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Eyes On, Hands On: Vicarious Observational Learning as an Enhancement of Direct Experience

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This research explores the concept of vicarious observational learning as a component of an experiential learning sequence. We compare measures of task performance when participants observe a task before engaging in direct experience versus immediate direct experience without observation. Two experimental studies were conducted using different types of tasks and different levels of performance analysis. We found support for the hypothesis that experiential learning sequencing, with vicarious observation preceding direct experiential learning, enhances classroom performance. The benefits of vicarious observational learning to direct experience sequencing appeared to be generally robust across task types and levels of analysis. The article concludes with some explanations of the relative efficacy of observational learning to direct experiential learning sequencing as well as implications for management education literature and practice.

Kolb wrote: "Learning is the process whereby knowledge is created through the transformation of experience" (Kolb, 1984: 38). However, an individual or a group does not necessarily have to participate in the experience directly in order to acquire new knowledge or skill. In fact, research shows that many learning phenomena resulting from direct experiences can occur on a vicarious basis, such as through observation of other persons' behaviors and its consequences (Bandura, 1986; Kim & Miner, 2007; Nadler, Thompson, & Van Boven, 2003). Behavioral response patterns can be established through modeling or observational learning, where an observation of a model's performance can enable the observer to reproduce the model's behavior (Bandura, 1969, 1977). In cases involving intricate patterns of behavior, such as language or surgery skills acquisition, observation often represents an indispensable aspect of learning that may allow the observer to avoid costly and unnecessary errors. For example, one would not want to teach skills such as surgery or flying an airplane solely through an individual's pattern of hit or miss experiences.

Vicarious observational learning (VOL) represents a learning method that places observation in the forefront of the learning process, with a key benefit seeming to derive to VOL from heavy cognitive demands placed on people when directly experiencing a task, as opposed to lighter demands placed on observers (Manz & Sims, 1981; Nathan & Kovoor-Misra, 2002). While vicarious learning has been addressed in various ways by management scholars (Kim & Miner, 2007; Manz & Sims, 1981) and by practitioners, we know surprisingly little about the efficacy of observational learning processes in improving task performance and demonstration of behavioral skills relative to direct experience, especially with respect to a management education classroom environment. Aside from literature on behavior modeling training, the majority of research we found on individual observational learning is conducted in the area of writing education, where researchers acknowledge the benefits of VOL on enhancement of individual writing skills (Raedts, Rijlaarsdam, Van Waes, & Daems, 2007; Rijlaarsdam, Braaksma, Couijn, Janssen, Raedts, van Steendam, Toorenaar, & van den Bergh, 2008). In addition, relatively little attention has been paid by management education scholars to VOL followed by direct experience to enhance learning and performance, as it would frequently occur in practice. Thus, the gist of the research reported here is an attempt to discern an answer to the question, "What would the learning effects be if a direct experiential learning (DEL) activity was preceded by VOL processes?" In particular, we define *vicarious observational experiential learning* (VOL) in management education as a learning process where vicarious observation is a significant initial component of the *total* learning activity, followed by direct experience with the activity itself. For the comparisons made in the studies reported here, we consider DEL to indicate processes whereby learning occurs from direct experience in an activity absent vicarious observation. While we acknowledge many phenomena are relevant to learning complex behavioral skills, we simply assert that initial observation facilitates learning as measured through task performance.

A better understanding of VOL's efficacy, especially when it precedes DEL, may help educators enhance behavioral skill acquisition among individuals and groups. As argued by Rynes, Trank, Lawson, and Ilies (2003), behavioral skill acquisition is a crucial strategy not only in its own right and for its own purposes, but also in transforming the lack of legitimacy and negative perceptions often ascribed to management curricula by both students and recruiters. Those authors urged the community of management scholars to "conduct higher quality pedagogical research assessing the effectiveness of behavioral science instruction in business schools" (Rynes et al., 2003: 279), since management "has little convincing evidence to counter this claim" (2003: 280). Our work here seeks to address this charge by providing evidence that vicarious observation preceding direct experience contributes to the empirical case for experientially and behaviorally based management educational practices, such as those expounded by Hoover, Giambatista, Sorenson, and Bommer (2010).

In particular, in this research we describe two empirical studies conducted to explore the learning impact of a round of observation followed by rounds of direct experience, contrasted with multiple rounds of direct experience alone, without an observational element in the learning sequence. The two studies were conducted across two tasks (a negotiation task [$n = 141$] and a leadership/teamwork performance task [$n = 89$ teams with 448 subjects]) and across the individual, dyadic, and group levels of analysis. We conclude with some explanations of the relative efficacy of the proposed total experiential learning model, as well as implications for theory and practice.

VOL AND RELATED CONSTRUCTS

We introduce the term VOL because not all vicarious experiences involve direct observation (e.g., experiencing vicarious pleasure in gossip about others) and not all observation is vicarious (e.g., a psychologist observing a patient). Observation was described by Bandura (1977) and Kolb (1984) as a more generalized learning phenomenon, while Merriam-Webster.com defines vicarious as "experienced or realized through imaginative or sympathetic participation in the experience of another," closely resembling the particular learning experiences we created and assessed in these studies. Since our particular approach to vicarious learning includes observational learning and management education scholars are generally familiar with this term, we therefore coin the term "vicarious observational learning."

A related body of literature concerns behavior modeling training (BMT; Taylor, Russ-Eft, & Chan, 2005). We will discuss this literature, and how VOL is fundamentally distinct from BMT, in the Discussion section. For now, we acknowledge some similarities, while pointing out that BMT has a very specific and programmatic nature that is far beyond the subject of the empirical tests in our studies. Here, we focus only on theorizing and testing the marginal learning and skill performance impact of a single round of observation prior to direct experience, as compared to repeated direct experience absent an observational component.

As vicarious learning is closely related to observational learning, we now turn to a comparison of how observational learning informs vicarious and direct learning experiences. According to Bandura (1977), *observational learning* includes attention, retention, reproductive, and motivational processes. In particular, attention processes emphasize how we perceive and become aware of learning opportunities. While a direct experiential learners' cognitive attention is necessarily focused on the task at hand, observational learners face no immediate task demands, potentially freeing up cognitive resources to perceive whichever aspects of a task are chosen by the learner as a point of focus. The burden facing individuals in a direct learning mode on tasks that are not routine is best articulated by Seijts, Latham, Tasa, and Latham

(2004: 229), who state: "when people are in the 'declarative' stage of learning, before performance routines have become automatic, their cognitive resources need to be allocated to mastering the processes required to perform well rather *than* (italics added) to the attainment of a specific level of performance." The above implies that learners immersed in DEL, especially if faced with a complex task, are simultaneously processing multiple sensory stimuli on two dimensions: learning new skills and performing those skills. It is quite possible to imagine that either dimension could be compromised when the number of cues, relative to the most pertinent data, may complicate the process, especially when attention is simultaneously allocated to the performance of subtasks. Thus, attention to the "right" cues becomes increasingly problematic. On the other hand, vicarious observational learners are engaged in the learning process in a different manner, with a differentiated perspective generated by their position as observers. Indeed, Boud (1994: 50) states that the VOL sequence stage of a VOL to DEL pedagogy can be productive but "there has to be an *active engagement* (italics added) of the mind of learners with the experience of others so that the learners might identify with and make the experiences of others part of themselves."

Retention processes, according to Bandura (1977), ensure that perceived stimuli are encoded into a cognitive or behavioral framework. Direct learning from experience requires simultaneous or near-simultaneous task, process, and performance cognition, potentially causing cognitive overload and leaving little room left over for codification of the information. Reduced demands in this regard provide VOL individuals with an opportunity to engage in a cognitive rehearsal process *before* actual behavioral engagement. However, cognitive biases may lead observational learners to screen out plausible alternatives essential to effective coding, while direct experiential learners may be forced to deal with uncomfortable aspects of the situation. Thus, VOL learners may behave more conservatively before directly engaging in the task than DEL learners because the former are less likely to stray from their cognitive comfort zones due to the lack of a necessity to do so.

