGrande (2018), Opat (2020), Tarpley et al. (2017a), and Cummins et al. (2018) implemented this practice into their studies. Further, researchers should constantly monitor participants during the presentation of the stimulus, and participants should be reminded to move their dials prior to the start of a new stimulus or during a longer stimulus.

Ensuring internal validity can also be problematic in CRM studies because the dial can only measure a single dimension due to the limited capacity of human information processing. For this reason, many researchers question whether CRM is sufficient for measuring complex processes such as viewers' cognitive processes (Mauer & Reinemann, 2009). Therefore, the evaluation of validity is related to the selection of the dimension being measured and the verbal instructions given to participants (Mauer & Reinemann, 2009).

As discussed previously, instructions given to participants in experimental sessions must be consistent for each participant group. When considering the reliability of CRM studies, it is important to note very few studies have examined the reliability of CRM and more research on the reliability of CRM measurement is necessary (Maurer & Reinemann, 2009). Because CRM is a measure of momentary cognitive processing, reliability is often in question as evaluations about specific media may be stable, but the hedonic responses given to a specific second of the stimulus may be variable since the system measures the flow of cognitive responses (Biocca et al., 1994). If testing prerecorded videos in laboratory-type setting, length of the video should be considered (Maurer & Reinemann, 2009) due to time-based impacts on participant responses. One potential time-based impact is dial fatigue, or weariness associated with engaging and evaluating the message stimuli, which may influence participants' normal responses (Biocca et al., 1994).

Findings of Past CRM Studies

Within this section, we will discuss the different types of results and findings and how researchers have applied these to practical and theoretical scenarios.

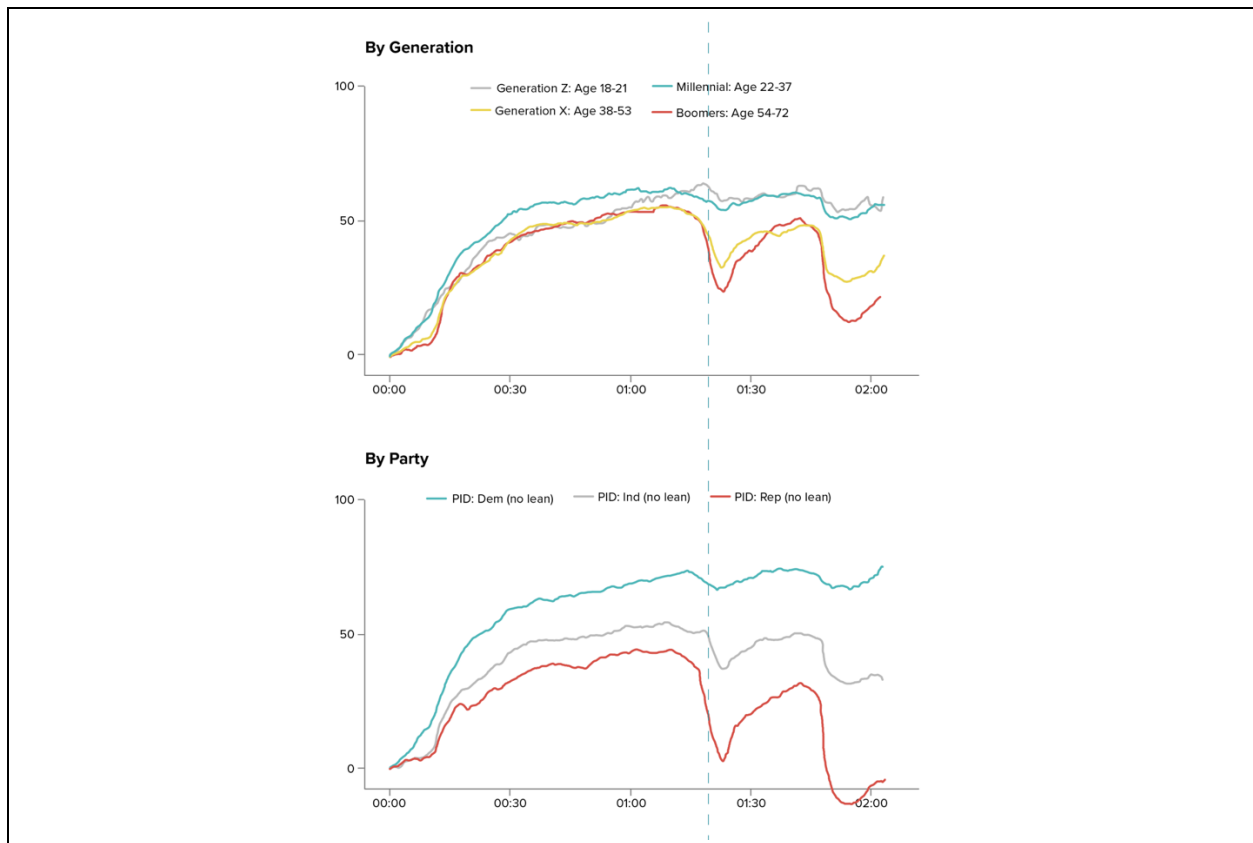
Use of CRM in Audience Segmentation. CRM can be used to perform audience analyses and is easily integrated into studies to showcase audience segmentation (Keppel, 1982). Commonly, dial testing has been used during political debates to compare voters' reactions to different candidates. In these kinds of analyses, researchers separate the voters by political affiliation and distinguish each party's views. The data collected allow the researcher to visually compare the reactions of those with varying political affiliations by viewing a different colored

