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A study of the validity and reliability of the Distraction Scale: A psychometric evaluation

Jianzhong Xu [a,*], Xitao Fan [b], Jianxia Du [b]

[a] Mississippi State University, United States
[b] Faculty of Education, University of Macau, China

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ABSTRACT

The goal of the current study is to evaluate psychometric properties of the Distraction Scale based on 866 teachers. Our findings from confirmatory factor analyses (CFA) supported the existence of two separate, yet related subscales for the Distraction Scale: conventional distraction and tech-related distraction. Regarding the concurrent validity evidence of the Distraction Scale, results indicated that, in line with theoretical expectations, these two subscales were positively related to avoidance and performance goal orientations. Furthermore, these two subscales were negatively associated with mastery goal orientation, interest in learning and using information technology, expectancy belief, and value belief.

1. Introduction

Distractions are almost unavoidable during goal-oriented learning activities [15,58]. They typically include television, phone calls, background conversations, day-dreaming, feelings of restlessness, and thoughts about other leisure-time activities [12,42,57,60,65].

Over the last decade, the concern over distractions has reached a new height, as the proliferation of new media technology (e.g., IPads, cell phones, and laptops) creates ever-growing webs of distraction to goal-oriented academic tasks [19,28,45,48,49,63]. For example, in the study by Foehr [26] with 694 students in grades 3–12, students were found often engaging other activities such as using e-mail and text messaging (65% of the time) while working on homework assignments on their computers.

In another study with 1026 college students, Jacobsen and Forste [37] found that 62% of participants used nonacademic electronic media (e.g., texting and e-mail) while studying, doing homework, or attending class. In addition, the use of electronic media was found to be negatively associated with academic performance, a finding that is in line with other related results that the use of new media technology during study and homework sessions (e.g., texting) is related to undesirable outcomes (e.g., lower GPAs or taking more time to complete assignments [34,48,59]).

One theoretical framework pertaining to distraction is relating to dual attentional processes [14,66]: (a) top-down (goal-driven) attention when our mind voluntarily set to concentrate on a target activity, and (b) bottom-up (stimulus-driven) reactive attention when our brain reflexively tunes in to or redirected by novel or unexpected external stimuli. Due to the brain's physical limitations, attentional capacities are limited (i.e., a finite resource). Thus, dividing attention among different tasks can impair performance [9,35,41].

* Corresponding author at: Department of Counseling, Educational Psychology, and Foundations, Mississippi State University, P.O. Box 9727, Mississippi State, MS 39762, United States. Tel.: +1 (662) 325 2186; fax: +1 (662) 325 3263.
E-mail addresses: jx18@colled.msstate.edu (J. Xu), xtfan@umac.mo (X. Fan), jianxiadu@umac.mo (J. Du).

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Stimulus-driven attention is affected by the properties of the external stimuli (e.g., texting) and the ongoing target activity (e.g., learning information technology), along with individual variables (e.g., goals and motivations [8,35,31,41]). Regarding the properties of external stimuli (i.e., the distractor) and the target activity, several researchers (e.g., [14,41]) posited that stimuli that are novel, salient, and conspicuous, change over time, are more likely to lure attention away from the target activity, particularly when the target activity requires mental effort. Thus, new media technology related distraction is likely to be categorically distinct from conventional distraction, due to its novelty [8], its visual stimulation (e.g., attraction and movement [25,28]), and its ongoing and seamless invasion of play, work, and human interaction [19].

As goal-oriented learning activities typically require mental effort and volitional control [15]. Switching to new media technology (e.g., texting) thus presents a quick, easy, and appealing outlet for escaping from a learning activity [11] and for fast-paced, instant gratification [48]. For instance, a text exchange with a peer may become an appetitive activity that produces positive affect (e.g., satisfying the desire for social connection [19]). Consequently, compared with conventional distraction, tech-related distraction presents a novel challenge for individuals, in that it provides an easy outlet for escaping from task frustration and for relieving boredom, for obtaining immediate gratification, or for satisfying the emotional need for social interaction [19,45,48]. Over time, individuals may be habitually "wired for distraction" in that they may find themselves being drawn into or seductively pulled toward tech-related off-task behaviors (e.g., texting or posting something online [1,45]).