Reproduction processes (Bandura, 1977) recall the encoded behavior or cognitive response on demand and are aided by the existing set of subskills a learning person may already possess. Slack cognitive resources potentially available to VOL learners may facilitate recall in the context of a cognitive and behavioral repertoire, while DEL learners, to the extent that they are overtaxed, may not be able to recall, reproduce, or integrate a full and effective learned response. On the other hand, direct learners may be more likely to enhance their experiential learning if they are in the presence of mentors or coaches as part of the experiential setting, thus boosting the ability to identify and reproduce complex cognitive and behavioral skills.

Finally, motivational processes speak to the importance of sufficient arousal throughout the other three processes to ensure that attention, retention, and reproduction are to occur successfully. Although the direct experiential learner may be motivated by connecting behavioral consequences in the "real time" of immersive experiences, vicarious observational learners may achieve motivation through observation of Skinnerian rewards (Skinner, 1953), while observing others' behaviors and reaping insight into both the positive and negative consequences of such behaviors. Individuals engaged in VOL may even be able to perceive subtle (e.g., nonverbal) positive or negative reinforcement cues that will help them to sort through the tasks more efficiently, which direct learners may not be able to attend to, due to greater task immersion and cognitive overload. Again, however, the vicarious observational learner may unconsciously avoid the unpleasant and attend to and reproduce only those alternatives that are inherently or immediately pleasing or rewarding, resulting in an incomplete learning experience.

While it is instructive to consider the pros and cons of VOL and DEL during the early stages of the learning process, the truth of the matter is that eventually, vicarious observational learners are expected to engage directly in a task themselves. Thus, from a practical sense, examining and assessing the efficacy of VOL processes involves more than simply learning through a single round of observation, but instead is ultimately a question of the combination of VOL followed by DEL, which represents our proposed approach here in our studies focused on enhancing management education experiential learning.

EXPERIENTIAL LEARNING THEORY

Our VOL followed by DEL approach hybridizes vicarious and direct experiences predominantly drawing upon experiential learning theory (EL; Kolb, 1984; Kayes, 2002) and most closely relates to tapping into the EL process of reflective observation. Kolb and Kolb (2005) found that learning styles of MBA students did not emphasize reflective observation as a relative "go-to" learning style as contrasted with arts students. The underreliance of reflective observation by MBAs, combined with Kolb and Kolb's (2005) emphasis on the need for learners to recursively "touch all the bases" (2005: 194) by experiencing all four of EL's processes (the other three are concrete experience, abstract conceptualization, and active experimentation), implies that there may be a need for management educators to incorporate more vicarious and observational processes into pedagogy. Indeed, the neuroscience field suggests that this dynamic, recursive EL process "arises from the structure of the brain" itself (Zull, 2002: 19), further implying a need for educators to attend to underutilized EL subprocesses. When VOL learners follow up their observations with direct experience on a task, they are more fully engaging in a closer representation of "touching upon all of the bases" of experiential learning as Kolb and Kolb (2005) suggest, versus those who do not have the potential benefit of a round of observation.

Hybridizing vicarious and direct experience mirrors one of the key tensions of Kolb's (1984; Kolb & Kolb, 2005), experiential learning model. For example, Kolb and Kolb (2005: 194) state: "learning requires the resolution of conflicts between dialectically opposed modes of adaptation to the world." Vicarious observational learning subsequently reinforced by a direct experience serves to facilitate engagement of the EL dimensions of observation, experience, and experimentation. The only piece of experiential learning explicitly missing in such a model is abstract conceptualization, which the learner may or may not engage in personally, but which can be easily leveraged into a learning module in a management education classroom or in a corporate training environment in order to provide a conceptual anchoring for the observational and direct learning experiences to follow.

INDIVIDUAL AND DYADIC PERFORMANCE

We were able to find one study in the literature focusing on a comparison of types of VOL and DEL combinations, with levels of analysis that included both individuals and groups, as does our study. Nadler and colleagues (2003) examined four training methods commonly used to improve individual negotiation skills, namely didactic learning (i.e., providing learners with principles for enhanced performance); information revelation learning (i.e., revealing all information about the task and its structure at the end of the activity); analogical learning (i.e., using an analogy as a means to better understand a novel situation); and observational learning. In their experiments, individuals first completed a negotiation exercise and then were assigned to one of the training methods above. Observational learning in particular proved efficacious relative to the baseline condition of direct experiential learning. However, their subjects each began with direct experience, so the sequencing was notably different from the current studies. For our study, we created an experimental setting wherein vicarious experiential learners observed their peers before having any experience with the activity (the VOL precedent condition) and then performed a similar exercise on their own.

At the dyadic level, complexity introduced by interpersonal dynamic processes may potentially overtax direct experiential learners. In other words, social interaction inherent to working in dyads (and groups) opens up a second dimension of learning—social learning, in addition to task learning. VOL learners, less burdened by immediate task demands, may have the capacity to be more attentive to social learning than direct learners, and to harvest social learning's benefits in subsequent task attempts. There is some empirical evidence to offer preliminary support for this argument. For example, as previously noted, Nadler and colleagues (2003) found that dyadic negotiation performance was improved when DEL was supplemented with observational learning. In addition, observational learning increased efficiency and effectiveness of a dyad's mastering of a complex physical training task (Shea, Wulf, & Whitacre, 1999). Specifically, when researchers compared efficiency and effectiveness of individual and dyad learning focusing on training protocols, they found that dyads that engaged in a VOL–DEL hybrid activity, although they initially performed poorly, eventually outperformed in all conditions (Shea et al., 1999).

Building on the findings discussed above, we believe that observation as a precursor to direct experience in a larger experiential learning framework may provide important benefits for both individual and dyadic performance. Our arguments for the efficacy of VOL to DEL sequencing are aptly summarized by Manz and Sims' (1981: 106) contention that "observers can often learn faster than actual performers of tasks that depend heavily on conceptual skill because of the latter's need to devote at least some attention to performing required responses." Our hypotheses are variants of our general thesis regarding the pedagogical value of a vicarious observational learning component across levels of analysis and degrees of performance benefit. Our (a) subhypotheses are a baseline test of VOL's *efficacy* and pose the question, "does inclusion of VOL provide any benefits to performance?" Our (b) subhypotheses are a test of

VOL's *complementarity*, in other words, "is overall performance maximized with VOL followed by DEL as contrasted with pure DEL to DEL sequencing?" Last, our most stringent (c) subhypotheses test VOL's *substitutability* with DEL and ask, "is VOL's immediate performance equal to or better than contemporaneous performance of DEL learners?"

These concepts are subject to some interpretation. For example, we operationalized the *efficacy* hypothesis as a comparison across first direct attempts on the task. Thus, if VOL is efficacious to any degree, the first direct experience with the task by VOL subjects should be superior to those not exposed to VOL. We operationalized *complementarity* as the complementary nature of VOL when added to DEL, in other words, inclusion of VOL in a learning paradigm should yield better general or overall results across task attempts in the aggregate when compared to DEL learning sequences. Last, we operationalized *substitutability* as performance in the second round between conditions. This implies that one round of VOL prepares learners equally (or more) effectively as one round of direct experience. Each subhypothesis is tested at the individual, dyad, and group levels (H1, H2, and H3), respectively.

Hypothesis 1a (Individual Efficacy): The first task attempt of those individuals initially exposed to VOL before engaging in DEL will result in higher performance than the first task attempt of those engaging immediately in DEL.

Hypothesis 1b (Individual Complementarity): The overall task performance across attempts of those individuals initially exposed to VOL before engaging in DEL will be higher than those individuals engaging in DEL to DEL learning sequences.

Hypothesis 1c (Individual Substitutability): The first task attempt of those individuals initially exposed to VOL before engaging in DEL will result in higher performance than the contemporaneous (i.e., second) task attempt of those individuals engaging immediately in DEL.

Hypothesis 2a (Dyadic Efficacy): The first task attempt of dyads initially exposed to VOL before engaging in DEL will result in higher performance than the first task attempt of those engaging immediately in DEL.

Hypothesis 2b (Dyadic Complementarity): The overall task performance across attempts of dyads initially exposed to VOL before engaging in DEL will be higher than those dyads engaging in DEL to DEL learning sequences.

Hypothesis 2c (Dyadic Substitutability): The first task attempt of dyads initially exposed to VOL before engaging in DEL will result in higher performance than the contemporaneous (i.e., second) task attempt of those dyads engaging immediately in DEL.