line. The lines move across the screen in real-time as participants indicate their approval of the candidate delivering the message. These differences can also be examined through statistical analysis such as repeated measures ANOVAs.

CRM has also been used by a variety of marketing and advertising research groups. One CRM study was conducted by Morning Consult to compare the reactions of several demographic groups to Nike's commercial featuring National Football League (NFL) player Colin Kaepernick (Morning Consult, 2018). Kaepernick is a former NFL quarterback who protested racial oppression by kneeling during the national anthem of the United States before games (Howard, 2016). The Morning Consult researchers divided their participants by race, generation, party, and whether or not they used Nike products. As seen in Figure 4, a critical moment within the media stimuli occurred when Kaepernick first appeared on screen. This critical moment identified differences in perception based on demographic segmentations. This Nike commercial example helps to showcase how researchers may visually assess how the ratings of various demographic groups compared at different points in the message.

Figure 4

Mean Scores of Demographic Groups' Approval Ratings of Nike's Kaepernick Commercial



Note. 100 = positive opinion and 0 = negative opinion (Morning Consult, 2018). The dotted blue vertical line represents the critical moment where Kaepernick appeared onscreen.

Use of CRM in Experimental Design. CRM can also be used in experimental study designs. For experimental studies participants should be randomly assigned to a condition, one of which should be a control. In one experimental CRM study, Cummins and Gong (2017) used CRM to evaluate the effects of increased spectator response on the perceived excitement of play during radio broadcast sports. The experimental groups listened to audio clips of a broadcasted game edited to include various levels of audience excitement, such as crowd noise or cheers, while the control group listened to the raw audio clips without any added audience excitement (Cummins & Gong, 2017). The results from each group were compared and changes in reactions at different points of the message were analyzed by conducting a series of ANCOVAs.

Use of CRM with Self-Report Items. CRM can also be paired with self-reported data. In a study by Tarpley et al. (2020), CRM data were collected in response to comfort levels related to a section of Temple Grandin's "Glass Walls Project" videos. During the experiment, participants were asked to rate their level of comfort throughout two videos (a cattle slaughter video and a swine slaughter video). After presentation of the videos, the level of involvement to agriculture was collected through a 10-item, Likert-scale. In the data collection process, the researchers aggregated and summated the scale, and categorized the participants as low or high involvement via a median split. It was found that although more comfort was associated with those indicating high agricultural involvement, all participants indicated discomfort with specific aspects of the video. To make recommendations, the researchers paired these critical moments with the visuals in the video to associate what items should be used with caution as industry communicators work to practice transparent communication (Tarpley et al., 2020).

Use of CRM with Qualitative Data. CRM data may also be paired with qualitative data for a more in-depth understanding of why participants may feel specific ways about the critical moment in the message. After the presentation of the stimulus, participants can be asked to participate in a focus group. During the focus group, participants are asked open-ended questions and engage in a conversation relating to the critical moments found from visual inspection of the data. Qualitative data may also be collected in written form through open-ended questions or by asking participants to list their thoughts to help connect, explain, and give insight to why a critical moment may have happened.

Discussion & Recommendations

Recent CRM studies in agricultural communications have contributed to CRM literature and the practice of agricultural communications. Literature has supported the notion that implementing CRM can help researchers understand more about information processing (Biocca et al., 1994). Because "cognitive states of individuals change continuously as they attend to, or understand, and react to messages" (Biocca et al., 1994, p. 15), comparing CRM responses with elements of the stimulus or stimuli can trace back to participants' impressions of a single visual or verbal component (Maurer & Reinemann, 2009).