It is intriguing to note, however, that little attention has been paid to systematically investigate whether tech-related or new media technology related distraction can be empirically distinguished from conventional distraction. One rare exception to the lack of attention is one study by Xu [63], in which he examined students' distraction in math homework, based on the data from 1799 high school students in China. CFA was carried out on the scores of six items concerning conventional and tech-related distractions. Results indicated that, compared with the one-factor model (*CFI = .874; SRMR = .050; *RMSEA = .159; 90% CI = .146–.172; asterisk indicating robust statistics), the two-factor model yielded a much better fitting to the data (*CFI = .983; SRMR = .020; *RMSEA = .062; 90% CI = .048, .077). Therefore, conventional and tech-related distractions as two conceptually distinct constructs were founded to be empirically distinguishable for high school students. Regarding the concurrent validity evidence, these two subscales were positively related to the frequency of coming to class *without* math homework assignments and negatively associated with math homework completion, in line with theoretical expectations.

Taken together, these findings suggest the homework distraction scale is factorially valid means of measuring high school students' homework distraction. The scale has the potential to become a scale of distraction for teachers during their goal-oriented learning activities (e.g., learning and using information technology) as its items are not high school specific. This line of investigation is important, as the previous research on conventional distraction (e.g., television) tended to focus on elementary and secondary school students [5,12,42,64]. Meanwhile, more recent research on tech-related distraction (e.g., texting) has been largely limited to college students [8,11,34].

Yet, distractions are known to take place during learning phases [51,58]. It is not surprisingly that teachers too can be easily distracted while trying to keep their professional knowledge and skills up to date (e.g., peripheral chat, side discussion, family members, telephones, and pets [18,33,40]). Indeed, it can be argued that teachers may face a unique challenge in this regard, as observed by Hunzicker [33]:

> Even when we are very interested in the topic, we can be easily distracted. Not only is it difficult to be away from our classrooms for an entire day, it can be agonizing to sit still and listen for long periods of time. We are accustomed to being on our feet, talking when we want to, and moving around our classrooms at will.
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> [(p. 177)]

It is surprisingly to note that, however, that there have been few attempts to systematically examine the types of distractions that teachers face in their professional learning and development. This is a particular concern, as new media technology presents expanding webs of distraction (e.g., texting) to goal-oriented activities (e.g., professional learning [19,28,48,63]).

Therefore, the goal of the present study is to evaluate the psychometric properties of the Distraction Scale for kindergarten teachers in the context of learning and using information technology. Specifically, the purposes of the current investigation are threefold: (a) to examine the factor structure of the Distraction Scale for Chinese kindergarten teachers using CFA, (b) to evaluate internal consistency for the Distraction Scale, and (c) to assess the concurrent validity evidence of the Distraction Scale by measuring the relationships between the Distraction Scale and multiple theoretically grounded measures (goal orientations, interest, expectancy belief, and value belief).

Our justification for studying kindergarten teachers in the context of learning and using information technology is as the following. More children are being exposed to new media technology at increasingly younger ages [46,53]. The gadgets such as tablets and IPads are appealing to young children and may foster learning and development in school and at home (e.g., using video, audio, and drawing applications [16]). Not surprisingly, learning and using information technology is increasingly viewed as an important part of being a kindergarten teacher across different countries. This is, for example, reflected in the position statement regarding technology and young children from National Association for the Education of Younger Children and, more recently, in the Professional Standards of Kindergarten Teachers by Chinese Ministry of Education [55].

Yet, younger children are more vulnerable to distraction than older children [4,13]. Thus, it becomes increasingly important for kindergarten teachers themselves to cope with distractions associated with learning and using