VOL TO DEL SEQUENCING AND GROUP SETTINGS

Although our study focuses on learning behavioral skills in a classroom setting, it is informative to examine research that has been conducted on VOL learning in groups. For example, on an organizational level, there is an extensive literature examining how companies can gain competitive advantages through vicarious observational learning (e.g., Baum, Li, & Usher, 2000; Holcomb, Ireland, Holmes, & Hitt, 2009). Literature on small group research also confirmed benefits of using vicarious observational learning (e.g., Darr, Argote, & Epple, 1995; Ingram & Simons, 2002; Kane, Argote, & Levine, 2005). For instance, both, Ingram and Simons (2002) and Darr and colleagues' (1995) studies found that teams were able to improve the quality of their work and even the pace of team learning through the process of viewing other teams. Argote and Ingram (2000) also argued that being able to learn from other teams could become a source of competitive advantage.

However, despite the presence of findings above, according to Bresman (2005), DEL approaches seem to dominate in the area of team learning. When instructors, for example, create project groups and expect them to learn about group dynamics through the group project experience, they are implicitly assuming DEL alone is sufficient for gaining such knowledge. As Bresman (2005: 4) observes, "scholars focused on the subject of team learning have tended to focus on internal learning by which a team learns its task based on team members' direct experience or 'experiential team learning.' The role of team members spanning boundaries in the team learning process has stayed in the background." In fact, Bresman's (2005) study is one of the few we have found that examines aspects of vicarious learning in teams. His overall conclusion was that vicarious learning in teams was not only different from other forms of team learning, but that it was also positively associated with enhanced team performance. Moreover, Bresman stressed the importance of learning context for improving team performance, which was also one of the key arguments in Holcomb, Ireland, Holmes, and Hitt's (2009) work on entrepreneurial learning.

In our work here, unlike Bresman (2005) and the other group studies cited, we compare a VOL to DEL group learning sequence as opposed to a DEL to DEL group learning sequence. In particular, by having the VOL condition groups observing the behavior of the DEL condition groups in the first round of DEL group activity, we were able to manifest a classroom-based experimental design that controlled learning context to a considerable extent. This is in contrast to potential problems with group comparisons in the field, since the context of field studies is less subject to control, leaving attributions of learning to VOL processes or DEL outcomes potentially ambiguous. Moreover, we believe that having an ability to control the setting, but also study group behavior, is an excellent opportunity to answer the question of whether group dynamics will affect the processes of VOL and thus influence the acquisition of behavioral skills in the same or different manner as compared to individual and dyadic processes. It should be noted that all of the study's participants knew that direct experience for all participants would follow the observational round. Adding in the fact that group assignment was done publically and randomly, groups seemed indifferent to their classification.

We hypothesize that VOL to DEL sequencing may be efficacious across levels of analysis because several of the processes and component subprocesses of observational learning (Bandura, 1977) are clearly applicable to individual, dyadic, and group interactions and tasks. Further, DEL at the group level faces yet another dimension of stimuli, namely the social complexity generated by group processes. As in the case of dyads, social complexity might have a significant impact on performance by creating cognitive overload. Thus, the general thrust of our arguments for VOL to DEL sequencing as opposed to DEL to DEL sequencing, apply to the group level of analysis as well.

Accordingly, the following hypotheses are proposed:

Hypothesis 3a (Group Efficacy): The first task attempt of groups initially exposed to VOL before engaging in DEL will result in higher performance than the first task attempt of those engaging immediately in DEL.

Hypothesis 3b (Group Complementarity): The overall task performance across attempts of groups initially exposed to VOL before engaging in DEL will be higher than those groups engaging in DEL to DEL learning sequences.

Hypothesis 3c (Group Substitutability): The first task attempt of groups initially exposed to VOL before engaging in DEL will result in higher performance than the contemporaneous (i.e., second) task attempt of those groups engaging immediately in DEL.

STUDY 1: METHODS AND RESULTS

Our sample for Study 1 included 141 individuals enrolled in an undergraduate survey course in management at a medium-sized northeastern private university. To test our hypotheses about individual and dyadic performance, we conducted a negotiation simulation of a multiple issue integrative bargaining task. The task was a part of a class module on negotiations. The students received course credit for participating and had the right to opt out if they wished to not take part in the simulation and complete a written assignment in lieu of participating. No students opted for the written assignment.

The negotiation simulation involved three rounds of closely related bargaining tasks. In round 1, half the class was randomly assigned to participate in the simulation (the DEL to DEL sequencing condition) and the other half was assigned to observe (the VOL to DEL sequencing condition). The 69 DEL students were randomly assigned a negotiating partner; the 72 VOL students were randomly assigned to observe a pair of DEL negotiators. The first round asked negotiators to agree on a three-issue package of raw materials/commodities in buyer/seller fashion; this general format was also used in rounds 2 and 3, but the number of issues and options within each issue, as well as respective profits, varied slightly by round. One of the issues was distributive in nature (i.e., zero-sum conflict, where the sides had directly opposing interests), while the other two could be traded off between the buyer and the seller for optimizing individual and joint gain. Negotiators were unaware before the exercises that tradeoffs were possible.

In round 2, all students in both experimental conditions negotiated. Each DEL to DEL condition student negotiated with a different randomly assigned DEL partner, while each VOL to DEL condition student negotiated with a randomly assigned VOL partner. The round 2 simulation involved five negotiation issues similar, but not identical, to those in round 1, with two issues being distributive in nature, two that had a possibility of a tradeoff for an improvement of an individual and joint gain, and one issue that was perfectly compatible (i.e., both sides wanted the same outcome). In the third and final round, students were again randomly assigned to a different partner within their experimental condition, again performing a five-issue simulation; however, in round 3, the number of options for each issue and the values for the issues were different from round 2. Because individuals rotated partners, each individual finished the exercise with their own individualized dyadic joint performance total (the sum of joint gains across different partners and scenarios attempted); thus, our sample size for H2 was also 141.

Variables and Analyses

Because the valuations and number of issues varied across cases, and we wanted common performance measures per student, we calculated two metrics for our dependent variables. First, for each role of each simulation, we identified the maximum amount of profit possible. Then, for each student in each case we calculated the actual profit realized as a percentage of total possible profit. This constitutes our measure of individual performance used to test H1a–H1c. Second, for each role of each simulation, we identified the optimal value for those issues that could be traded off for joint gain, and for each student in each case, calculated the actual trade-off value realized as a percentage of the optimal value. Thus, in order to test H2a–H2c, the second measure focused on the key learning aspect of the case: uncovering win–win potential and exploring mutual gain. Our independent variable was the experimental condition of a student (i.e., DEL to DEL or VOL to DEL). We ran *t*-test mean comparisons of our hypotheses with Bonferroni adjustments applied to all *t*-test results across the two studies. We also ran cross-sectional time series analyses to more closely explore the overall performance pattern predicted by H1b and H2b. In these analyses, we centered the variables and created a condition multiplied by attempt interaction term to help us compare performance improvement attributable to learning across attempts and conditions. Thus, in the regressions, the VOL term denotes overall performance improvement associated with exposure to the VOL to DEL sequencing condition; the attempt term represents the learning curve performance slope for the control (DEL only in the DEL to DEL sequencing) condition; and the interaction term represents the difference in the learning curve performance slope between VOL to DEL condition and DEL to DEL condition subjects (see Aiken & West, 1991, for details on interaction modeling).

RESULTS

Descriptive statistics and correlations for Study 1 are reported in Table 1.

Individual Performance

Our correlation data were consistent with H1a in that the VOL–DEL condition was positively associated with individual performance on the first task attempt ($r = .20$, $p < .05$). H1a was tested by way of *t*-test mean comparisons, and we found that the VOL–DEL condition was associated with greater profit realization on the first task attempt ($t = 2.43$, $p < .05$, $D = .41$) and the second task attempt ($t = 2.87$, $p < .01$, $D = .48$). Figure 1a provides graphical support for H1a as well; the first data point on the VOL–DEL line depicts greater profit

TABLE 1
Descriptives and Correlations for Study 1

		M	*SD*	1	2	3	4	5	6	7	8
1	Individual performance, Attempt 1	.58	.14								
2	Individual performance, Attempt 2	.64	.15	.35***							
3	Individual performance, Attempt 3	.64	.16	.37**	.68***						
4	Overall individual performance	.63	.10	.81***	.77***	.73***					
5	Dyadic performance, Attempt 1	.77	.13	.47***	.22**	.14	.45***				
6	Dyadic performance, Attempt 2	.80	.18	.30***	.74***	.60***	.53***	.22**			
7	Dyadic performance, Attempt 3	.80	.19	.29*	.68***	.84***	.58***	.26*	.61***		
8	Overall dyadic performance	.80	.10	.49***	.58***	.53***	.69***	.73***	.75***	.74***	
9	Vicarious learning (VOL)	.51	.50	.20*	.24**		.17*	−.11	.33***		.09

Note. $N = 141$.
* $p < .05$. ** $p < .01$. *** $p < .001$.