Although CRM can be an extensive research venture, it is one that provides participants' immediate responses to media. CRM may not be able to reveal the mysteries associated with participants' minds, but it can enable social scientists the opportunity to explore some models of opinion information and persuasion (Maurer & Reinemann, 2009). CRM is a helpful tool for the social sciences and more social scientists should take advantage of it (Maurer & Reinemann,

2009). Tarpley et al. (2020), LaGrande (2018), and Cummins et al. (2018) are three individuals whose research parallels the previous statement and whose research was able to use CRM to pinpoint exact moments in videos where participants' opinions shifted in an agricultural communications setting.

Previous studies have indicated more research is required to understand how to increase knowledge and trust of agriculture (Ruth & Rumble, 2017). In addition, researchers have also suggested conducting more experimental studies that incorporate research communication technology in agricultural communications in order to better understand what types of messages in agriculture resonate best with consumers (Fischer et al., 2020; Tarpley et al., 2020; Krause et al., 2016). Four recent CRM studies in agricultural communications, briefly outlined below, have contributed to this body of knowledge by providing analyses of how different types of agricultural messages can elicit various levels of comfort, trust, understanding, and interest.

Tarpley et al. (2020) used CRM to determine the comfort ratings of consumers as they viewed videos regarding the slaughter of livestock. In another study, LaGrande (2018) used CRM to measure levels of trust in different agricultural messages within a pro-agriculture video. Extension has also been a focus of CRM studies. Cummins et al. (2018) utilized CRM to identify different what visual elements extension agents preferred when learning about mitigating greenhouse gas emissions. Opat (2020) used CRM to determine how science attitude and different communication tones used in scientific podcasts affect how interesting and credible participants' find the podcast. These four studies have added to the body of knowledge and reiterate the importance for agricultural communications researchers to conduct more moment-to-moment analyses. These studies have also shown the potential impact dial testing can have on message development.

Studies by Tarpley (2020), LaGrande (2018), and Opat (2020) are three examples of CRM agricultural communications studies built upon cross-disciplinary relationships between communication research faculty members and agricultural communications graduate students. Before beginning their research studies, many graduate student researchers at [university] have enrolled in an introductory research communication technology course offered by the [college]. CRM research experts taught the students how to use CRM technology and software and allowed them to practice utilizing CRM in mini in-class research projects. These faculty have encouraged both graduate students and agricultural communications faculty to partner with those in the [college], conduct their CRM studies in the dial-testing lab on campus, and have helped students analyze data.

One way to incorporate CRM into a research program is by partnering with communications researchers on campus who may already have this equipment available. While partnering is not always an option, universities and marketing research firms may have available equipment that can be used for a small fee. Various grant opportunities may also be available to purchase the needed tools. We recommend partnering with other researchers, at your university or outside of the university, interested in working with the technology to obtain the software and technology. In each of the previous studies using continuous response measurement in agricultural communication, the Perception Analyzer was used to conduct research. As stated by many marketing communications groups, the Perception Analyzer tends to be the tool of choice for in-person dial testing; however, online dial testing software is available through survey platforms such as Qualtrics, 20|20 Research, Survey Monkey, and more. PsychoPy, a freeware stimulus presentation software, allows participants to respond to stimuli using a joystick or keyboard (Pierce, 2009; Szul et al., 2019). However, for validity reasons, the authors suggest

using in-person dial testing for maximum results as participants who participate in online dial testing have greater opportunity to become distracted from the stimulus in a less controlled environment.

This type of technology may be of interest to undergraduate and graduate researchers alike. More and more agricultural communications and marketing professionals are interested in hiring graduates with research experience. Therefore, using graduates who have experience in message testing may give students an edge in the hiring process, and these students may also be interested in these kinds of research opportunities should they choose to further advance their education. Working with students on projects could also offset time and costs associated with conducting CRM research.

The purpose of this professional paper was to discuss the potential benefits and limitations of CRM research for agricultural communications. Agricultural communications practitioners can benefit from a clearer understanding of how consumers rate communications messages (Goodwin et al., 2011). While CRM is not without limitations, it offers an opportunity for the discipline and field of agricultural communications to better craft messages based upon feedback from consumers. Those involved in agricultural communications should not shy away from CRM despite its costs and limitations, and it should seek partnerships campus-wide to lessen the cost and to stimulate collaboration in research efforts.

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