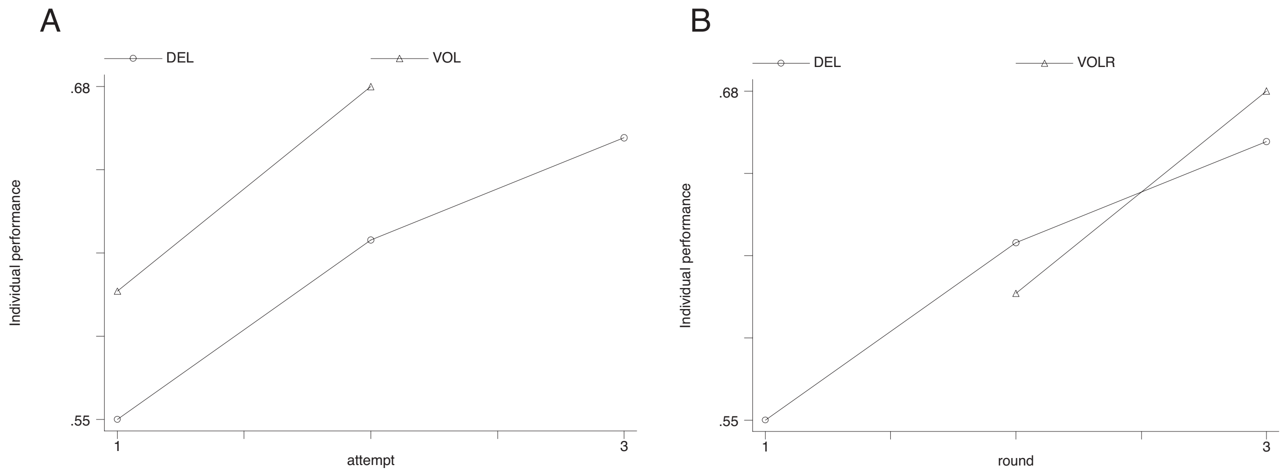

FIGURE 1
Graphs of Individual Performance by Attempt and by Round

Note. Individual performance represents percentage of maximum possible profits realized on a negotiation task, thus the learning curve follows an *upward* slope. Figure 1a shows performance by *i*th attempt (for vicarious observational learning [VOL] to direct experiential learning [DEL] learners, their first task attempt was in the 2nd round). Figure 1a is best employed to assess efficacy and complementarity. Figure 1b shows performance by round, and is best employed to assess substitutability. $N = 141$ individuals.

realization than on the DEL–DEL line. We thus conclude that VOL–DEL is efficacious at the individual level on the first task attempt, Supplementary H1a.

Our correlation data similarly were consistent with H1b and revealed that overall performance across task attempts was higher in the VOL–DEL condition than the DEL–DEL condition ($r = .17$, $p < .05$). We tested H1b two ways, through *t*-test mean comparisons and regression (see Tables 2, 3). The *t* test revealed greater profit realization across task attempts for those exposed to VOL ($t = 2.06$, $p = .06$, $D = .35$), consistent with our regression results ($b = .07$, $p < .001$). Figure 1a similarly depicts greater profit realization generally for the VOL–DEL line compared to the DEL–DEL. We thus conclude that VOL complements DEL and yields better performance across task attempts, Supplementary H1b.

Last, *t* tests were also employed for H1c, and these revealed no significant difference ($t = -.62$, *ns*, $D = -.10$). Figure 1b depicts that round 2 performance (1st attempt for VOL–DEL, 2nd for DEL–DEL) was slightly higher in the control group but the VOL–DEL group had a more pronounced learning gain in round 3. Technically, VOL–DEL could be substitutable for DEL–DEL if our findings were anything but significantly negative, but rather than test a null hypothesis, we concluded that H1c was weakly supported since neither method outperformed the other.

TABLE 2
***T* Tests of Performance and Improvement Comparisons for Study 1**

	Individual performance (H1)				Dyadic (Joint) performance (H2)			
	DEL	VOL	*t*	*d*	DEL	VOL	*t*	*d*
Attempt 1 (efficacy)	.55	.60	2.43*	.41	.79	.76	-1.34^{1a}	−.23
Attempt 2	.62	.68	2.87**	.48	.76	.85	4.10***	.69
Attempt 3	.66				.82			
Round 2 (substitutability)	.62	.60	−.62	−.10	.76	.76	−.01	−.00
Total performance (complementarity)	.61	.64	2.06+	.35	.79	.81	1.05	.18
N	69	72			69	72		

Note. VOL represents vicarious observational learning, DEL represents direct experiential learning.

N = individuals assigned to each condition. Between each attempt, negotiating partners rotated, thus joint performance is assessed at the individual level across negotiations.

T tests are Bonferroni adjusted.

[a] For attempt 1, VOL negotiated in round 2. Results for DEL in round 1 and round 2 for dyadic performance indicate that the task in round 2 was more difficult, thus the mean comparison for attempt 1 is probably biased in favor of DEL. + denotes $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

TABLE 3
Results of Cross-Sectional Time Series Regression Analysis Predicting Negotiation Performance for Study 1

Variable	Individual profits			Joint profits		
	b	*SE*	*z*	*b*	*SE*	*z*
VOL	.07	.02	3.76***	.07	.02	3.36**
Attempt	.05	.01	6.01***	.02	.01	1.60+
VOL* attempt	.02	.02	.95	.08	.02	3.73***
R^2			.11***			.06***

Note. $N = 351$ task attempts across 141 individuals. + *denotes* $p < .10$, * $p < .05$, ** $p<.01$. *** $p< .001$.
Model significance determined via Wald chi-square-tests.

Dyadic Performance

Our correlation data did not show a relationship between the VOL–DEL condition and dyadic performance on the first task attempt ($r = -.11$, *ns*). H2a was tested by way of *t*-test mean comparisons, and the VOL–DEL condition was not associated with greater joint gains on the first task attempt ($t = -1.34$, *ns*, $D = -.23$) but was on the second task attempt ($t = 4.10$, $p < .001$, $D = .69$). Figure 2a depicts these data graphically; the first data point is associated with lower joint gains on the first attempt but higher joint gains on the second attempt. Nonetheless, we could not conclude support for H2a given our "first task attempt" operationalization of efficacy.

Our correlation data revealed that overall dyadic performance across task attempts was not different in the VOL–DEL condition versus DEL–DEL ($r = .09$, *ns*) We tested H2b two ways, through *t*-test mean comparisons and regression, and these results can be found in Tables 2 and 3, respectively. While the *t* test was inconclusive ($t = 1.05$, *ns*, $D = .18$), the regression analysis revealed higher joint gains across task attempts for those exposed to VOL ($b = .07$, $p < .01$); VOL subjects also improved their performance at a greater rate ($b = .08$, $p < .001$). Figure 2a's relatively steeper slope for the VOL–DEL line compared to DEL–DEL visually depicts this performance gain. Support for H2b's complementarity hypothesis for dyadic joint gains was mixed.

Last, *t* tests were also employed for H2c, and these revealed no significant difference ($t = -.01$, *ns*, $D = -.00$). As discussed above, a nonfinding could technically be interpreted as evidence for substitutability, but rather than test a null hypothesis, we concluded that H2c was weakly supported since neither method outperformed the other.

Our findings across the H2 subhypotheses, however, come with a large caveat. The round 1 task was simpler in that it contained fewer negotiating issues and no compatible issues to discover, likely skewing our results in favor of the control group. Empirical evidence for this is revealed in that dyadic performance in the DEL–DEL condition *decreased* from .79 in attempt 1 (round 1) to .76 attempt 2 (round 2), while performance in the VOL–DEL condition increased from .76 in attempt 1 (round 2) to .85 in attempt 2 (round 3). We will discuss this at greater length in the Discussion section.

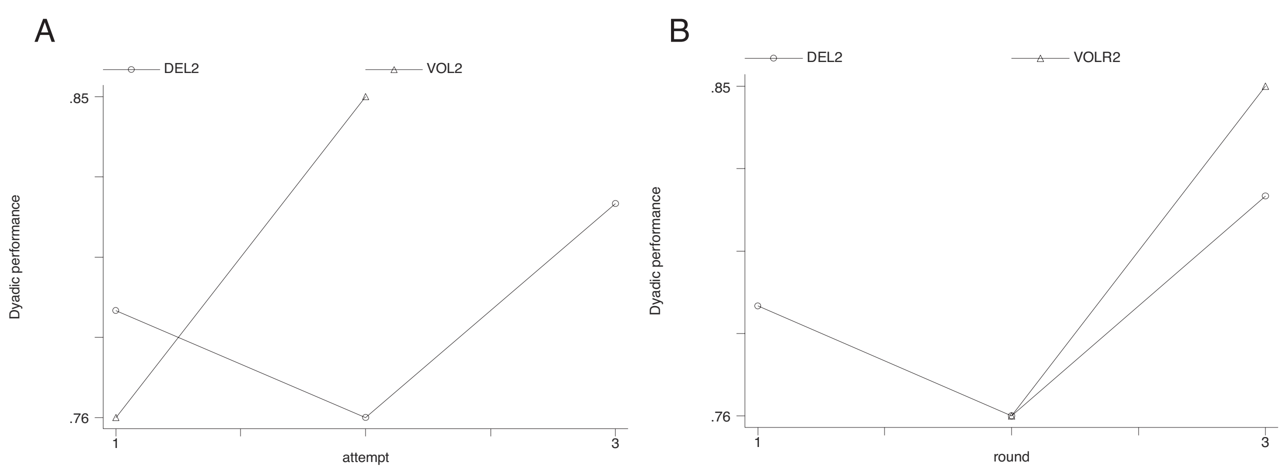

FIGURE 2
Graphs of Dyadic Performance by Attempt and by Round

Note. Dyadic performance represents percentage of maximum possible joint gains an individual realized with a partner on a negotiation task, thus the learning curve follows an *upward* slope. Figure 2a shows performance by *i*th attempt (for VOL to DEL learners, their first task attempt was in the 2nd round). Figure 2a is best employed to assess efficacy and complementarity. Figure 2b shows performance by round, and is best employed to assess substitutability. $N = 141$ individuals working in dyads and changing partners between rounds.

STUDY 2: METHODS AND RESULTS

Procedure

To test our hypotheses on the group level of analysis we used the STARFISH situational group leadership simulation. The STARFISH simulation was chosen because it both supported the larger pedagogical needs of the MBA class in which it was employed and because, as a rigidly controlled task, it also allowed us to create a controlled environment akin to a lab study. This task was presented to students as a competitive exercise in situational leadership and problem solving. Students were randomly assigned to groups and conditions. The instructions for the exercise and the description of which groups would actively perform the assigned task in round 1 (as the direct experiential learning to direct experiential learning condition groups) and which groups would be observing them (the vicarious observational learning to direct experiential learning condition groups) were given to the entire class simultaneously.

The STARFISH leadership exercise used in this group experiment is based on the internal brain functions of a starfish and consists of a communication-based timed challenge. Each group of participants receives the same list of 30 random numbers and has to identify those numbers in order following strict rules about allowed verbiage. Individual group members play the roles of starfish—head, leg, or arm in the group communication setting. The role of the leader ("head") changes after each round, as do the "arm" and the "leg" assignments. In each round only the leader can initiate speech (8 possible vocalizations are allowed), while the "arms" and the "legs" can only respond by vocalizing even or odd numbers, respectively. No hand signals, stomping of feet, writing, or physical number clues are allowed. When the leader in the head role confirms that the correct number has been vocalized, then that person moves to the next number on the list.

The competitive group exercise ends for a group in a given round when the total list of random numbers has been verified. Every group completes all rounds. The group jumping to its feet and shouting "Oyster!" in unison signals the completion of the task. When all groups have signaled a completion of the task, a 2-minute break begins before the next round (wherein the role assignments are rotated within the group) commences. The instructor informs all groups that the 2-minute break is available for the purpose of a "group strategy discussion." All rounds are timed and all group performance scores are posted at the end of each round.

Through extensive historical classroom use and analysis of the STARFISH case, we already came to the realization that peak performance most often occurred in rounds 3 or 4 and then would gradually decline due to fatigue effects. Thus, we conducted STARFISH across four rounds.

As in the case of Study 1, in the first round, half the groups were randomly assigned to the direct experience category (the direct experiential learning [DEL] to DEL groups) and actively participated in the exercise while being observed by the vicarious observational learning (VOL) to DEL condition groups. All rounds after the first round had both the DEL to DEL groups and the VOL to DEL groups participating and competing simultaneously. The lowest elapsed time scores were posted and highlighted by the instructor after each round. At the end of the fourth round, the winning team was announced. Additional details that further explicate the STARFISH exercise can be found in the Appendix.

Data and Sample

Our sample included 448 individuals in 89 groups enrolled in a graduate course in executive skills at a large southwestern public university. Each group's size was fixed at five or six members (at least one head role, two arm and two leg roles). In the three groups with six members, an extra leg role was designated, but since "legs" were required to rotate their verbalizations and speak in turn, this did not affect the group dynamics. In addition, in the very few instances where there were 6-person groups, assignments were made equally to the VOL to DEL and DEL to DEL conditions. Thus, if there was a 6-person DEL to DEL group, they were observed and matched in competition by a 6-person VOL to DEL group, which created matched samples and eliminated group size as a potential confound.

The task used for this study was a required part of a module on teamwork and leadership. Students were enrolled in 18 different sections of the course, which is required of all MBA students in this program, over a 5-year period. Over the duration of the study, six teams had to be dropped from the dataset due to factors such as significant lack of group effort, not completing the group task, or stopwatch failure. These phenomena occurred randomly, and were equally distributed across random group assignments. The module in question was administered by one instructor, with a varying cast of research assistants, thus minimizing the presence of an instructor confound.

In the STARFISH exercise, each group was timed regarding the number of seconds it took them to complete the task. The unique and intricate nature of the communication needed to achieve the task is learned as groups perform the task multiple times. Group learning is evidenced through faster completion time on subsequent trials. As part of the exercise, 41 groups engaged in the exercise immediately in the first round (the DEL to DEL groups), while 48 groups observed the DEL to DEL groups in the first round of the exercise (the VOL to DEL groups). In the second, third and fourth rounds, all groups were actively engaged in the task.

Variables and Analyses

Our dependent variable was the number of seconds needed to complete the task in a satisfactory manner, which was communicated to the instructor by the verbal signal "Oyster!" from the team. The instructor and teaching assistants used stopwatches to log the time at which the group indicated completion. Our independent variable was whether the group was engaged in the task directly in the first round (i.e., the DEL to DEL condition) or observed the direct experiential learning groups in the first round (i.e., the VOL to DEL condition) and then directly participated in the group task for the first time in the second round. As the group size was fixed at 5 or 6, and groups were assigned to conditions randomly, these were the only variables included in the analyses, which were conducted in similar manner to H1 and H2.

Results

Descriptive statistics and correlations for Study 2 are reported in Table 4. Because the group task employed time as the dependent variable, negative test coefficients and lower data points on graphs indicate support for H3. Our correlation data revealed that VOL–DEL groups performed the task more quickly on their first attempt than DEL–DEL groups ($r = -.57$, $p < .001$). H3a was tested by way of *t*-test mean comparisons, and the VOL–DEL condition was associated with faster time-to-completion on the first task attempt ($t = -6.55$, $p < .001$, $D = -1.38$). Figure 3a provides graphical support for H3a as well; the first data point on the VOL–DEL line depicts faster performance than on the DEL–DEL line. We thus conclude that VOL–DEL is efficacious at the group level on the first task attempt, Supplementary H3a.

Our correlation data revealed that group performance across task attempts was faster in the VOL–DEL condition versus DEL–DEL ($r = -.27$, $p < .05$). We tested H3b two ways, through *t*-test mean comparisons and regression. Tables 5 and 6 indicate that the *t* test ($t = -2.52$, $p < .05$, $D = -.57$) and the regression analysis ($b = -18.59$, $p < .001$) revealed superior task performance across task attempts for groups exposed to VOL. Figure 3a reveals that VOL–DEL learners consistently performed the same or better than DEL–DEL learners. We thus conclude that VOL–DEL is complementary at the group level across task attempts, Supplementary H3b.

Last, *t* tests were also employed for H3c, and these revealed that VOL–DEL learners did not perform as well in round 2 (their first attempt) as did DEL–DEL learners ($t = 2.95$, $p < .01$, $D = .63$). Figure 3b similarly shows that in any given round, DEL–DEL learners performed as well or better than VOL-DEL learners. Thus, H3 was not supported, and in Study 2, one round of observation was not fully substitutable for prior experience in predicting group performance.

DISCUSSION

Our research demonstrated that vicarious observational learning followed by direct experience (our VOL to DEL sequencing condition) can afford greater learning benefits than DEL alone in a DEL

TABLE 4
Descriptives and Correlations for Study 2

		M	*SD*	1	2	3	4	5
1	Group performance, Attempt 1	174.26	35.34					
2	Group performance, Attempt 2	134.27	28.32	.53***				
3	Group performance, Attempt 3	123.10	25.92	.39***	.60***			
4	Group performance, Attempt 4	129.25	31.79	.45**	.37*	.51**		
5	Overall group performance	142.09	23.48	.78***	.83***	.79***	.80***	
6	Vicarious learning (VOL)	.54	.50	−.57***	−.12	−.00		−.27*

Note. N = groups.
$p < .05$. ** $p < .01$. *** $p < .001$.

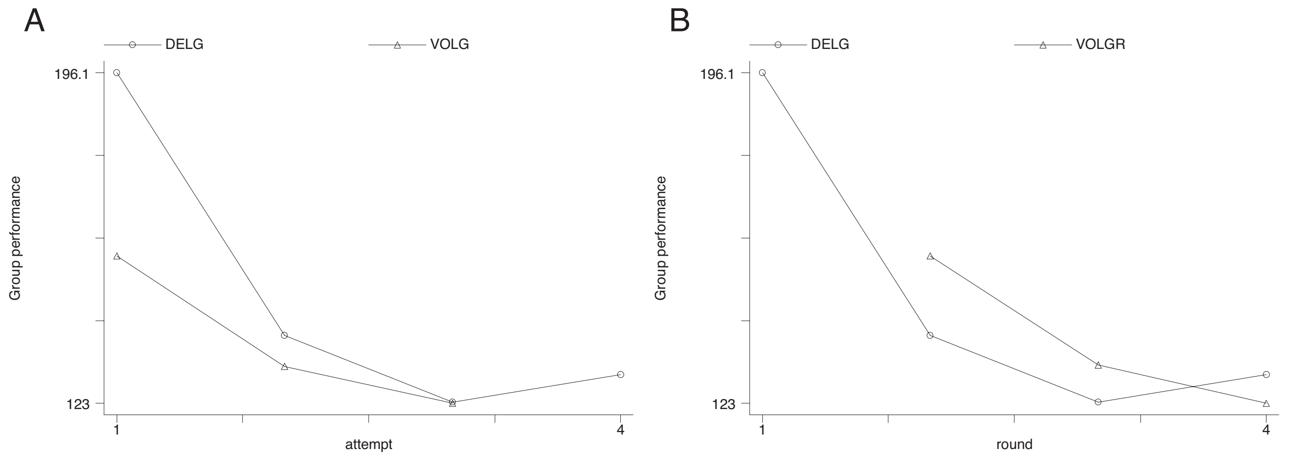

FIGURE 3
Graphs of Group Performance by Attempt and by Round

Note. Since the *y*-axis represents elapsed time to complete the task in seconds, lower numbers represent superior performance, thus the learning curve follows a *downward* slope. Figure 3a shows performance by *i*th attempt (for VOL to DEL learners, their first task attempt was in the 2nd round). Figure 3a is best employed to assess efficacy and complementarity. Figure 3b shows performance by round, and is best employed to assess substitutability. $N = 89$ groups.

to DEL sequencing format. Across the two studies, we found various instances of VOL to DEL's efficacy (better first task attempts), complementarity (inclusion of VOL showing better general outcomes across all task attempts), and substitutability (substituting VOL for DEL in round 1 yielding no worse outcomes).

Our Study 1 confirmed those arguments on an individual level. Specifically, we found that individual performance was superior for both attempts at negotiating, as well as superior across task attempts for those engaged in the VOL to DEL sequencing condition. Performance improvement was sustained at a higher rate into the final round as well. Similar findings, though mixed, were also observed for dyadic performance, although the findings for attempt 1 were skewed because the second round negotiating task proved more difficult than expected at identifying the underlying integrative structure than the first round task. Similarly, our Study 2 demonstrated that group performance was superior for VOL to DEL condition groups as compared to DEL to DEL alone groups for the first attempt, as well as overall. Furthermore, our evidence suggests that performance improvement was sustained at a higher rate into the later rounds of task performance.

We believe that results of our research carry implications for theory and practice. First and foremost, we believe that our findings contribute to the literature on experiential learning theory. In particular, our results demonstrated that the vicarious observation to direct experience hybrid sequence, compared to the utilization of direct experiential

TABLE 5
***T* Tests of Performance and Improvement Comparisons for Study 2**

	DEL	VOL	*t*	*d*
Performance				
1st attempt (efficacy)	196.1	155.6	−6.55***	−1.38
2nd attempt	138.0	131.1	−1.16	−.24
3rd attempt	123.2	123.0	−.02	−.01
4th attempt	129.3			
Round 2 (substitutability)	138.0	155.6	2.95**	.63
Overall Performance (complementarity)	147.2	136.6	−2.52*	−.57

Note. $N = 48$ for vicarious learning groups; $N = 41$ for direct learning groups.

Bartlett's test for equality of variance showed no significant variance differences across rounds by direct or vicarious learning condition. Since performance is represented by time to complete the task, lower numbers represent superior performance. *T* tests are Bonferroni adjusted.

+ denotes $p < .10$. * $p < .05$. *** $p < .001$.

TABLE 6
Results of Cross-Sectional Time Series Regression Analysis Predicting Time to Completion in Seconds for Study 2

Variable	*b*	*SE*	*z*
VOL	−18.59	4.87	−3.82***
Attempt	−22.94	1.74	−13.18***
VOL* attempt	6.66	3.01	2.21*
R^2			.31***

Note. $N = 303$ overall task attempts across 89 groups. Regression coefficients unstandardized.

*$p < .05$. *** $p < .001$.

learning alone, is an efficacious and complementary learning tool and that individuals, dyads, and groups exposed to VOL to DEL sequencing generally perform better on a given *i*th attempt at a task as compared to those who had only been exposed to DEL to DEL sequencing. We feel that these results allow better understanding of the experiential learning concept of reflective observation, highlighting the complexity and possible interplay between reflection-in-action and reflection-on-action approaches. Finally, we believe that both scholars and practitioners should revisit widely held taken-for-granted assumptions, such as the popular proverb "there is no substitute for experience." Our research indicates that under some circumstances, observation may indeed be a valid substitute for experience, and in other circumstances observation can complement experience such that it plus experience yields even better learning and performance.

Another possible advantage of a VOL to DEL sequencing program was observed in Study 2, where utilizing the DEL to DEL sequencing produced results wherein group performance regressed from round 3 to round 4. This finding suggests that the early and continuous direct task exposure of DEL to DEL sequencing may have contributed to earlier boredom or fatigue effects for the DEL learners. Such a problem was not observed with VOL to DEL sequence learners, leading us to believe that this sequence introduces task variety into the learning mix, and thus possibly hedges against learner boredom or fatigue effects. Our summary conclusion is that the combined findings of Study 1 and Study 2 demonstrate circumstantial advantages of the VOL to DEL sequencing condition as a pedagogical tool.

Relationship to Behavior Modeling Training (BMT)

As was discussed at the beginning of the paper, BMT has some characteristics and components that resemble the VOL to DEL sequencing condition examined in this research (Taylor et al., 2005). For example, BMT begins with a presentation of learning models and concludes with implementation of acquired skills. VOL to DEL sequencing, as implemented in this study, begins with watching task performers without a preassigned script for the observational role, and concludes with DEL task performance. While these patterns are roughly parallel, there are considerable differences in both scope and scale between the two pedagogical approaches.

As utilized in our research design, and as we conjecture that it would be used in application in the management education classroom, the VOL to DEL sequencing paradigm can be utilized either in its entirety—in the framework of a total learning experience—or as separate component, depending on the skills being applied, the characteristics of the classroom, the limitations of the educational system, such as class scheduling, and any other constraints or opportunities that could cause a management educator to make VOL and DEL hybrid application productive (see additional discussion below for examples). In contrast, behavior modeling training, as described by Taylor and colleagues (2005), has formal program components that are designed to function as part of the total and comprehensive BMT program application. Specifically, BMT program components (1) represent formal presentation of learning models (often teaching how to do or not to do a task); (2) allow time for rehearsals; (3) require hours of training; and, (4) use enhancers to facilitate skill transfer to the workplace. A VOL to DEL sequencing application, in contrast, has no overall formal learning model presented, no time for formal rehearsal or training, and no enhancers. Instead, VOL to DEL sequencing relies more on the intrinsic rewards inherent in the learning process itself.

Thus, while BMT expands on many aspects of social learning theory and clearly relates to various aspects of experiential learning, observational learning, and even behaviorally based pedagogies (Hoover et al., 2010), our studies here do not share the whole set of BMT characteristics, and thus, are not directly comparable. Instead, the VOL to DEL sequencing approach, at least in this research, is focused on what might be labeled as "quick" behavioral skill acquisition, facilitated by a close tie-in to the direct experience component that immediately follows the vicarious observational learning component. When we frame this approach as a VOL and DEL hybrid, the flow of the learning is from vicarious to direct experiences. However, since VOL and DEL occur contemporaneously as part of the same total learning module, we view them simply as component parts of the same experiential learning exercise.

Since we believe that meaningful management education requires a significant cognitive, intellectual element, the skill acquisition exercises employed in this research begin with the establishment of a cognitive framework as a component of the skill learning targeted. We believe many educational and workplace situations require or provide opportunities for quick knowledge acquisition with minimal or no pedagogical or training context available except a simple observation of a behavioral task. Because BMT specifically calls for extensive rehearsals, training, and enhancers (presumably extrinsically provided), it is qualitatively different from our VOL and DEL sequencing approach to management education in the classroom.

Another important distinction needs to be made regarding interpreting our findings; specifically, whatever other classroom elements present in administering a graduate course that might have tended to emulate some aspects of BMT, these were available to both our treatment and control subjects. Our findings were derived from an experimental design, with the only notable difference between conditions being one round of vicarious observation. Thus, our findings cannot be attributable to BMT's approach or a condensed application of it, but solely to vicarious observation. Finally, our findings may stimulate research on boundary conditions of BMT, as our research implies that much less structure and formalization than that present in BMT is needed to obtain substantive benefits of observational learning.

Experiential Learning Theory Implications

Since the literature and practice of experiential learning is dominated by DEL paradigms, it would appear that experiential learning theory (EL) largely rests on the premise that DEL task performers can "hit the ground running." In addition, EL seems to be operating on the assumption (examined or not) that the errors linked to immediate task engagement are either inconsequential or not costly at a significant level. Our research results suggest that adding VOL to DEL for some challenging tasks can enhance subsequent DEL task performance by adding "insight in advance of action" to the learning mix.

The eventual decision to adopt a VOL to DEL learning sequence as opposed to a DEL to DEL or DEL alone paradigm, could boil down to a cost–benefit analysis. The issue would be the risks and costs associated with errors and suboptimal performance in the early stages of direct experiential learning, plus possible earlier onset of boredom and fatigue effects assessed, against the cost incurred of time spent in a vicarious observational mode. Our findings indicating performance benefits for individual negotiation, dyadic negotiation and group performance—not only in the first round of action, but also in subsequent rounds—would argue for the wisdom of such cost–benefit analyses, perhaps leading to increased adoption of VOL-influenced learning models.

Perhaps future research could also investigate the benefits of VOL in simulation-based training (Salas, Wildman, & Piccolo, 2009) as well. Another benefit of employing VOL could derive from viewing observation as possessing skill components; in other words, it is likely that people can learn to be more effective observers through experience with observation itself. Particularly given that MBA students may underattend to this learning process (Kolb & Kolb, 2005), increased use of observation might lead to better organizational learning and problem solving across a wide array of organizational contexts.

In our experimental conditions, vicarious observation preceded direct experience. This is a potentially powerful combination when the learner knows that the VOL experience will be followed by a DEL application (a common assumption in training programs and in skill development exercises in a management education classroom). Initial vicarious experiences benefit from the observational aspects of VOL, since VOL is better than DEL at separating the "wheat from the chaff" at the attention stage. In addition, the knowledge of and the impending immediacy of the DEL ahead may counteract a potential VOL weakness, such as the human tendency to pursue only that is seen as pleasing or immediately rewarding, by providing a clear understanding of the challenges ahead.

That said, DEL followed by VOL could also be an efficacious application of the hybrid concept, although one that is outside the scope of the current research. One of the suggestions for future researchers interested in testing this hypothesis could be employing the STARFISH exercise used in our Study 2 (or a similar skill exhibition exercise such as negotiation, group collaboration, conflict management, or communication) with a different sequencing. For example, the steps would be (1) set the cognitive base of the exercise, (2) conduct a round of vicarious observational learning before direct experience, (3) go into skill development activities by way of DEL to DEL processes, (4) videotape the eventual best performance or winning team from the DEL skill application rounds, and then, (5) show the highest level of attained performance to all learning subjects by way of another vicarious observational learning round. Such a VOL to DEL to VOL cycle might maximize the benefits of both DEL and VOL. In addition, the highest demonstrated skill level attained by way of the DEL rounds, then observed by all in the final stage, could become a consensus-based benchmark or standard of excellence for subsequent behaviors.

Our studies also inform Bandura's (1977, 1986) observational modeling framework. While we did not directly test its four subprocesses, our predictions extrapolated from the model were generally supported. We found evidence of DEL to DEL groups struggling with the complexity of the STARFISH task in Study 2, particularly with their first task attempt, consistent with our arguments that the bombardment of stimuli in DEL environments may overwhelm learners, while vicarious observational learners have the potential to gain understanding without simultaneously being loaded with task burdens. On the fourth task attempt, performance of the DEL to DEL individuals regressed somewhat, providing potential support for the importance of motivational processes in sustaining learning and performance argument. In Study 1, the nuanced and nontransparent nature of integrative bargaining and trading off issues for mutual gain was readily "picked up" by our VOL condition subjects, suggesting that they attended to, retained, and were able to reproduce nonobvious behavior. Indeed, their superior performance in round 3 suggests the complexity of this skill may possibly be harder to obtain through DEL than through the perspective provided by VOL.

As a final point of our discussion of theoretical implications of our research, our findings are also supportive of the learning skills model developed by Boyatzis and Kolb (1991). Simplifying for the purposes of discussion, Boyatzis and Kolb's model contained three stages of progression in learning skills—the cognitive stage, the associative stage, and the autonomous stage. The cognitive stage included initial encoding that facilitates approximations of skilled behaviors. Our findings that VOL to DEL sequence learners performed better on their first behavioral attempt suggests they benefit from selective observation and the lack of potential distractions produced by behavioral immersion that could confound attentional focus. In Boyatzis and Kolb's associative stage, performance is enhanced by the capacity to smooth out errors. Direct experiential learning performance on round 1 of Study 2 provides an example of the magnitude of potential costs and risks of trial-and-error learning. The final stage of the Boyatzis and Kolb model is the autonomous stage, wherein continual performance occurs. The overall superior performance profile of vicarious observation followed by direct experience, particularly in later task attempts, suggests that VOL to DEL sequencing allows for internalization of performance.

With regard to practical implications, our findings suggest that companies can employ VOL as a substitute for or complement to DEL, whenever expenses associated with a round of observation are offset by obtaining compatible or superior benefits. As VOL helps to move learners through the initial stages of learning that carry the greatest challenges and where the learning curve is at its steepest, both the psychological and physical costs associated with DEL can be reduced. Moreover, since VOL is typically an inexpensive activity, realizing improved performance levels over time can indicate organizational cost savings or risk exposure avoidance in skill acquisition activities (e.g., formal or on-the-job training) with few offsetting performance or productivity disadvantages.

Last, educational practitioners can apply our findings by increasing their use of "fishbowl" exercises, where some students engage in role-play simulations, while others observe vicariously. However, our studies imply that fishbowl activities might facilitate learning best when supported by a subsequent round of direct engagement in the role-play. Related applications, such as viewing previous students engaging in a role-play by way of video, not only are representative of VOL, but also are amenable to distance and on-line learning. However, our research did not directly test video observation, so media differences in learning acquisition should be considered accordingly.

LIMITATIONS AND FUTURE RESEARCH

In addition to a number of important implications of our research, there are some potential limitations to our study methods and findings. As with all experimental research, generalizability could be a concern. This is why we conducted two studies of different tasks using two different samples, and across different levels of analysis, with the negotiation task and the STARFISH task at opposite poles of the conflict/cooperation axis underlying McGrath's (1984) task circumflex. Since our findings were robust across radically different task types, they might extend to other task types as well. Our pattern of findings across individual, dyadic, and group levels of analysis similarly suggest they might generalize to other settings. At a minimum, our findings should warrant further confirmatory research in different contexts.

Our dyadic finding for attempt 1 appears on the surface to contradict our other findings in that DEL joint gains were nominally higher than the VOL condition. However, the performance of DEL negotiators actually declined from their first to second attempts, strongly suggesting that the addition of two extra negotiating issues for the round 2 task (i.e., the 1st attempt for VOL learners) made integrative agreements more difficult to realize than in round 1 (i.e., the 1st attempt for DEL learners). Because of this, the first attempt for DEL negotiators constituted an easier task relative to the first attempt for VOL negotiators. Such interpretation is also supported by the finding that both DEL and VOL negotiators realized 76% of joint profits possible in round 2, despite round 2 representing the *second* attempt for DEL negotiators, but only the *first* attempt for VOL negotiators. This shows that VOL was substitutable for DEL in round 2. Moreover, if we assume DEL is an efficacious learning method, then VOL should be viewed as efficacious as well. An alternative explanation for this finding is consistent with our arguments that DEL learners are overburdened as task and social complexity increase, since we saw that DEL learners improved their individual performance, but regressed in their dyadic outcomes in round 2, potentially signifying that they learned the wrong thing (i.e., paid attention to irrelevant details, for example) or at least learned insufficiently from the first task attempt, while in the midst of completing the actual task.

Third, the seeming simplicity of the STARFISH exercise could be seen as a boundary condition for Study 2. The allowed verbiage and the task itself (deciphering a list of numbers) were kept purposefully simplistic. This allowed for tighter control of the range of possible behaviors exhibited in the group for experimental testing purposes. For classroom education applications, the exercise was designed to be done within a 1-hour class period. Eliminating many possible verbal cues forced the groups to identify and then adopt nonverbal communication strategies. For example, a common solution was to use direct eye contact to identify the arm or leg that was to speak next. Another solution saw the group leader leaning forward to ask for an odd number response and sitting bolt upright to ask for an even number response. With multiple rounds of practice preceded by strategy sessions, it took most groups three or four rounds to identify, implement, and hone the skills necessary for the lowest possible elapsed time. This task was a significant challenge for the groups even with the simplistic performance task, and was further complicated by the fact that the roles rotated in each round, and thus, the group had a new leader in every round. We believe future studies should also consider the workplace as a research setting, since vicarious observational learning is an important aspect of training, particularly on-the-job training. More elaborate interventions with respect to complex sequences of vicarious observational and direct learning might be considered by future researchers, as might different methods and media delivery (i.e., videos), along with varying lengths of vicarious observational learning to see whether and at what point concerns over boredom effects may be justified.

CONCLUSIONS

While applications of DEL to DEL models are innumerable, applications of a VOL component in the literature of management education and development are somewhat rare (Gosen & Washbush, 2004). However, the applications of VOL components that do exist, including this study, demonstrate the potential breadth and depth of VOL approaches. Let us be clear and state that we are not advocating that vicarious observational learning should be considered as a complete replacement for direct experience. We are saying that VOL processes can function quite effectively as a complement to DEL, especially in the creative design and application of VOL and DEL hybrids.

In addition, we do not feel that VOL to DEL sequencing operates as a panacea that might cure the ails or overcome many of the potential challenges of experiential learning. Experiential learning does not occur in a vacuum. It is immersed in a web of challenges, including psychodynamic challenges (Kayes, 2002). It is possible, however, that the unique advantages of the VOL characteristic of observation could afford advantages that would allow for heightened processes of identification of psychodynamic variables so that they could be addressed more readily. Moreover, especially in cases where vicarious observational learning precedes direct experience, the emotional detachment of observation, as opposed to the emotional immersion related to direct experience, could function to lessen the probability of the manifestation of learning inhibitors. Such an outcome could serve to lessen concerns expressed by Kayes (2002) and others (Reynolds, 1999; Vince, 1998) relative to the possible emergence of denial and learning avoidance behaviors in experiential learning processes.

In closing, we would like to observe that learning comes down to the capacity of the focal individual, at some point, to exercise the newly acquired knowledge at will. As Bandura (1969) has noted, transferring skills and gaining insight are vital educational objectives. The bottom line is the ability to garner the consequences we desire as management educators. VOL processes and VOL to DEL sequencing represent pedagogical tools with perhaps greater potential than management educators have realized and exploited to date. We believe that VOL, and more elaborate VOL and DEL hybrids, should be looked at more carefully, especially given the relative efficiencies of using observational media with larger groups, as opposed to simply individualized applications or use of DEL alone. The continuing evolution of distance learning and the Internet classroom make an examination of the relative efficacy of VOL processes and a VOL to DEL sequencing approach even more of a potential benefit for management educators.

APPENDIX

Flow of the STARFISH Experiential Learning Exercise

1. The cognitive base of the exercise is established by giving the information on starfish characteristics, group decision making and situational group leadership to all participants.
2. Groups of five or six people are formed randomly.
3. At random, half of the groups are then designated as direct experiential learning (DEL) groups; these groups perform the task during round 1. The remaining groups are designated as vicarious observational learning (VOL) groups; these groups observe the performance of the direct performance groups in the first round, but do not engage in the performance task themselves.
4. At random, a starfish Head is chosen and designated as the DEL group leader for round 1.
5. The individuals on the DEL group leader's immediate right and left are designated as starfish Arms.
6. All remaining group members are designated as starfish Legs.
7. Group role assignments are designated visually by placing a name placard (Head, Arm or Leg) in front of each person.
8. After the rules for speaking in the exercise are explained, each starfish Head is given the same list of 30 random integers (0 to 9). No other group member can see the list of numbers.
9. At a "go!" signal, each group deciphers the list of 30 numbers (which only the Head can see) in order, utilizing the STARFISH speaking rules. The goal is to perform this task as quickly as possible, and to be declared the winning group for the round.
10. Upon completing the list, the entire group jumps to their feet and shouts "Oyster." The elapsed time of all groups is then recorded by the facilitator.
11. The round continues until the deciphering of the list is completed by all groups.
12. The groups' elapsed times are posted immediately at the completion of each round for all groups to see, and a round winner is declared.
13. In rounds 2, 3 and 4, all groups (both DEL and VOL) perform the task.
14. All scores for all groups are immediately posted after each round. The posted data allows for (a) the winner of each round to be identified (as well as the team that finishes last); (b) comparisons between the DEL and VOL groups; and (c) identification of a positive learning curve as group times decline from round to round.
15. After each round, all within-group roles are reassigned to new individuals by rotating the name placards Head, Arm, and Leg one position to the right. As a result, the group leadership role of Head rotates within the group, with each impending leader knowing when their turn will arise.
16. Groups are given 2 min. (timed and enforced) to strategize before the start of each round, including the first round. This creates a pattern of strategy, followed by action, followed by strategy, followed by action, and so on throughout the session.
17. After the strategy meeting period is over, a different list of 30 random integers is given to the new group Heads at the beginning of each round.
18. Rounds continue until round 4 is completed. If the groups are limited to five members, a four-round exercise allows all but one of the group members to function as the Head in the group leader role.

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